

# The Meaning of “*Mean Streets*”

Crime, Casualties and Mode Choice

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**Crime and its Association with Sustainable  
and Active Travel Choices**

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Associate Professor, San Jose State University



# Sustainability Needs Inter- Disciplinary Teamwork



**THE JUNGLE WAS NEVER  
THIS WILD!**

- Live Music and Dancing
- Jazz Every Wednesday

**CANNIBAL BAR**

**CATAMARAN**  
RESORT HOTEL

3999 Mission Boulevard  
On Mission Bay  
San Diego, California 92109  
(619) 488-0811

• Happy Hour Buffet  
6-8 p.m., Tues.-Sat.



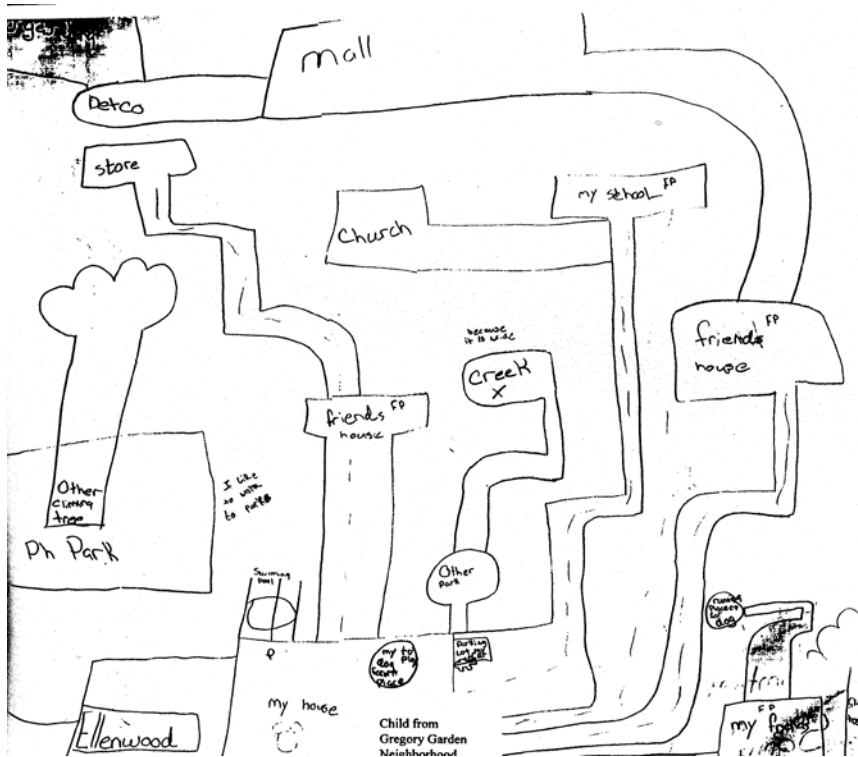
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- While travel is an inherently linear activity, most studies of the built environment's influence on active travel attribute zonal aggregations/averages to unique individuals, likely missing key details important to pedestrians and bicyclists.

# Background

## Key Assumption: People Traveling by Different Modes Experience The Environment Differently

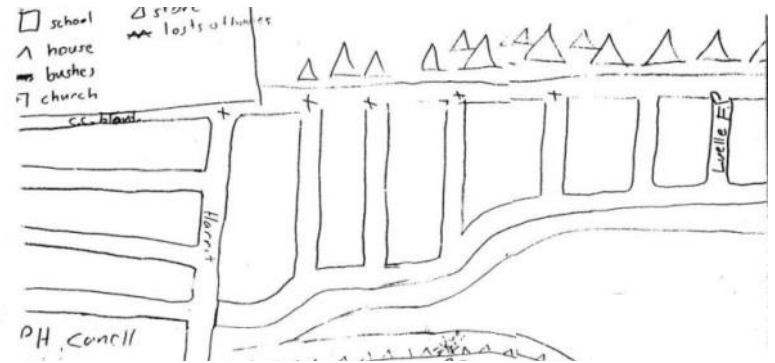
"Map neighborhood between home and school as if you want to describe it to someone"

### In-Vehicle Experience



### Out-of Vehicle Experience

Elements important to pedestrians & bicyclists



I like my neighborhood because I have lots of friends, and because I can play there when ever I want, I like every thing in my neighborhood and I dislike nothing in my neighborhood and I also ride my bike every where or I walk.



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- In response, this study employs individualized linear spatial units of analysis in combination with detailed geospatial data -- in sum, disaggregated (human scale) data for disaggregated (human scale) research.



# Phase 3

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- This is one of the few studies to:
  - 1) look at people's trip routes, from home origin to station destination, and
  - 2) analyze bicycling trips for a large enough group to meaningfully for guide policy, and
  - 3) finally, it is one of the few studies to look at the
    - influence of bicycle and pedestrian collision data in combination with criminal activity.
    - influence of criminal activity along different segments of a person's route

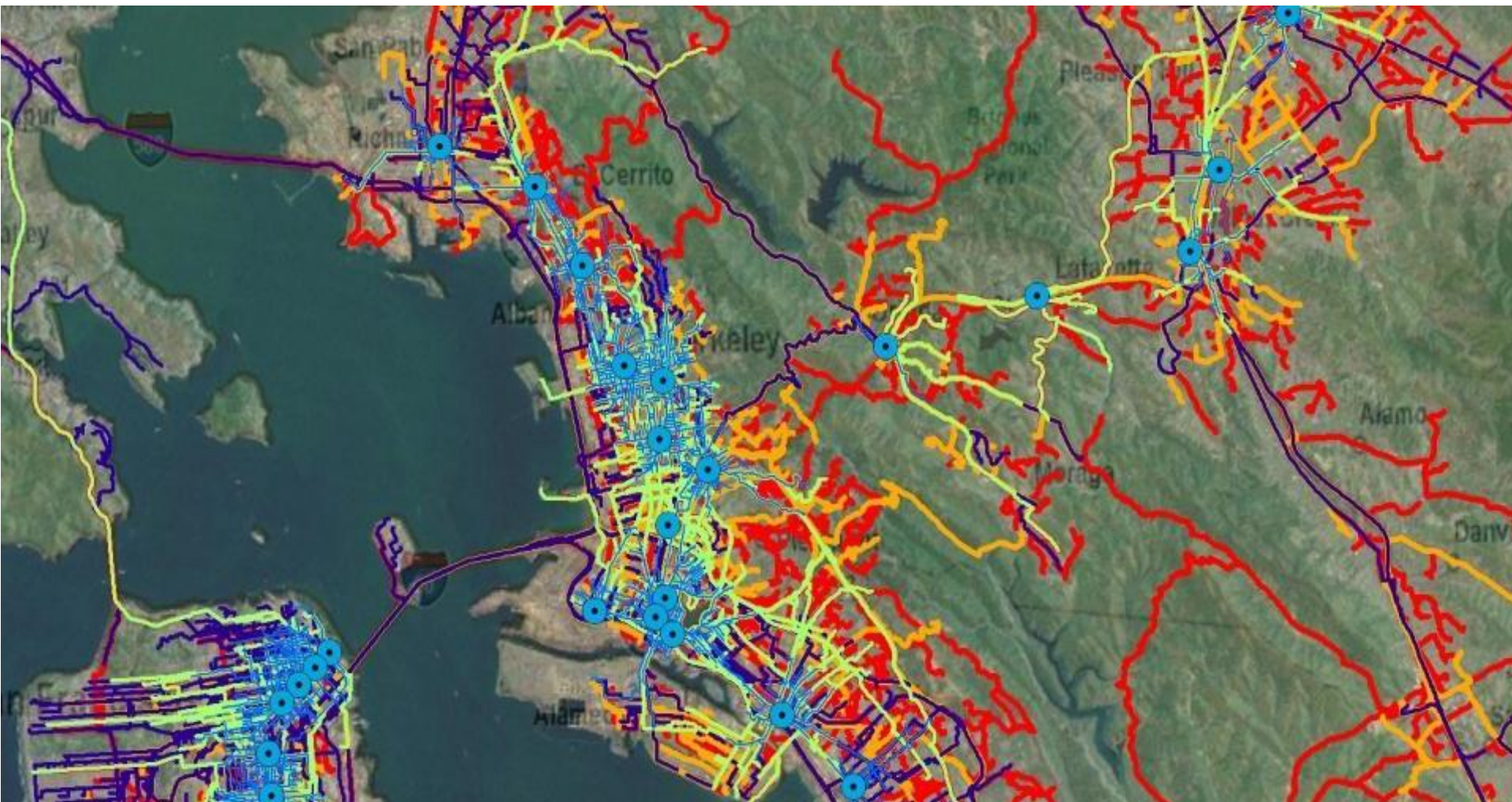


RESEARCH Background: New Data

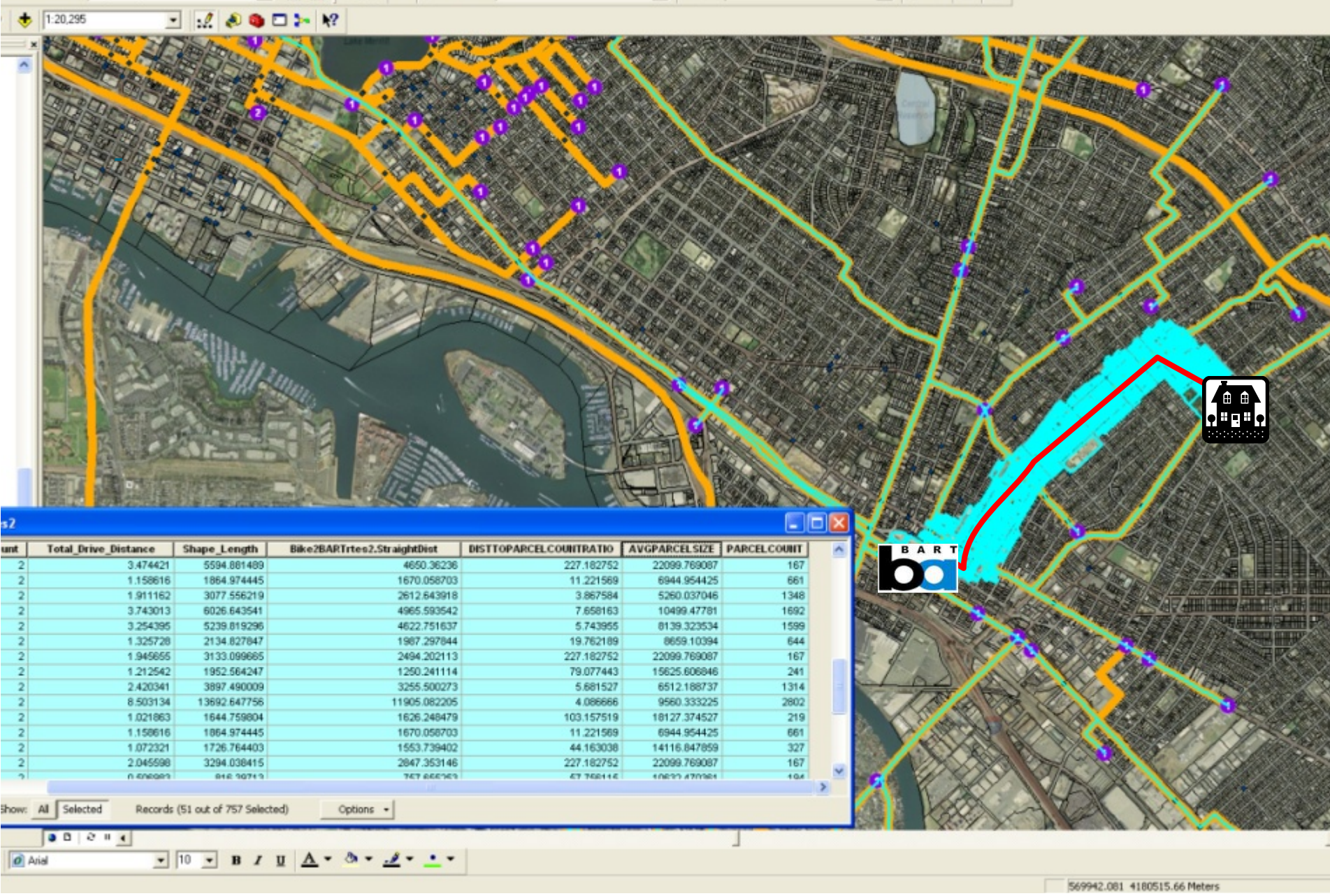
Estimated paths for thousands of travel survey respondents...

Using new, **linear** spatial unit of analysis (Individual Access Corridor) +  
Finer **resolution** BE data (parcel, point, network) =

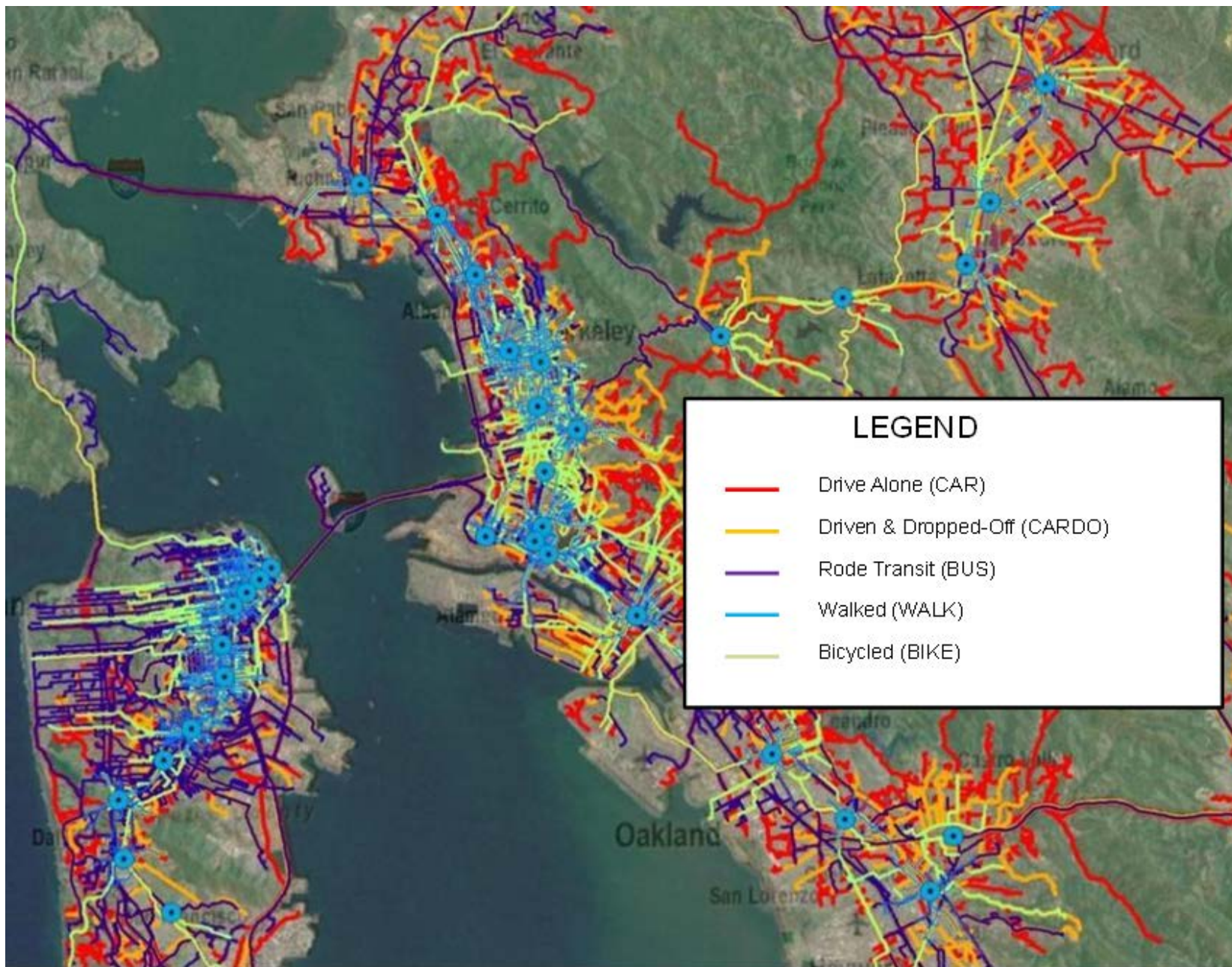
Paradigm shift for Travel Behavior Research



# RESEARCH OVERVIEW: *Home? Route? Station?*







# Research Background: New Measures

## Human Scale

Buildings should match the size, texture and articulation of a person walking (and bicycling). At least at the street wall.

## Enclosure:

Buildings should be located closer to the street (emanating senses of intimacy and *enclosure*).

## Transparency

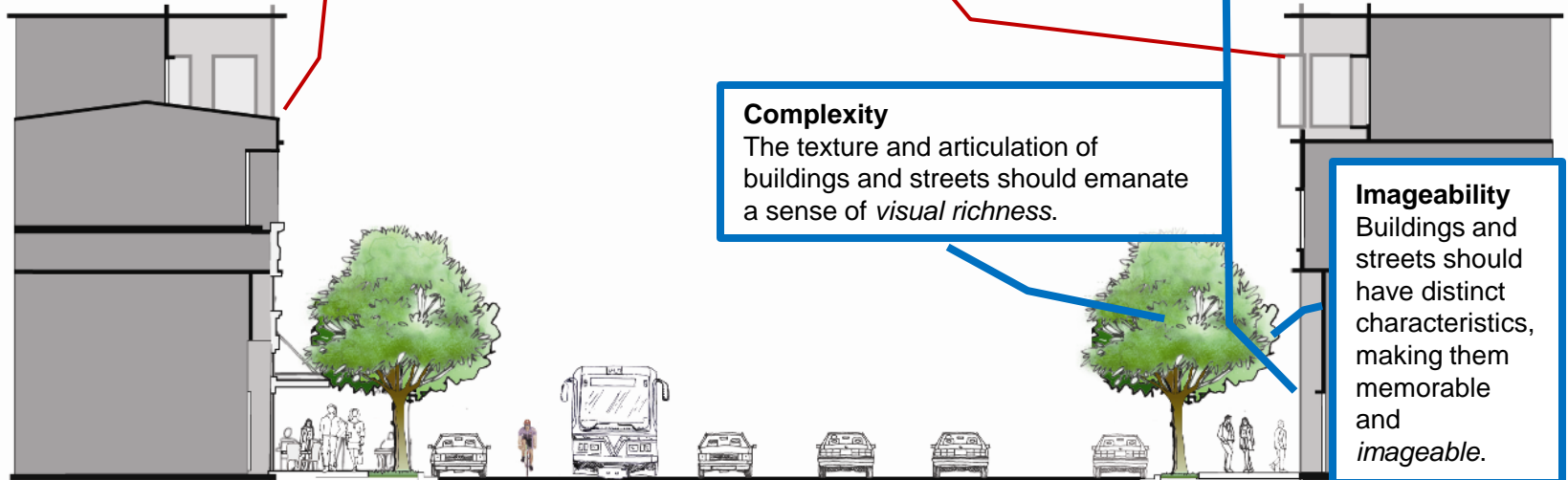
Buildings should be designed so people can perceive what lies beyond the edge of public space

## Complexity

The texture and articulation of buildings and streets should emanate a sense of *visual richness*.

## Imageability

Buildings and streets should have distinct characteristics, making them memorable and *imageable*.



# METHODS to Create Linear MEASURES (M2M) of Activity

*Land Use Activity: Issues Dealing with Detailed Land Use Categories*

Four ways to calculate land use variables along IAC:

## Parcel based

1. Land Use Distance (LUD): The absolute distance of a certain activity along IAC.
2. Land Use Proportion (LUP):  
The proportion of a certain activity along IAC.
  - Parking Lots
  - Road ROW

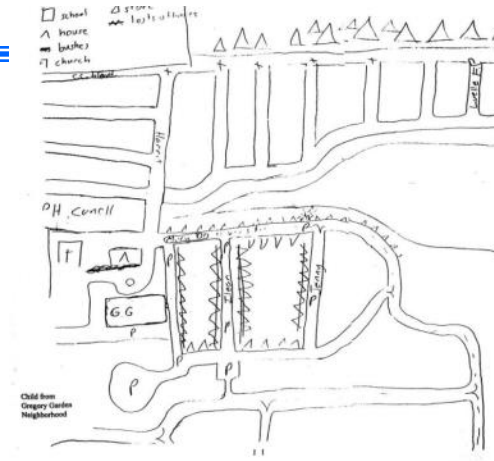
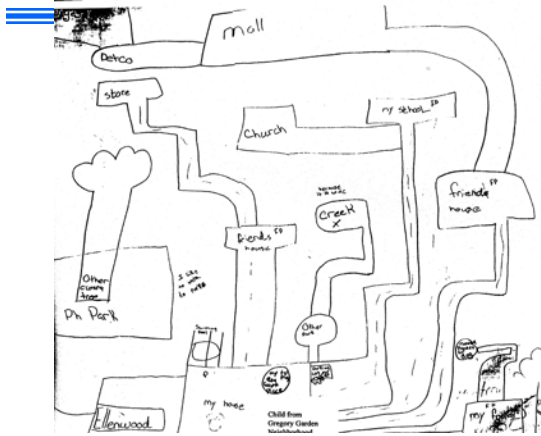
## Point-based

3. Land Use Dummy Variables:
  - The presence of an activity
    - Use for personal service utility where consumer may be indifferent to more than one (coffee shop)
4. Number of a certain activity  
(crime, retail, ped/bike casualties)

1. Mineta Transportation Institute  
*Crime and Mode Choice Study*



# From Children's Views of their world



To this: Predictive Multinomial (MNL) Models of Mode Choice

$$P(CAR_n) = \frac{e^{V_{CARn}}}{e^{V_{WALKn}} + e^{V_{BIKEN}} + e^{V_{BUSn}} + e^{V_{CARn}} + e^{V_{CARDOn}}$$



# *Considerations for Crime/Casualty and Travel Behavior Studies*

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- There are likely circular relationships in the study of crime and pedestrian/bicycle casualties and human behaviors.
- Felson (1980) first developed the “Routine Activity Theory” (Rational Choice Argument) of criminal events, stating there are three elements:
  1. Opportunity “Vulnerable Target”
  2. Motivated Offender
  3. Guardian/Enforcer (witnessing and reporting)



# *Considerations for Crime/Casualty and Travel Behavior Studies*



- Bruce's "Routine Activity Theory" of Ped/Bike Casualties
  1. Opportunity ("Vulnerable Targets"): Pedestrian and Bicyclists
  2. Dominating Offender: Drivers/cars (in some cases bicycles)
  3. Guardian/Enforcer: Police (who may or may not record offense)

Therefore:

Greater numbers of people (walkers and bicyclists) and property (cars and bikes),

1. not only brings a greater chance for victimization, but perhaps
  2. also intervention, guardianship and enforcing (witnessing and reporting).
1. Jane Jacobs famous "eyes on the streets" hypothesis:  
greater numbers of people bring a greater sense of community security

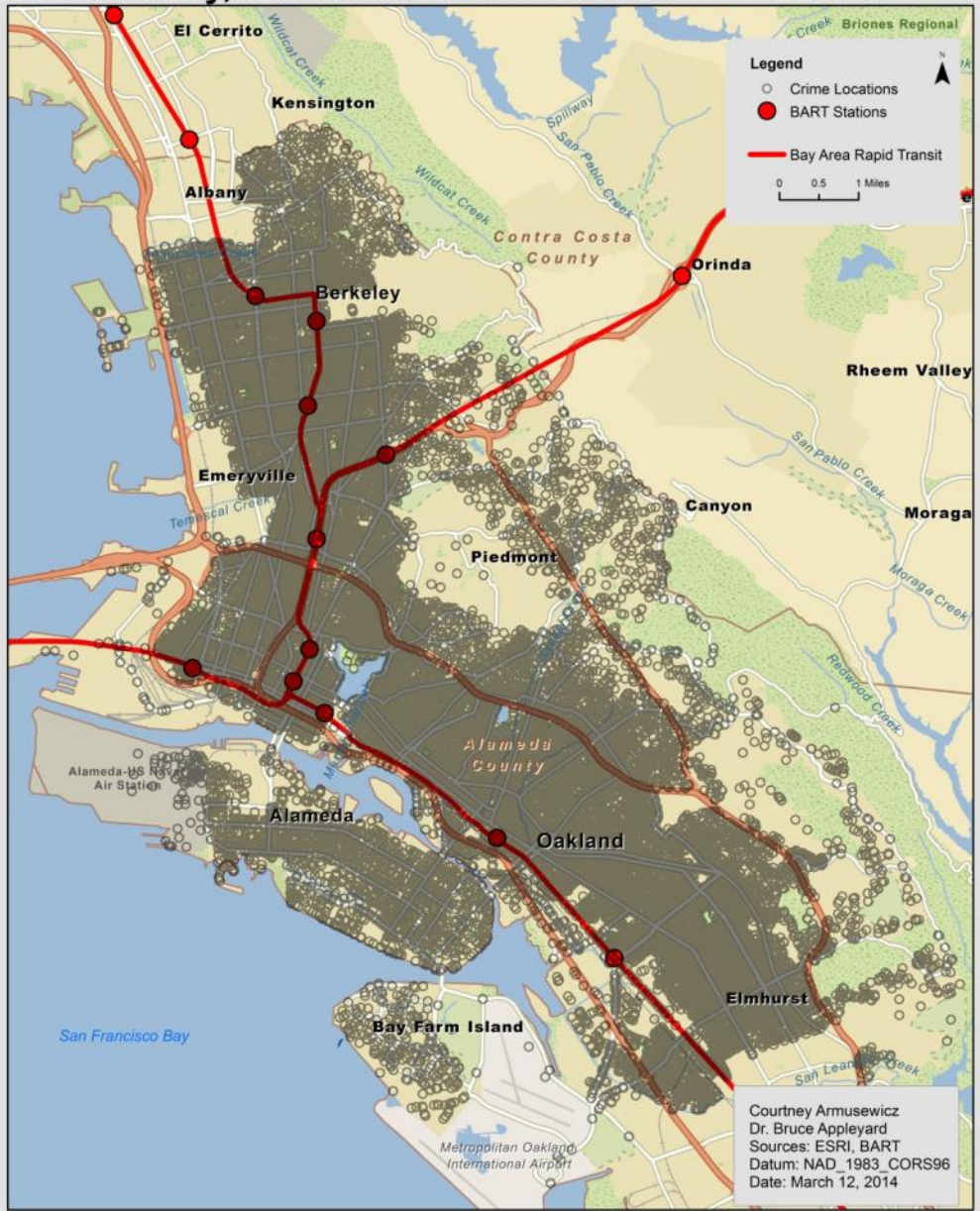


# Berkeley, Oakland and Alameda Study Area





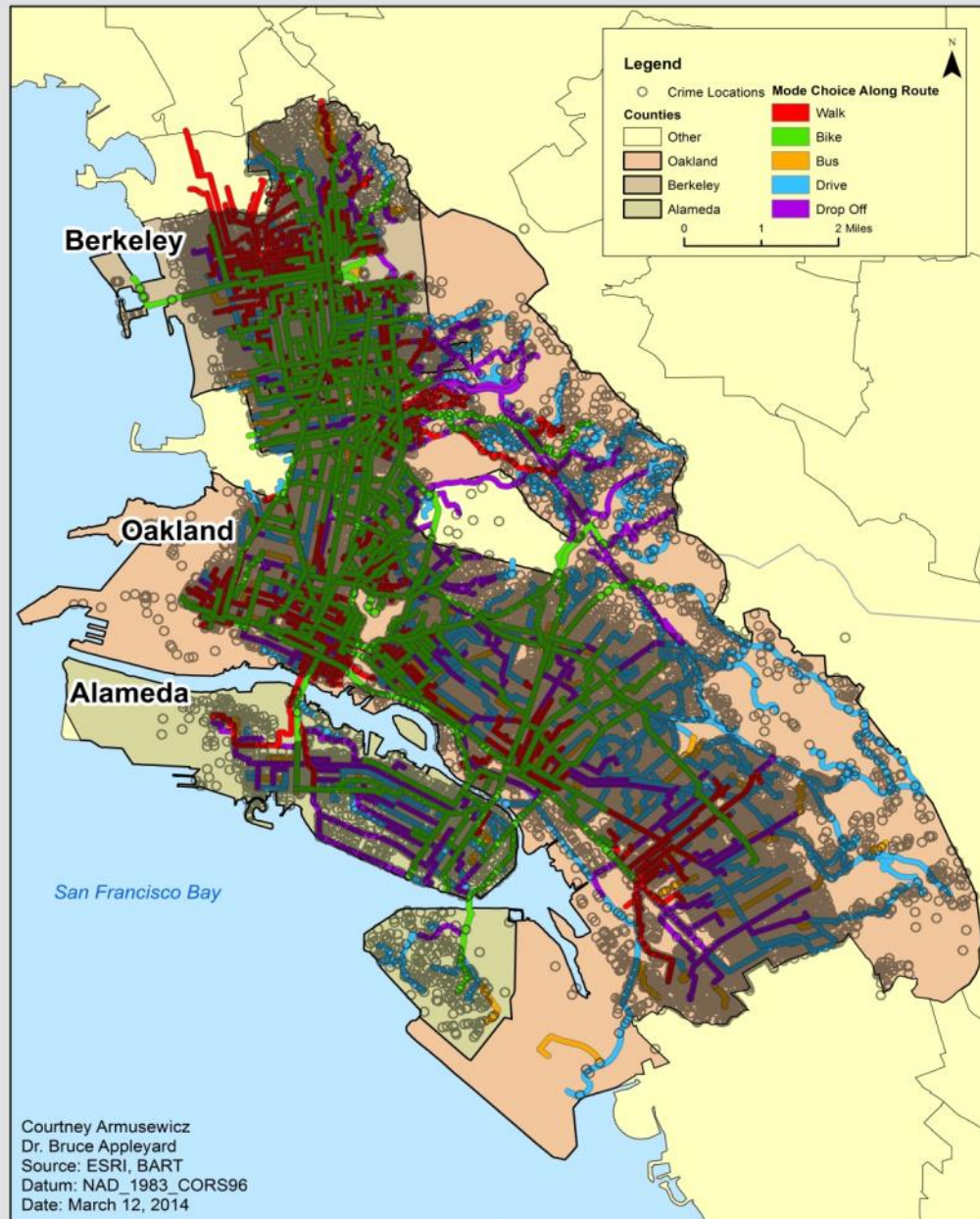
# Berkeley, Oakland and Alameda Crime Locations







# Crime Locations Along Route



Courtney Armusewicz  
Dr. Bruce Appleyard  
Source: ESRI, BART  
Datum: NAD\_1983\_CORS96  
Date: March 12, 2014



# Background on Crime Data

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The U.S. Department of Justice has developed a standardized crime data collection and coding system known as the Uniform Crime Reporting (UCR) program.

The UCR Program defines two categories of crimes: Parts I and II.

- Part I crimes are considered more serious.
  - For the purposes of this study, Part I crimes were broken down into two categories,
    - 1) Violent Part I crimes, i.e. homicide, rape, robbery, and aggravated assault, and
    - 2) Part I crimes against property, i.e. burglary, larceny-theft, auto theft, and arson.
  - Part II crimes are described as all other crimes outside of Part I crimes.
- Federal Bureau of Investigation. Uniform Crime Reporting Handbook, revised 2004. [www.fbi.gov/ucr/ucr.htm](http://www.fbi.gov/ucr/ucr.htm). Accessed 10 October, 2006.





<b>PART I CRIMES</b>		<b>Major Violent</b>	<b>Major Property</b>
Violent	Criminal Homicide	X	
Violent	Rape	X	
Violent	Robbery	X	
Violent	Aggravated Assault	X	
Property	Burglary		X
Property	Larceny-theft		X
Property	Motor Vehicle Theft		X
Property	Arson		X





<b>PART II (Minor) CRIMES</b>	<b>Criminal Activity</b>	<b>Minor Violent</b>
"Minor" Violent	Assault and battery	X
"Minor" Violent	Carjacking	X
"Minor" Violent	Injury by culpable negligence	X
"Minor" Violent	Kidnapping	X
"Minor" Violent	Minor assault	X
"Minor" Violent	Resisting or obstructing an officer	X
"Minor" Violent	Sex offenses	X
"Minor" Violent	Simple assault	X
"Minor" Violent	Unlawful use, possession, etc., of explosives	X

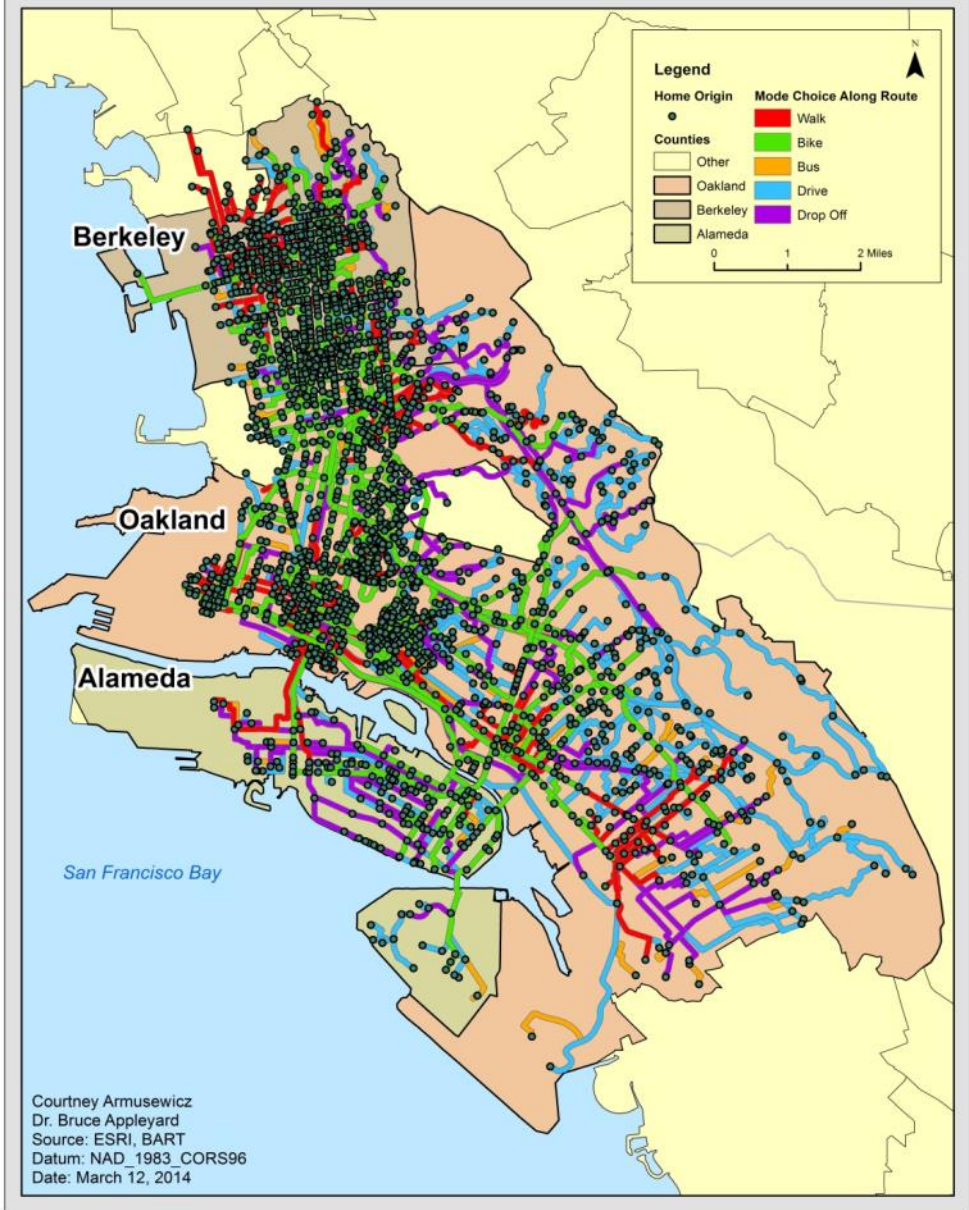




Vice and Vagrancy	
Coercion	X
Curfew and loitering laws	X
Disorderly conduct	X
Drug abuse violations	X
Drunkenness	X
Hazing	X
Intimidation	X
Prostitution	X
Stalking	X
Vagrancy	X
Weapons: carrying, possessing	X



# Home Origin Locations Along Route



# Descriptive Statistics: Characteristics of the Sample Population

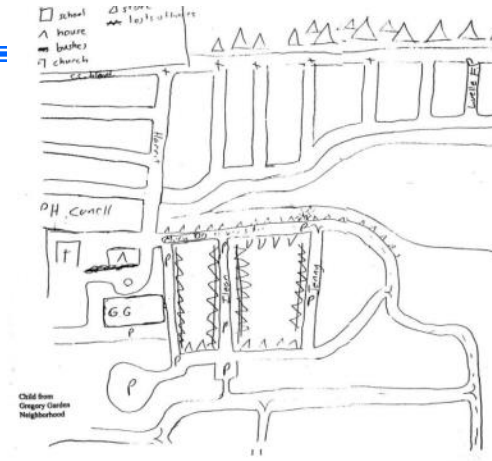
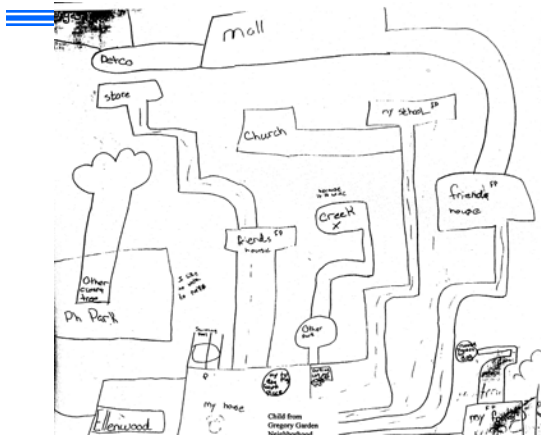
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- The sample population for the model is as follows:
- Of 2563 respondents, 1,014 (39.6%) identified themselves as either Black or Hispanic/Latino and not White.
- The number of individuals in the sample, by mode and percentage of total, are as follows:
  - Walk (1226 or 47.8%);
  - Bicycle (262 or 10.2%);
  - Rode Bus (172 or 6.7%);
  - drove alone (690 or 26.9%);
  - were driven and dropped off (213 or 8.3%).



# From Children's Views of their world



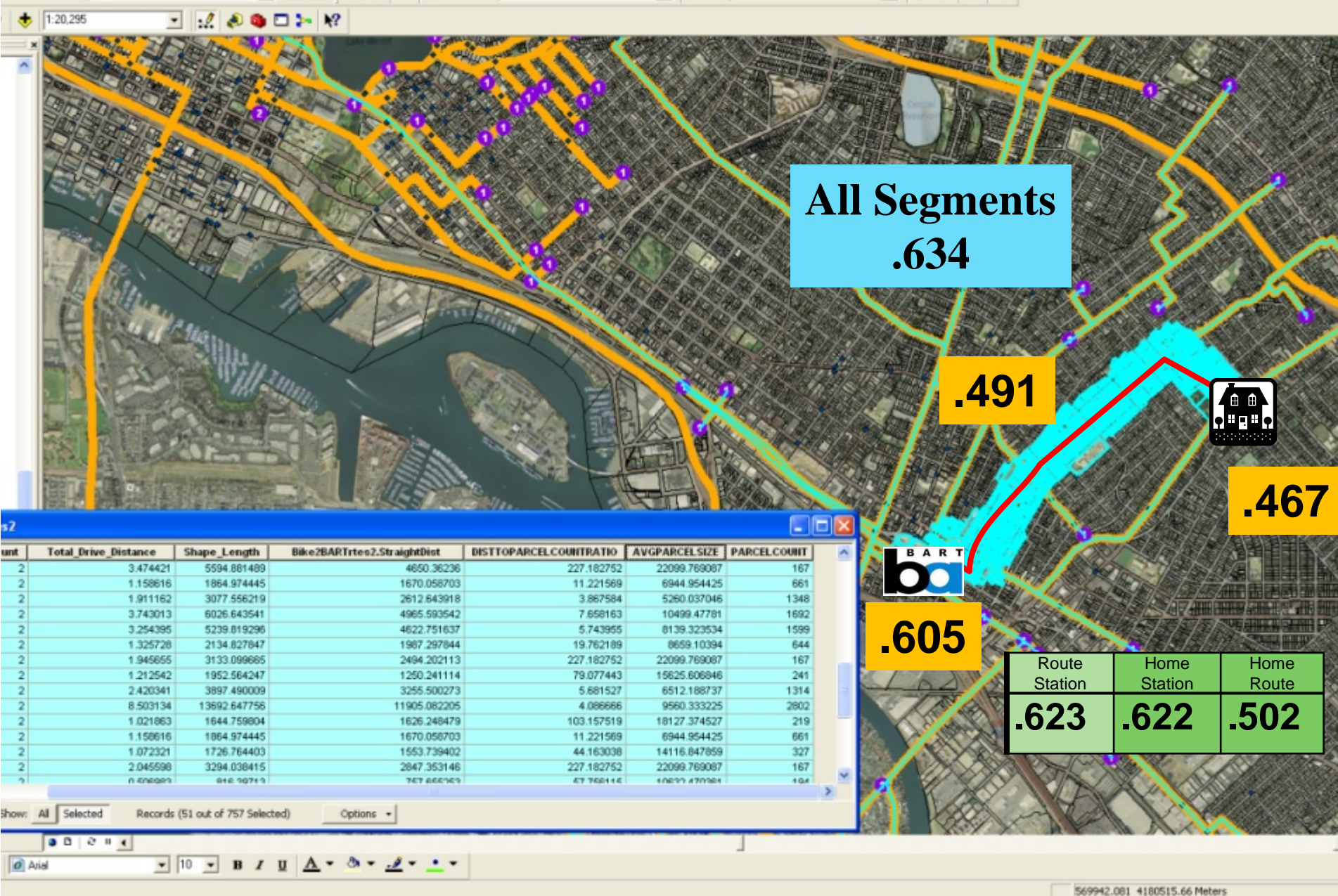
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# RESEARCH OVERVIEW: *Home? Route? Station?*



**All Segments  
.634**

**.491**

**.467**

**.605**

Route Station	Home Station	Home Route
<b>.623</b>	<b>.622</b>	<b>.502</b>

Count	Total_Drive_Distance	Shape_Length	Bike2BARTres2.StraightDist	DISTTOPARCEL	COUNTRATIO	AVGPARCEL_SIZE	PARCEL.COUNT
2	3.474421	5594.881489	4650.36236	227.182752	22099.769087	167	
2	1.158616	1864.974445	1670.058703	11.221569	6944.954425	661	
2	1.911162	3077.556219	2612.643918	3.867584	5260.037046	1348	
2	3.743013	6026.643541	4965.593542	7.658163	10499.47781	1692	
2	3.254395	5239.819296	4622.751637	5.743955	8139.323534	1599	
2	1.325728	2134.827647	1987.297044	19.762189	8659.10394	644	
2	1.945655	3133.099685	2494.202113	227.182752	22099.769087	167	
2	1.212542	1952.564247	1250.241114	79.077443	15625.606846	241	
2	2.420341	3897.490009	3255.500273	5.681527	6512.188737	1314	
2	8.503134	13692.647756	11905.082205	4.086666	9560.333225	2802	
2	1.021863	1644.759804	1626.248479	103.157519	18127.374527	219	
2	1.158616	1864.974445	1670.058703	11.221569	6944.954425	661	
2	1.072321	1726.764403	1553.739402	44.163038	14116.847859	327	
2	2.045598	3294.038415	2847.353146	227.182752	22099.769087	167	
2	0.626091	816.907113	747.665163	47.766114	10621.477184	104	

# Crime, Casualties and Mode Choice Model Comparisons

	Nagelkerke adjusted rho -squared .505								Nagelkerke adjusted rho -squared .535							
	walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.	Walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.
Intercept	-3.566	.000	-3.245	.006	-7.001	.000	-.576	.567	-3.297	.000	-3.365	.005	-6.888	.000	-.420	.675
APSlu1kSqFt	-.002	.031	-.005	.000	-.002	.185	-.002	.121	-.004	.000	-.006	.000	-.002	.189	-.002	.046
TotPrk_1	.002	.000	-.005	.000	.002	.044	-.001	.149	.002	.000	-.005	.000	.002	.082	-.001	.124
TotBikSp	-.021	.000	.022	.004	-.005	.051	-.005	.070	-.019	.000	.025	.001	-.005	.045	-.004	.116
@_AllStrtIntDens	.026	.000	.016	.000	.014	.000	.002	.652	.026	.000	.016	.000	.013	.000	.001	.821
@_#Entrpy5Obs	4.942	.000	5.174	.000	3.066	.003	1.575	.090	4.484	.000	5.352	.000	3.544	.001	1.571	.100
StatViolent	<b>-.524</b>	<b>.000***</b>	<b>.228</b>	<b>.039***</b>	<b>-.068</b>	<b>Ns (.410)</b>	<b>-.193</b>	<b>.003***</b>	<b>-5.00</b>	<b>.000***</b>	<b>.237</b>	<b>.036***</b>	<b>-.050</b>	<b>Ns (.570)</b>	<b>-.210</b>	<b>.003***</b>
StationProperty	<b>.002</b>	<b>Ns(.497)</b>	<b>-.040</b>	<b>.002***</b>	<b>.002</b>	<b>Ns(.626)</b>	<b>.005</b>	<b>.079**</b>	<b>.004</b>	<b>.109*</b>	<b>-.043</b>	<b>.001***</b>	<b>.003</b>	<b>Ns (.444)</b>	<b>.007</b>	<b>ns(.023)</b>
RtPropertyCrime	<b>.010</b>	<b>.000***</b>	<b>.009</b>	<b>.005***</b>	<b>.009</b>	<b>.007***</b>	<b>.003</b>	<b>Ns(.355)</b>	<b>.004</b>	<b>.063**</b>	<b>.006</b>	<b>.066***</b>	<b>.007</b>	<b>.018***</b>	<b>.001</b>	<b>Ns(.773)</b>
RtViolentCrimMajor	<b>-.008</b>	<b>.050**</b>	<b>-.019</b>	<b>.001***</b>	<b>.002</b>	<b>ns (.778)</b>	<b>-.010</b>	<b>.082***</b>	<b>.003</b>	<b>Ns(.528)</b>	<b>-.012</b>	<b>.044***</b>	<b>.003</b>	<b>.659</b>	<b>-.006</b>	<b>Ns(.354)</b>
RtViolentCrimMinor	<b>.026</b>	<b>.079**</b>	<b>-.001</b>	<b>Ns(.964)</b>	<b>-.044</b>	<b>.114*</b>	<b>-.028</b>	<b>Ns(.266)</b>	<b>.033</b>	<b>Ns(.024)</b>	<b>-.003</b>	<b>Ns(.876)</b>	<b>-.024</b>	<b>.369</b>	<b>-.026</b>	<b>ns(.289)</b>
Bike_Cas_Jobs									<b>.552</b>	<b>.011**</b>	<b>.527</b>	<b>.046***</b>	<b>-.234</b>	<b>Ns(.481)</b>	<b>.300</b>	<b>ns(.282)</b>
Ped_Cas_Jobs									<b>-2.090</b>	<b>.000***</b>	<b>-.746</b>	<b>.006***</b>	<b>.006</b>	<b>Ns(.979)</b>	<b>-.448</b>	<b>.043***</b>
[FemaleDV=1.00]	-.567	.000	-1.129	.000	-.426	.029	.160	.361	-5.50	.000	-1.127	.000	-.428	.029	.165	.347
[WhiteDV=1.00]	.353	.006	1.413	.000	-.407	.050	-.221	.202	.391	.003	1.478	.000	-.349	.095	-.176	.312
[CarAvailDV=1.00]	-2.805	.000	-3.086	.000	-3.551	.000	-2.037	.000	-2.759	.000	-3.046	.000	-3.522	.000	-2.005	.000
[LowIncomeDV=1.00]	.533	.071	.837	.017	.653	.074	.498	.171	.466	.117	.794	.024	.657	.074	.468	.199
[Age18_34=1.00]	.626	.051	1.847	.004	-.024	.961	.050	.899	.531	.101	1.827	.005	.086	.864	.048	.903
[Age35_64=1.00]	.080	.799	1.307	.043	-.119	.806	-.654	.094	.018	.956	1.314	.043	.029	.953	-.633	.106

Notes: \*\*\* = p < 0.01    \*\* = p < 0.10    \* = p < 0.20

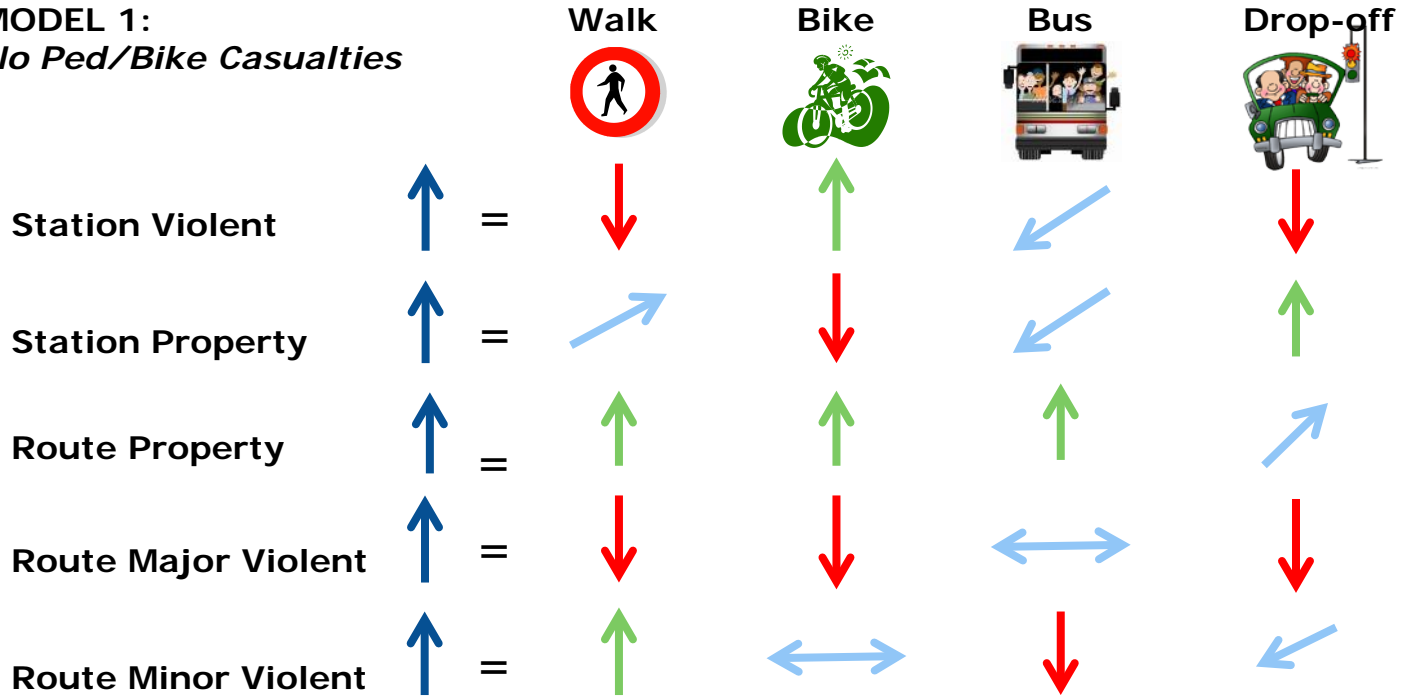
# Crime, Casualties and Mode Choice Model Comparisons

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	walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.	Walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.
StationViolent	-.524	.000***	.228	.039***	-.068	Ns (.410)	-.193	.003***	-.500	.000***	.237	.036***	-.050	Ns (.570)	-.210	.003***
StationProperty	.002	Ns(.497)	-.040	.002***	.002	Ns(.626)	.005	.079**	.004	.109*	-.043	.001***	.003	Ns (.444)	.007	ns(.023)
RtPropertyCrime	.010	.000***	.009	.005***	.009	.007***	.003	Ns(.355)	.004	.063**	.006	.066***	.007	.018***	.001	Ns(.773)
RtViolentCrimMajor	-.008	.050**	-.019	.001***	.002	ns (.778)	-.010	.082***	.003	Ns(.528)	-.012	.044***	.003	.659	-.006	Ns(.354)
RtViolentCrimMinor	.026	.079**	-.001	Ns(.964)	-.044	.114*	-.028	Ns(.266)	.033	Ns(.024)	-.003	Ns(.876)	-.024	.369	-.026	ns(.289)
Bike_Cas_Jobs									.552	.011**	.527	.046***	-.234	Ns(.481)	.300	ns(.282)
Ped_Cas_Jobs									-2.090	.000***	-.746	.006***	.006	Ns(.979)	-.448	.043***

Notes:

- \* = p < 0.20
- \*\* = p < 0.10
- \*\*\* = p < 0.01

## MODEL 1: No Ped/Bike Casualties



# Hypotheses

- Personal Exposure Hypothesis
  - Exposed vs Enclosed Modes
- Property Exposure Hypothesis
  - Property vs Non-Property Modes (Property Exposure)
- The “Self-Selection” Hypothesis:
  - People understand the risks inherent in the areas they live.

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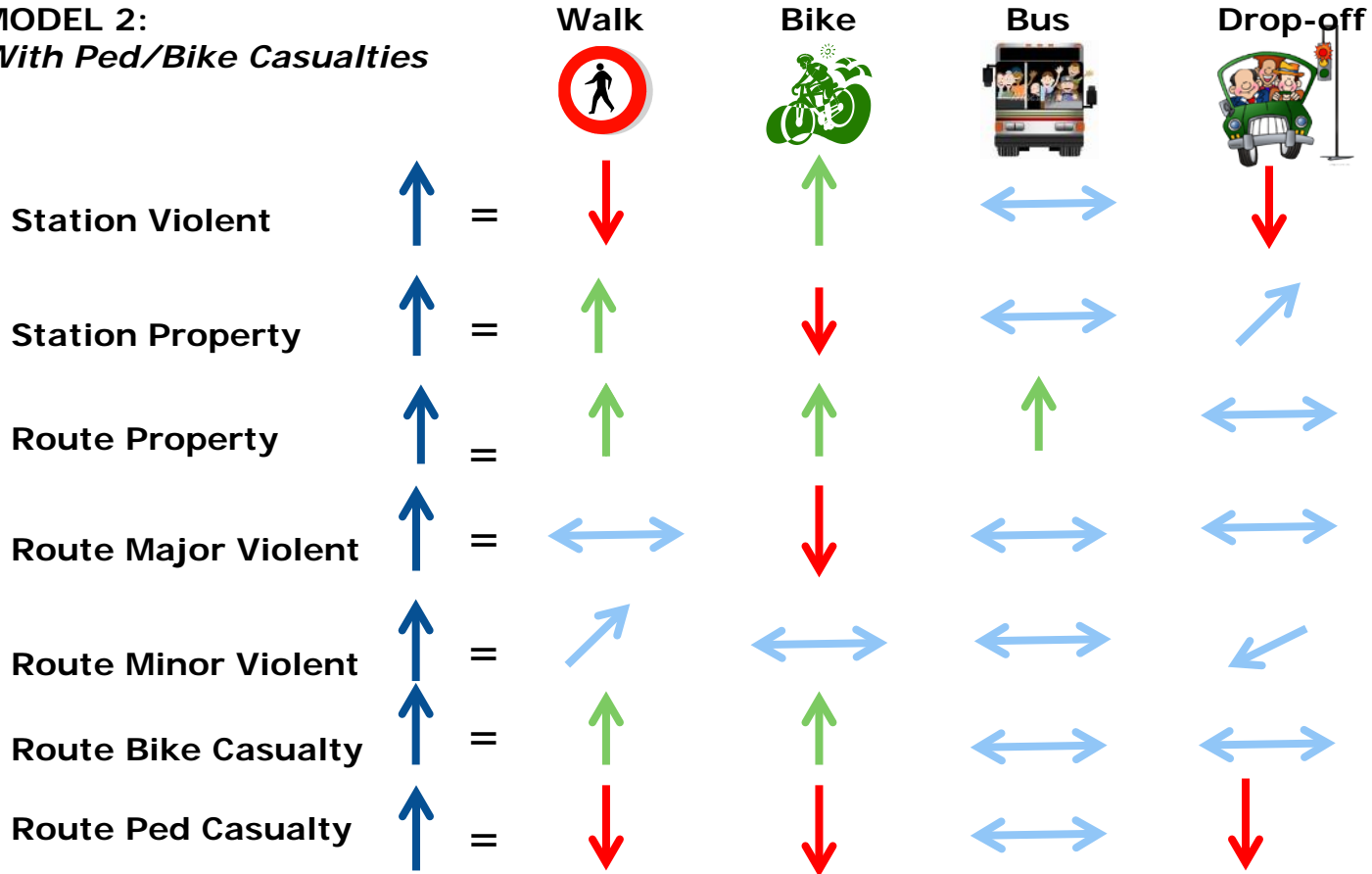
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## MODEL 2: With Ped/Bike Casualties



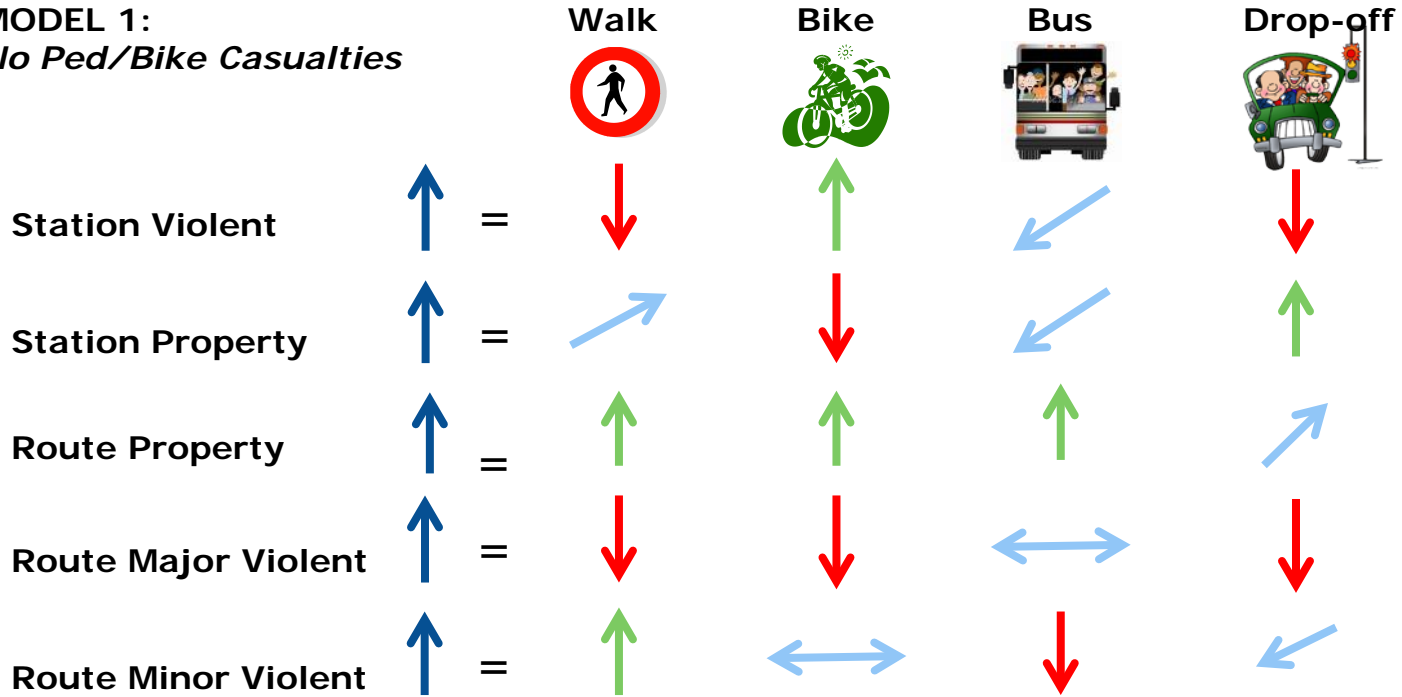
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RtPropertyCrime	.010	.000***	.009	.005***	.009	.007***	.003	Ns(.355)	.004	.063**	.006	.066***	.007	.018***	.001	Ns(.773)
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	walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.	Walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.
StatViolent	-.524	.000***	.228	.039***	-.068	Ns (.410)	-.193	.003***	-.500	.000***	.237	.036***	-.050	Ns (.570)	-.210	.003***
StationProperty	.002	Ns(.497)	-.040	.002***	.002	Ns(.626)	.005	.079**	.004	.109*	-.043	.001***	.003	Ns (.444)	.007	ns(.023)
RtPropertyCrime	.010	.000***	.009	.005***	.009	.007***	.003	Ns(.355)	.004	.063**	.006	.066***	.007	.018***	.001	Ns(.773)
RtViolentCrimMajor	-.008	.050**	-.019	.001***	.002	ns (.778)	-.010	.082***	.003	Ns(.528)	-.012	.044***	.003	.659	-.006	Ns(.354)
RtViolentCrimMinor	.026	.079**	-.001	Ns(.964)	-.044	.114*	-.028	Ns(.266)	.033	Ns(.024)	-.003	Ns(.876)	-.024	.369	-.026	ns(.289)
Bike_Cas_Jobs									.552	.011**	.527	.046***	-.234	Ns(.481)	.300	ns(.282)
Ped_Cas_Jobs									-2.090	.000***	-.746	.006***	.006	Ns(.979)	-.448	.043***

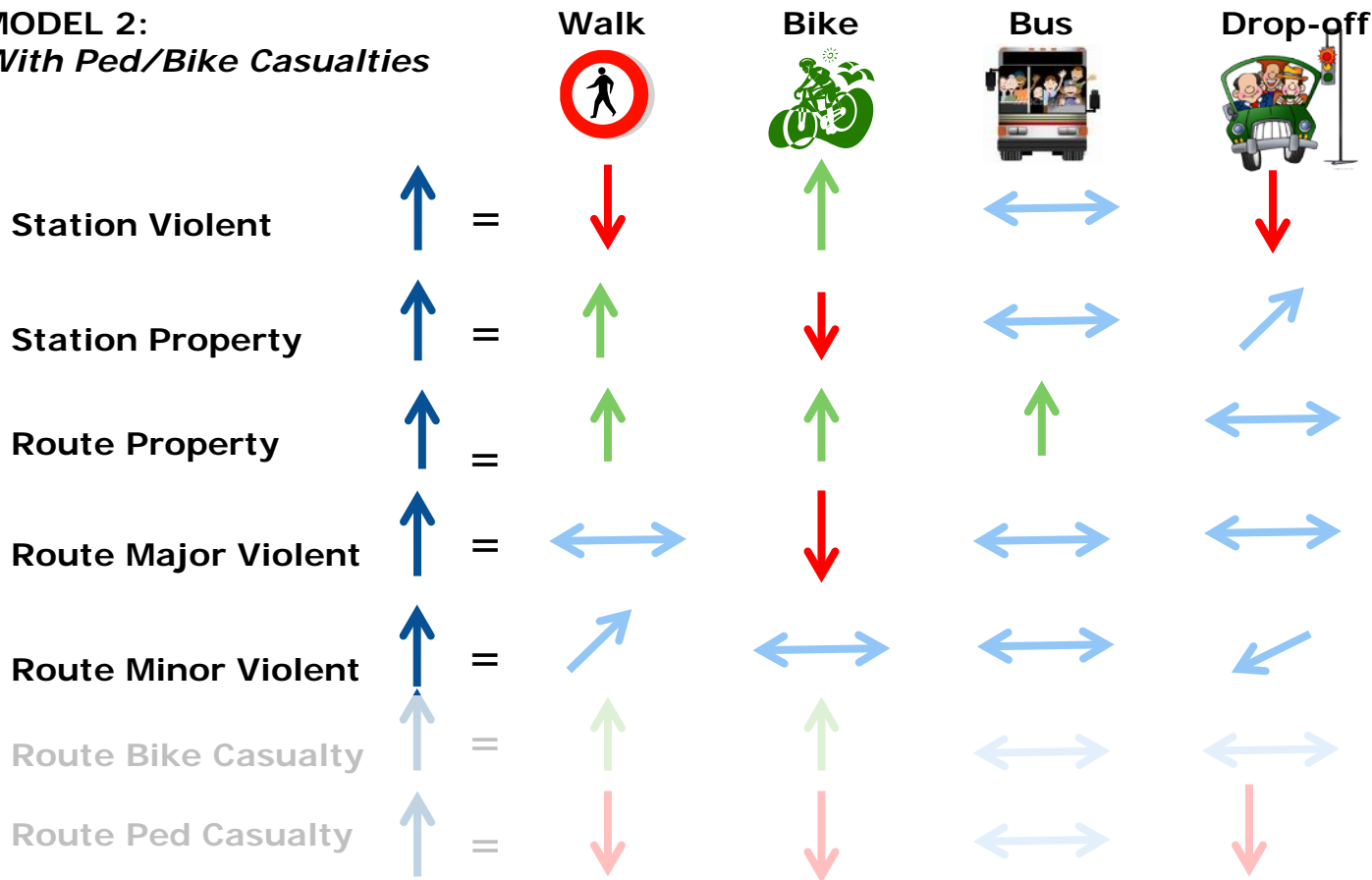
Notes:

\* = p < 0.20

\*\* = p < 0.10

\*\*\* = p < 0.01

## MODEL 2: With Ped/Bike Casualties



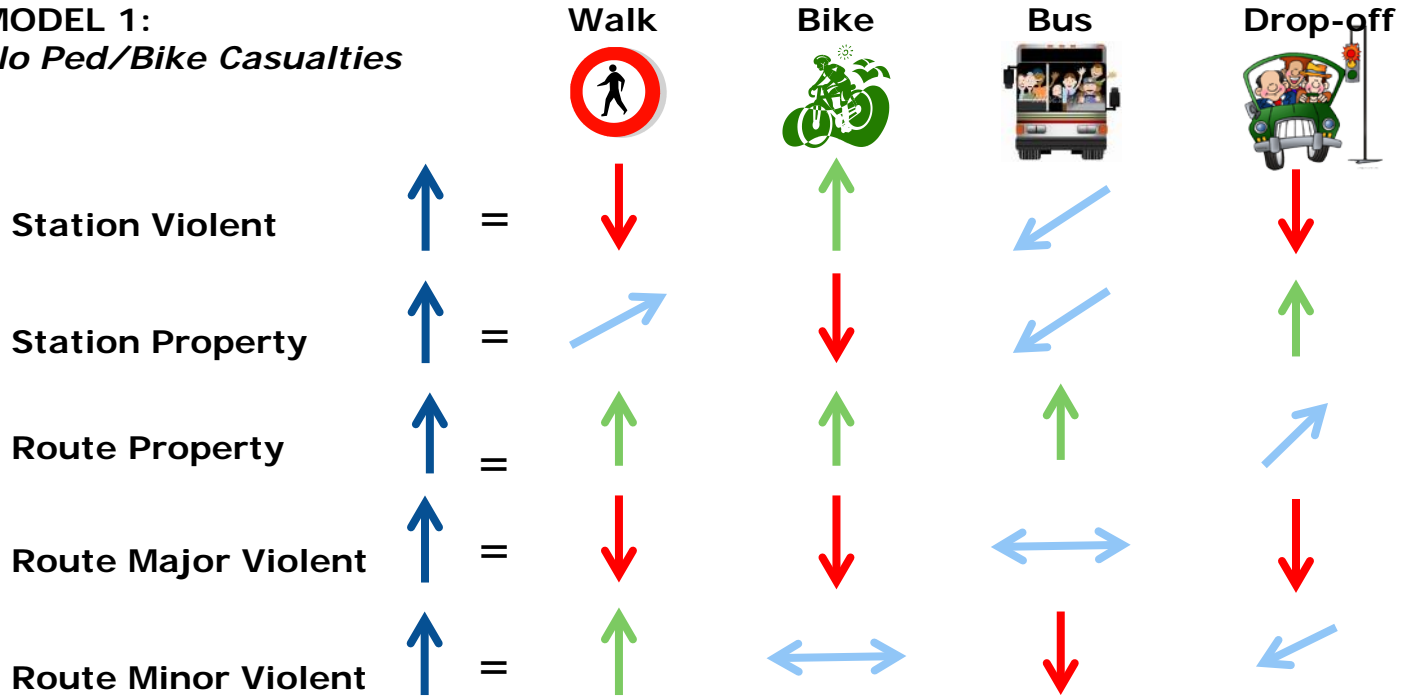
# Crime, Casualties and Mode Choice Model Comparisons

	Nagelkerke adjusted rho -squared .505								Nagelkerke adjusted rho -squared .535							
	walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.	Walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.
StationViolent	-.524	.000***	.228	.039***	-.068	Ns (.410)	-.193	.003***	-.500	.000***	.237	.036***	-.050	Ns (.570)	-.210	.003***
StationProperty	.002	Ns(.497)	-.040	.002***	.002	Ns(.626)	.005	.079**	.004	.109*	-.043	.001***	.003	Ns (.444)	.007	ns(.023)
RtPropertyCrime	.010	.000***	.009	.005***	.009	.007***	.003	Ns(.355)	.004	.063**	.006	.066***	.007	.018***	.001	Ns(.773)
RtViolentCrimMajor	-.008	.050**	-.019	.001***	.002	ns (.778)	-.010	.082***	.003	Ns(.528)	-.012	.044***	.003	.659	-.006	Ns(.354)
RtViolentCrimMinor	.026	.079**	-.001	Ns(.964)	-.044	.114*	-.028	Ns(.266)	.033	Ns(.024)	-.003	Ns(.876)	-.024	.369	-.026	ns(.289)
Bike_Cas_Jobs									.552	.011**	.527	.046***	-.234	Ns(.481)	.300	ns(.282)
Ped_Cas_Jobs									-2.090	.000***	-.746	.006***	.006	Ns(.979)	-.448	.043***

Notes:

- \* = p < 0.20
- \*\* = p < 0.10
- \*\*\* = p < 0.01

## MODEL 1: No Ped/Bike Casualties





# Crime, Casualties and Mode Choice Model Comparisons

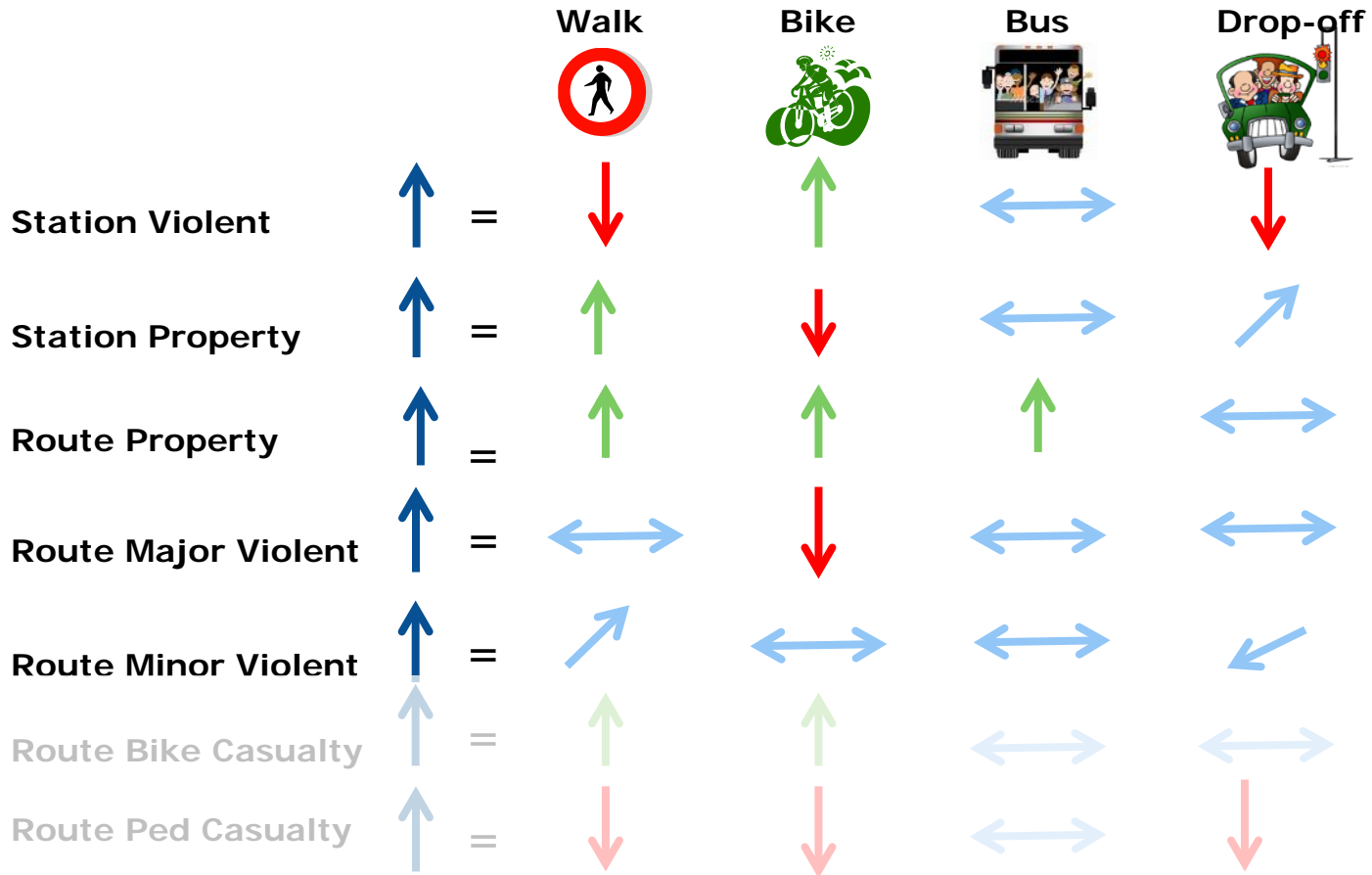
	Nagelkerke adjusted rho -squared .505								Nagelkerke adjusted rho -squared .535							
	walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.	Walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.
StationViolent	-.524	.000***	.228	.039***	-.068	Ns (.410)	-.193	.003***	-.500	.000***	.237	.036***	-.050	Ns (.570)	-.210	.003***
StationProperty	.002	Ns(.497)	-.040	.002***	.002	Ns(.626)	.005	.079**	.004	.109*	-.043	.001***	.003	Ns (.444)	.007	ns(.023)
RtPropertyCrime	.010	.000***	.009	.005***	.009	.007***	.003	Ns(.355)	.004	.063**	.006	.066***	.007	.018***	.001	Ns(.773)
RtViolentCrimMajor	-.008	.050**	-.019	.001***	.002	ns (.778)	-.010	.082***	.003	Ns(.528)	-.012	.044***	.003	.659	-.006	Ns(.354)
RtViolentCrimMinor	.026	.079**	-.001	Ns(.964)	-.044	.114*	-.028	Ns(.266)	.033	Ns(.024)	-.003	Ns(.876)	-.024	.369	-.026	ns(.289)
Bike_Cas_Jobs									.552	.011**	.527	.046***	-.234	Ns(.481)	.300	ns(.282)
Ped_Cas_Jobs									-2.090	.000***	-.746	.006***	.006	Ns(.979)	-.448	.043***

Notes:

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# Crime, Casualties and Mode Choice Model Comparisons

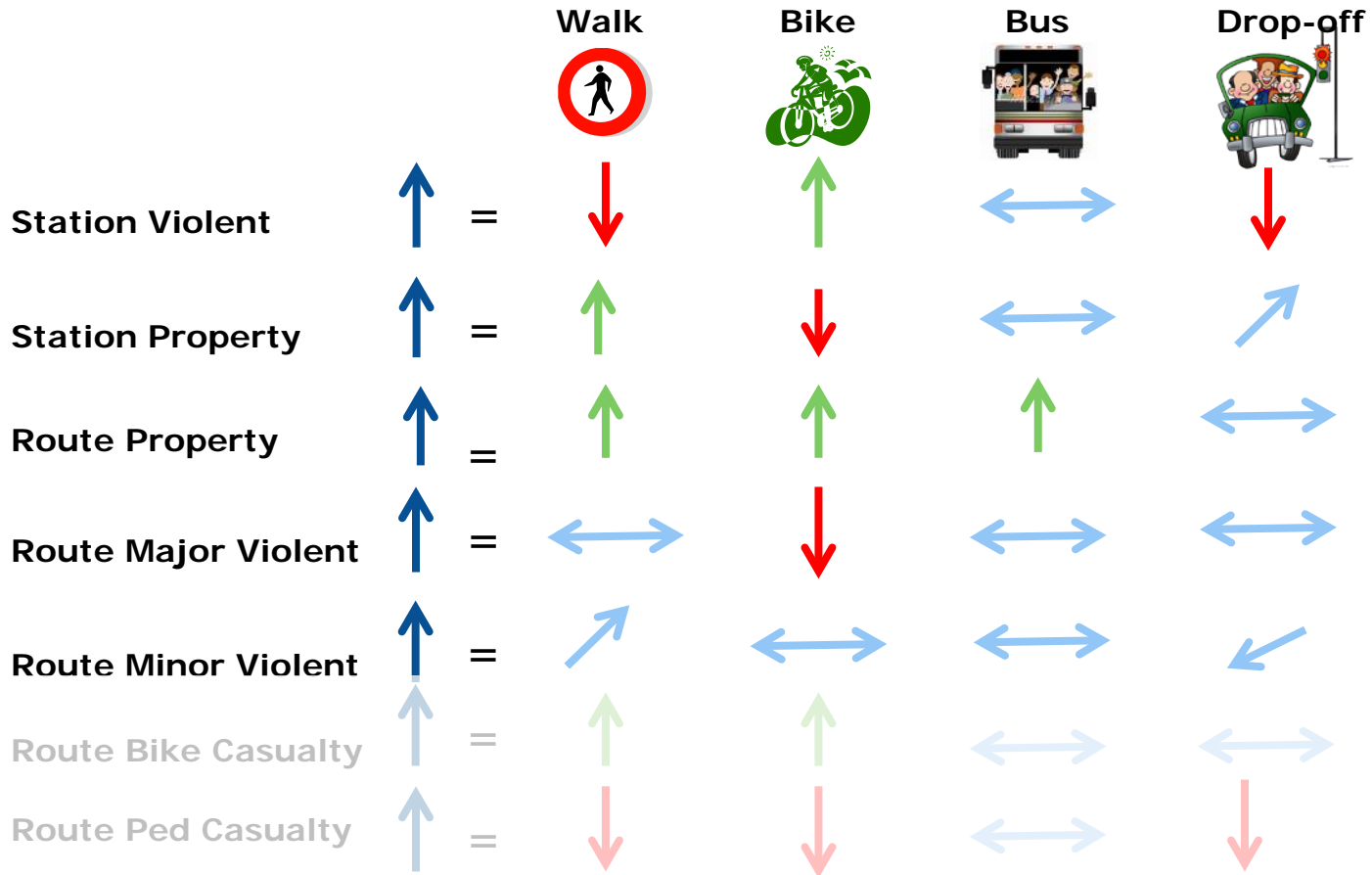
	Nagelkerke adjusted rho -squared .505								Nagelkerke adjusted rho -squared .535							
	walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.	Walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.
StationViolent	-.524	.000***	.228	.039***	-.068	Ns (.410)	-.193	.003***	-.500	.000***	.237	.036***	-.050	Ns (.570)	-.210	.003***
StationProperty	.002	Ns(.497)	-.040	.002***	.002	Ns(.626)	.005	.079**	.004	.109*	-.043	.001***	.003	Ns (.444)	.007	ns(.023)
RtPropertyCrime	.010	.000***	.009	.005***	.009	.007***	.003	Ns(.355)	.004	.063**	.006	.066***	.007	.018***	.001	Ns(.773)
RtViolentCrimMajor	-.008	.050**	-.019	.001***	.002	ns (.778)	-.010	.082***	.003	Ns(.528)	-.012	.044***	.003	.659	-.006	Ns(.354)
RtViolentCrimMinor	.026	.079**	-.001	Ns(.964)	-.044	.114*	-.028	Ns(.266)	.033	Ns(.024)	-.003	Ns(.876)	-.024	.369	-.026	ns(.289)
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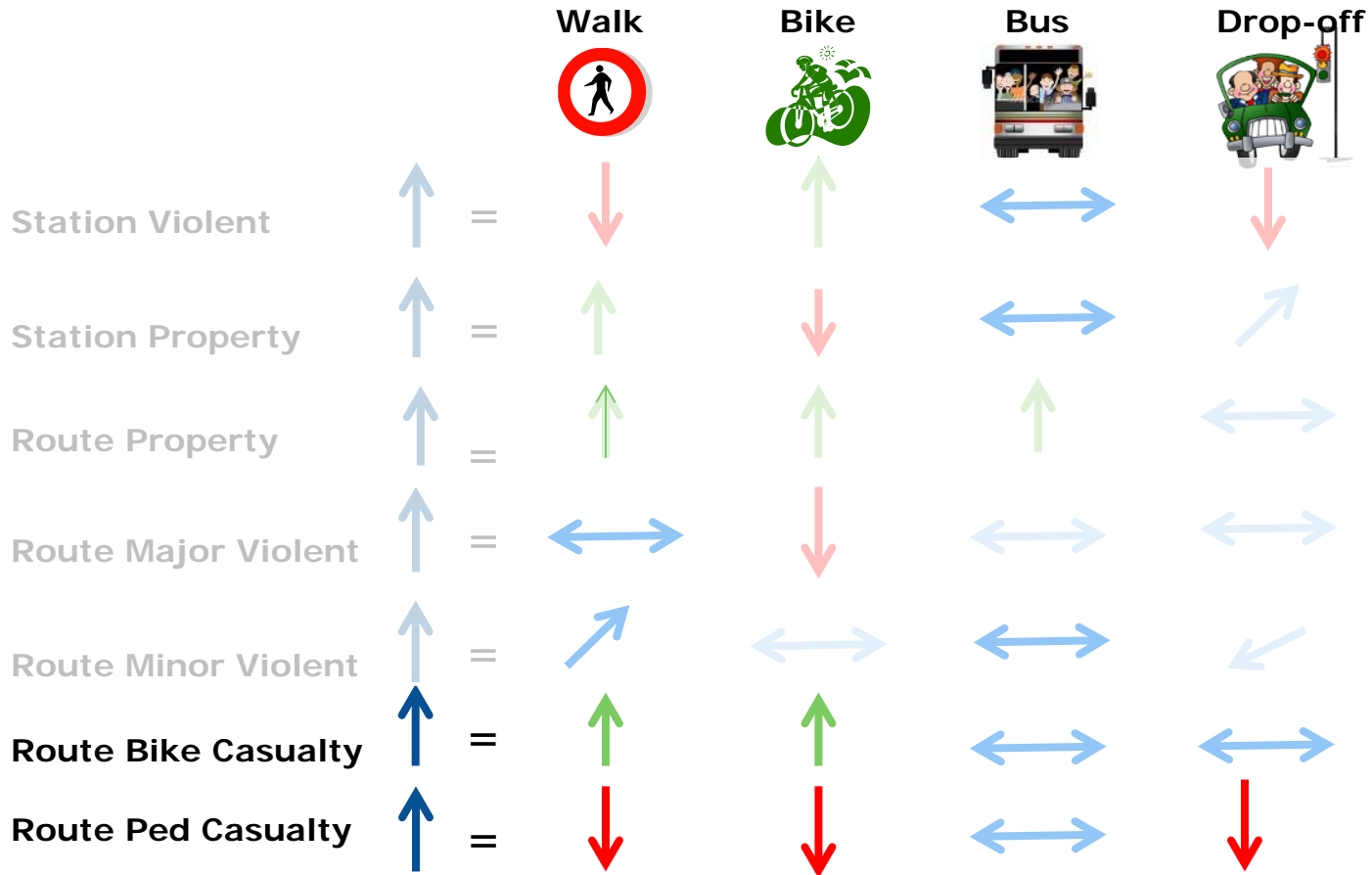


# Crime, Casualties and Mode Choice Model Comparisons

	Nagelkerke adjusted rho -squared .505								Nagelkerke adjusted rho -squared .535							
	walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.	Walk	Sig.	bike	Sig.	bus	Sig.	dropoff	Sig.
StationViolent	-.524	.000***	.228	.039***	-.068	Ns (.410)	-.193	.003***	-.500	.000***	.237	.036***	-.050	Ns (.570)	-.210	.003***
StationProperty	.002	Ns(.497)	-.040	.002***	.002	Ns(.626)	.005	.079**	.004	.109*	-.043	.001***	.003	Ns (.444)	.007	ns(.023)
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RtViolentCrimMajor	-.008	.050**	-.019	.001***	.002	ns (.778)	-.010	.082***	.003	Ns(.528)	-.012	.044***	.003	.659	-.006	Ns(.354)
RtViolentCrimMinor	.026	.079**	-.001	Ns(.964)	-.044	.114*	-.028	Ns(.266)	.033	Ns(.024)	-.003	Ns(.876)	-.024	.369	-.026	ns(.289)
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Notes:

- \* = p < 0.20
- \*\* = p < 0.10
- \*\*\* = p < 0.01



# Crime Casualty, & Mode Choice

- Furthermore, when pedestrian and bicycle casualties are entered into the model, the associations with criminal activity change.
- The main change along the route appears to be the association between violent crimes and mode choice. For example, Part 1 Violent Crimes becomes insignificant, but flipping to a positive sign.
- However, property crimes along the route remain significantly associated with walking.
- Interestingly, property crimes at the station become significant when ped/bike casualties are entered into the model.

# Conclusions

- The results suggest different crimes appear to have different effects on different modes:
  - property crimes deter people who may wish to avoid placing personal property at risk—such as parking a vehicle or a bicycle.
  - Violent crimes along-the-route appear to have a significant deterrent to modes where travelers are more exposed to personal risk, such as walking, bicycling and transit ridership.
  - People who have the option to avoid certain stations with high threats to personal safety, appear to exercise that option, such as people being dropped-off, carpooling and/or driving alone.

# Conclusions

- Furthermore, when pedestrian and bicycle casualties are entered into the model, the associations with criminal activity change.
- The main change along the route appears to be the association between violent crimes and mode choice. For example, Part 1 Violent Crimes becomes insignificant, but flipping to a positive sign.
- However, property crimes along the route remain significantly associated with walking.
- Interestingly, property crimes at the station become significant when ped/bike casualties are entered into the model.

# Hypotheses

- Personal Exposure Hypothesis
  - Exposed vs Enclosed Modes
- Property Exposure Hypothesis
  - Property vs Non-Property Modes (Property Exposure)
- The “Self-Selection” Hypothesis:
  - People understand the risks inherent in the areas they live.

# IMPLICATIONS FOR PRACTICE

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## Policy Relevance

- While we can reducing auto dependency through land use and urban design, these changes take place over the course of years and decades.
- Improved crime and ped/safety intervention strategies hold promise for more immediate benefits and should be considered as part of a larger package to reduce auto dependency and improve health outcomes.





# IMPLICATIONS FOR PRACTICE

- In addition, this study provides the following policy guidance:
  - Improves our understanding of the importance of the connection between various crimes and mode choice, and the location, which can
  - help decisions on where to focus police resources, and finally
  - tie the placement of police resources to important sustainability and public health goals related to transportation choices.

# IMPLICATIONS FOR PRACTICE

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- Transit agencies should consider working in close collaboration with police departments in the jurisdictions surrounding their transit stations in order to reduce crimes, increase non-auto access to their transit systems, and potentially, increase transit ridership overall.





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- Finally, transit agencies, local governments and emergency service providers should consider working collaboratively to integrate crime prevention through environmental design (CPTED) methods into local planning and building codes, and in particular, into transit-oriented development (TOD) plans and policies.
  - This will maximize the beneficial effects of TOD over the long term, since it will help create safe, transit- and ped/bike-oriented communities around transit stations.



# Conclusions—Future Research & Implications for Practice



appreciate your thoughts.  
thank you very much!

