

Evaluating Changes in Roadway User Bad Behavior in Los Angeles

Watch the Road Evaluation Study

Daniel E. Mitchell, P.E., PTOE
City of Los Angeles Department of Transportation

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THE
ROAD**

OPERATION TRAFFIX

LADOT
Moving LA Forward

Watch the Road Campaign

- Education and awareness campaign to reduce crashes, fatalities, injuries, and congestion
- Bilingual messages on television, radio, buses, changeable message signs, yard signs, and more.
- Designed to produce **measured behavioral changes** in drivers, bicyclists and pedestrians
- Sponsored by **Operation Traffic** & California OTS
 - Coalition of public and private agencies in L.A. County
 - \$1.5 million grant from California Office of Traffic Safety

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Collateral Material



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Evaluation Program

- Measure campaign awareness
 - Public awareness
 - Understanding of campaign
 - Favorable opinion of campaign
- **Behavior Modification**
 - **Observed change**
 - April/May 2004 to April/May 2005
- Reduction in crashes, injuries & fatalities



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Top Ten Bad Behaviors

1. Driving too fast (speeding)
2. Aggressive driving
3. Inattentive driving (e.g., cell phone)
4. Driving/cycling/running through red traffic lights
5. Driving under the influence (DUI)
6. Not yielding to pedestrians
7. Walking without looking
8. Walking outside crosswalk
9. Bicycling against traffic
10. Not buckling up!

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9. Bicycling against traffic
10. Not buckling up!



You drink & drive.
You lose.

Watch the Road.

Evaluation Studies

| Primary Traffic Collision Factor | Bad Roadway User Behaviors | | | | | | | | | |
|---|---------------------------------|--------------------|---------------------|---------------------------|-----------------------------|----------------------|-------------------------|---------------------------|--------------------------------|-----------------------------|
| | Driving too fast for conditions | Aggressive driving | Inattentive driving | Driving through red light | Driving under the influence | Not Yielding to Peds | Walking without looking | Walking outside crosswalk | Bicycling on left side of road | Bicycling through red light |
| Unsafe speed (Basic speed law) | Speeding | | | | | Yield to Ped | | | | |
| Fail to yield on left of U-turn | | | | | | | | | | |
| Vehicle fail to stop on red light | | Vehicle Run Red | | | | | | | | Bike Run Red |
| Drunk driving | | | | | | | | | | |
| Unsafe turn | | | | | | | | | | |
| Failure to stop at Stop Sign | | Stopping | | | | | | | | |
| Unsafe lane change | | | | | | | | | | |
| Following too close | Tailgating | | | | | | | | | |
| Failure to yield entering a street | | | | | | | | | | |
| Failure to yield to ped at intersection | | Stopping | | | | Yield to Ped | | | | |
| Jaywalking | | | | | | | Safe Ped Crossing | | | |
| Unsafe starting or backing | | | | | | | | | | |
| Failure to drive on right half of road | | | | | | | | | Wrong Way | |
| Failure to stop at limit line | | Stopping | | | | | | | | |
| Improper turn | | | | | | | | | | |
| Bicycle fail to drive on edge of road | | | | | | | | | | |
| Crossing solid double lines | | | | | | | | | | |
| U-turn in business district | | | | | | | | | | |
| Overtake and pass on left | | | | | | | | | | |
| Unsafe passing on right | | | | | | | | | | |

Spanish Version



Tome y maneje.
Usted pierde.

Atención a la carretera.

Evaluation Study Plan

- Measures “observable” bad behaviors
 - Example: Unable to study drunk driving
- Representative cross-section of behaviors
- Utilizes technology and existing equipment as much as possible
- Involves L.A. City, L.A. County & Caltrans
- Seven separate studies



Wearing a windshield.
Now that's uncomfortable.
Click it or ticket!

Watch the Road.

Evaluation Studies

- Speeding
- Tailgating
- Vehicle Run Red
- Wrong Way Bicycles
- Stopping (Signals & Stop Signs)
- Yielding to Pedestrians
- Safe Pedestrian Crossing



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Evaluation Scheduling

- Four week evaluation period each time
- Conducted while school is in session
- Avoids unusual conditions
 - Including holidays and bad weather



Watch for kids.
Watch the Road.

watchtheroad.org

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Study Locations

- 75 Total locations countywide
 - Distributed geographically
- 6 Locations in common for the pedestrian studies
- 10 Locations outside of the City of L.A. for speeding study
 - Caltrans (freeways)
 - County of Los Angeles (streets)



It's your life
on the line.

Watch the road.

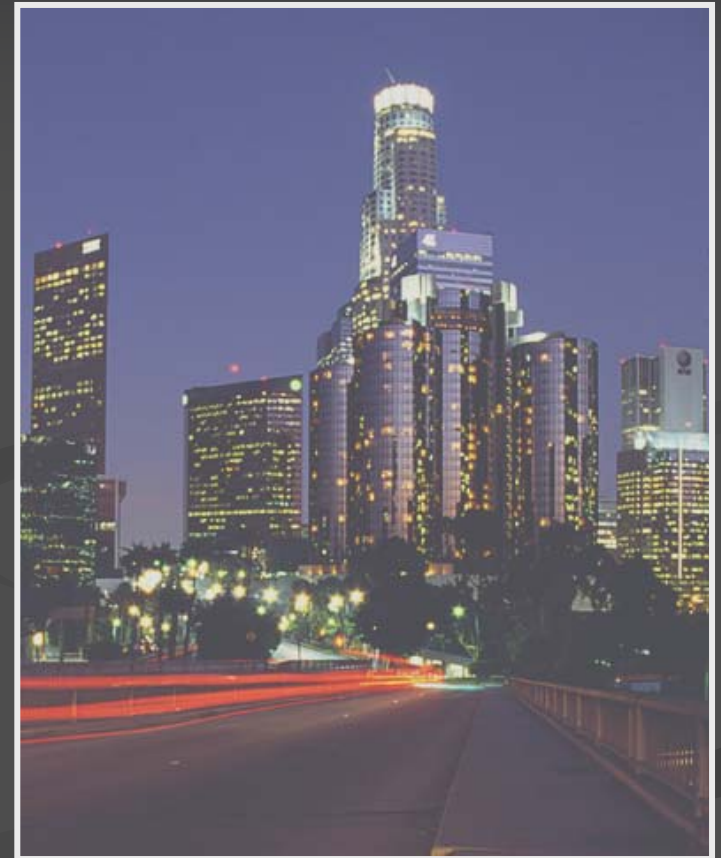
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Evaluation Studies

- Speeding
- Tailgating
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- Stopping (Signals & Stop Signs)
- Yielding to Pedestrians
- Safe Pedestrian Crossing

Speeding: Streets

- Measured speeds on free-flow sections of city streets
- 15 locations and over 360,000 vehicles analyzed
 - Variety of street classifications in L.A. City & County
 - **Locations have known speeding issues**



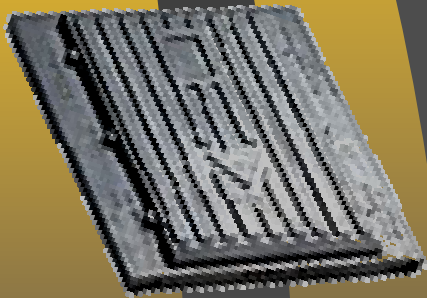
It's better to lose one minute of your life than your life in one minute.

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Speeding: Streets

- Collected individual vehicle speeds
 - #1 Lane in each direction
 - 3 days (Mon, Thu, Sat) of 24-hour data
 - Utilized Nu-metrics Histar traffic counter with specially developed software



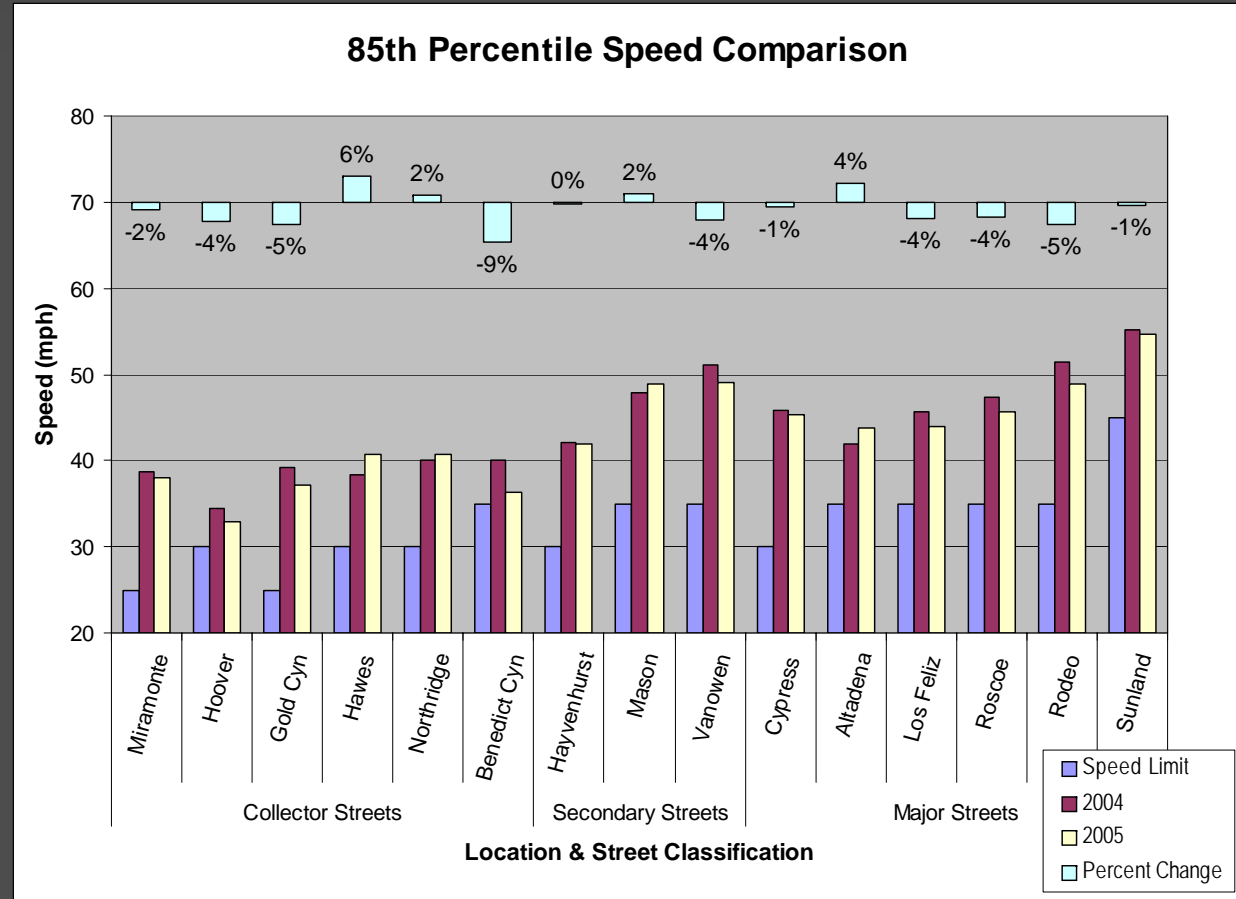
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Speeding: Streets Results

- 85th percentile speed reduced at 73% of locations
- Average reduction of 2% from before condition



8 months

May 2004 to Jan 2005



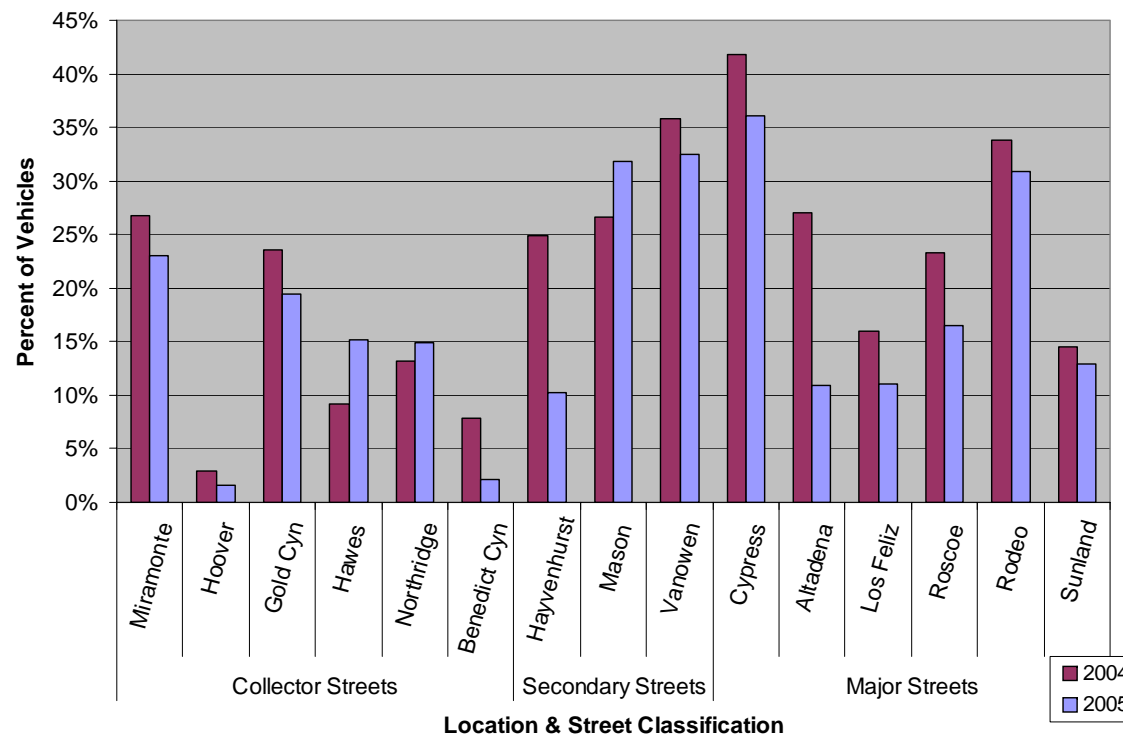
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Speeding: Streets Results

- Percent of vehicles traveling more than 10 mph over the speed limit reduced at 80% of locations.
- Average reduction of 4% from before condition

Comparison of Vehicles Traveling >10 mph Over Speed Limit



8 months

May 2004 to Jan 2005



It's better to lose one minute of your life than your life in one minute.

Watch the Road.

Tailgating

- 7 locations and over 197,000 vehicles analyzed
- Video detection used to collect headways on free-flow sections of streets and freeways
- No technical or legal definition of tailgating, but 2.0 sec is minimum recommended safe following time.



Tailgating causes crashes.
Back off.

Watch the road.

Tailgating Study Method

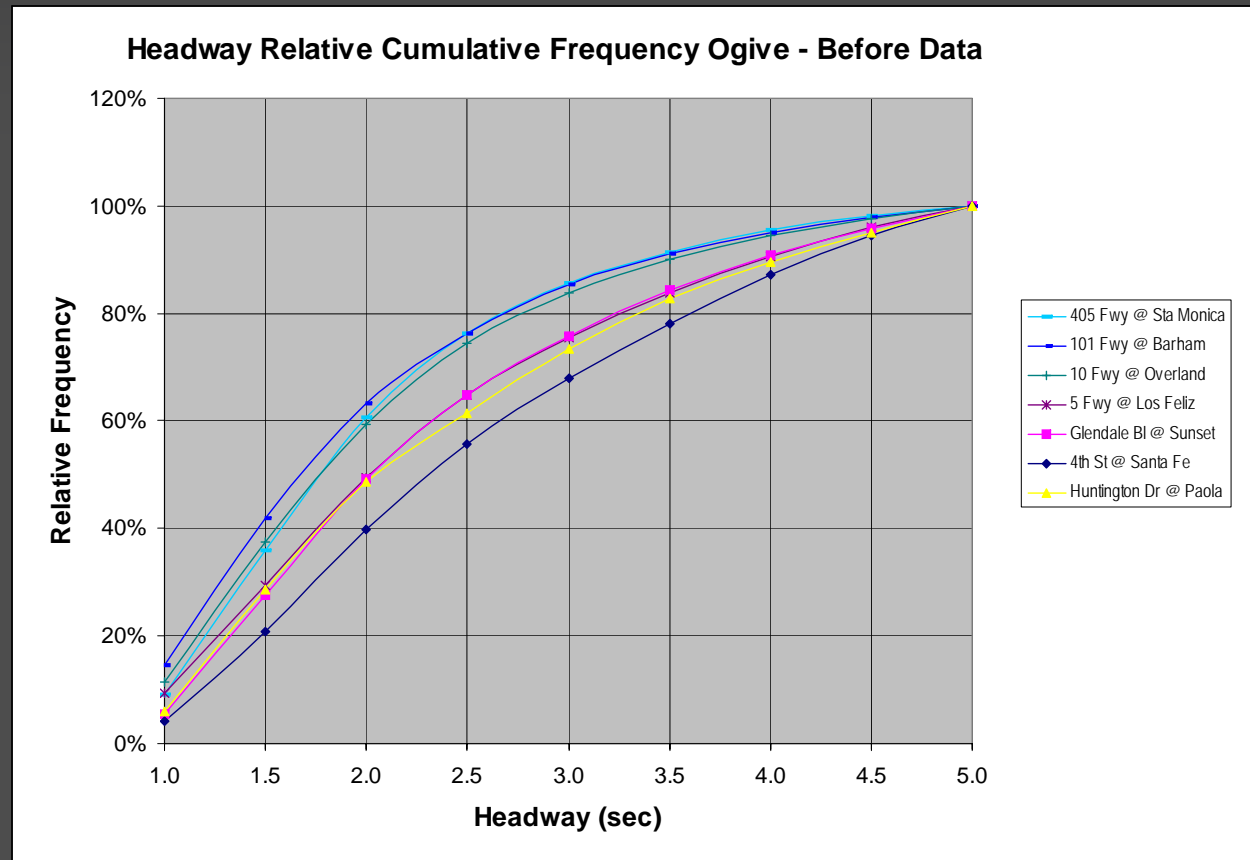


Tailgating causes crashes.
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Tailgating Results

- Headway values displayed using an *ogive*
 - Relative frequency of headway time plotted cumulatively



1 month (after study)
Mar 2006 - Present

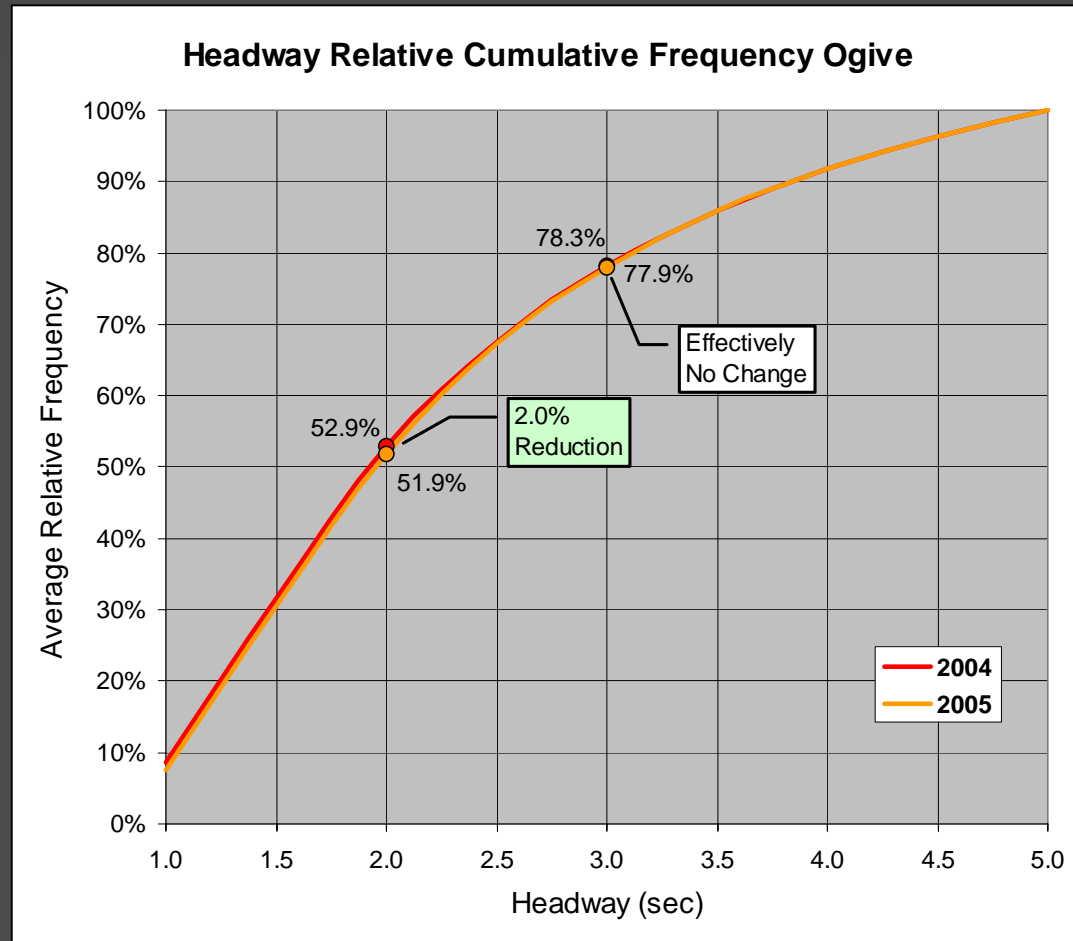


Tailgating causes crashes.
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Watch the road.

Tailgating Results

- <2.0-sec Headway: Reduced 2.0% from 52.9% to 51.9%.
- <3.0-sec Headway: Effectively no change at 78%.



1 month (after study)
Mar 2006 - Present



Tailgating causes crashes.
Back off.

Watch the road.

Vehicle Run Red

- 7 comparable locations analyzed
- Video detection with 2070 ATSAC signals used to send back up to 5 weeks of vehicle data
 - Counts vehicles demonstrating aggressive behavior (entering at end of yellow or beginning of red).
 - Due to the small percentage of red light violators, data for over **23 million vehicles** was compared.



Stop at the red
or end up dead.

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Vehicle Run Red Study Method



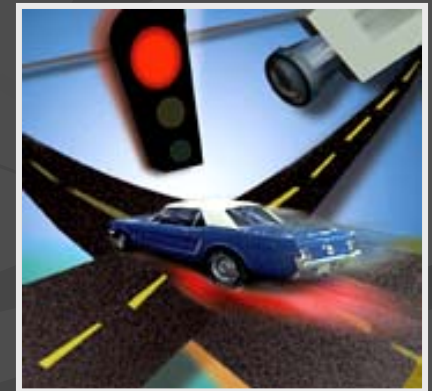
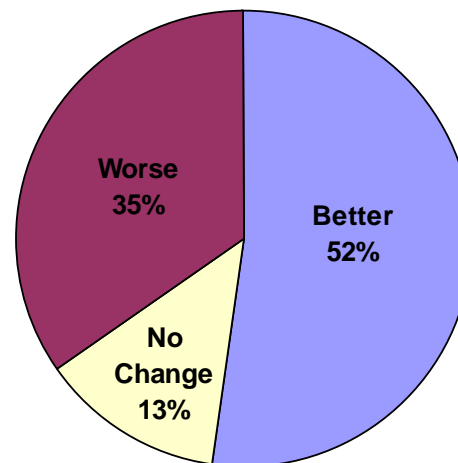
Stop at the red
or end up dead.

Watch the Road.

Vehicle Run Red Results

- Aggressive behavior displayed by 1 in 50 vehicles (2.0%) on average.
- Behavior improved slightly by an average of 2% over all 7 intersections.
- 52% of the 23 approaches improved by 5% or more.

I/S Approach Behavior Change
(by 5% or More)



6 months (after study)
Sep 2005 to Mar 2006



Stop at the red
or end up dead.

Watch the Road.

Wrong Way Bicycles

- Bicyclists ride against the flow of traffic leading to crashes
- Difficulty in identifying study locations
 - Bike volume and accident data reviewed
- Utilized temporary cameras to record behavior



Ride right,
and stop at the light.

Watch the Road.

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Wrong Way Bicycles

- Bicyclists ride against the flow of traffic leading to crashes



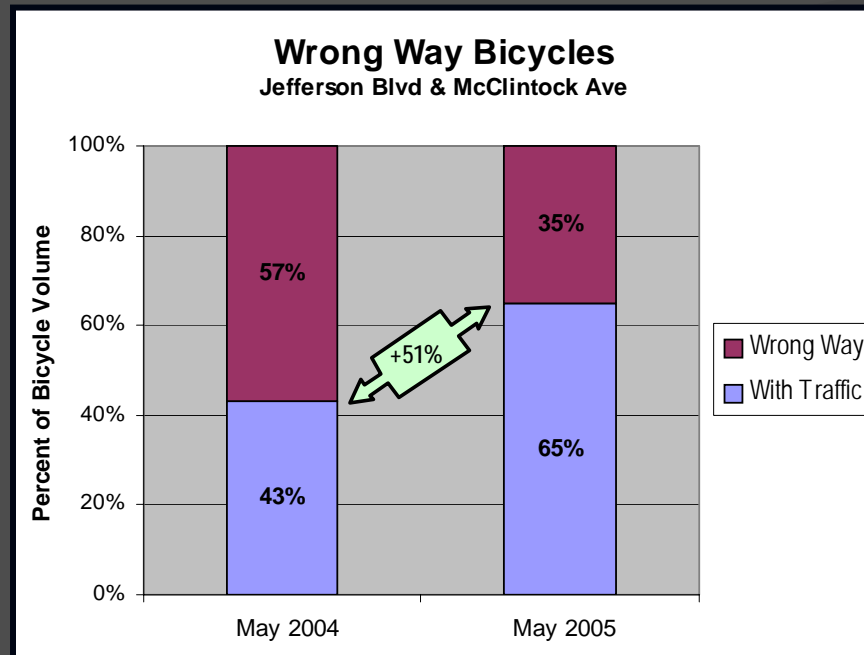
Ride right,
and stop at the light.

Watch the Road.

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Wrong Way Bicycles Results

- 4 locations and over 3,000 bicyclists studied
 - One-way Downtown street: 56% wrong way
 - Street with bike lane on one side: 11% wrong way
 - Divided highway with bike lanes: 2% wrong way
 - Comparable: Jefferson & McClintock (near USC)



3 months

Nov 2004 to Feb 2005



Ride right,
and stop at the light.

Watch the Road.

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Direct Observation Studies

- Developed new methodologies for behaviors observed directly
 - Extensive literature review
 - Practical field testing and procedure refinement
 - Centralized training of LADOT staff
 - Utilized professional & clerical staff depending upon requirements of study
 - Engineers, engineering aides, drafting techs, traffic checkers, clerk/typists

Stopping

- 10 locations and over 21,000 vehicles analyzed
- Studied driver behavior in two conditions
 - All-way stop signs
 - Right turn on red at traffic signals
- Established four categories of behavior
 - Full stop (discretionary & non-discretionary)
 - Rolling (California) stop (<3 mph)
 - Yielding (3-15 mph)
 - No Stop (>15 mph)



Life is important.
Drive Responsibly.

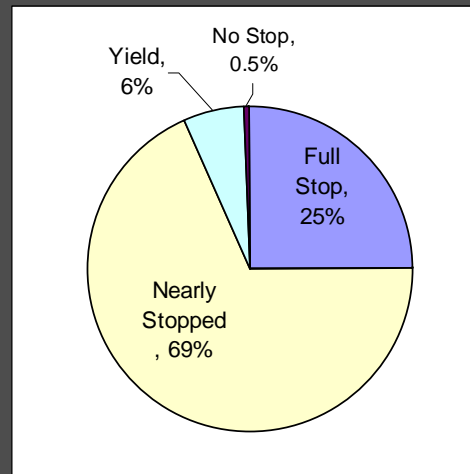
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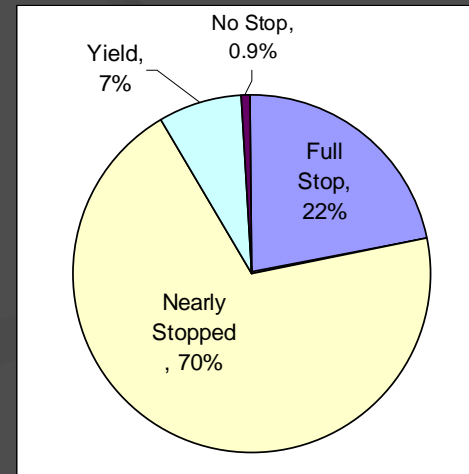
Stopping: Stop Signs Results

- Vehicles stopped completely 22% of the time that they had the right of way (down 12%)
- Evaluated stopping prior to limit line
 - Of those that came to a complete stop, 72% stopped before limit line (down 2%)

2004



2005



3 months during study
Feb 2005 to Sep 2005



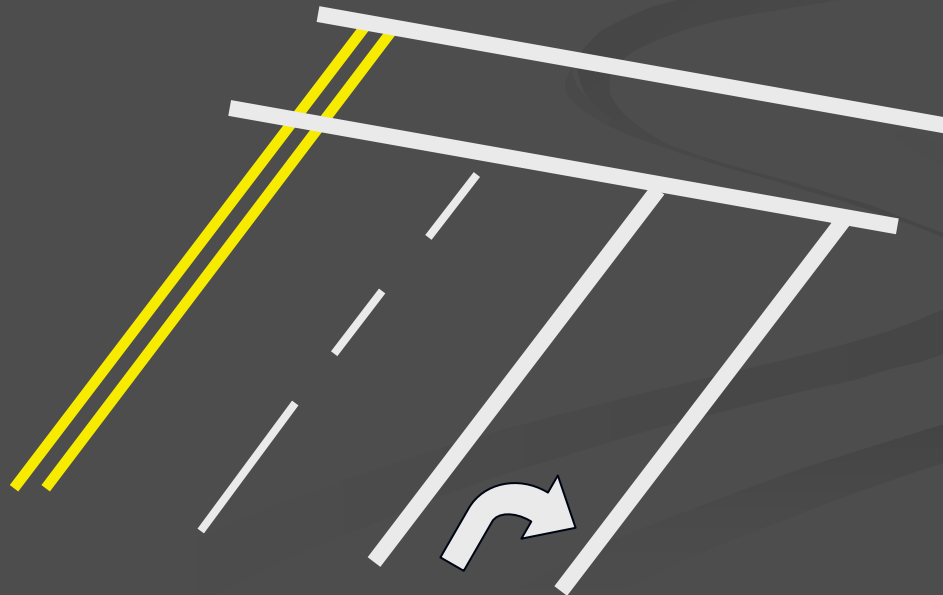
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Stopping: RTOR at Signals

- Studied drivers stopping for a right turn on red at signalized intersections
 - Right turn only lane
 - Yielding to pedestrians during red & green



3 months during study
Feb 2005 to Sep 2005



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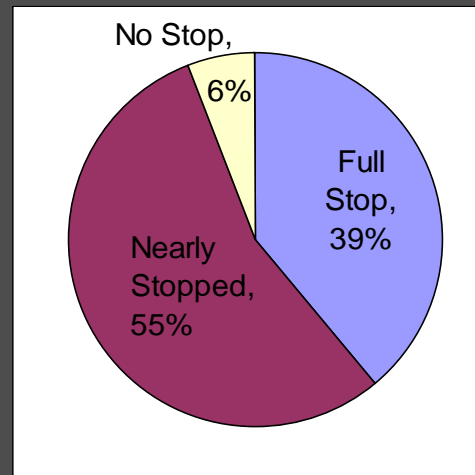
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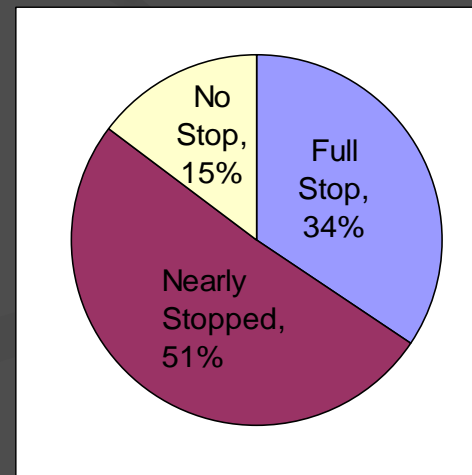
Stopping: Signals Results

- Percentage of vehicles that failed to stop (>3 mph) increased 150% from 6% to 15%.
- Vehicles stopped completely only about one third of the time that they were unimpeded.
- Of those that stopped, the percentage that did so prior to the limit line increased 30% from 33% to 43%
- 68% of drivers properly yielded to pedestrians in one of the conflicting crosswalks, down 11% from the previous year.

2004



2005



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3 months during study
Feb 2005 to Sep 2005



Life is important.
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Watch the Road.

Yielding to Pedestrians

- 12 Locations and over 6800 trials analyzed
- All have ladder crosswalks, word markings, and fluorescent warning signs at the crosswalk



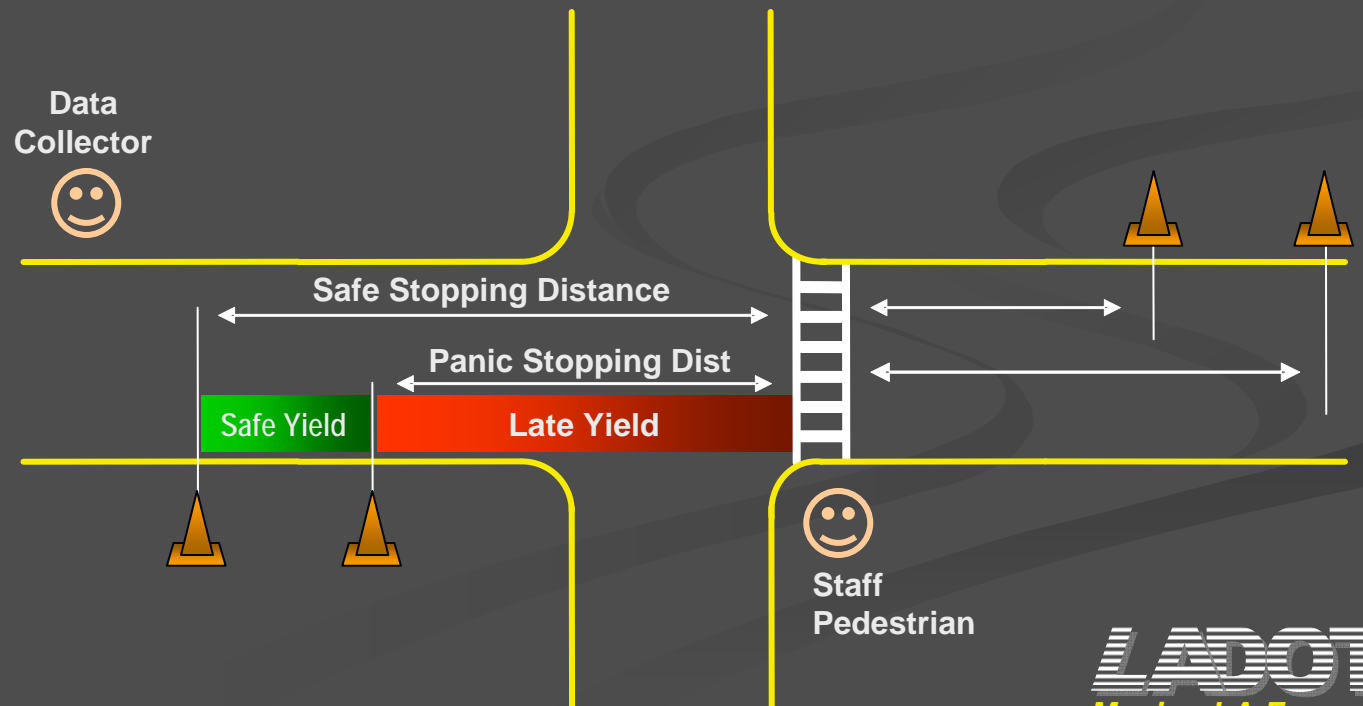
Yield for peds.
It's the law.

Watch the Road.

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Yielding to Pedestrians

- Safe yield begins prior to the panic stopping point
- Late yield is late with panic-type deceleration
- No stop required for yield



Yield for peds.
It's the law.

Watch the Road.

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It's the law.

Watch the Road.

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Yielding to Pedestrians

■ Procedure

- Waits out of sight for radio call from partner indicating a new platoon is approaching the safe stopping distance.



Yield for peds.
It's the law.

Watch the Road.

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Yielding to Pedestrians

- Procedure
 - Begins when safe stopping distance is clear
 - Displays active intent to cross
 - Crosses each lane as vehicles yield



Yield for peds.
It's the law.

Watch the Road.

Yielding to Pedestrians

- No Yield Behavior
 - Some folks just can't wait...
 - 10 No yield vehicles
 - 2 Late yield vehicles



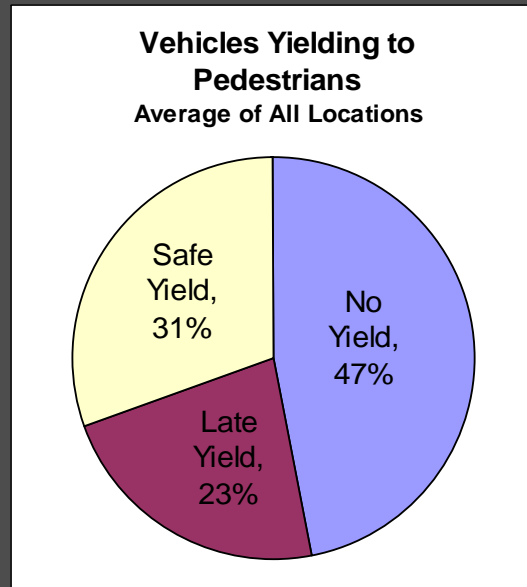
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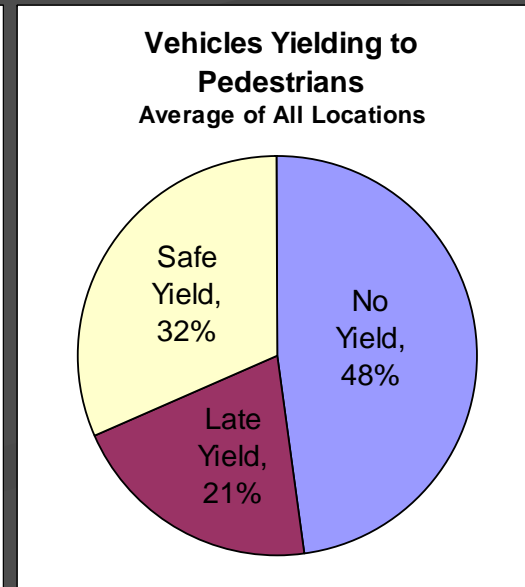
Yielding to Peds Results

- Vehicles yielded properly just 32% of the time (improved 3%)
 - One location with a construction lane drop went from 51% down to 15% safe yielding.

2004



2005



6 months (after study)
Sep 2005 to Mar 2006



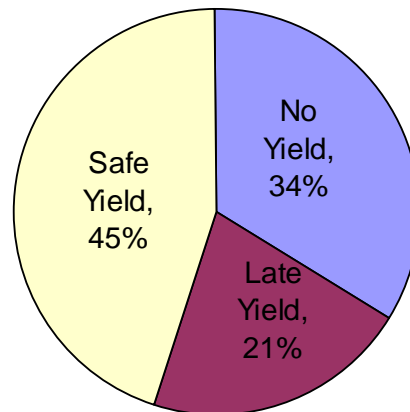
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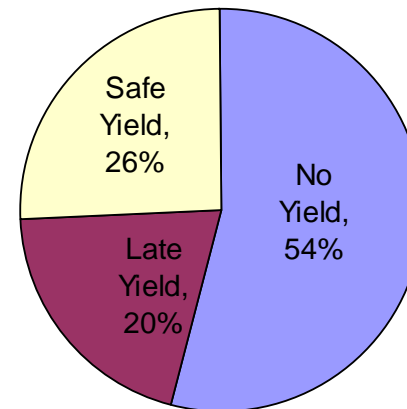
Yielding to Peds Results

- Vehicles yielded more often to pedestrians already crossing from their left than to those waiting on their right.
 - 45% yielded to left-side peds vs. 26% to right-side

Vehicles Yielding to Pedestrians
Left-side Pedestrian Crossings



Vehicles Yielding to Pedestrians
Right-side Pedestrian Crossings



6 months (after study)
Sep 2005 to Mar 2006



Yield for peds.
It's the law.

Watch the Road.

Safe Pedestrian Crossing

- Evaluated pedestrian behavior at marked unsignalized crosswalks
 - Looking before crossing
 - Stopping before crossing
 - Crossing within the marked crosswalk



Look before you cross.
Cars may not see you.

Watch the Road.

Safe Ped Crossing Results

- 9 Locations and over 3300 pedestrians analyzed
- 80% of pedestrians stopped completely before entering the street (up 2%)
- 75% of pedestrians in the vicinity used the marked crosswalk at the intersection (down 1%)



4 months

Oct 2004 to Feb 2005



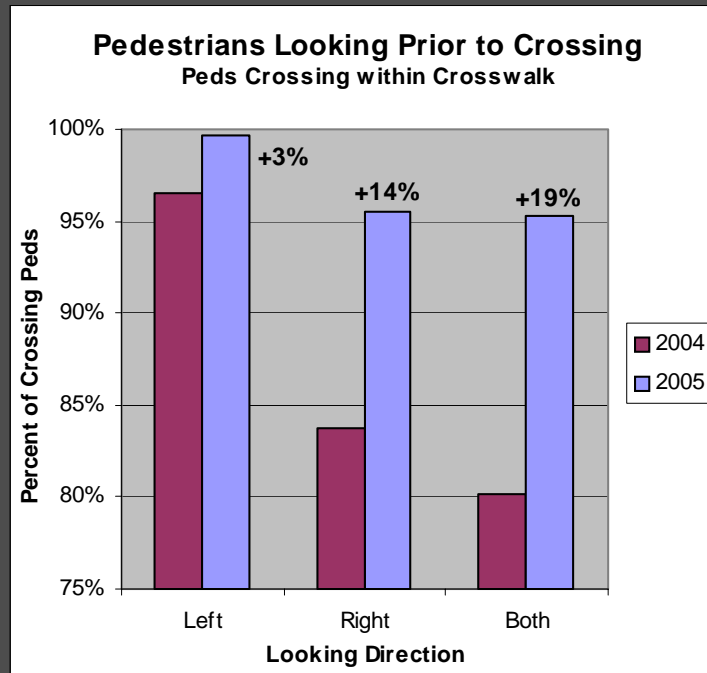
Look before you cross.
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Safe Ped Crossing Results

- 99.5% of pedestrians looked left before crossing.
- Peds looking both ways increased 14% to 95%.
- Peds looking in the **marked crosswalk** increased even more significantly.



4 months

Oct 2004 to Feb 2005



Look before you cross.
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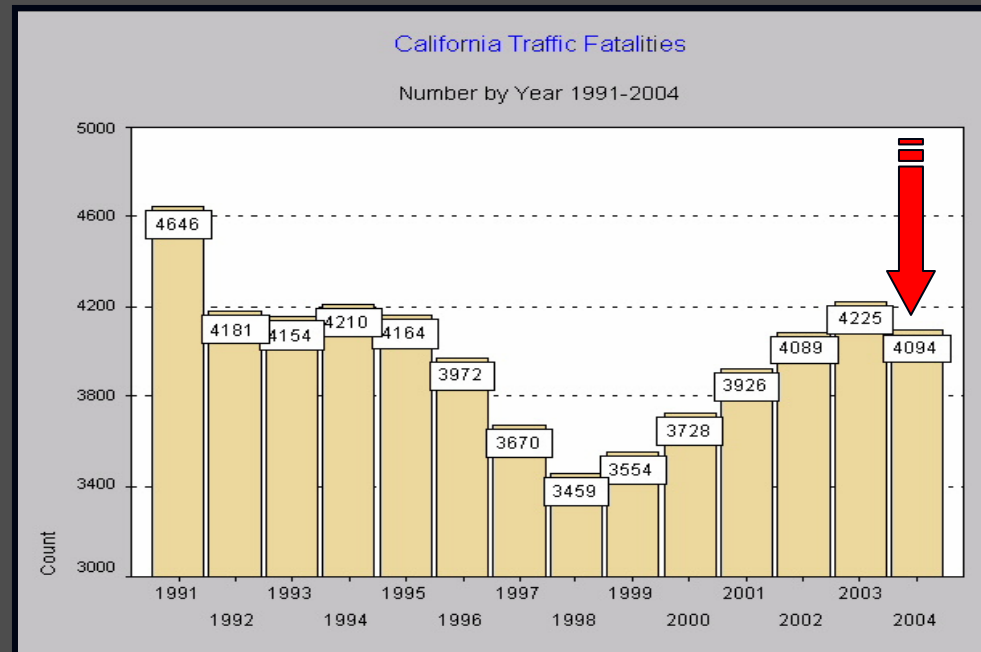
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Conclusions

- Improvements to at least some degree in 6 of the 7 behaviors measured
 - Improvements in all 3 behaviors that were specifically targeted by the campaign prior to May 2005.
- Improvements are impressive given the limited time frame for exposure
 - Lasting changes in behavior generally take 3 years.
- Additional behavioral change is expected if safety messages are reinforced by **targeted enforcement.**

Promising California Trends

- Seat belt use increased 2.1% in 2005 from 90.4% to 92.5%.
- Traffic fatalities decreased 3.1% in 2004
 - First decrease in 6 years



For Further Study

- Incorporate supplemental data and identify additional trends
 - Vehicle speeds and vehicle & pedestrian volumes
 - Street and intersection characteristics
 - Age and gender classification
- Perform additional analysis including significance testing
 - Modeling systematic error vs. random error
 - Analysis by UC Berkeley Traffic Safety Center



Traffic Safety Center

Setting New Directions in Traffic Safety

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- Visit us on the web at watchtheroad.org

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