

# Adolescents' fears of violence in transit environments during daily activities

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**Safety in Transportation Environments, KTH, Stockholm**

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# Adolescents' risks in transportation environments

- Public transportation provides mobility and travel possibilities to individuals worldwide and is used by people of all ages and walks of life.

- 10.4 billion public transportation uses in the US in 2011.

American Public Transportation Association 2012

- Many municipalities, community organizations, and transportation agencies host education programs to teach children to take public transportation safely.

Family Education Network 2013; METRO LACMTA 2013; TRIMET 2013

- Risk of unintentional injuries, e.g., struck by traffic while boarding/alighting a bus, losing balance on a trolley during abrupt starts and stops.
- Risk of assault, or fear about the potential to be assaulted, warrants attention.

# Research on youths' fear in transportation environments

- Youth interviewed in Philadelphia USA, 55% felt unsafe between home and school.  
Lalli and Savitz 1976
- Students interviewed in Philadelphia USA, concerned about being assaulted or robbed when walking to and from school.  
Savitz, Lalli & Rosen 1977
- National survey of US students, fear during travel to school was common.  
Alvarez & Bachman 1989
- National survey of US youth, 11% were fearful of violence travelling to/from school.  
Bachman, Randolph & Brown 2005
- Web-based surveys of 13 year-old students in Stockholm, fear of neighborhood conditions impacts mobility.  
Johansson, Hasselberg & Laflamme 2010
- 13-14 year-old students in Stockholm, mobility and school commute affected by fear.  
Johansson, Hasselberg & Laflamme 2010
- National survey of US students, fear lower in car, higher in public transportation, during travel to school.  
Pearson & Toby 1991

# Objective

- Examine whether and how adolescents' perceptions of safety from risk of being assaulted varies based on modes of travel during daily activities
- Examine whether perceived safety differs between daytime and after-dark hours
- Study design: cross-sectional time series
- $H_0$ : Adolescents' perceived safety while travelling does not vary by transportation mode, controlling for age, companions, environmental conditions, and time of day.

# Space-Time Adolescent Risk Study



School of Medicine  
School of Nursing  
School of Arts and Sciences  
School of Social Work  
School of Engineering & Applied Science  
Children's Hospital of Philadelphia

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National Institute of Child Health & Human Development (R01AA014944)

Graphic provided by The HELP Network, Chicago

## Design of parent study

Population-based case-control study

## Recruitment

Case subjects: hospital ER

- Screening by Academic Associates
- Interviewing by full-time project staff
- Interview takes place in ER, on hospital ward, home, or research office

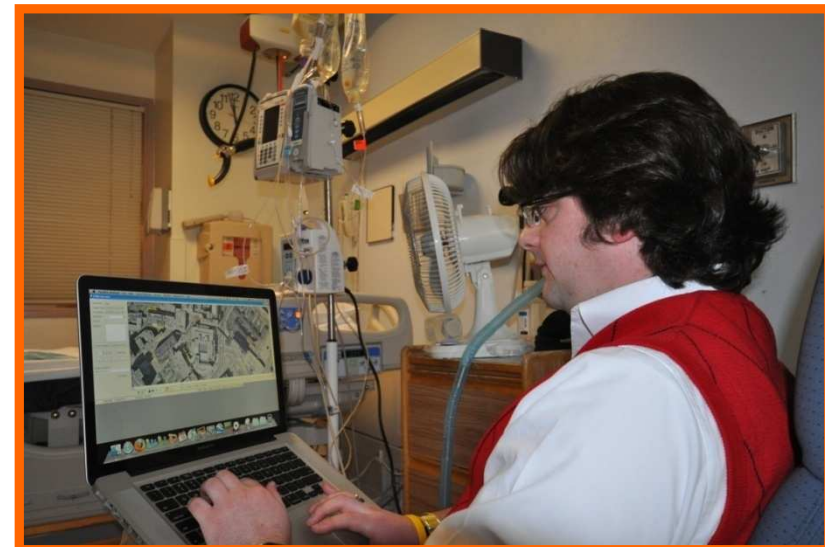
Control subjects: community

- Screening via RDD (random digit dialing)
- Interviewing by full-time project staff
- Interview takes place at home or research office

## Design of current study

Cross sectional analysis of control subjects' activity pattern data

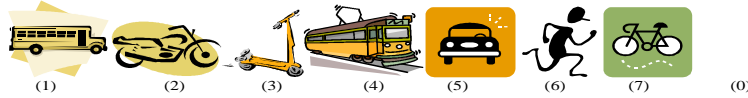
Descriptive statistics, parametric & non-parametric tests, mixed effects regression





Time
6:00 am
6:10
6:20
6:30
6:40
6:50
7:00 am
7:10
7:20
7:30
7:40
7:50
8:00 am
8:10
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GO TO NEXT PAGE

How are you getting around? Here are some examples. Others?



What are you doing? Anything else?



How safe do you feel?

On a scale of 1-10, how safe do you feel?

10 FEELING VERY SAFE  
1 FEELING VERY UNSAFE



10  
9  
8  
7  
6  
5  
4  
3  
2  
1



Are any of these things involved? Anything else?



Who are you with? Family, Friends, Girlfriend, Boyfriend, Someone you don't like, anyone else?



Interview ID: grant1  
 Creation Time: 11/6/2008 1:21:09 PM  
 Last Update: 11/6/2008 2:22:24 PM  
 Interviewer: Luke  
 Closed?:   
 Remarks:

Delete Interview Add New Interview

8 of 9 Interviews  
 << < > >>

Search for Address:  
 3400 SPRUCE ST  
 Find Address



View: Detail Street Aerial

PathSeqID	DateAndTime	TransMode	Remarks	Activity	Safety	Weapon	Substance	Companion	IsIndoors	IsPointOfInjury
1	10/24/2008 07:00:00 AM	None	at home	waking up	10	none	cigarettes	mom, sister, cousin	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	10/24/2008 07:15:00 AM	None	at home	eating breakfast, getting ready for school	10	none	cigarettes	mom, sister	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	10/24/2008 07:30:00 AM	On Foot	leaving for school	walking	7	none	none	None	<input type="checkbox"/>	<input type="checkbox"/>
4	10/24/2008 07:31:00 AM	On Foot	walking to bus	walking	7	none	none	none	<input type="checkbox"/>	<input type="checkbox"/>
5	10/24/2008 07:32:00 AM	On Foot	walking to bus	walking	7	none	none	none	<input type="checkbox"/>	<input type="checkbox"/>
6	10/24/2008 07:32:30 AM	On Foot	walking to bus	walking	7	none	none	none	<input type="checkbox"/>	<input type="checkbox"/>
7	10/24/2008 07:33:00 AM	On Foot	walking to bus	walking	7	none	none	none	<input type="checkbox"/>	<input type="checkbox"/>
8	10/24/2008 07:34:00 AM	On Foot	walking to bus	walking	6	none	Alcohol	some guys	<input type="checkbox"/>	<input type="checkbox"/>
9	10/24/2008 07:35:00 AM	On Foot	walking to bus	walking	5	none	Alcohol, marijuana	guys on corner	<input type="checkbox"/>	<input type="checkbox"/>
10	10/24/2008 07:35:30 AM	On Foot	walking to bus	walking	5	none	alcohol, marijuana	guys on corner	<input type="checkbox"/>	<input type="checkbox"/>
11	10/24/2008 07:36:00 AM	On Foot	walking to bus	walking	6	none	marijuana	guys	<input type="checkbox"/>	<input type="checkbox"/>
12	10/24/2008 07:38:00 AM	On Foot	walking to bus	walking	7	none	none	none	<input type="checkbox"/>	<input type="checkbox"/>
13	10/24/2008 07:39:30 AM	On Foot	walking to bus	walking	7	none	none	none	<input type="checkbox"/>	<input type="checkbox"/>
14	10/24/2008 07:40:13 AM	None	waiting for bus	standing	7	none	none	couple people	<input type="checkbox"/>	<input type="checkbox"/>
15	10/24/2008 07:50:00 AM	SEPTA Bus	on bus	Sitting	9	none	none	passengers	<input type="checkbox"/>	<input type="checkbox"/>



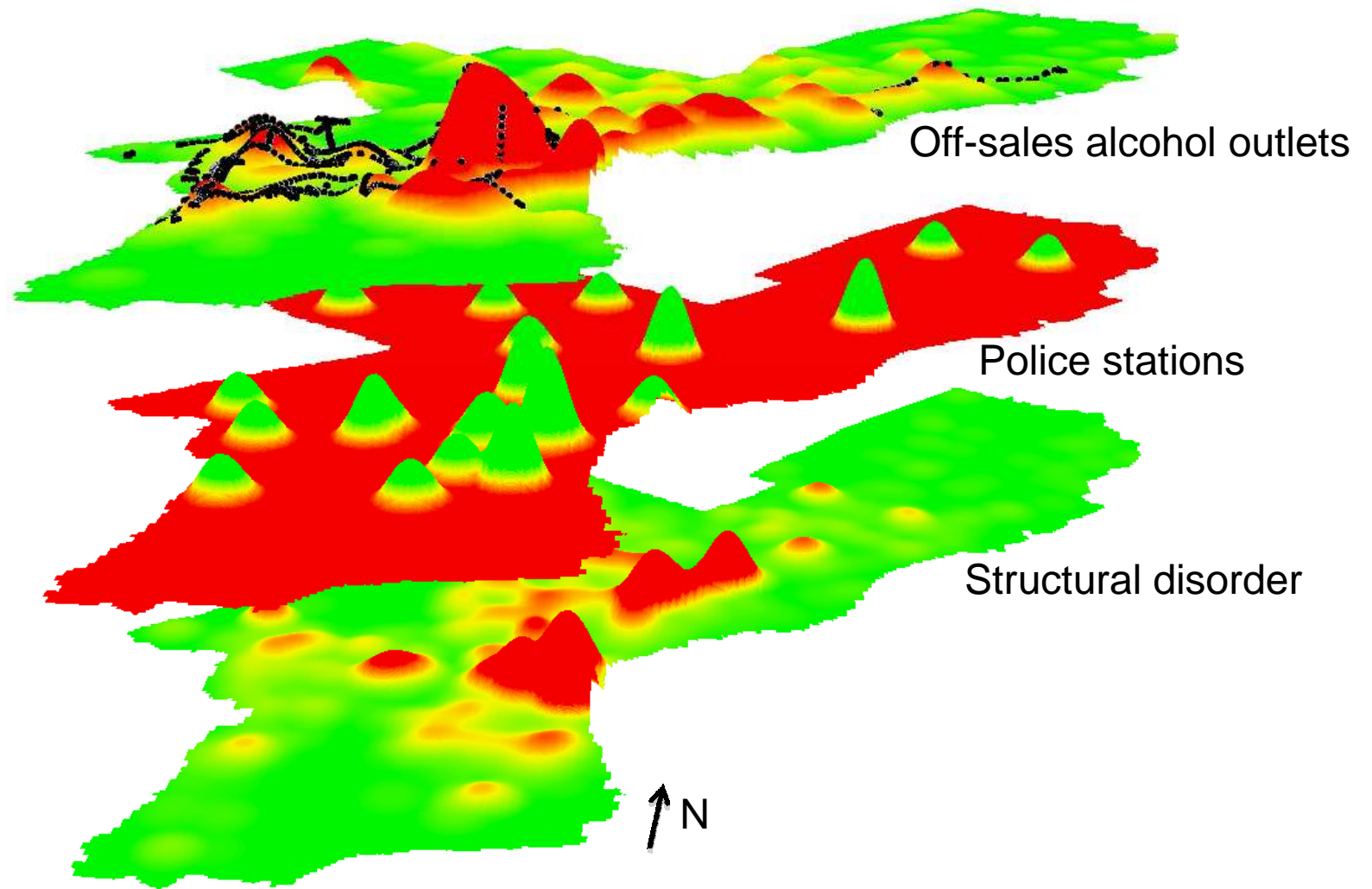


Table 1. Characteristics of 153 children and their travel during daily activities

	Percent or median (IQR) [range]	
<b>Subject</b>		
Age, median (IQR)	16 (17, 17)	
Male, %	100	
African American, %	100	
Neighborhood Environmental Scale, median (IQR)	9 (7, 11)	
<b>Travel</b>		
Distance (miles), median (IQR)	2.7 (0.6, 10.9) [0.1, 18.6]	
Transportation mode		
Foot, %*	100	
Car, %*	27.5	
Bus, %*	29.4	
Subway, %*	18.3	
Modes of transportation, median (IQR)	2 (1, 2) [1, 4]	
Foot only, %	44.4	
Travel time**		
Foot (minutes), median (IQR)	79 (60, 96) [9, 135]	
Car (minutes), median (IQR)	18 (9, 26) [1, 70]	
Bus (minutes), median (IQR)	13 (4, 20) [1, 57]	
Subway (minutes), median (IQR)	12 (3, 18) [1, 33]	

\* Indicates percent who used a particular mode of transportation; subjects may have used more than one mode of transportation.

\*\* Indicates travel time only among subjects who used each particular transportation mode.

IQR: interquartile range.

Subway includes travel on a subway, trolley or train.

**Table 2. Perceived safety during daily activities**

<b>Safety</b>	<b>Percent or correlation</b>
Minimum safety level reported (scale from 1-10), %	
10	24.2
9	15.0
8	14.4
7	15.0
6	10.5
5	10.5
4	4.6
3	2.6
2	2.0
1	1.3
Correlation, NES score and safety immediately upon exiting home	-0.15 *

\* p<0.10

NES: Neighborhood Environment Scale.

24.2% of subjects felt 10 out of 10 on safety for entire period  
 75.8% of subjects felt less than entirely safe to some extent

Safety categories: 10, 9, 8, ≤7

Table 3. Perceived safety level among 10-18 year-olds in Philadelphia during daily activities by transportation environment, age, and companion status, during daytime hours

Day time	Coef.	SE	P	95% CI
Car	-0.72	0.56	0.197	-1.80, 0.37
Bus	-0.75	0.45	0.099	-1.64, 0.14
Subway	-0.85	0.37	0.021	-1.57, -0.13
Foot (reference)	-ref-			
10-15 years	2.65	0.28	<0.001	2.10, 3.20
16-18 years (reference)	-ref-			
Adult	0.75	0.25	0.003	0.26, 1.25
Child	3.11	0.49	<0.001	2.15, 4.07
Other	0.14	0.33	0.673	-0.51, 0.79
Alone (reference)	-ref-			
Crime	0.05	0.14	0.744	-0.23, 0.33
Alcohol outlets	-0.19	0.13	0.135	-0.45, 0.06
_cut 1	-2.32	0.34	<0.001	-2.98, -1.65
_cut 2	-0.41	0.32	0.205	-1.04, 0.22
_cut 3	1.47	0.31	<0.001	0.86, 2.08

Results based on ordinal logistic regression using generalized linear models.

Higher values on outcome variable correspond to higher safety level.

Outcome variable coded 10, 9, 8, and ≤ 7.

Coef.: coefficient. SE: standard error. CI: confidence interval.

The "cut" variables report thresholds associated with the outcome variable.

Table 4. Perceived safety level among 10-18 year-olds in Philadelphia during daily activities by transportation environment, age, and companion status, during night time hours

Night time	Coef.	SE	P	95% CI
Car	3.37	0.34	<0.001	2.70, 4.03
Bus	2.21	0.58	<0.001	1.07, 3.36
Subway	-1.45	0.84	0.084	-3.10, 0.20
Foot (reference)	-ref-			
10-15 years	1.52	0.23	<0.001	1.07, 1.97
16-18 years (reference)	-ref-			
Adult	1.48	0.26	<0.001	0.96, 1.99
Child	-1.79	0.29	<0.001	-2.36, -1.23
Other	-0.68	0.24	0.005	-1.16, -0.21
Alone (reference)	-ref-			
Crime	-0.29	0.11	0.008	-0.51, -0.07
Alcohol outlets	-1.49	0.19	<0.001	-1.85, -1.12
_cut 1	-3.25	0.25	<0.001	-3.73, -2.77
_cut 2	-1.39	0.22	<0.001	-1.82, -0.96
_cut 3	0.19	0.20	0.364	-0.22, 0.59

Results based on ordinal logistic regression using generalized linear models.

Higher values on outcome variable correspond to higher safety level.

Outcome variable coded 10, 9, 8, and  $\leq 7$ .

Coef.: coefficient. SE: standard error. CI: confidence interval.

The "cut" variables report thresholds associated with the outcome variable.

# Companions

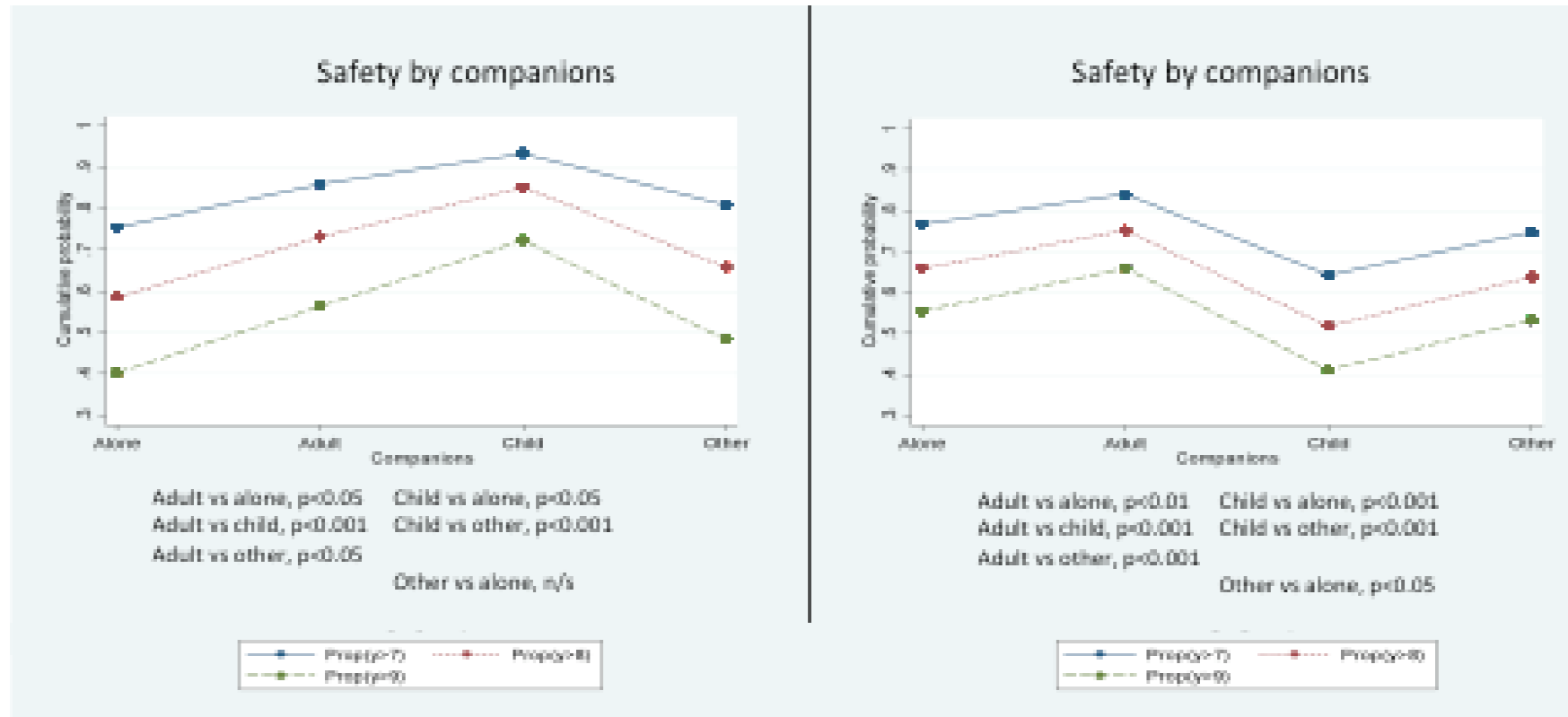


Figure 3. Cumulative predicted probabilities of perceived safety levels of above 7, above 8, and above 9 based on transportation mode and companionship status during daylight hours (left) and after dark hours (right) (based on regression models in Tables 3 and 4).

# Transportation mode

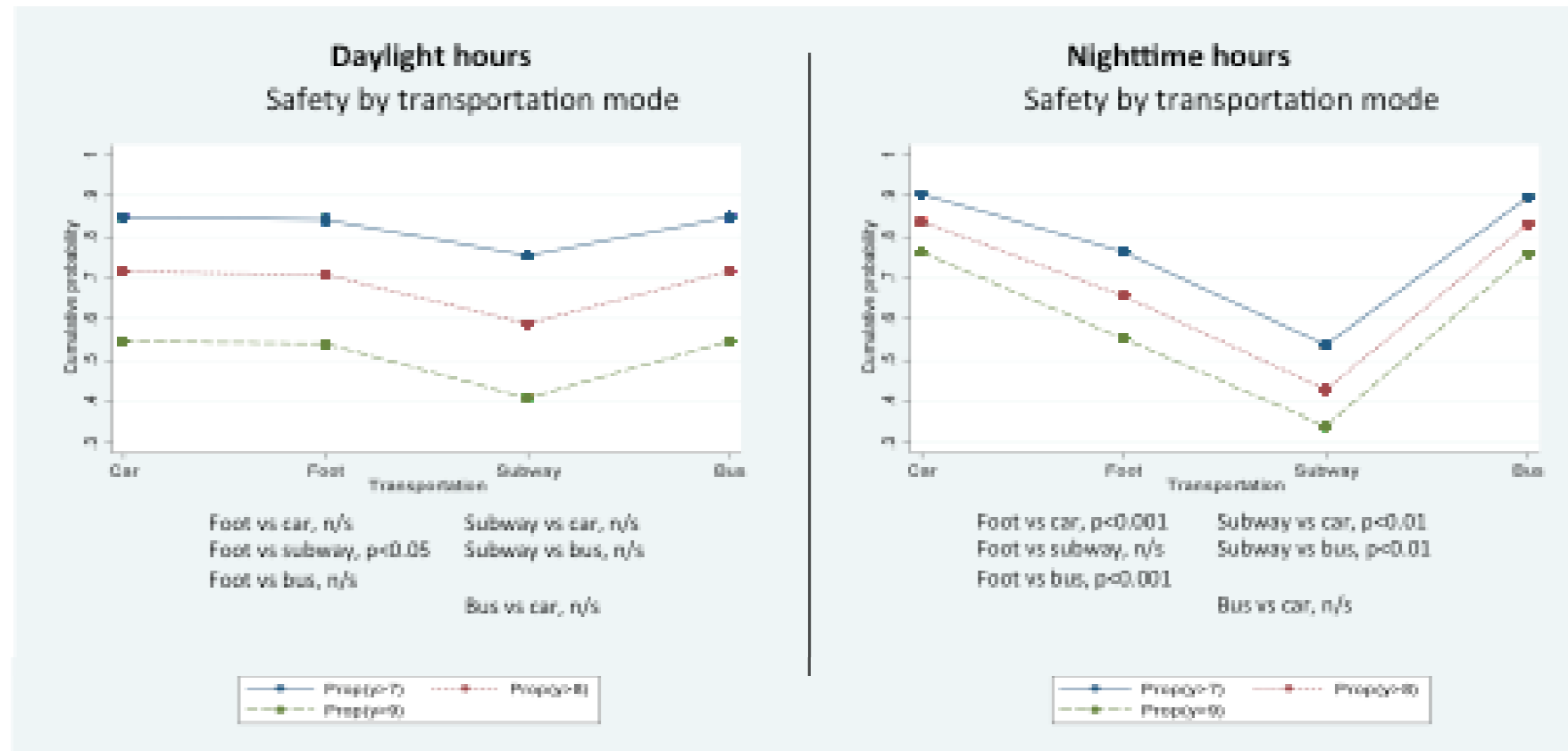


Figure 3. Cumulative predicted probabilities of perceived safety levels of above 7, above 8, and above 9 based on transportation mode and companionship status during daylight hours (left) and after dark hours (right) (based on regression models in Tables 3 and 4).

# Limitations and Implications

## **LIMITATIONS**

- Retrospective recall
- Respondent bias from self report, underreporting fear
- Misclassification bias, e.g., school bus and public bus not distinguished
- Information bias, e.g., did not exclude times when stationary & not travelling

## **IMPLICATIONS**

- Creating defensible space appears reasonable
- Qualitative research needed
- Perceived safety/fear can be studied prospectively