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Pedestrian Safety and Culture Change

Ron Van Houten
Western Michigan University

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Pedestrian Safety

Almost Everyone is a Pedestrian

- 12 Percent of Traffic Fatalities
- Most occur in cities
- Many occur at night

Many Say Pedestrian Safety is a Shared Responsibility

Safety Assessments

- Begins with examination of crash reports
- At sites examine conflicts or incidents
- Examine unsafe behaviors that could be related to the crash type

Treatment Strategies

- Prompting
- Feedback Systems
- Increasing or Reducing Effort
- Increasing or Reducing Wait Time
- Incentive Systems

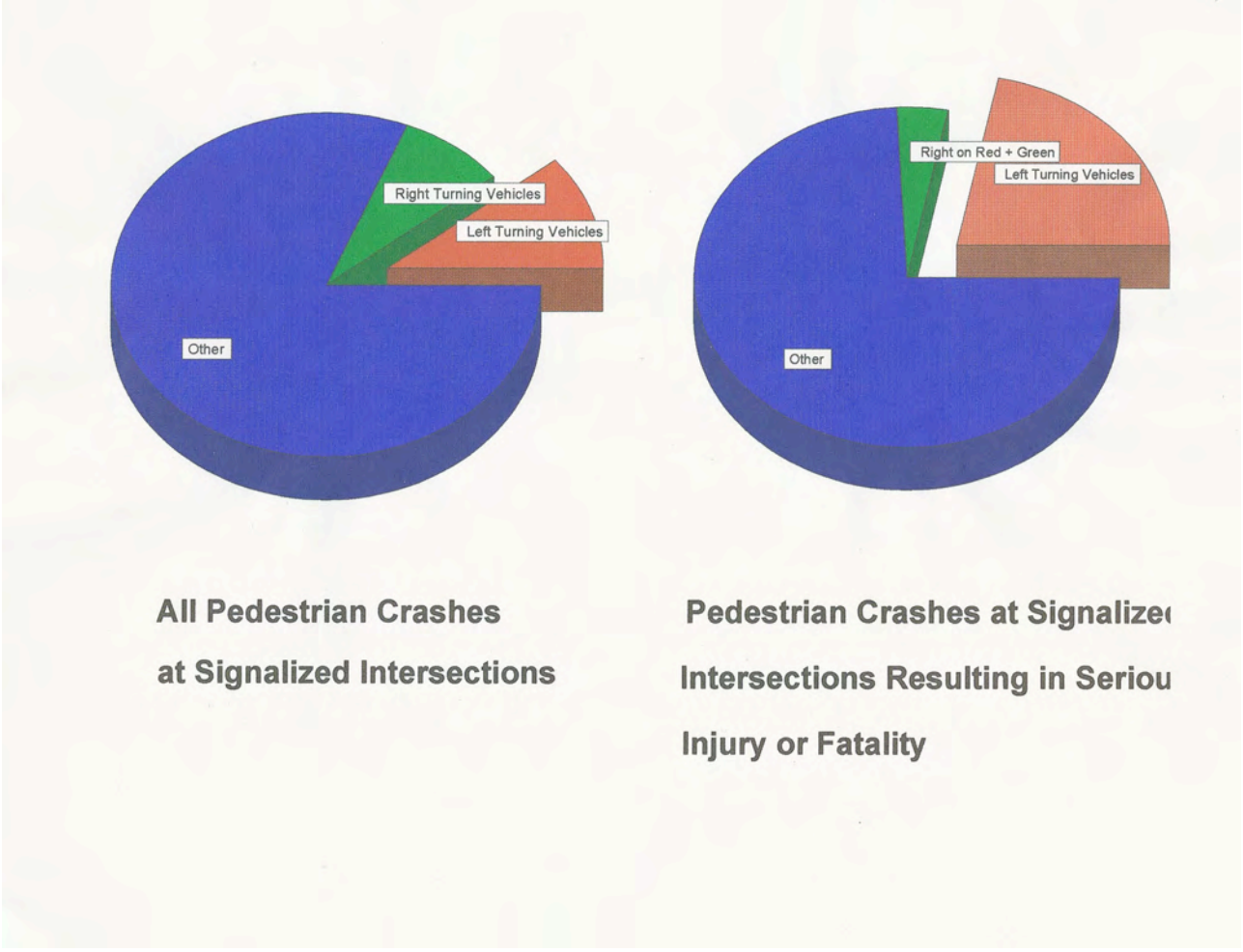
Special Concerns

- Screening Crashes
  1. Dangers of midblock multilane
  2. Turning vehicles A pillar
- Failure to Scan for Pedestrians
  1. Drivers turning right
  2. Drivers turning left
  3. Speed narrows field of vision

Traffic Signals

- Advance or Offset Stop Bars
- Leading Pedestrian Phase
- Hot buttons
- Buttons that confirm press
- Wide turning radius and wide lanes
- Countdown signals and signals that remind you to look
- Signs that prompt drivers of turning vehicles to look

Where do you look



It matters which direction you cross

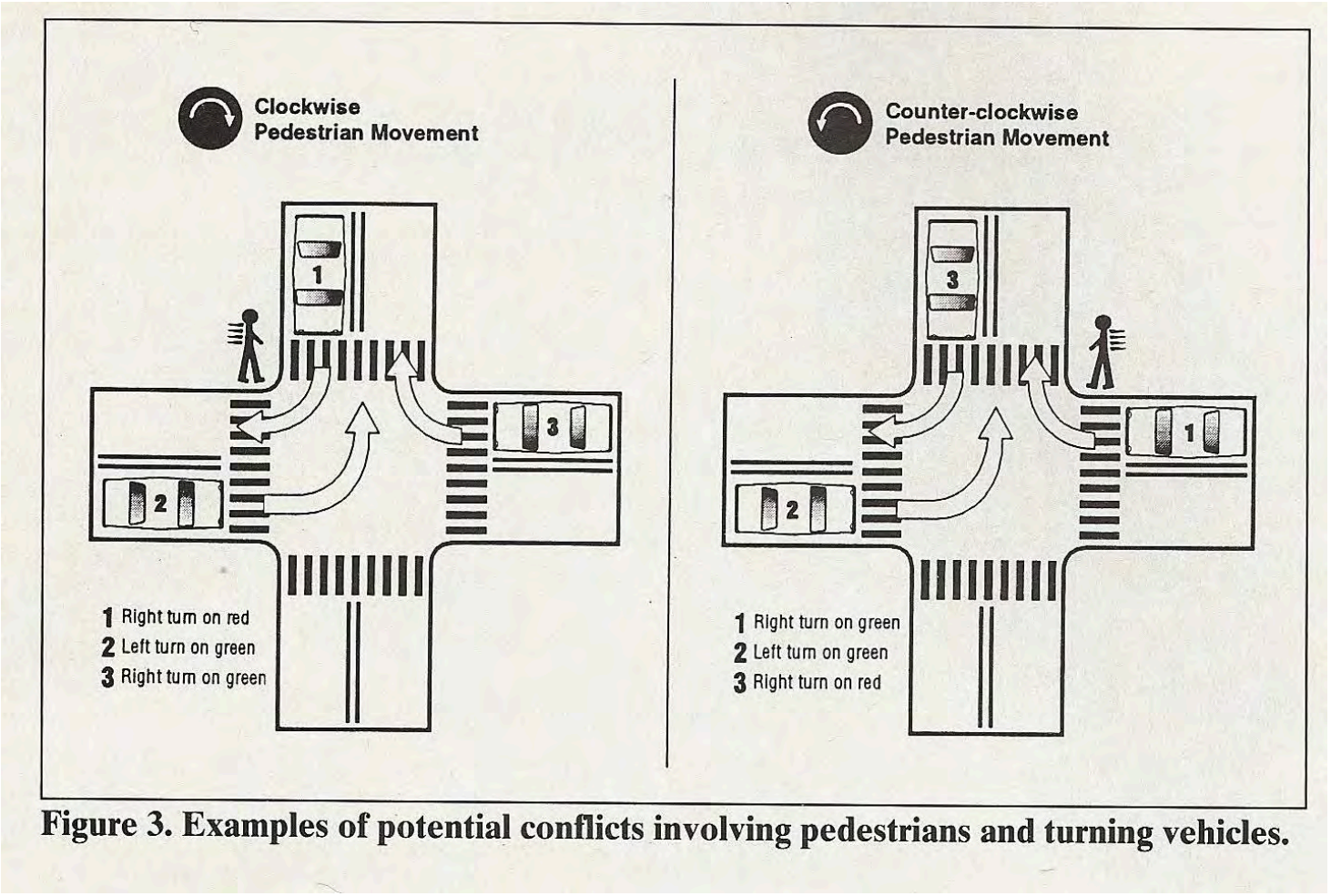
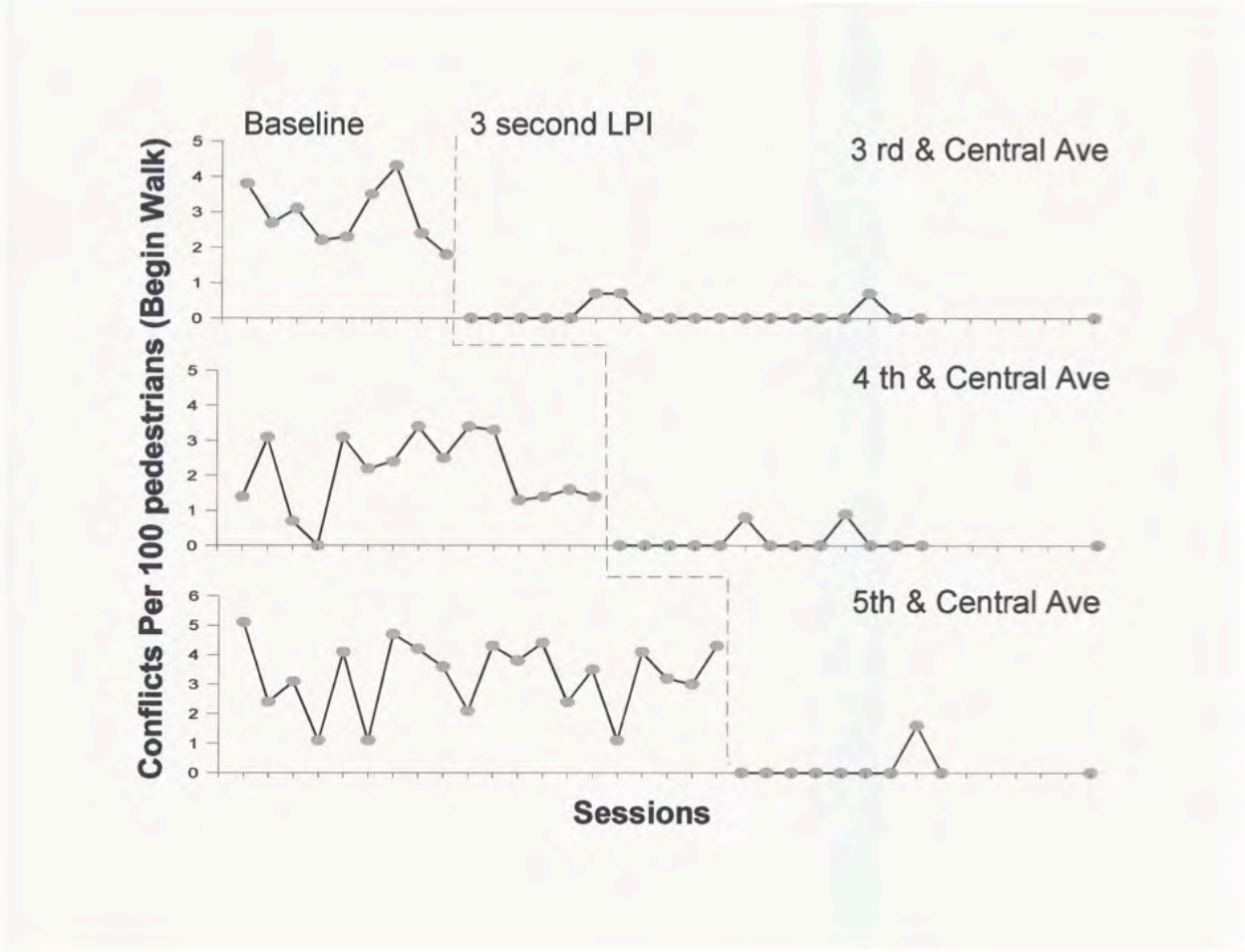


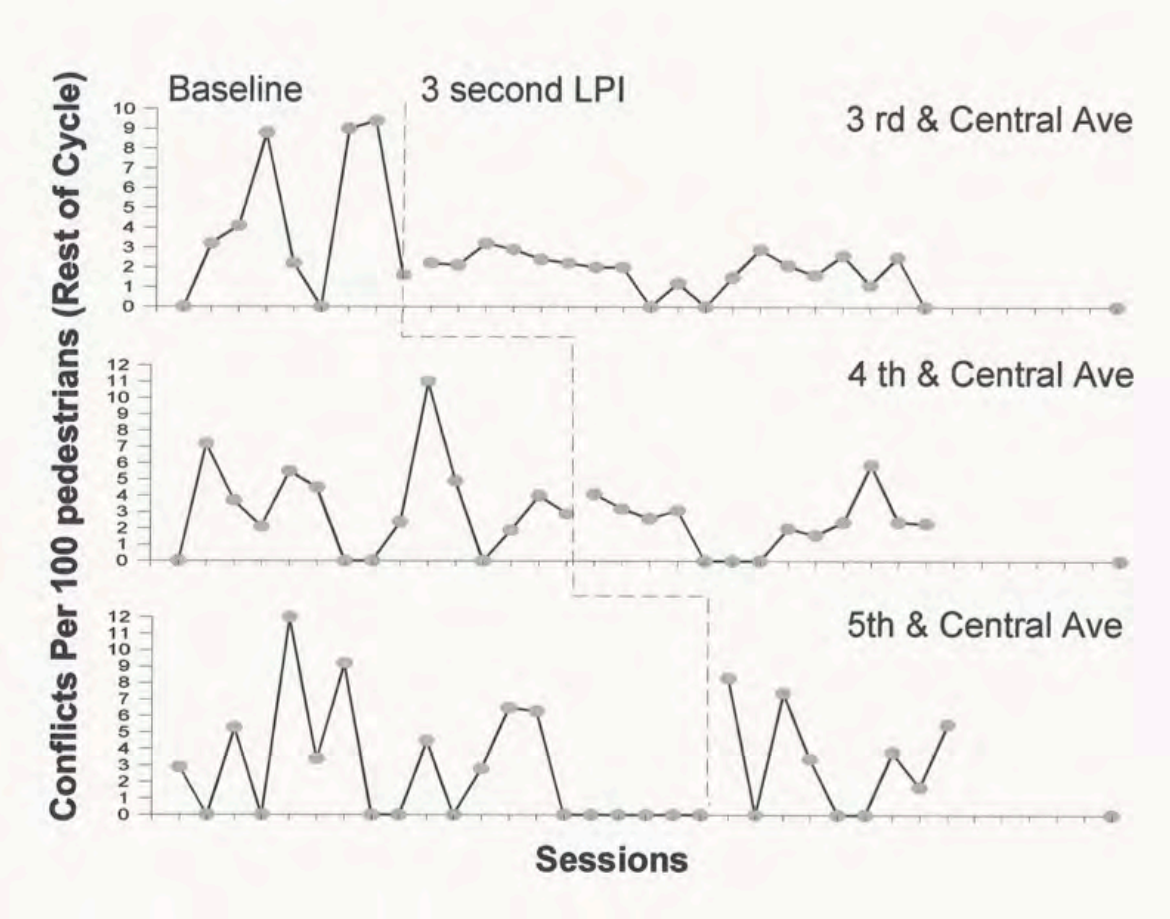
Figure 3. Examples of potential conflicts involving pedestrians and turning vehicles.

Use of Advance Stop Lines

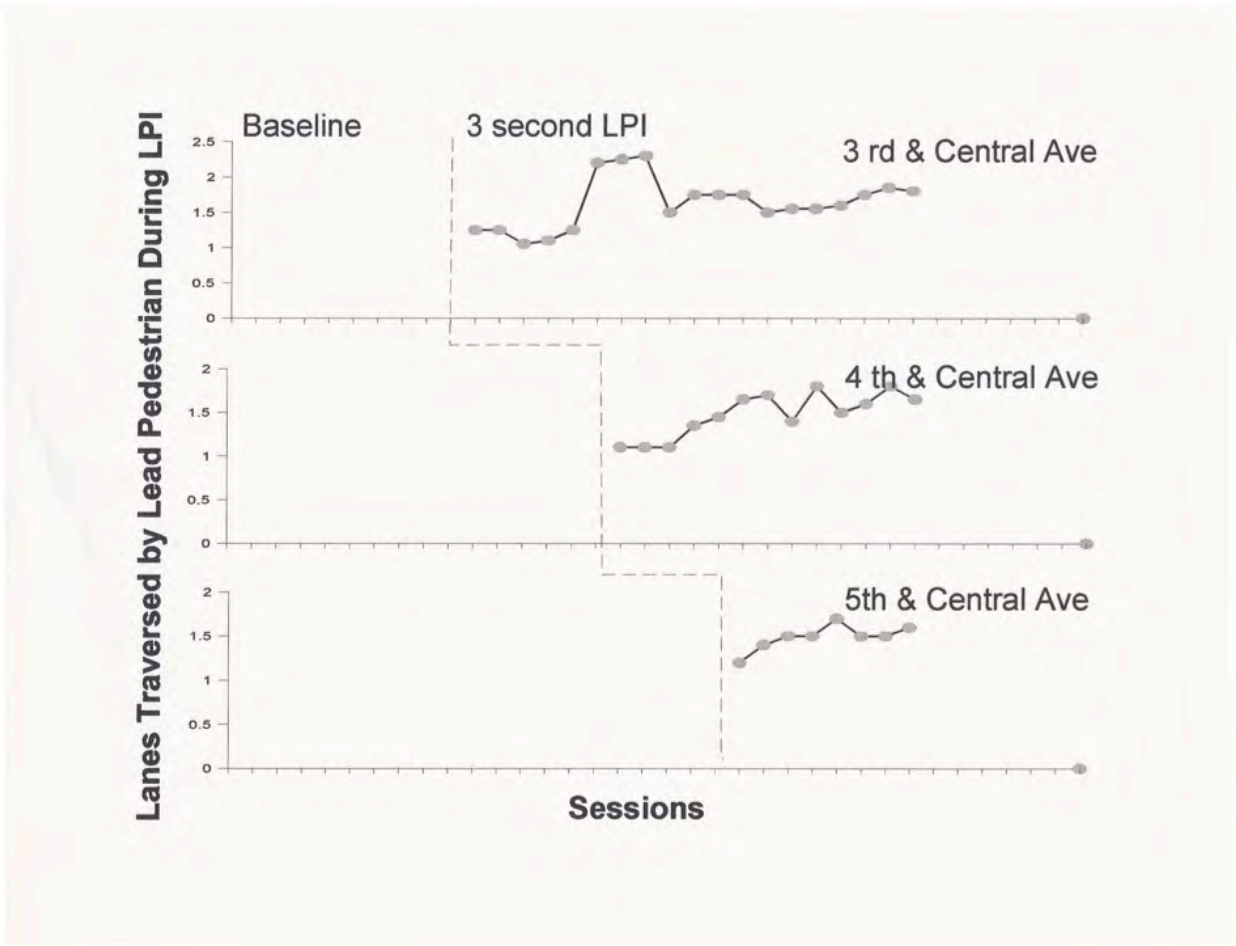

WALK

Leading Pedestrian Phase

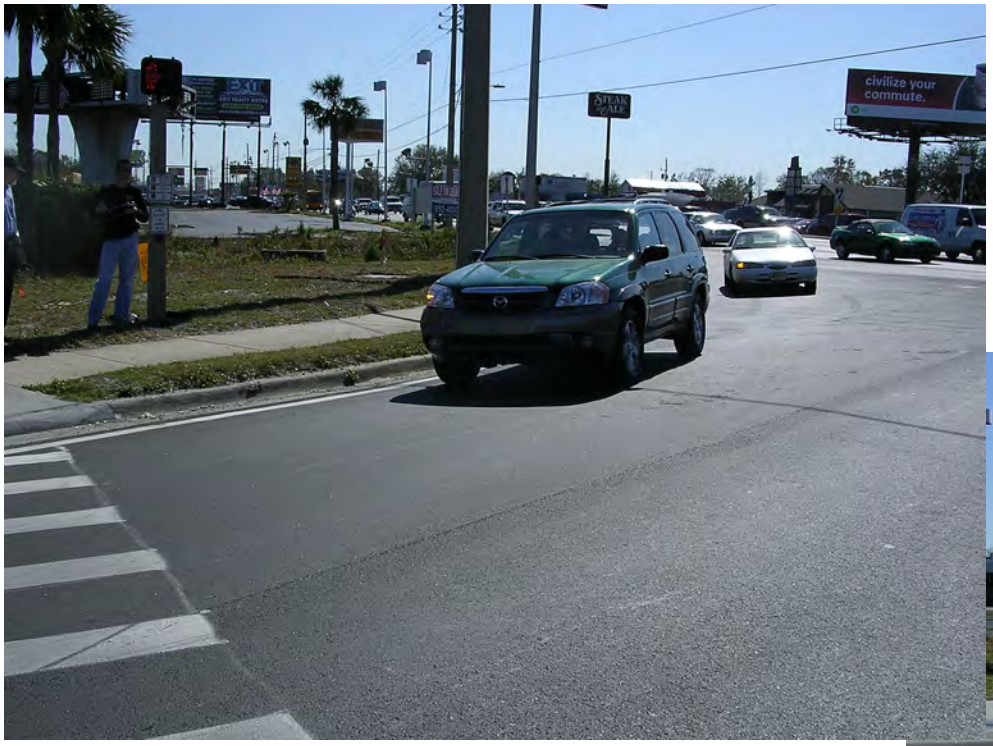


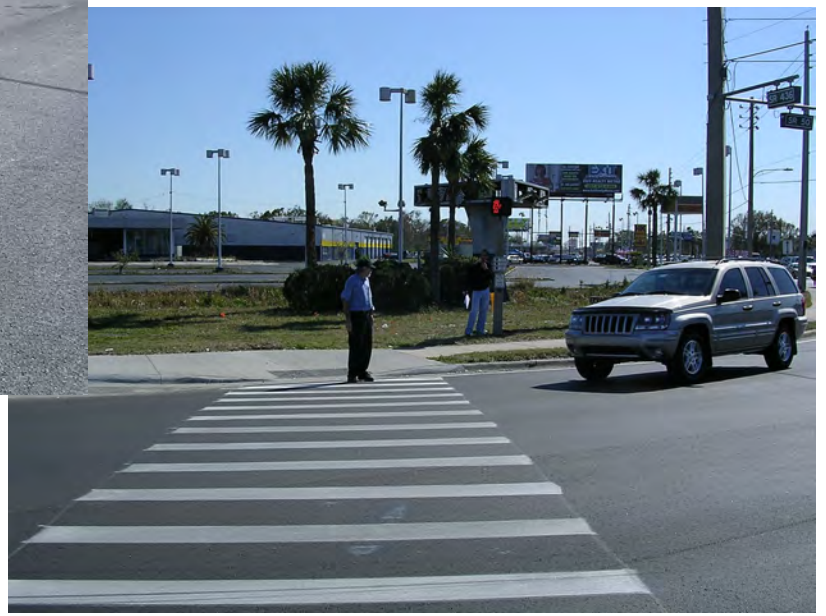

Baseline
3 second LPI
3 rd & Central Ave
4 th & Central Ave
5th & Central Ave
Conflicts Per 100 pedestrians (Rest of Cycle)
Sessions

Like taking a lead in baseball



Reduce Turning Radius





Turning Radius and Conflicts

Countdown Signals and SignalEyes

Signaleyes

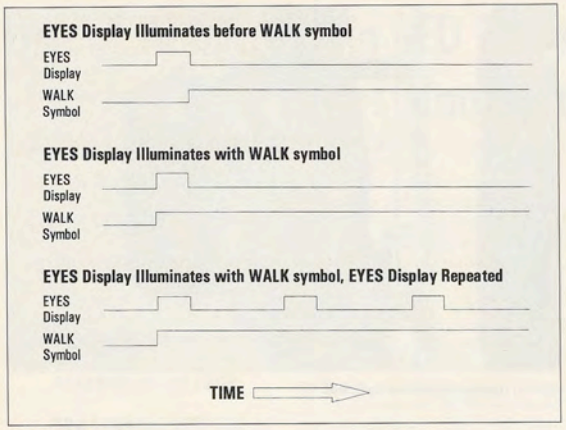


Figure 2. Event diagram.

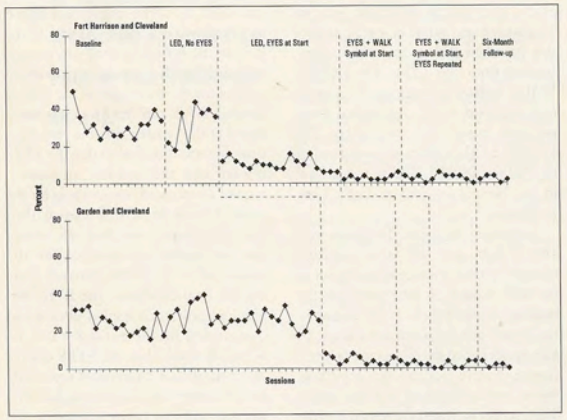


Figure 3. Percentage of pedestrians who did not look for turning vehicles and crossed at start of WALK interval.

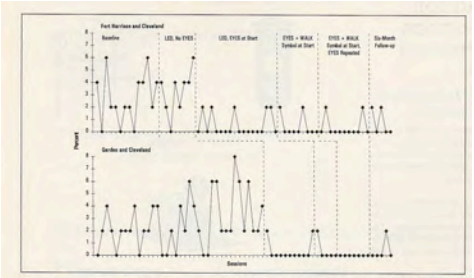


Figure 4. Percentage of pedestrians crossing within three seconds of start of WALK interval who had conflicts with turning vehicles.

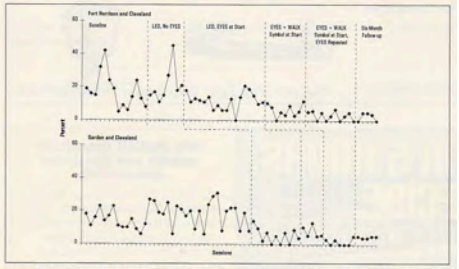


Figure 5. Percentage of pedestrians crossing during remainder of WALK interval who did not look for turning vehicles.

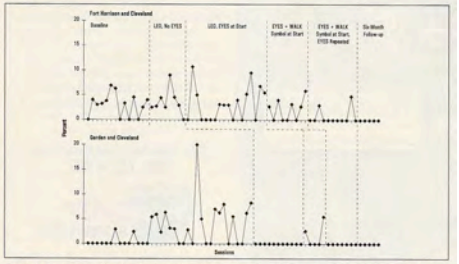


Figure 6. Percentage of pedestrians crossing during remainder of WALK interval who had conflicts with turning vehicles.

Prompting Signs

- Signs advertising increased
- enforcement at crosswalks

Hot Button

- Vehicle Speed - Faster Vehicles More risk
- Gap Size - Shorter Gaps More Risk
- Crosswalk Length - Greater length More Risk
- Number of lanes to cross – more lanes more risk
- Directions that need to be watched. Ones Way Seems Less Risky Than Two Way Traffic
- Presence of absence of a median or pedestrian refuge island

The Less Comfortable the Pedestrian The Higher The Probability of a Violation

Factors Related to Comfort

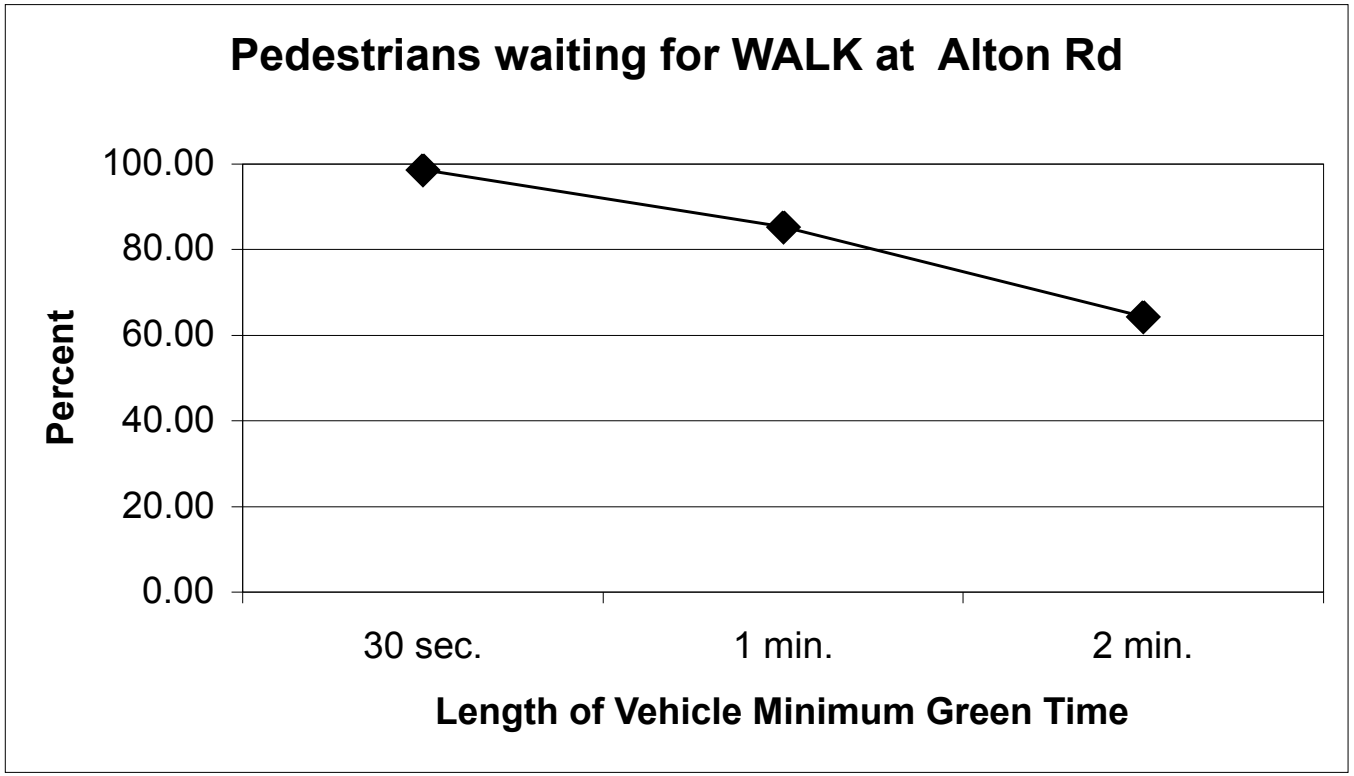
- Temperature Extremes
- Rain, Snow and Wind
- Whether the Pedestrian is dressed for the conditions

Solution: Provide Shelter from Elements

Availability of Concurrent Behavior. Waiting is Easier When Activities are Made Available

- Something to Listen to Such as Music.
- Something to Look at. Flowers, Interesting Displays. Something to read
- Provide interesting messages
- This is why they give children crayons in restaurants. Adults work the same way

Relationship between violation and minimum green time



Uncertainty Reduces Compliance

- Uncertainly About Whether The Push Button Works
- Uncertainty About How Long You Need to Wait
- Uncertainty About How Much Time is Left to Cross
- Solutions: Provide Push Button that Confirms Press (Why not use an APS Signal?). Use Countdown Timers. These Increase the Percentage of Pedestrians Waiting.

Other Variables

- Prompting pedestrians to remind drivers to yield
- Enforcement of pedestrian right-of-way laws
- Teaching people how to safety cross the street

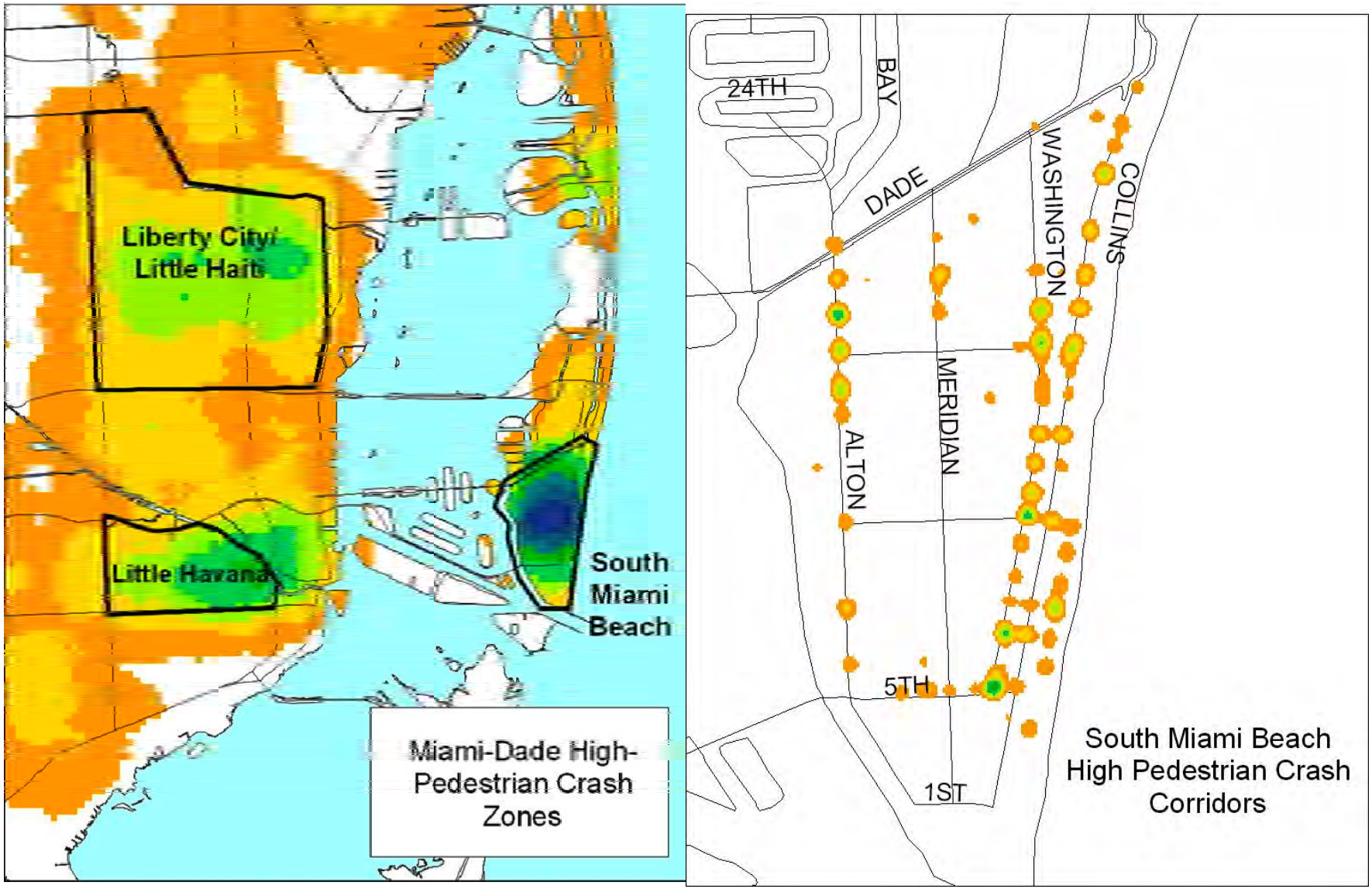
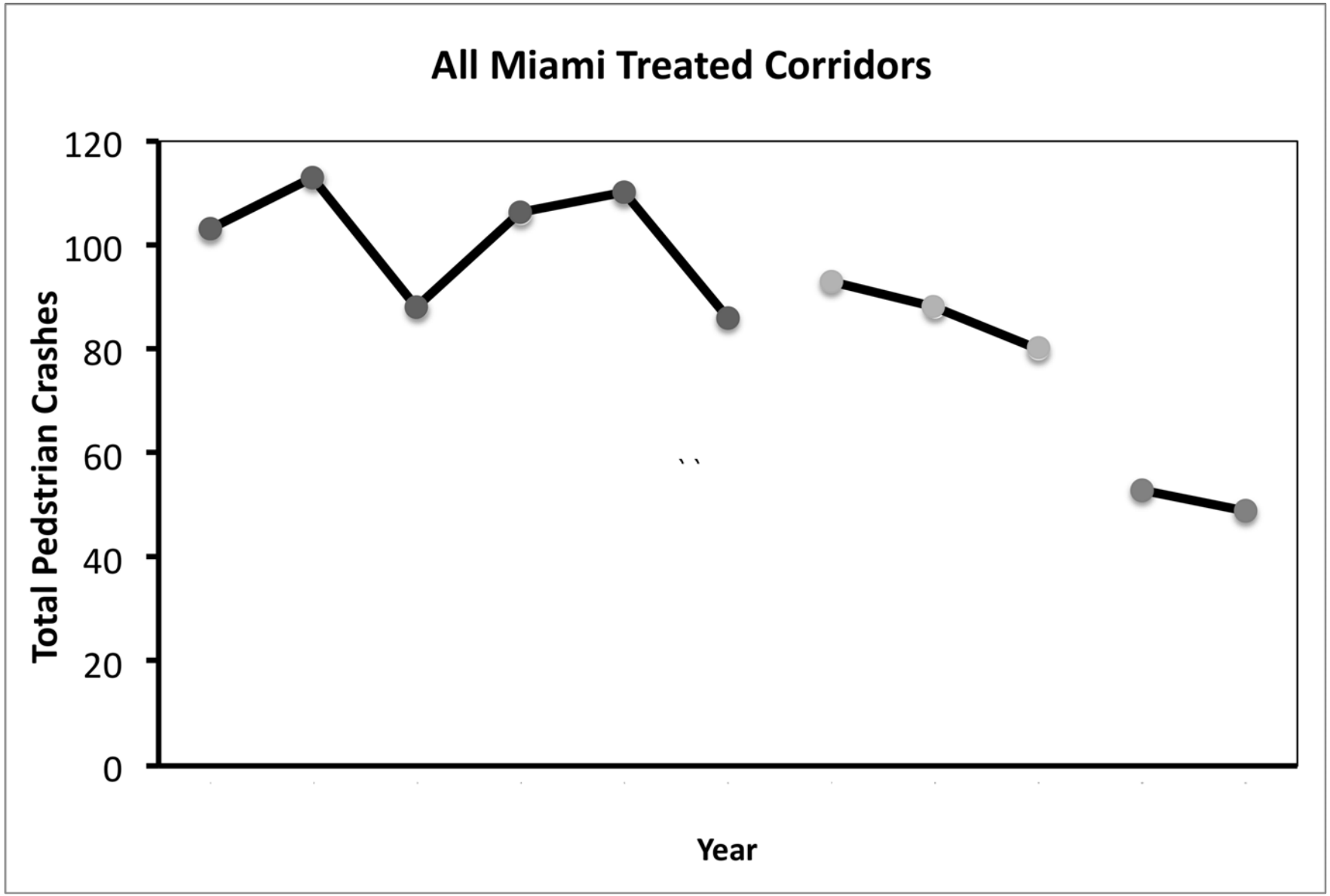


Figure 1. Miami-Dade High Pedestrian Crash Zones.


All Miami Treated Corridors
120
100
80
60
40
20
0
Total Pedstrian Crashes
Year

Behavior Principles for Signs, Markings, and Signals

- These most often function as prompts that guide behaviors
- They should be effective S^Ds
- They should provide feedback and consequences if possible.

Handling the dilemma zone

The Formula:
Time = signal clearance interval in seconds
Time = t + v/(2a +2Gg)

- **t = driver reaction time**
- **v = vehicle velocity**
- **a = safe deceleration rate**
- **G = gravitational constant**
- **g = grade of road**

- ✓ The time is multiplied by the posted speed to calculate the distance.
- ✓ The driver must be beyond the cone when the pedestrian enters the crosswalk for a valid stop.

Assuming no grade

Speed Limit (mph)	15	20	25	30	35	40
Distance (ft)	46	73	102	140	183	234

Assuming no significant grade, table shows cone placement distance based on vehicle speeds

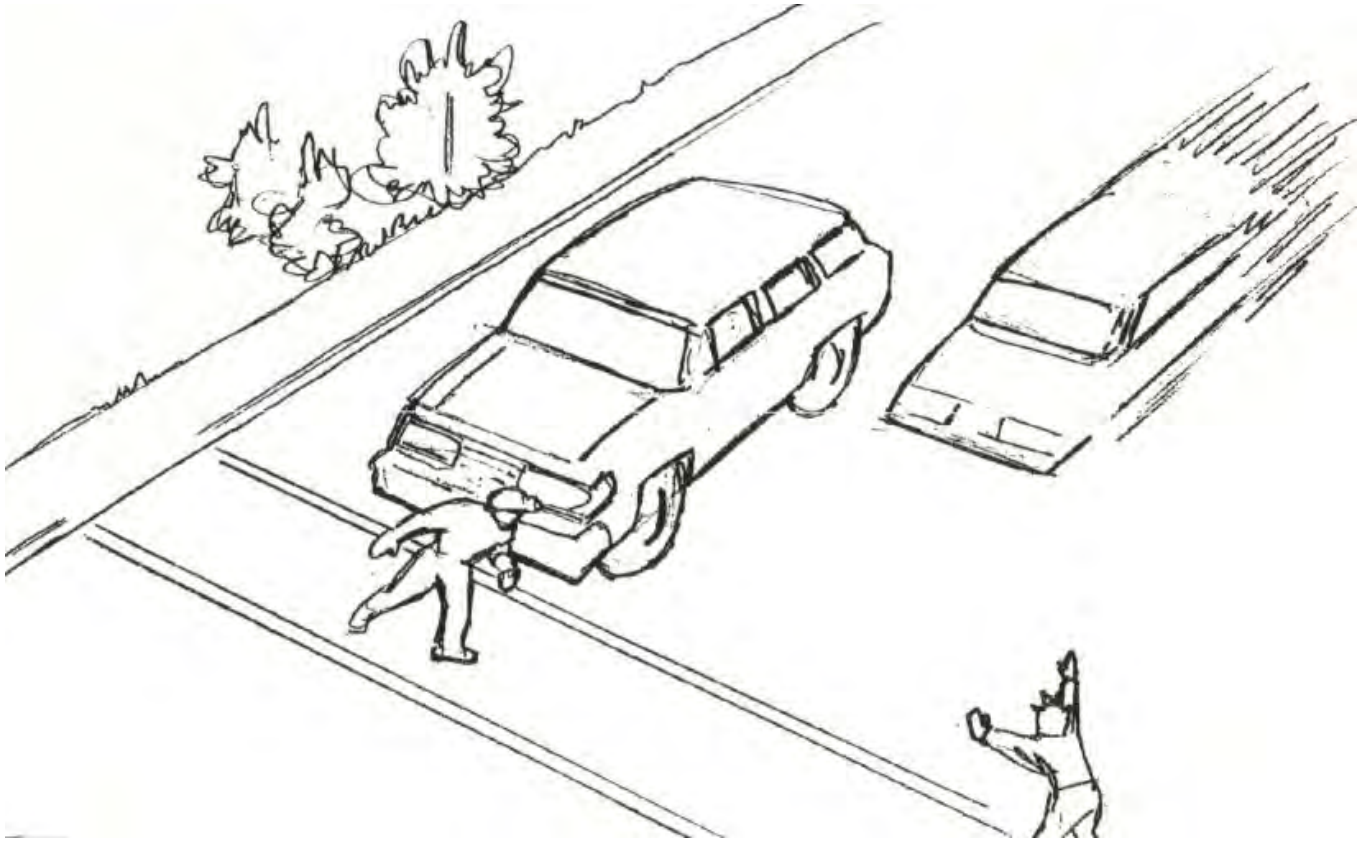
Distances measured from nearest crosswalk line to where cone is to be placed

These distances hold for dry pavement and daylight

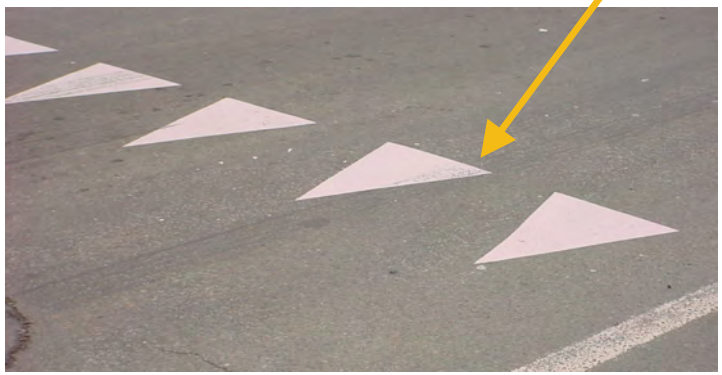
Reducing Screening Crashes

- Advance Stop Lines and Yield Markings
- Rectangular Rapid Flashing Beacons (RRFB)
- Hybrid Beacon
- In-Street Signs

It is dangerous when cars stop to close




YIELD
HERE
TO



Data from 24 site study

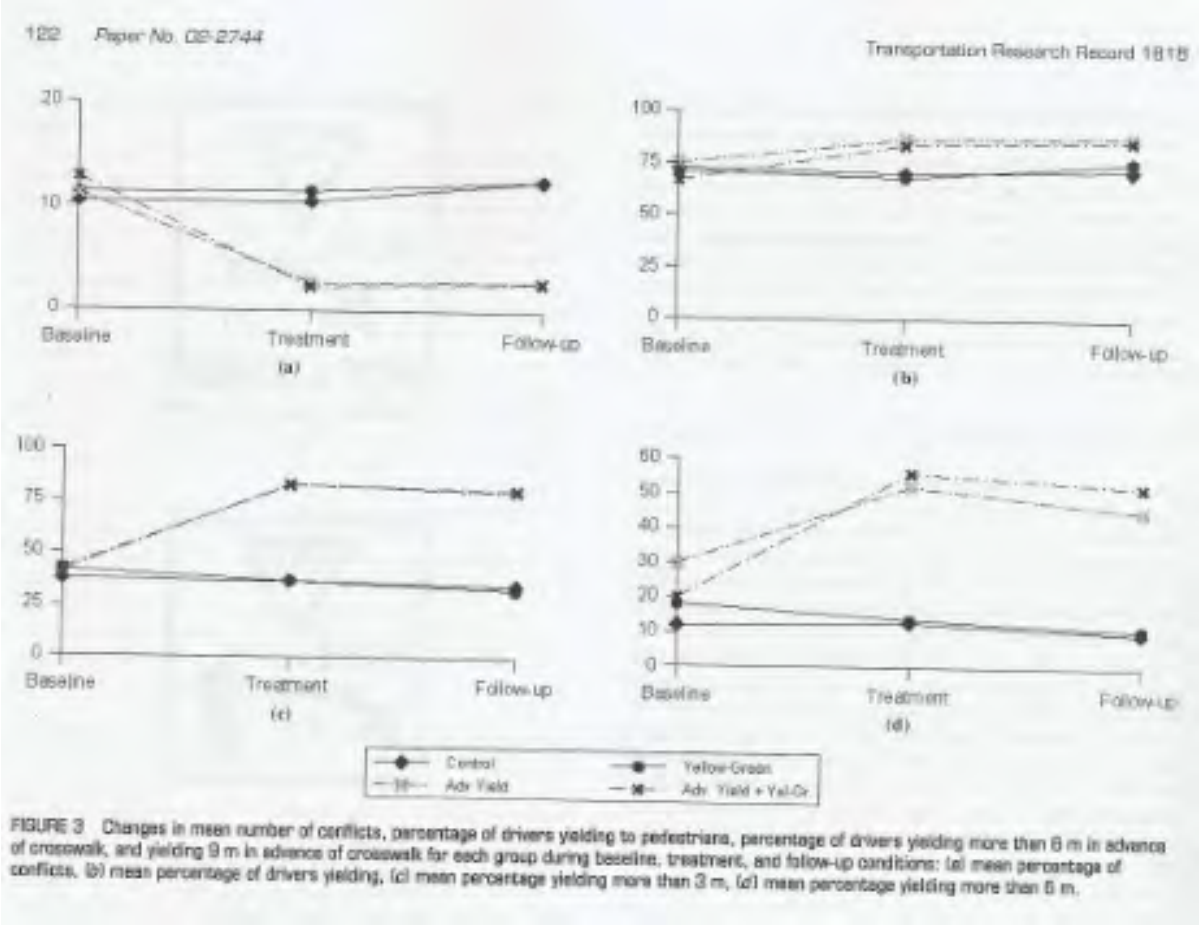


FIGURE 3 Changes in mean number of conflicts, percentage of drivers yielding to pedestrians, percentage of drivers yielding more than 6 m in advance of crosswalk, and yielding 9 m in advance of crosswalk for each group during baseline, treatment, and follow-up conditions: (a) mean percentage of conflicts, (b) mean percentage of drivers yielding, (c) mean percentage yielding more than 3 m, (d) mean percentage yielding more than 6 m.

Component Analysis

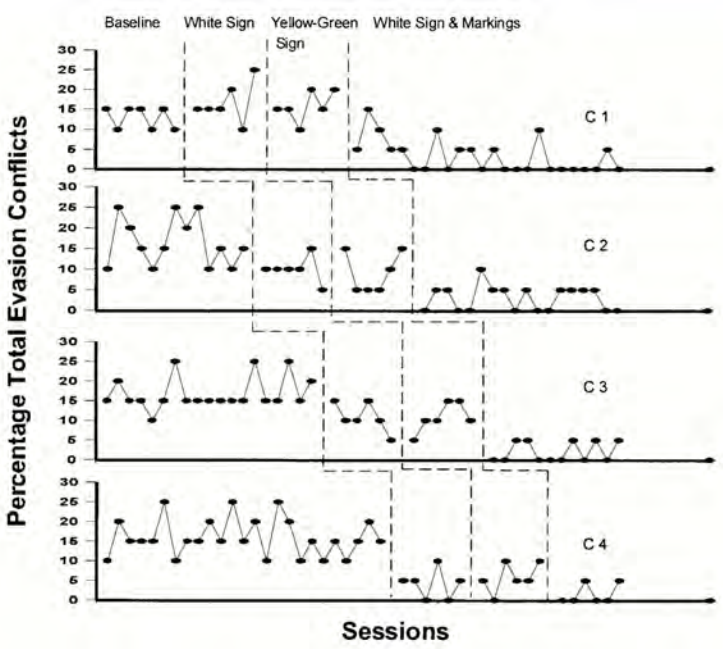
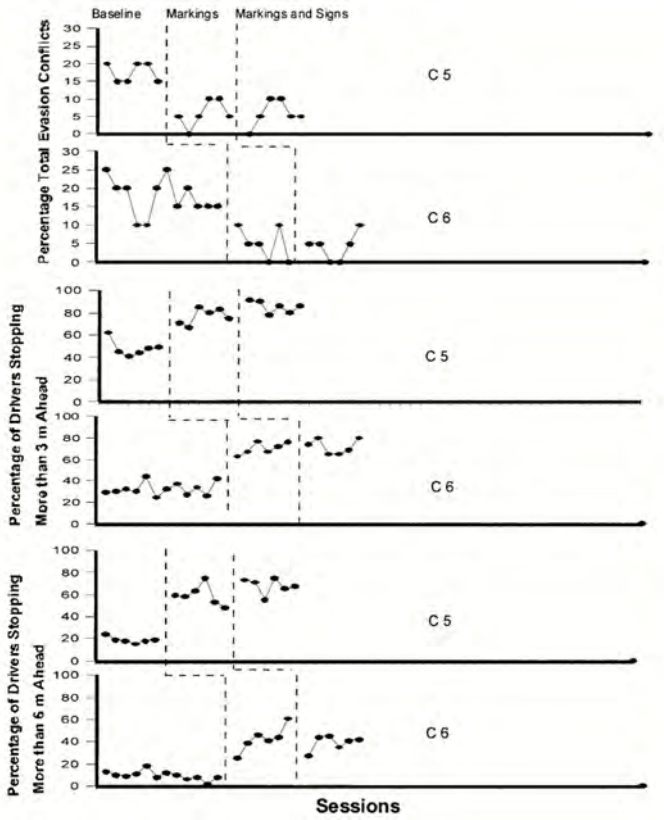
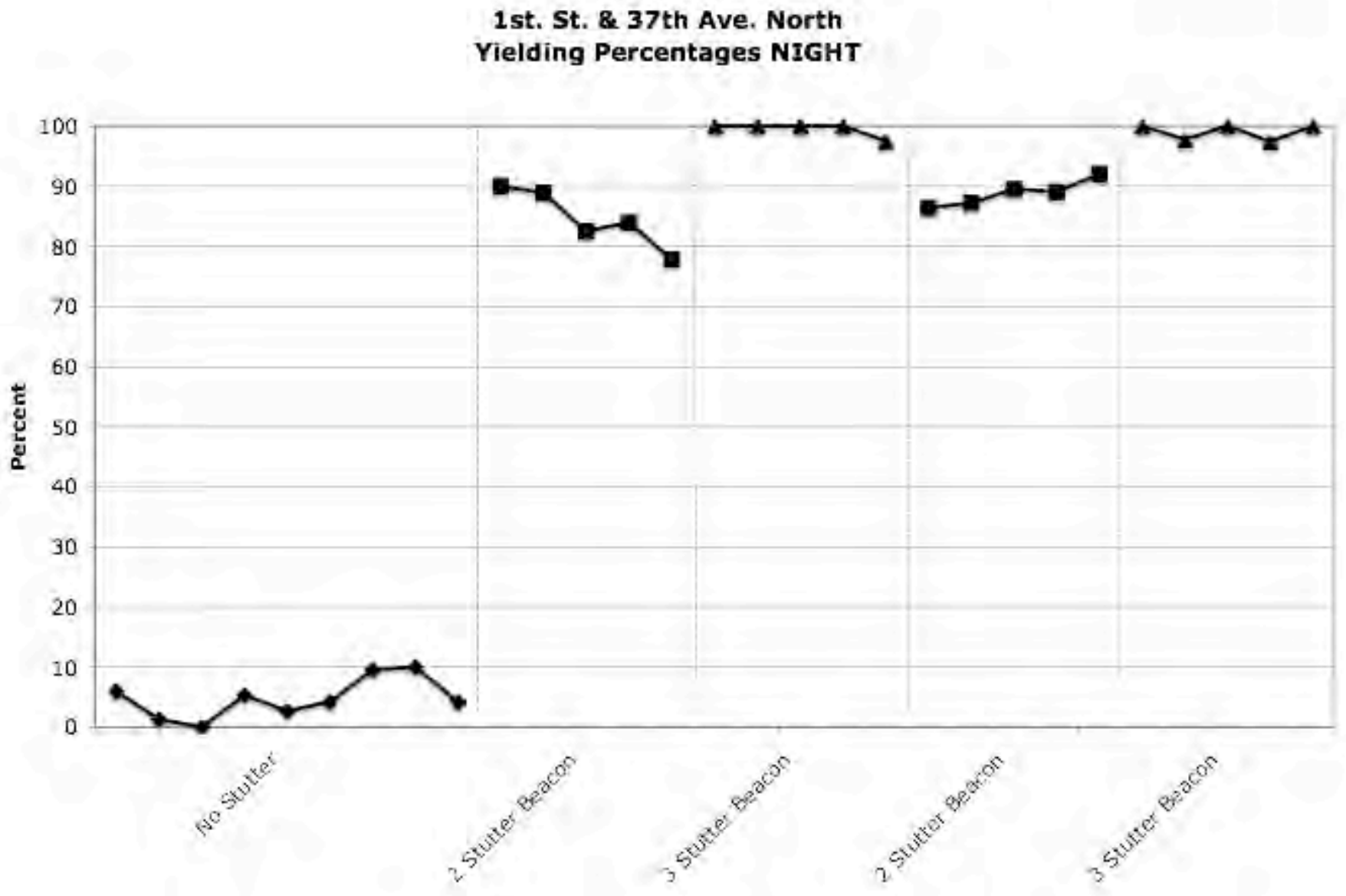


Figure 3. Percentage of total evasion conflicts during each session of Experiment 1.



RRFB

Night Data


1st. St. & 37th Ave. North
Yielding Percentages NIGHT
Percent
100
90
80
70
60
50
40
30
20
10
0
No Stutter
2 Stutter Beacon
3 Stutter Beacon
2 Stutter Beacon
3 Stutter Beacon

RRFB

Data From Miami Sites

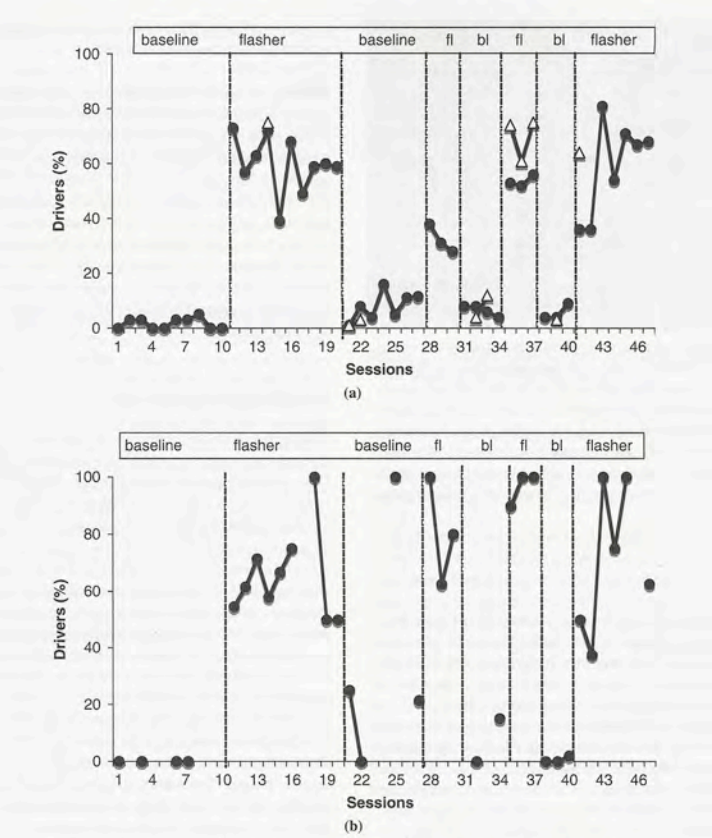


FIGURE 3 Percentage of drivers yielding for crosswalk at Northwest 67th and Main Streets during each experimental condition: (*a*) staged pedestrians and (*b*) local resident pedestrians. (Filled circles represent percentage who yielded for daytime crossing, and unfilled triangles show data for nighttime probe crossings.)

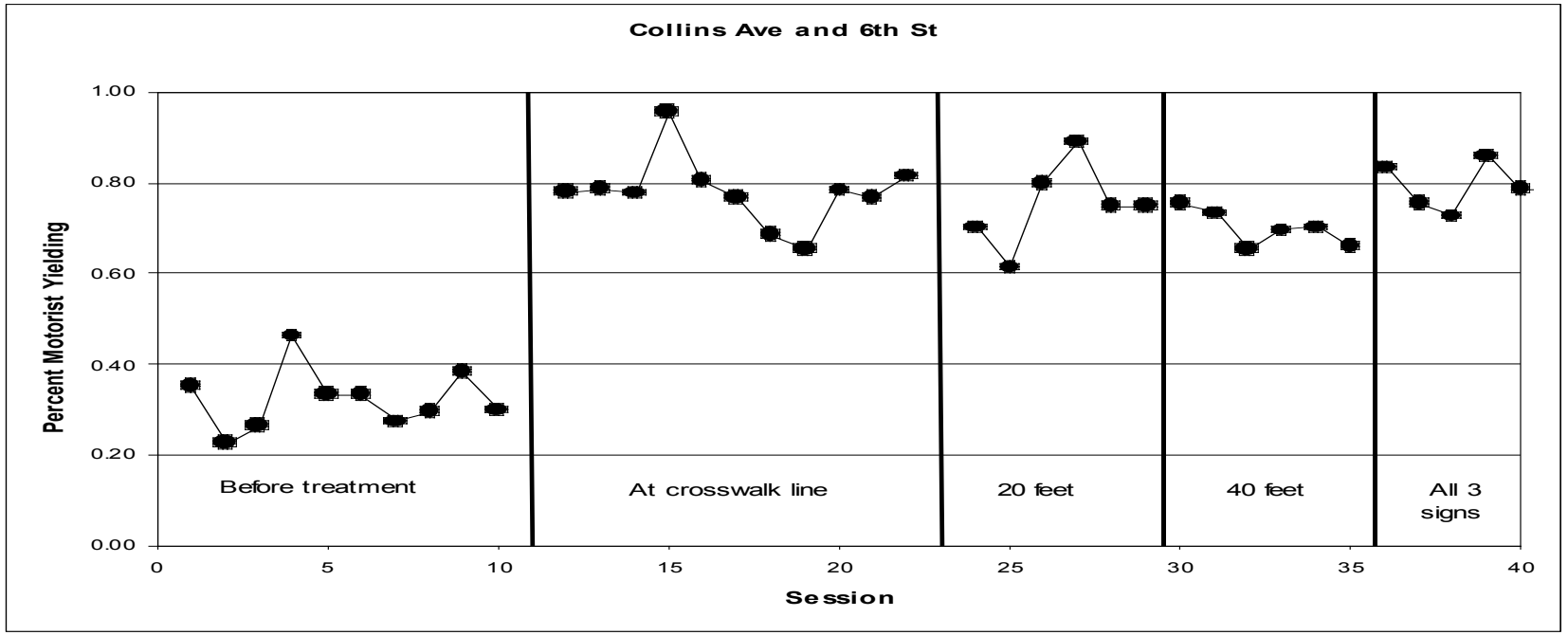
Data From 19 Sites

Site	Day (Percent)								
	Baseline (Percent)	7	30	60	90	180	270	365	730
la									
treet south of 54th Avenue S	0	54	76	N/A	59	N/A	91	75	83
reet at 18th Avenue S	0	63	72	N/A	69	N/A	69	80	80
venue N and 7th Street	0	97	96	91	93	92	91	98	96
enue N and 26th Street	0	80	82	85	95	81	88	77	78
venue N and 5th Street	8	87	89	92	92	87	96	92	95
Luther King Street and 15th e S	1	86	84	85	82	N/A	89	88	88
Luther King Street and venue N	0	96	94	80	82	83	88	82	83
enue N and 13th Street	2	85	87	75	78	N/A	91	88	N/A
enue N and 25th Street	0	86	90	83	90	N/A	88	81	79
eet and 37th Avenue N	0	79	87	85	87	N/A	90	97	95
treet and 3d Avenue N	0	85	84	85	85	79	92	82	88
l Avenue and 61st Street	0	94	95	77	73	72	79	67	72
enue S and 61st Street	5	68	72	73	75	72	90	72	78
enue N and 61st Street	0	75	75	68	82	42	76	79	83
venue N and Macoma Drive	0	86	93	91	73	88	84	80	90
enue N and 45th Street	0	54	91	89	90	80	83	77	78
venue S west of 23d Street	0	89	86	78	77	60	75	81	82
venue S and 21st Street	0	77	76	77	53	78	81	84	80
enue N and 31st Street	16	93	95	89	88	82	82	89	N/A
a Average	2	81	86	82	80	76	86	83	84
s									
thian Road and Kilarny Pass	7	62	62	N/A	N/A	N/A	N/A	N/A	N/A
y Street and Atwater Drive	19	71	68	N/A	N/A	N/A	N/A	N/A	N/A
s Average	13	67	65	N/A	N/A	N/A	N/A	N/A	N/A
ington, DC									
wood Road and 13th Street	26	62	74	N/A	N/A	80	N/A	N/A	N/A
ge Yield (All Sites)	4	78	82	83	80	77	85	83	84

One vs. three signs

Evaluation of in street pedestrian crossing sign

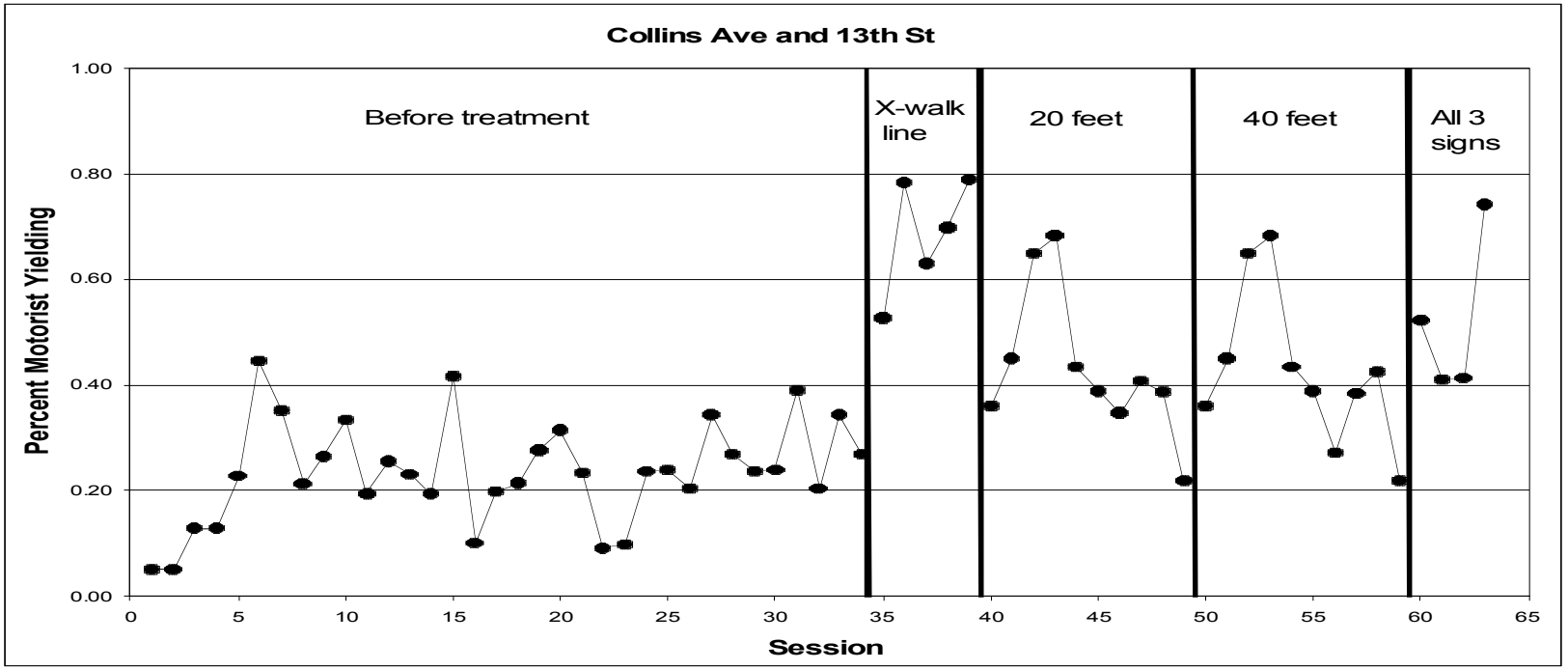
Results 1st site



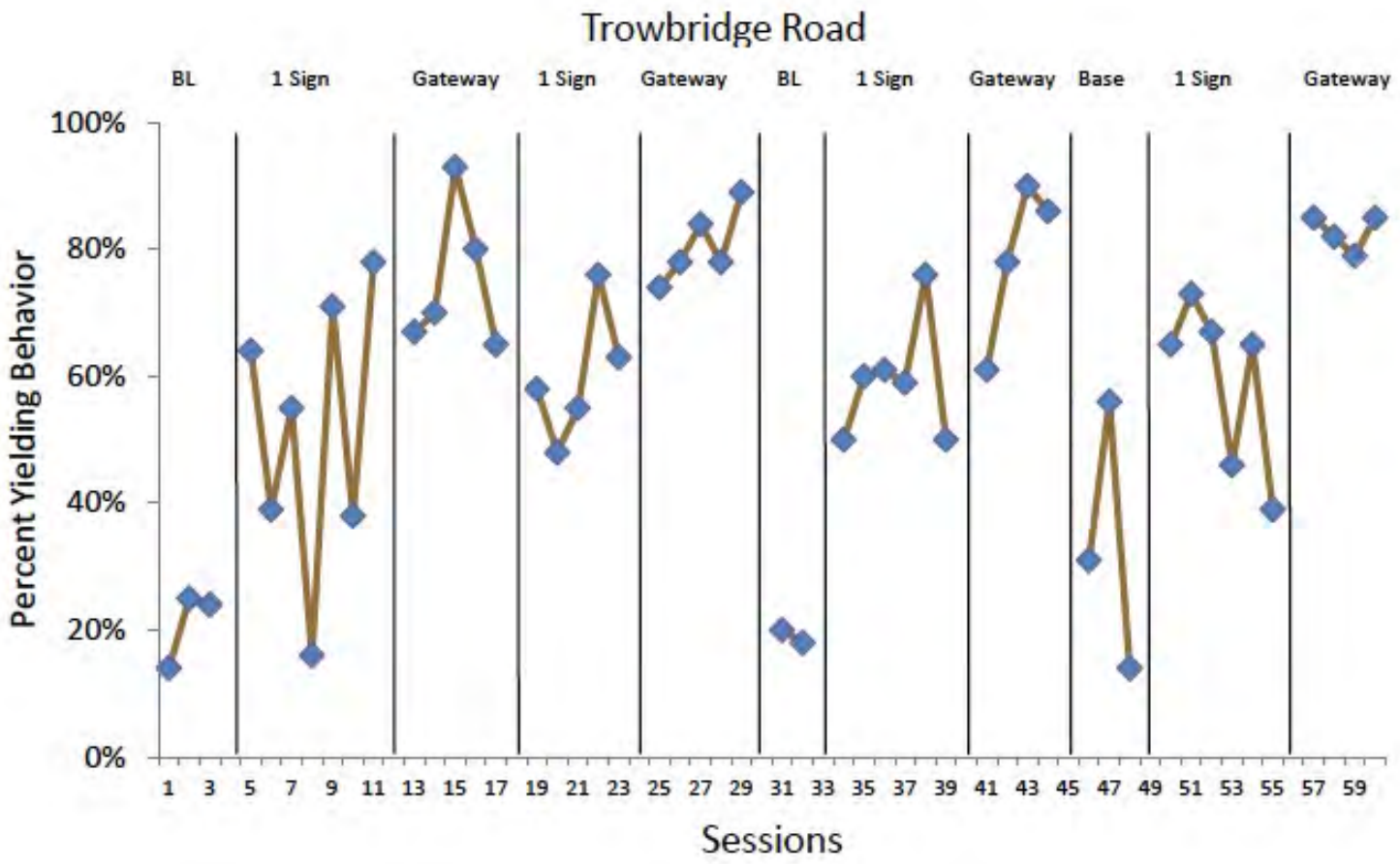
2nd site


Collins Ave and 9th St
Percent Motorist Yielding
1.00
0.80
0.60
0.40
0.20
0.00
0
5
10
15
20
25
30
35
Session
Before treatment
At crosswalk line
20 feet
40 feet
All 3 signs

3rd site

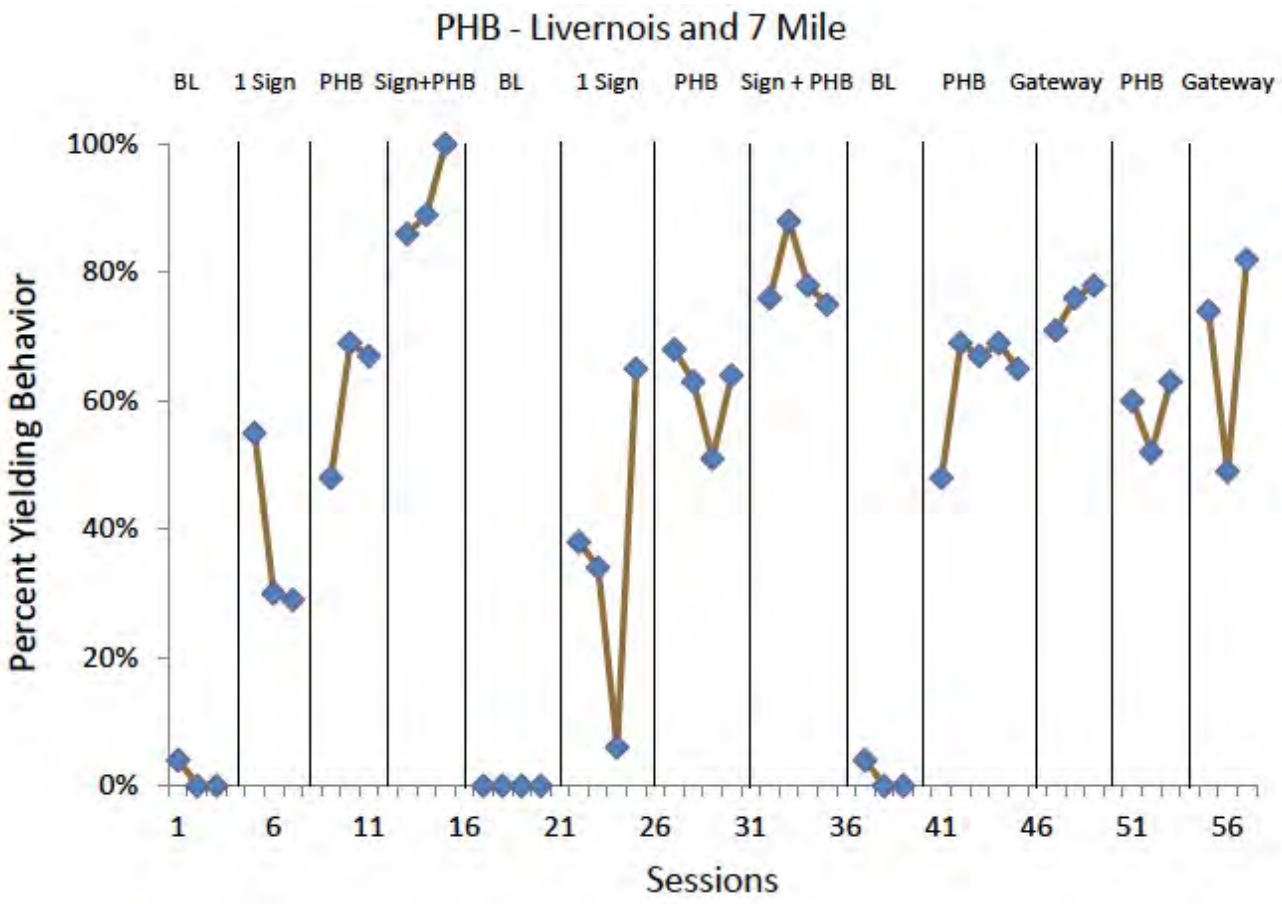

Collins Ave and 13th St
Before treatment
X-walk line
20 feet
40 feet
All 3 signs
Percent Motorist Yielding
1.00
0.80
0.60
0.40
0.20
0.00
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Session

One vs. Three Signs


Trowbridge Road
BL
1 Sign
Gateway
1 Sign
Gateway
BL
1 Sign
Gateway
Base
1 Sign
Gateway
Percent Yielding Behavior
100%
80%
60%
40%
20%
0%
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59
Sessions


STARBUCKS
COFFEE


ARBUCKS
COFFEE


PHB - Livernois and 7 Mile
BL
1 Sign
PHB
Sign+PHB
BL
1 Sign
PHB
Sign + PHB
BL
PHB
Gateway
PHB
Gateway
Percent Yielding Behavior
100%
80%
60%
40%
20%
0%
1
6
11
16
21
26
31
36
41
46
51
56
Sessions

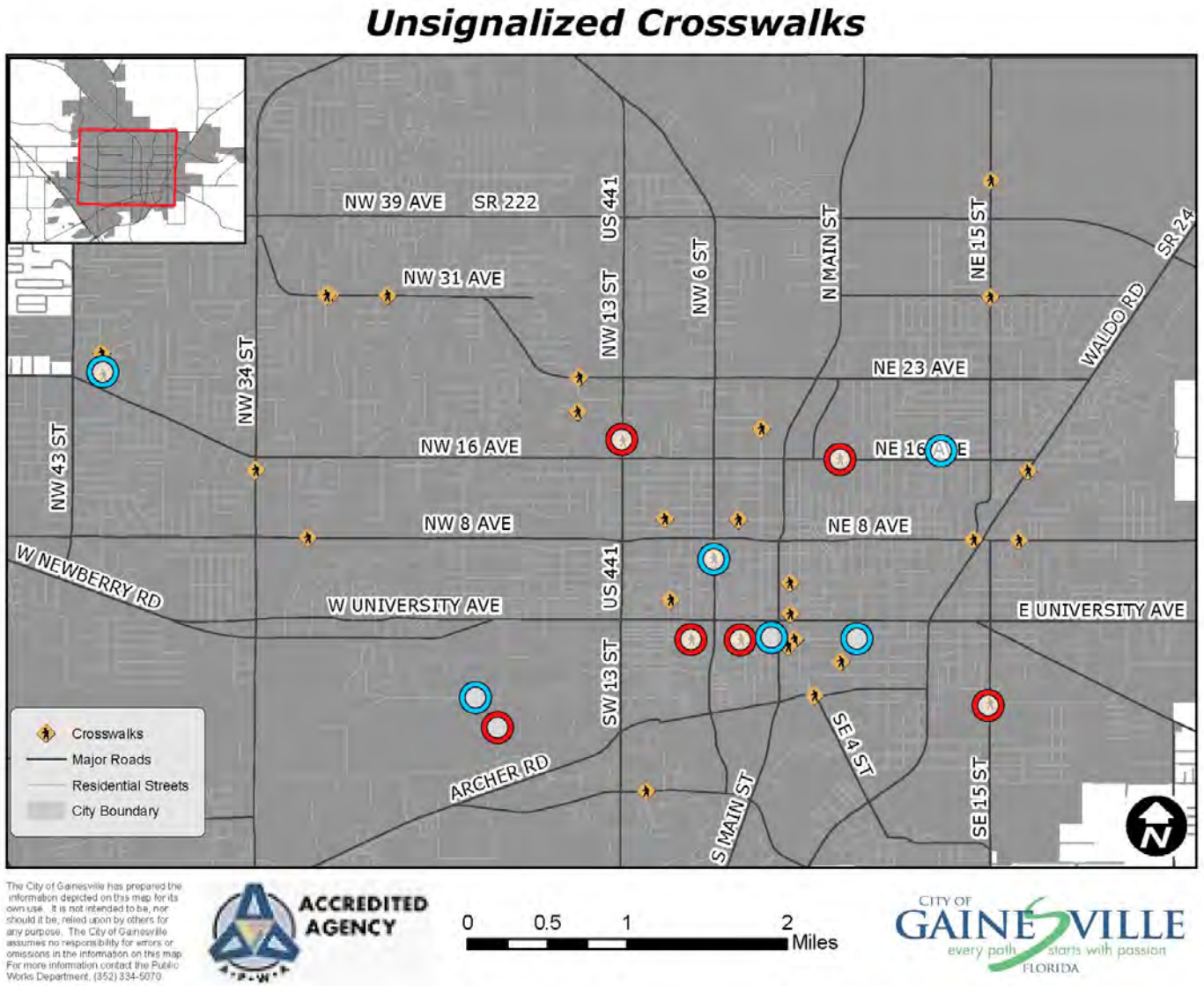
The Use of Treatment Packages

- A good package in multi faceted
- A good package is cost efficient
- A good package ties components together to generate a synergistic effect.

Background

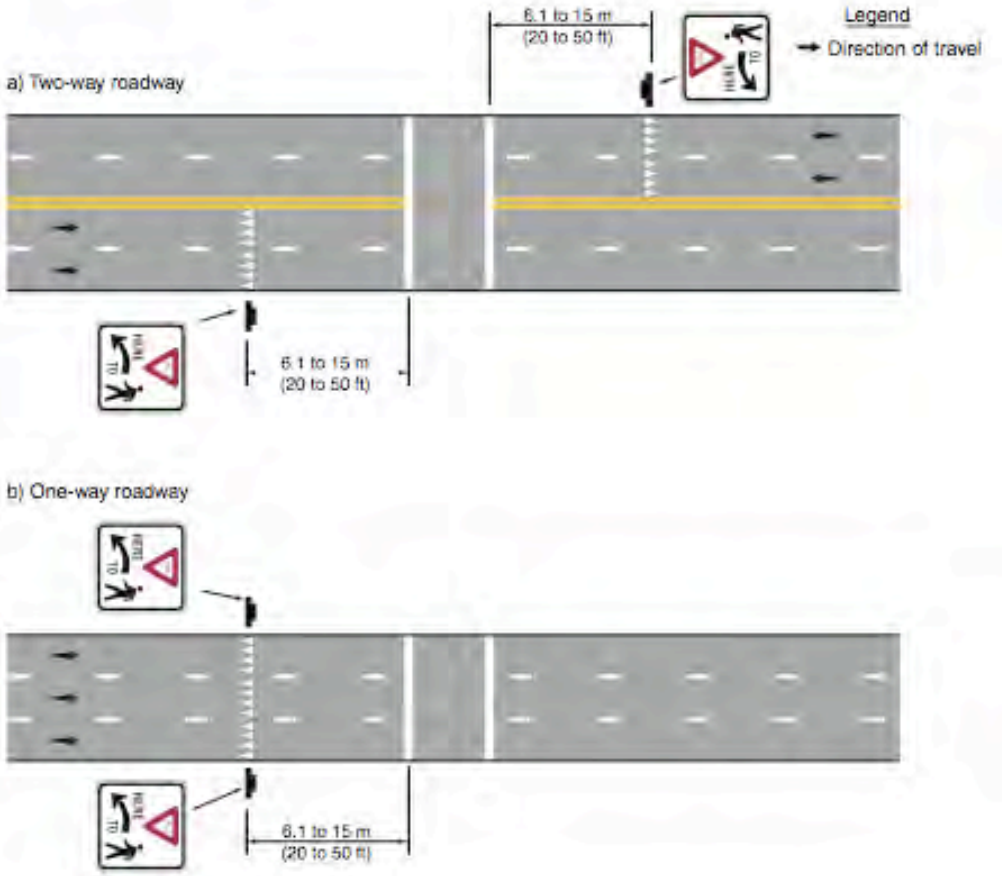
- Past research (e.g., Hunter, Stutts, Pein, and Cox, 1996) has indicated that a lack of driver compliance is associated with pedestrian motor vehicle crashes.
- Research conducted in the U.S. indicates that the use of increased enforcement coupled with increased publicity about the enforcement program has been associated with substantial increases in compliance with other laws
- Research has demonstrated that pedestrian sting operations alone can produce modest increases in the percentage of drivers yielding right-of-way to pedestrians

Treatment and Generalization Sites

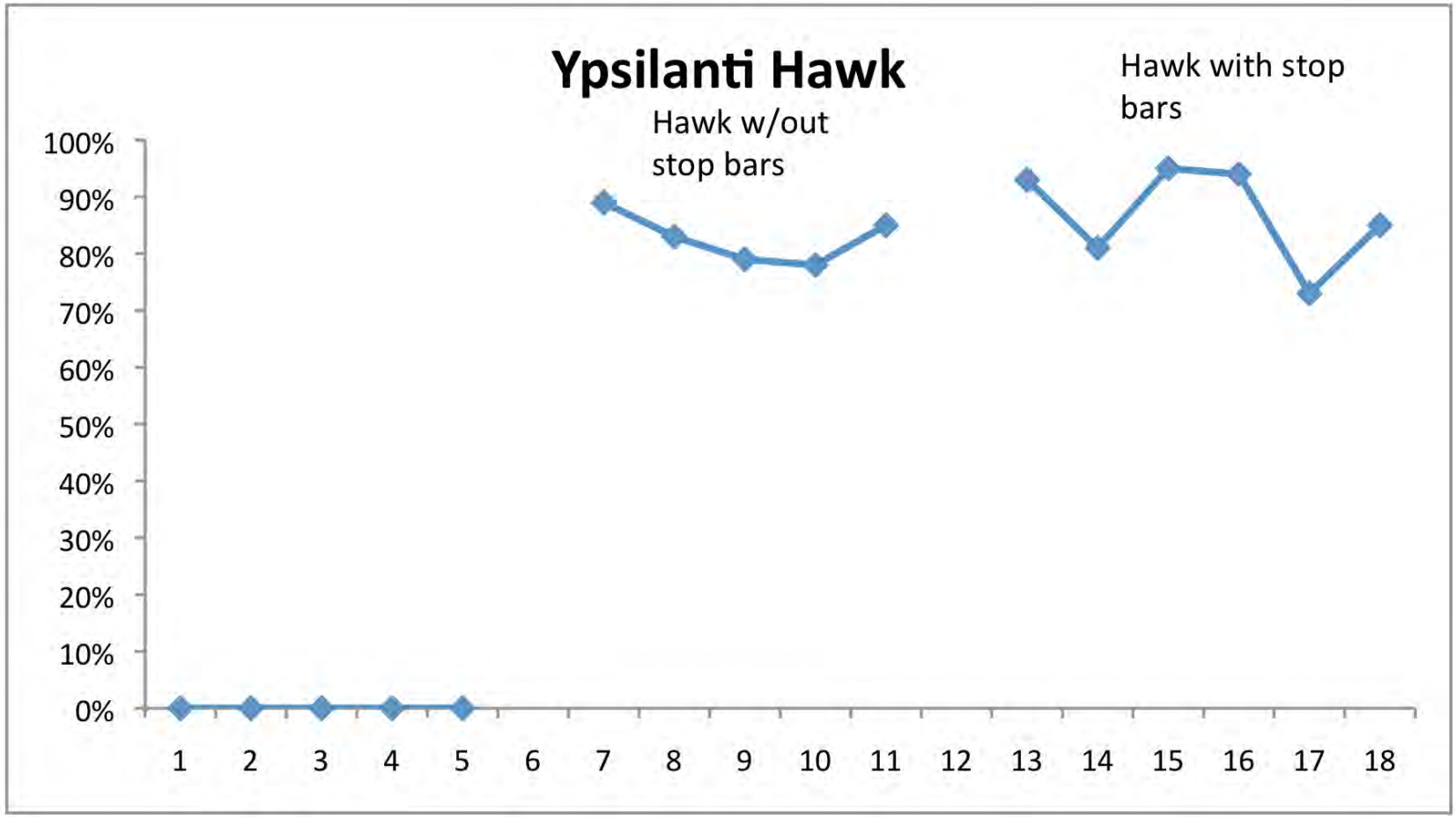


Prior to Beginning we Refreshed Crosswalk and Added Advance Stop/Yield Markings

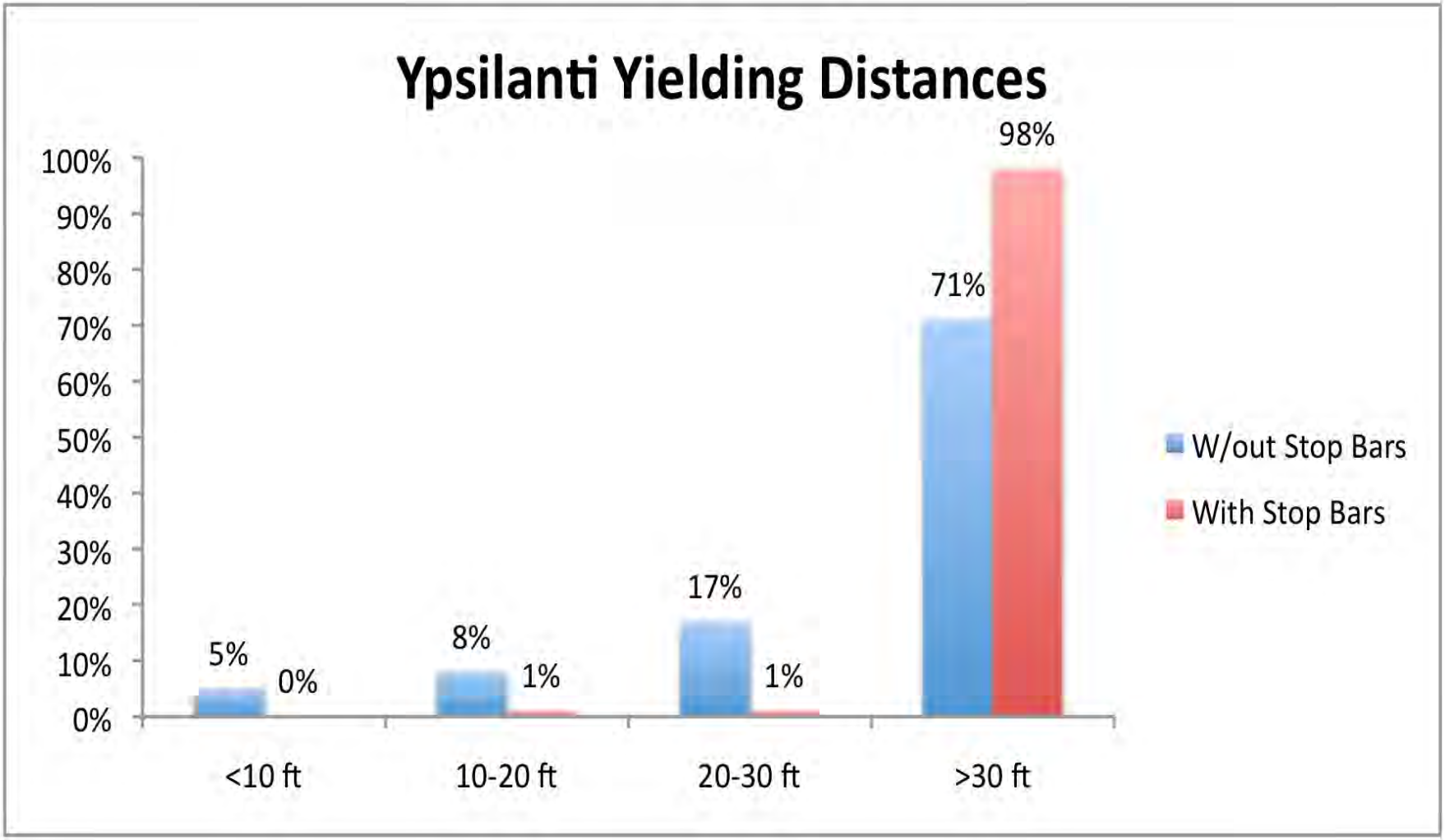
Figure 3B-15. Examples of Yield Lines at Unsignalized Midblock Crosswalks



Advance Stop Bar at Hawk



Yielding Distances



Treatment Strategy

HVE Element	MONTH											
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Warnings	■											
Citations				■			■			■		
Parent Outreach	■			■								
UF Outreach	■			■								
Public Posting				■	■	■	■	■	■	■	■	■
Earned Media	■	■	■	■	■	■	■	■				
Paid Radio Ads							■	■				
In-Street Signs										■	■	■

Community Support

- Identify community groups who can support the program
- Focus on getting support and participation from a cross section of community groups
- Once on board include groups as program sponsors

Enforcement Countermeasures

- Begin with warnings to win support
- The use of police decoy pedestrians
- The use of flyers handed to stopped drivers that documented the seriousness of the problem
- The use of a sandwich board downstream of the enforcement site to inform drivers passing through that a pedestrian operation was being conducted
- Rapid rotation between many sites
- Use of standardized procedures that have held up in court

Sandwich board signs clearly delineate what law is being enforced

Replaced with a portable sign that is much larger

The Solution at Uncontrolled Crosswalks

- Operational definition of failure to yield and specific standardized procedure
- Use decoy pedestrians
- Warning flyers to inform about law and magnitude of the problem

Operational Definition of Not Yielding

We use the signal timing formula used to time yellow duration to calculate the dilemma zone.

If a driver can avoid running a light they can yield. We place a cone at the location

Standard Crossing Protocol

- Start to cross only when vehicle is close to but has not yet reached the cone.
- Begin by placing one foot off curb between crosswalk lines
- Do not begin to cross in front of vehicle unless driver is clearly slowing to yield for you.
- If a gap appears finish crossing

Multilane roads

- If a vehicle yields close to crosswalk do STOP AND LOOK AT LANE LINE before proceeding
- Passing a stopped vehicle at a crosswalk is an infraction. Cite people who do this.

Use of Warnings

- Warnings allow more stops
- Warning flyers help to sell the program
- Warnings allow a transition from no enforcement to enforcement of rules

Front

You have just failed to yield to a pedestrian at a crosswalk in Gainesville.

Drivers MUST yield to pedestrians at crosswalks. *It's the law!*

- Florida has one of the highest rates of pedestrian injuries in the Nation.
- Each year more than 8,000 pedestrians are injured and more than 500 are killed.
- The cost to the State is estimated at approximately $300,000,000 annually.

In Gainesville, crashes involving pedestrians for 2007 and 2008 totaled 278; more than 2 per week.

The law is clear:
- Drivers must yield to pedestrians in crosswalks. This means stopping when necessary to let a pedestrian cross.
- Drivers must yield even if there are no pavement markings at the crossing.
- Drivers may not overtake other cars stopped at a marked or unmarked crosswalk to permit a pedestrian to cross.
- Turning vehicles must yield to pedestrians crossing on a green light or with the WALK signal.

We are trying to make our streets safer for everyone. Help us by cooperating and by encouraging others to do the same.

A safety message from the Gainesville Police Department, University of Florida Police Department and Alachua County Sheriff's Office

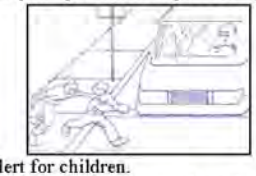
Back

Drivers: *Protect pedestrians at crosswalks!*

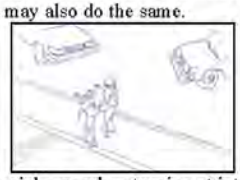
Follow these four rules:

1 Never stop directly at or too near a crosswalk. Stop 30 feet back so pedestrians can see cars in other lanes.

2 Wait until pedestrians have crossed at least one lane beyond yours before proceeding.



3 Be alert for children.
They may dart out into traffic without warning. Adults may also do the same.



4 Use special care when turning at intersections. Pedestrians are more vulnerable to turning vehicles and must look over their shoulder to see them.

Common Excuses

I did not see the pedestrian

Didn't know I had to yield

They don’t even yield to a blind pedestrian

Educational Elements

- Warnings distributed to residents just prior to the beginning of the first wave (warnings) and second wave (citations)
- Earned media
- Large highway feedback signs
- Partnerships between city agencies, and community partners

NOTICE

We are sending you this notice to alert you that the Gainesville Police Department, Alachua County Sheriff's Department, and University of Florida Police Department will begin an intensive program of stopping and ticketing drivers that do not yield to pedestrians in crosswalks starting this coming week.

We need your help to make Gainesville safer for pedestrians of all ages.

You can help by:

1. **Looking for pedestrians in crosswalks**
2. **Yielding by stopping or slowing for the pedestrian** as the law requires
3. **Encouraging others to do the same**

Be a Good Model. Yield, avoid a ticket, and help keep pedestrians safe

A safety message from the Gainesville Police Department

Pedestrians:

Make crosswalks work for you!

Follow these rules

1. Wait for the walk signal.
2. At crosswalks without traffic signals, place only one foot off the curb in the street.
3. Wait for the cars to stop.
4. NEVER, NEVER STEP IN FRONT OF A MOVING VEHICLE!
5. Keep looking for oncoming vehicles as you cross each lane
6. Keep looking from side to side and over your shoulder for turning vehicles as you cross.
7. Thank drivers with a friendly wave.

Crosswalk markings and traffic lights don't stop cars. Make sure you *KEEP LOOKING!*

After dark, drivers cannot see pedestrians in dark clothing until it is too late. Even if their head lights blind you, they still cannot see you.
Wear retro-reflective materials or carry a lit flash light to make yourself more visible.

The Crosswalk Safety Program is a joint initiative of the Gainesville Police Department, the University of Florida Police Department and the Alachua Sheriff's Office.

The program is endorsed by the following organizations:

Prepared by CERS
www.cers-safety.com

CROSSWALK
SAFETY

In **Gainesville**, an average of 140 pedestrians are injured each year.

Drivers MUST yield to pedestrians.

It's the law!

Florida has one of the highest rates of pedestrian injuries in the nation.

Each year more than 8,000 pedestrians are injured and 500 are killed.

In Gainesville, an average of 140 pedestrians are injured each year.

The Law in Florida is CLEAR:

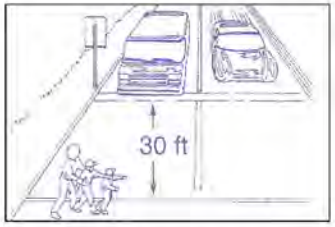
- Drivers must yield to pedestrians in crosswalks. This means stopping when necessary to let a pedestrian cross.
- Drivers may not overtake other drivers stopped at a crosswalk.
- Drivers must yield even if there are no pavement markings at the crossing.
- Turning vehicles must yield to pedestrians crossing on a green light or with the WALK signal.

WE ARE TRYING TO MAKE OUR STREETS SAFER FOR EVERYONE. HELP US BY COOPERATING AND BY ENCOURAGING OTHERS TO DO THE SAME.

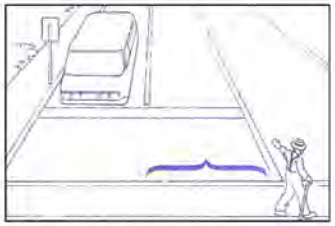
Drivers:

Protect pedestrians at crosswalks!

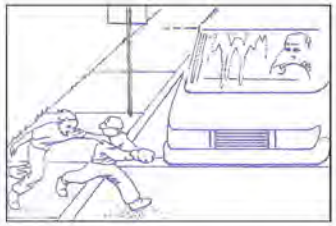
Follow these four rules:



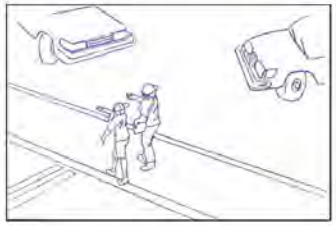
1 Never stop directly at or too near a crosswalk. Stop 30 feet back so pedestrians can see cars in other lanes.



2 Wait until pedestrians have crossed at least one lane beyond yours before proceeding.



3 Be alert for children. They may dart out into traffic without warning. Adults may also do the same.



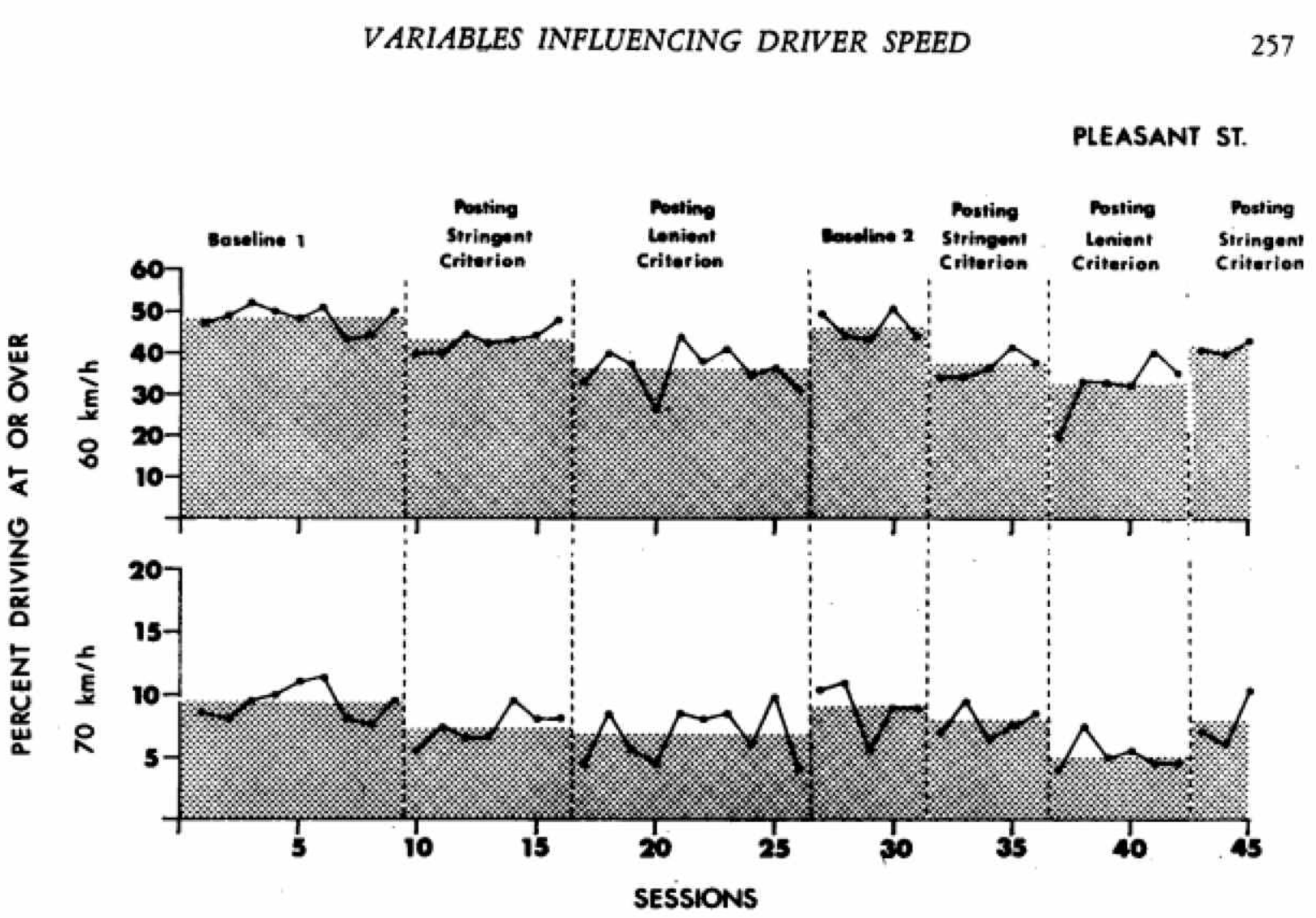
4 Use special care when turning at intersections. Pedestrians are more vulnerable to turning vehicles and must look over their shoulder to see them.

Earned Media

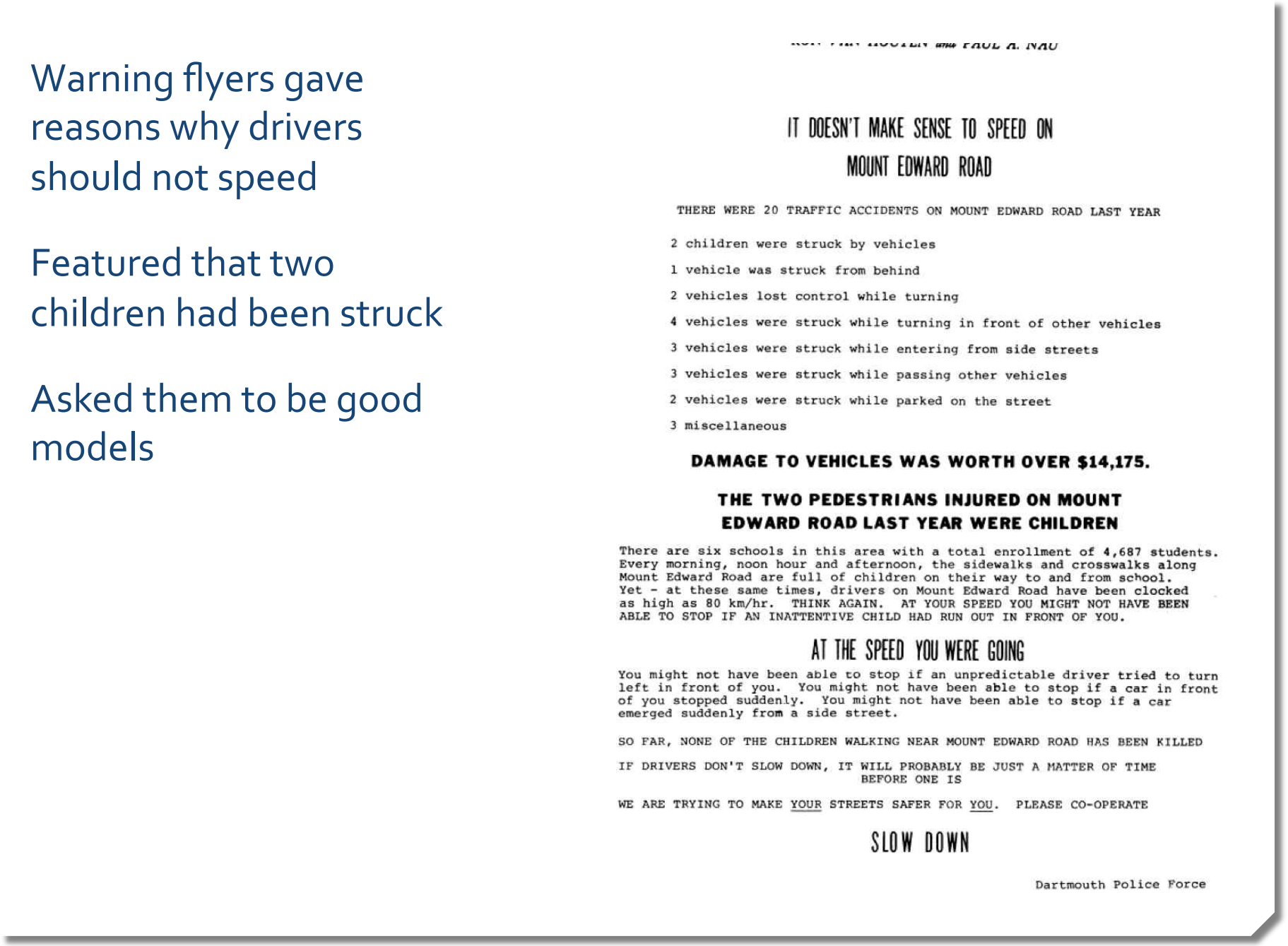
Month	The Gainesville Sun	T.V. News	Radio	UF News
February	3	3	2	
March	1		1	1
April	2			
May	1			
June	1			
July	1			
August		1		
September	2			
October				
November				
December				

We used this idea for speeding, seatbelt use and yielding to pedestrians

Data from Speeding Sign



- Warning flyers gave reasons why drivers should not speed
- Featured that two children had been struck
- Asked them to be good models



IT DOESN'T MAKE SENSE TO SPEED ON
MOUNT EDWARD ROAD

THERE WERE 20 TRAFFIC ACCIDENTS ON MOUNT EDWARD ROAD LAST YEAR

2 children were struck by vehicles

1 vehicle was struck from behind

2 vehicles lost control while turning

4 vehicles were struck while turning in front of other vehicles

3 vehicles were struck while entering from side streets

3 vehicles were struck while passing other vehicles

2 vehicles were struck while parked on the street

3 miscellaneous

DAMAGE TO VEHICLES WAS WORTH OVER $14,175.

THE TWO PEDESTRIANS INJURED ON MOUNT EDWARD ROAD LAST YEAR WERE CHILDREN

There are six schools in this area with a total enrollment of 4,687 students. Every morning, noon hour and afternoon, the sidewalks and crosswalks along Mount Edward Road are full of children on their way to and from school. Yet - at these same times, drivers on Mount Edward Road have been clocked as high as 80 km/hr. THINK AGAIN. AT YOUR SPEED YOU MIGHT NOT HAVE BEEN ABLE TO STOP IF AN INATTENTIVE CHILD HAD RUN OUT IN FRONT OF YOU.

AT THE SPEED YOU WERE GOING

You might not have been able to stop if an unpredictable driver tried to turn left in front of you. You might not have been able to stop if a car in front of you stopped suddenly. You might not have been able to stop if a car emerged suddenly from a side street.

SO FAR, NONE OF THE CHILDREN WALKING NEAR MOUNT EDWARD ROAD HAS BEEN KILLED

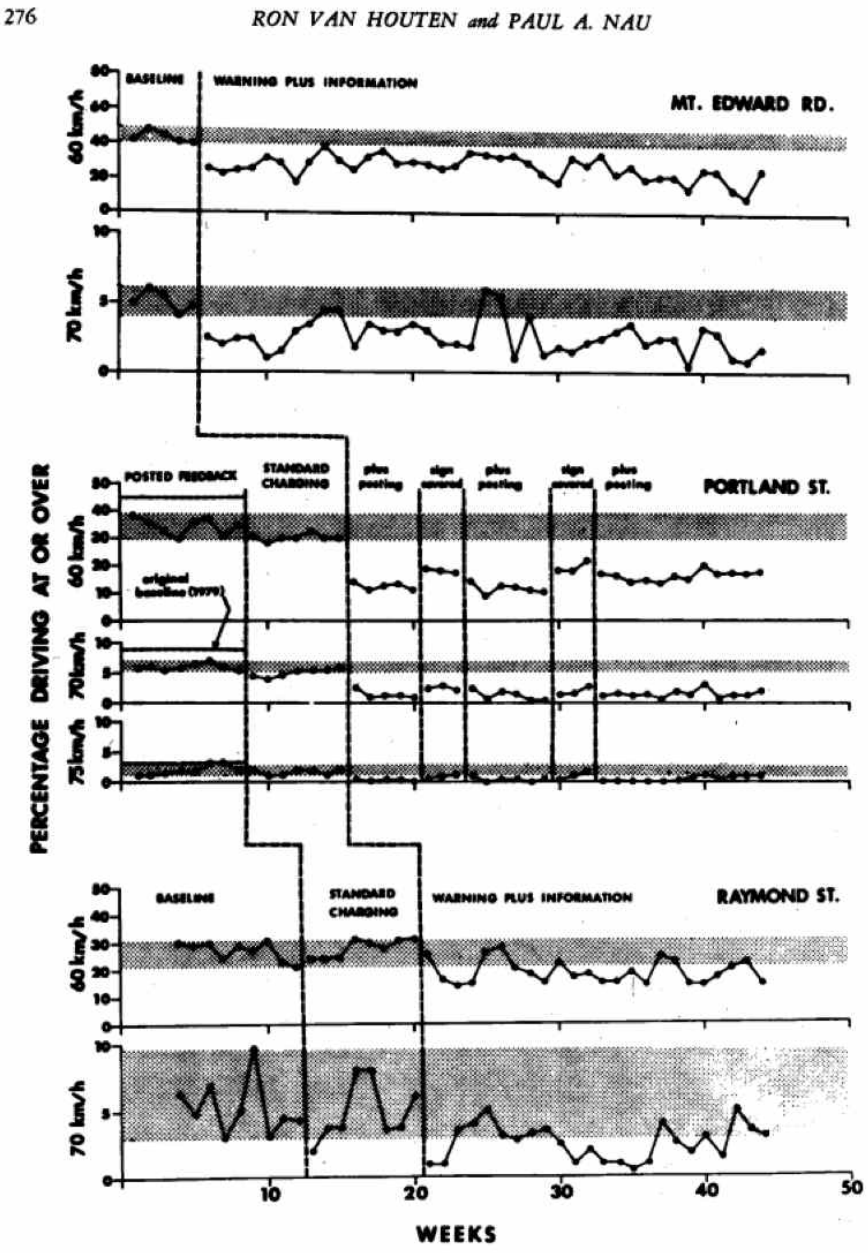
IF DRIVERS DON'T SLOW DOWN, IT WILL PROBABLY BE JUST A MATTER OF TIME BEFORE ONE IS

WE ARE TRYING TO MAKE YOUR STREETS SAFER FOR YOU. PLEASE CO-OPERATE

SLOW DOWN

Dartmouth Police Force

- Speed reductions for a 1 week program with large numbers of stops produced effects that persisted for a year
- Combining the program with posted feedback produced very large reductions



Paid Radio Ads

- The city of Gainesville prepared 3 radio ads for play on radio stations during the third phase.
- All other TV radio, and printed media spots were the result of earned media

Enforcement Flyer

back front

Protect pedestrians at crosswalks!

Follow these four rules:

1. Never stop directly at or too near a crosswalk. Stop 30 feet back so pedestrians can see cars in other lanes.
2. Wait until pedestrians have crossed at least one lane beyond yours before proceeding.
3. Be alert for children. They may dart out into traffic without warning. Adults may also do the same.
4. Use special care when turning at intersections. Pedestrians are more vulnerable to turning vehicles and must look over their shoulder to see them.

(Section 316.130 F.S.)

What's a legal crosswalk?

All sides of every intersection are legal crosswalks *regardless of whether or not there is signage, painted lines or a paved sidewalk.*

(Section 316.003(6)F.S.)

Best Foot Forward for pedestrian safety

iYield4peds.org

A Pedestrian Safety Initiative of Bike/Walk Central Florida funded by MetroPlan Orlando and the Winter Park Health Foundation

Prepared by CERS

Copyright © Bike/Walk Central Florida

ORLANDO POLICE

You have just failed to yield to a pedestrian at a crosswalk in

Orlando

Drivers MUST yield to pedestrians at crosswalks. It's the law!

- Florida has the highest rate of pedestrian injuries in the Nation.
- Each year more than 8,000 pedestrians are injured and more than 500 are killed.
- The cost to the State is estimated at approximately $300,000,000 annually.

Metro Orlando ranks as the Nation's most dangerous for pedestrians. An average of more than two pedestrians are injured each day and one is killed each week.

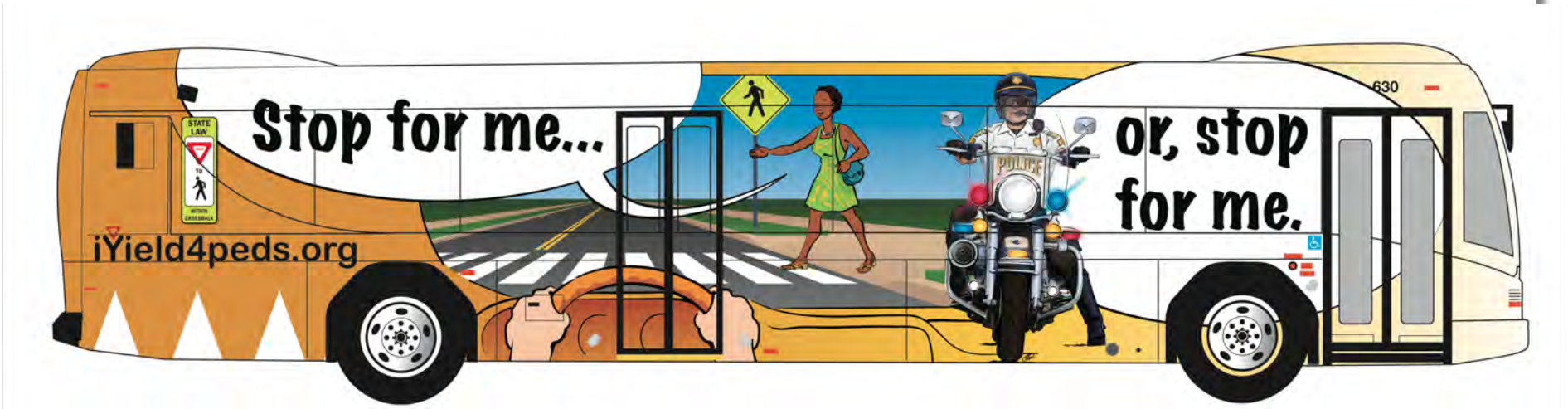
The law is clear:

- Drivers must yield to pedestrians in crosswalks. This means stopping when necessary to let a pedestrian cross.
- Drivers must yield even if there are no pavement markings at the crossing.
- Drivers may not overtake other cars stopped at a marked or unmarked crosswalk to permit a pedestrian to cross.
- Turning vehicles must yield to pedestrians crossing on a green light or with the WALK signal.

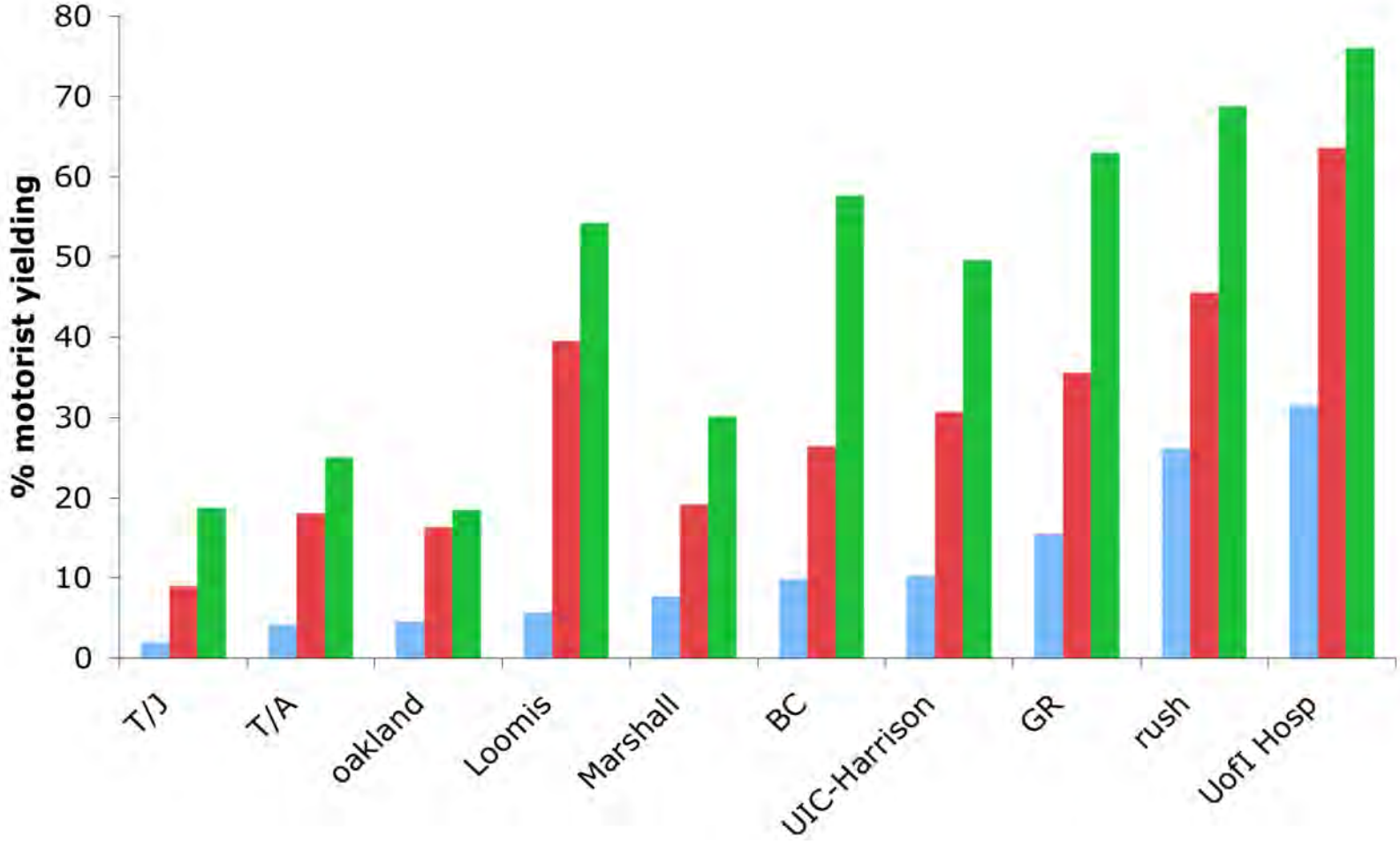
We are trying to make our streets safer for everyone. Help us by cooperating and by encouraging others to do the same.

A safety message from the Orlando Police Dept.

Bus wrap



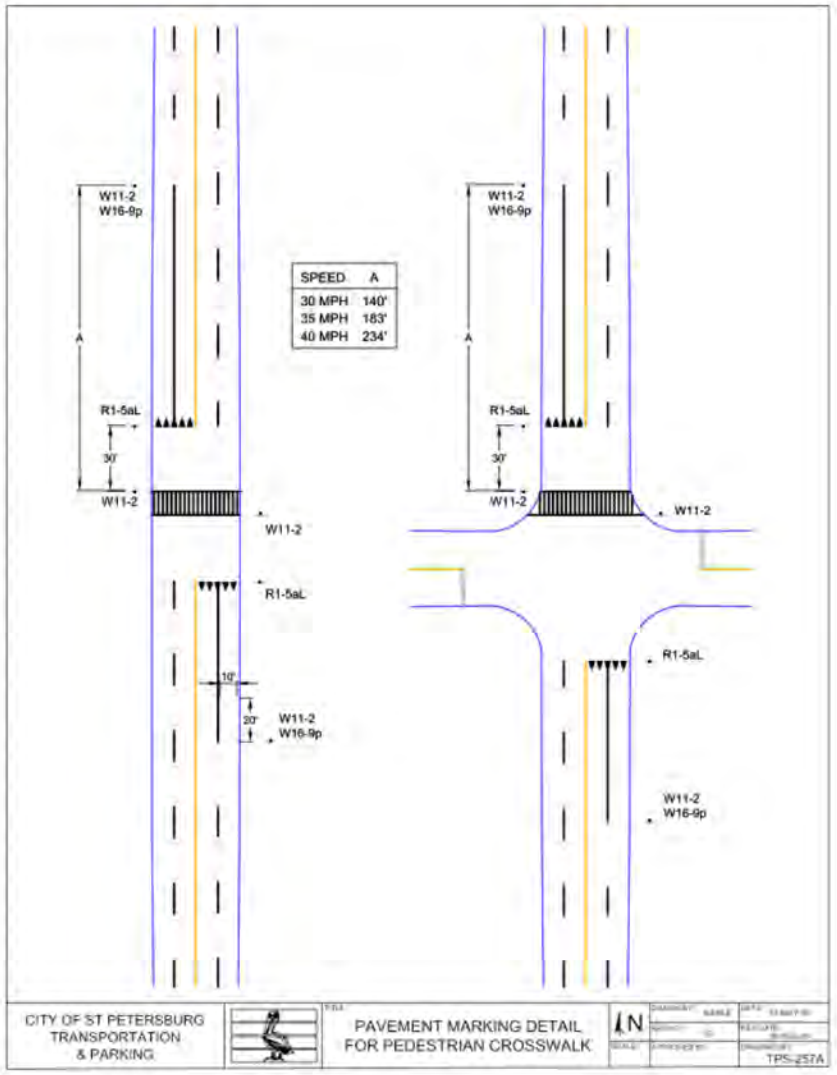
Pedestrian Prompt Signs


% motorist yielding
80
70
60
50
40
30
20
10
0
T/J
T/A
oakland
Loomis
Marshall
BC
UIC-Harrison
GR
rush
UofI Hosp

Engineering

- No passing from dilemma zone to the crosswalk
- Use of advance yield markings
- Use of in-street signs to remind drivers that yielding to pedestrians is State Law

Marking


W11-2
W16-9p
A
R1-5aL
30'
W11-2
SPEED A
30 MPH 140'
35 MPH 183'
40 MPH 234'
W11-2
R1-5aL
10'
20'
W11-2
W16-9p
W11-2
W16-9p
A
R1-5aL
30'
W11-2
W11-2
R1-5aL
W11-2
W16-9p
CITY OF ST PETERSBURG
TRANSPORTATION
& PARKING
PAVEMENT MARKING DETAIL
FOR PEDESTRIAN CROSSWALK
N
TPS-257A

In-street signs

Another Example

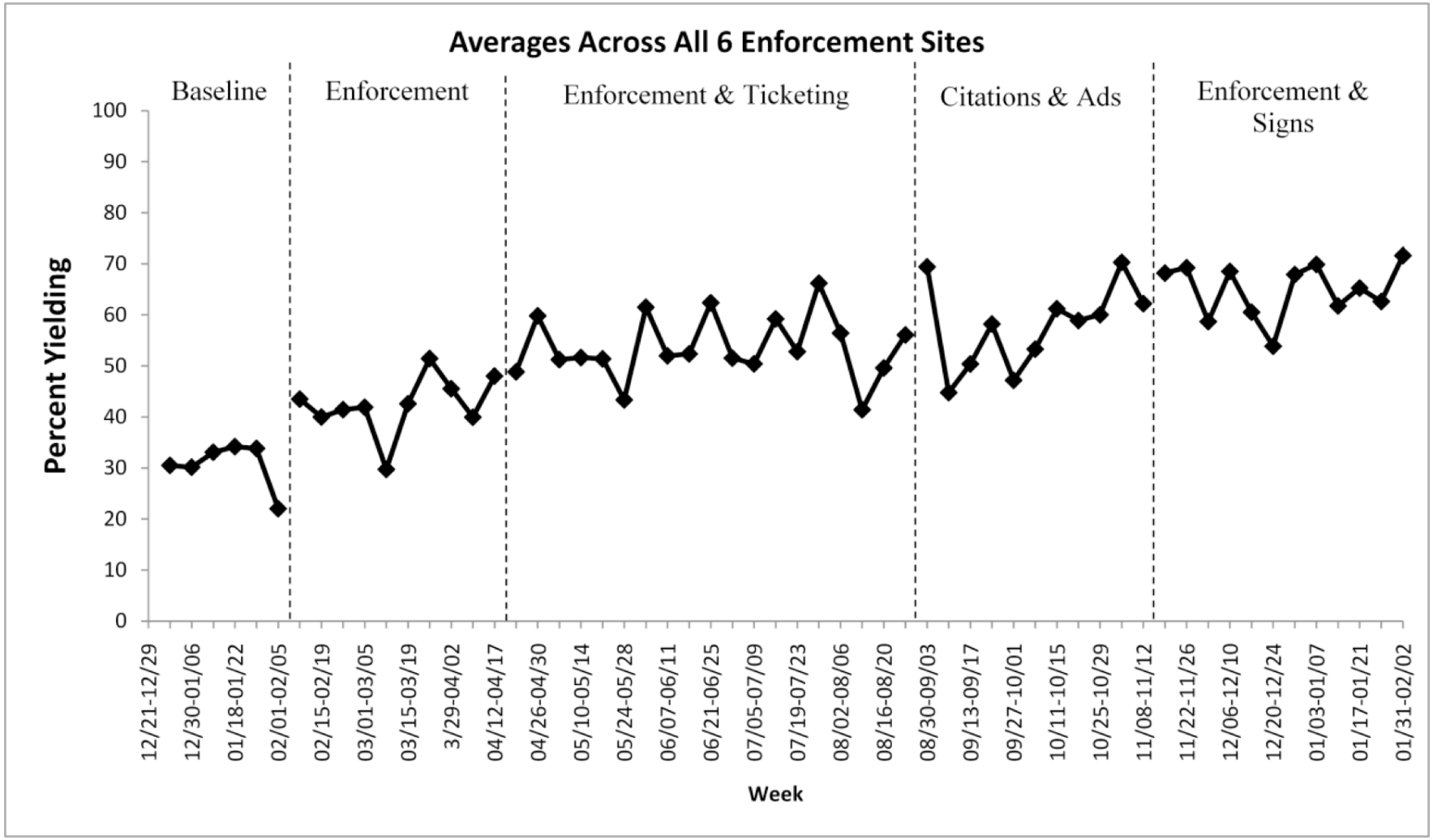

STATE
LAW
STOP
FOR

Yielding Results

- **Treated Sites**. Yielding for staged crossings at treated sites averaged 31.5% during baseline and 62.0% by the end of the study. Yielding for unstaged crossing averaged 45.4% during baseline and 82.7% at the end of the study.

- **Untreated Generalization Sites**. Yielding for staged crossings at untreated generalization sites averaged 36.7% during baseline and 58.5% by the end of the study. Yielding for unstaged crossing at these sites averaged 49.6% during baseline and 72.9% percent at the end of the study

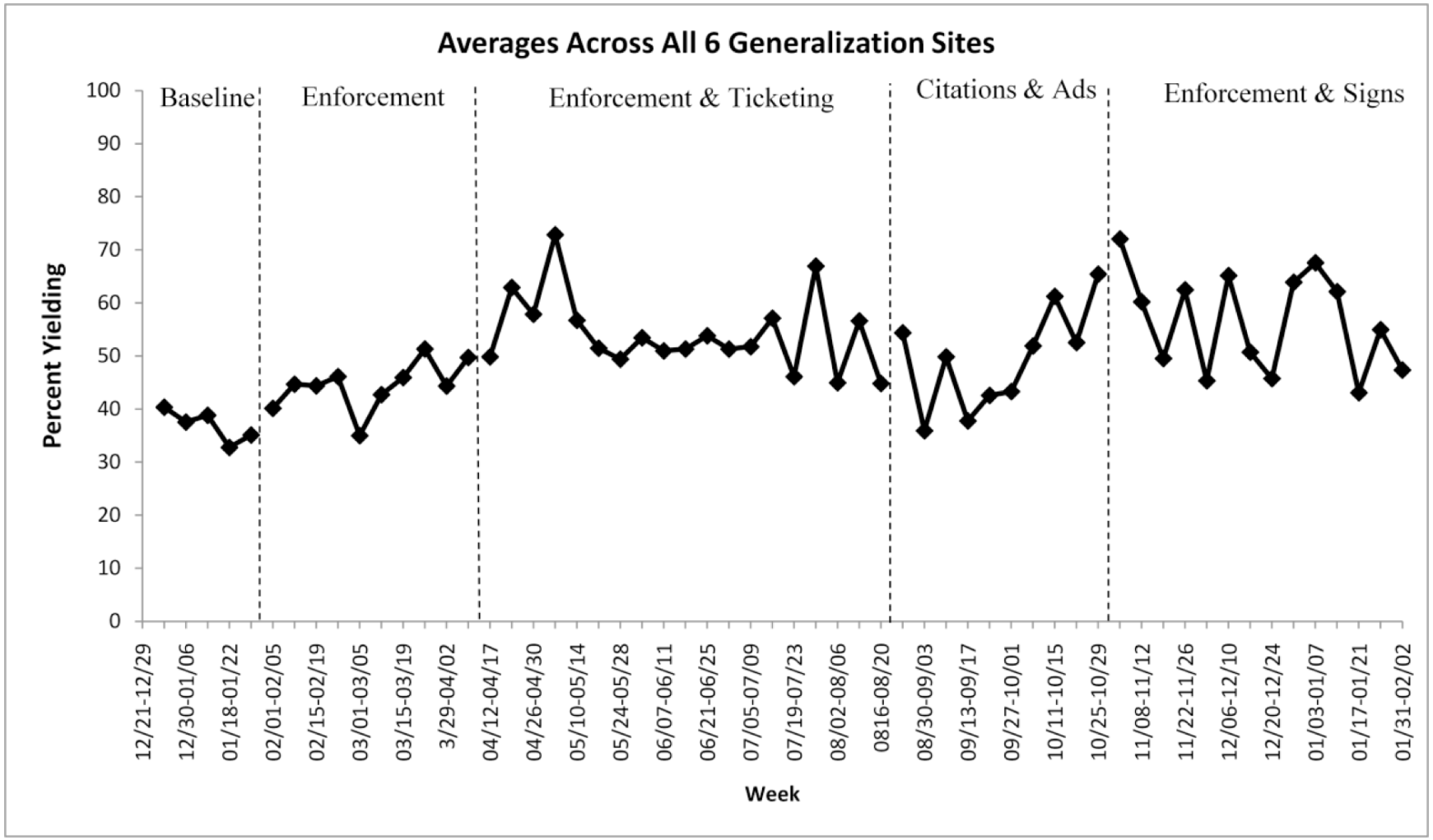
Weekly yielding at treatment sites



Enforcement Sites

	Site	Baseline	Enforcement	Enforcement & Ticketing	Citations & Ads	Enforcement & Signs
Staged	SE 15th Street at SE 11th Avenue	27.8	34.2	60.3	63.3	85.9
	782 SW 2nd Avenue at Shands Hospital	30.9	49.0	64.9	63.4	66.2
	University of Florida at Gale Lemerand	86.2	85.6	82.3	85.9	No Data
	NE 16th Street at Saint Patrick's School	24.3	34.6	43.3	58.1	65.7
	NW13th Street at Gainesville High School	3.0	13.8	19.0	24.9	34.6
	NW13th Street at Gainesville High School	16.8	50.8	45.5	44.3	57.4
	MEAN	**31.5**	**44.7**	**52.5**	**56.7**	**62.0**
Unstaged	SE 15th Street at SE 11th Avenue	29.2	59.5	83.3	56.3	91.7
	782 SW 2nd Avenue at Shands Hospital	56.5	55.0	83.3	80.0	80.6
	University of Florida at Gale Lemerand	86.3	71.9	85.4	84.6	No Data
	NE 16th Street at Saint Patrick's School	No Data	No Data	100.0	50.0	100.0
	NW13th Street at Gainesville High School	9.4	29.6	55.8	52.1	58.5
	NW13th Street at Gainesville High School	No Data	No Data	50.0	No Data	No Data
	MEAN	**45.4**	**64.6**	**76.3**	**64.6**	**82.7**

Weekly yielding at generalization sites



Generalization Sites

	Site	Baseline	Enforcement	Enforcement & Ticketing	Citations & Ads	Enforcement & Signs
Staged	University of Florida Museum Road	82.9	74.6	83.0	84.8	84.5
	NE 16th Avenue at NE 12th Street	13.6	39.2	30.3	32.8	47.1
	NW 16th Street at Gainesville Police Dept.	7.2	11.8	13.1	13.0	16.7
	NW 41st Street at Shopping Center	41.2	56.0	49.7	46.7	58.9
	SE 2nd Avenue at Sweetwater Park	37.3	49.0	70.0	72.7	79.0
	SW 2nd Avenue at SW 1st Street Courthouse	37.9	47.5	60.7	65.2	64.5
	MEAN	**36.7**	**46.3**	**51.1**	**52.5**	**58.5**
Unstaged	University of Florida Museum Road	91.1	77.0	80.6	79.0	86.0
	NE 16th Avenue at NE 12th Street	0.0	0.0	50.0	No Data	100.0
	NW 16th Street at Gainesville Police Dept.	1.1	36.0	49.1	33.3	35.4
	NW 41st Street at Shopping Center	100.0	100.0	77.8	No Data	No Data
	SE 2nd Avenue at Sweetwater Park	55.5	54.9	66.7	75.0	55.6
	SW 2nd Avenue at SW 1st Street Courthouse	50.0	95.0	62.0	83.3	87.5
	MEAN	**49.6**	**60.5**	**64.4**	**67.7**	**72.9**

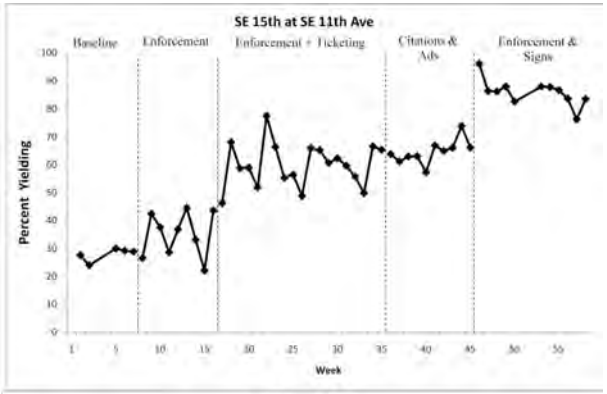
Time Series Results Enforcement Sites

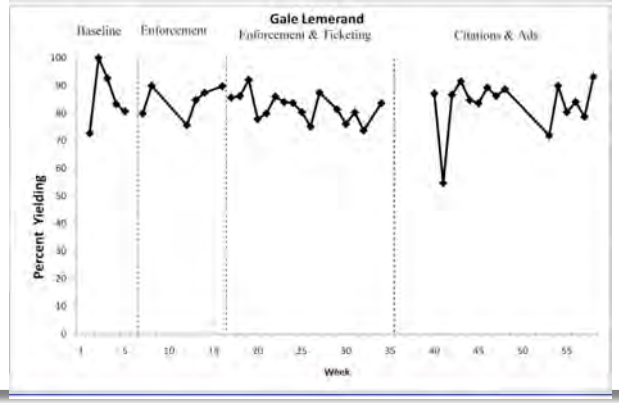
Site	LC_1	*p*-value	SC_1	*p*-value	Baseline Level	Level at end of study	End level minus baseline
Average of all six Enforcement sites	11.97	<.001	.484	<.001	30.63	67.3	36.7
E1	6.52	.26	1.06	<.001	28.63	84.34	55.71
E2	21.41	<.001	.369	<.001	30.18	70.43	40.25
E3	-2.49	.46	-.007	.912	85.83	82.98	-2.85
E4	9.11	.009	.738	<.001	22.48	69.21	46.73
E5	7.10	.042	.500	<.001	3.10	35.76	32.66
E6	30.55	<.001	.002	.79	17.52	49.29	31.77

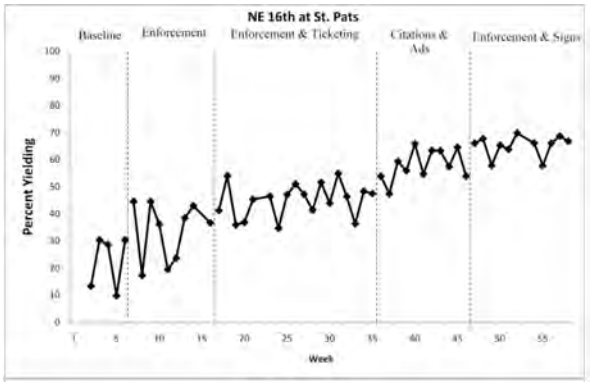
Time series results generalization sites

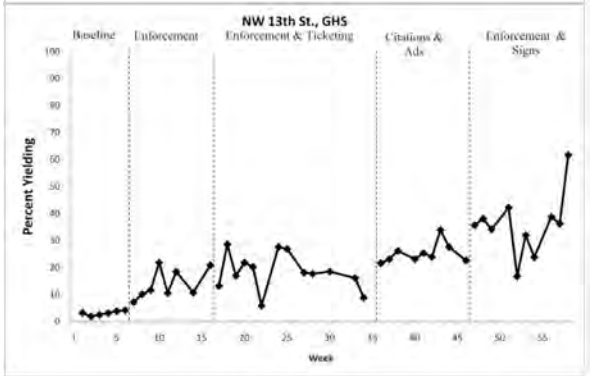
Site	LC_1	*p*-value	SC_1	*p*-value	Baseline Level	Level at end of study	End level minus baseline
Average of all generalization sites	10.80	.010	.158	.044	37.48	56.30	18.82
G1	-9.74	.002	.243	<.001	85.00	87.64	2.64
G2	22.33	<.001	.129	.204	12.77	47.69	34.92
G3	4.94	.011	.095	.017	6.52	16.29	9.77
G4	23.08	<.001	-2.28	.004	43.06	59.46	12.73
G5	15.34	.036	-.406	.73	35.04	79.69	44.65
G6	10.76	.018	.447	<.001	37.03	70.59	33.56

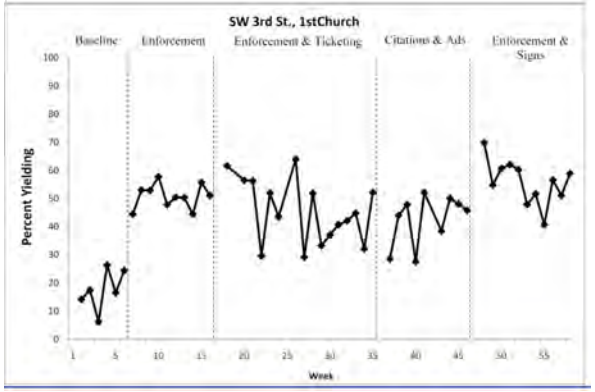
Individual site results











Regression Test Results

- Significant results for enforcement and generalization sites
- Significant diffusion effect
- No significant difference between staged and unstaged crossing results.
- The enforcement group slope (.484) is approximately three times the value of the generalization group slope (.157).
- A test on the difference (enforcement versus generalization) between the overall rate of increase for the two groups of sites is statistically significant (p <.001).
- It is clear from these analyses that as a whole, there were large increases in yielding behavior for both groups of sites, but the enforcement group was associated with much larger increases.

Results – Knowledge, Attitudes and Awareness

- The objective was to increase proper yielding behavior among drivers
- The program produced a robust increase in awareness associated with the behavioral change in driver behavior.
- Following the introduction of treatment there was a statistically significant increase in the percentage of people who
  - thought they knew the law;
  - had seen or heard publicity about the program;
  - had read about the program in a newspaper;
  - and had seen a road sign showing yielding data.

Whether they had recently seen a road sign containing yielding data?

	Wave	Jan 10	Apr 10	Sep 10	Jan 11	Total
Yes	Count	58	104	103	35	300
	Column N %	13.0%	52.8%	75.2%	77.8%	36.3%
No	Count	389	93	34	10	526
	Column N %	87.0%	47.2%	24.8%	22.2%	63.7%
Total	Count	447	197	137	45	826
	Column N %	100.0%	100.0%	100.0%	100.0%	100.0%

Crash Results

Crash Results. Crash data were of interest as the ultimate outcome measure. Although changes in the number of pedestrians struck in crosswalks were noted that were in accord with predictions, the sample size is far too small to draw any conclusions about the relationship between yielding behavior and crashes.

This Study Produced 5 Interesting Results

1. High-visibility enforcement led steady increase in the percentage of drivers yielding right-of-way to pedestrians over the course of the year.

2. The program produced a marked increase in yielding behavior best described as a sustained change in driving culture.

3. The program produced higher levels of yielding to natural pedestrian crossings than to staged crossings and the changes in both were highly correlated.

Results (continued)

4 The effects of the program generalized to crosswalks that were not targeted for enforcement and the amount of generalization to was inversely proportional to the distance from sites that received enforcement.

5 The program produced a large change in driver perception of crosswalk enforcement over the course of the year.

Speeding

Stringent vs Lenient Criteria for Speeding

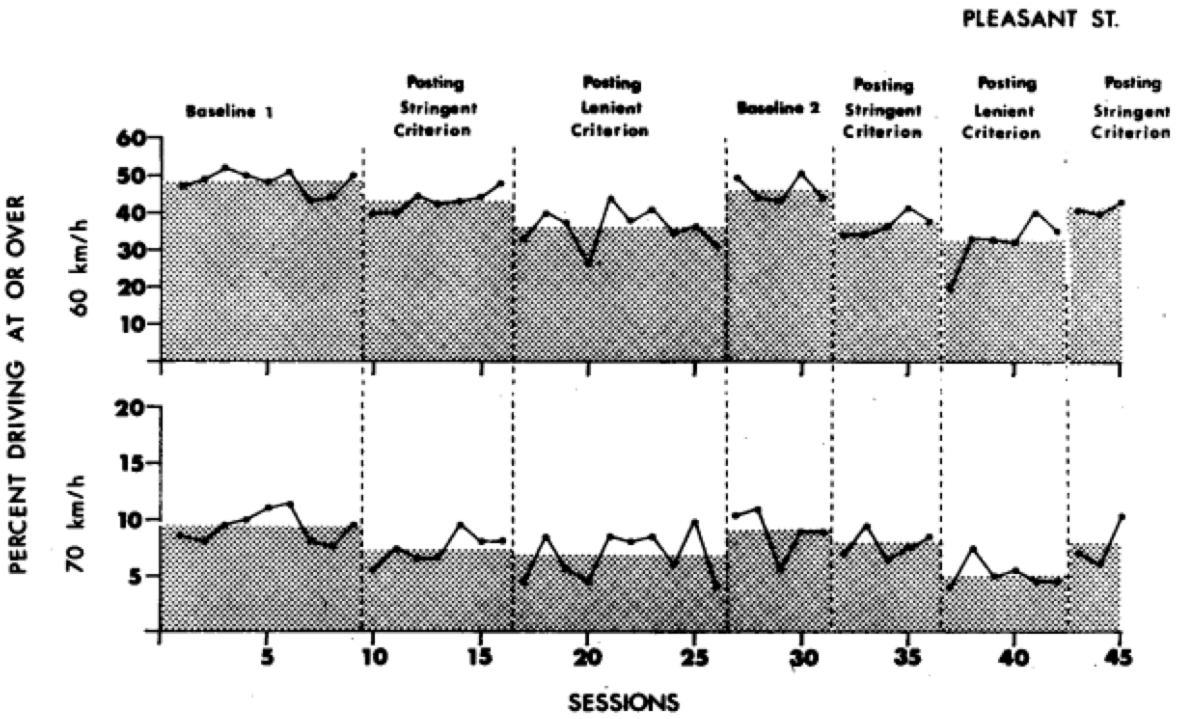
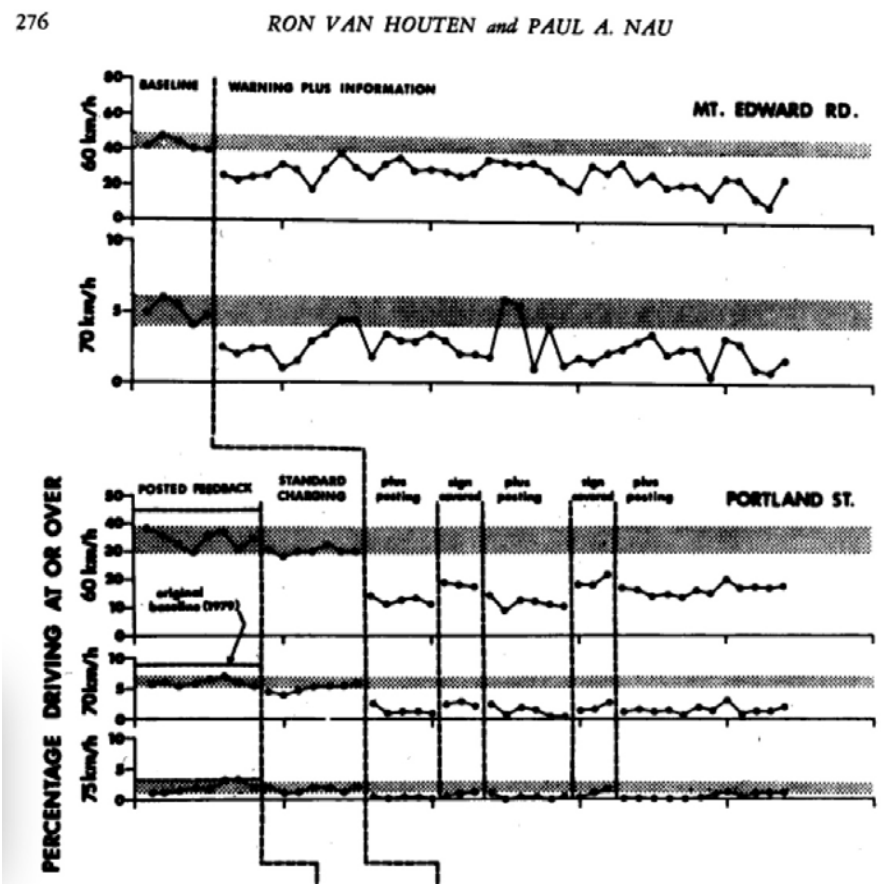
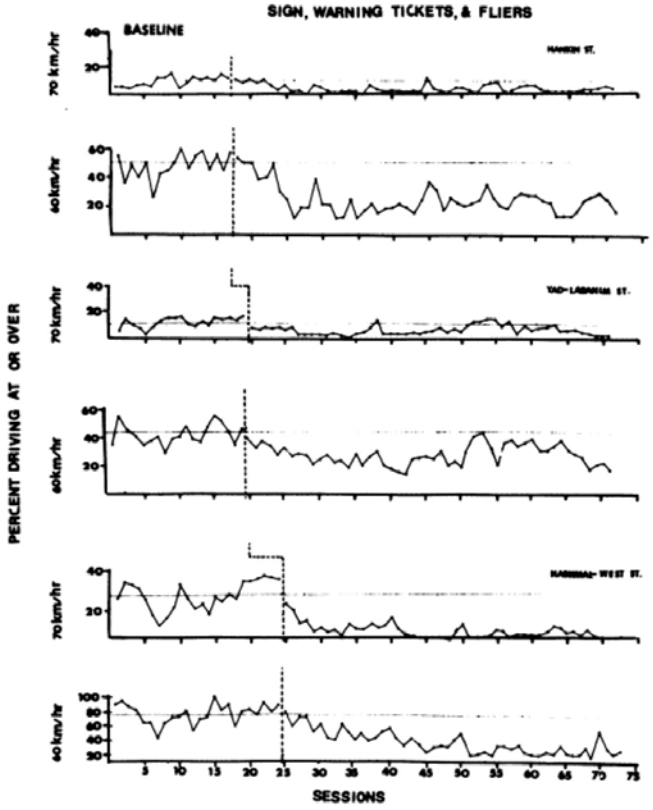


Fig. 1. The percentage of drivers traveling at or over 70 and 60 km/hr during each session of Experiment 1. The shaded bars represent the mean percentages during each condition.

Warning Program



Replicated in Israel



2. Mean percentage of drivers traveling at or over 60 km/hr and 70 km/hr during each session of Experiment
e typical streets. Horizontal dashed lines represent the initial baseline averages.

Monetary Incentive System

- $25 per week during Weeks 2 & 3: Delayed incentive
- Immediate Disincentive: 2 deduction levels
  - If speeding 5-8 mph over the limit for 6 seconds then bonus would reduce by 3 cents
  - If speed was > 4 mph for 6 seconds and if at any point during that period speed increased to 9 mph or more over the limit then incentive would reduce by 6 cents
  - Deductions continued every 6 seconds until speed < 5 mph over the limit
- Incentive amount presented to drivers for 5 seconds at start and end of trips