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Irregular pedestrian crossing behaviour on a busy road in London

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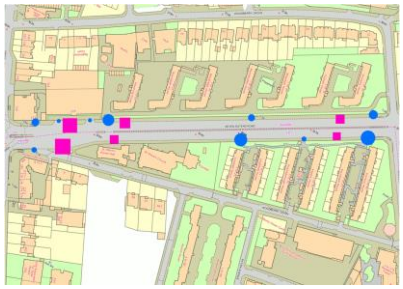
Where? How? When? Who? Why?

Case study: Seven Sisters Road, London



Bus stops
- 1500 passengers

Entrances to residential area
- Nearest entrance for 150 residents

Carriageway

- Outside lane
- Middle lane
- Bus lane
- Bus stop
- U-turn
- Central reservation (flushed)
- Central reservation (with step)
- Crossing facility

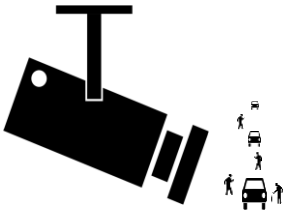
Pavement

- Pavement
- Dropped kerb
- Obstructions
- Car entrances
- Intersection (shared space)

Method

529 pedestrians observed

(7AM-10PM, 15'-30' past the hour)



Variables

Path across the road		Other characteristics
Origin and destination	Points where behaviour changes (stop, change speed, change direction)	
Pavement (nearside and farside)	**Carriageway**	**Time of day**
Distance to bus stop	Bus stop area	Morning Peak
Daily number of passengers boarding and alighting	Bus lane	Lunch time
Distance to pedestrian crossing	Middle lane	Evening peak
Shared space	Inside lane	Dark
Dropped kerbs	U-turn	**Mobility**
Obstructions	Central reservation (with step)	Child
Pedestrian environment (pavement)	Central reservation (flushed)	Walking aid
Pedestrian environment (crossing point)	**Approaching traffic**	Walking problem
Area (nearside and farside)	Platooning	Carrying large object
Distance to nearest entrance to residential area	Bus departing/arriving	Using phone
Population served by that entrance	Number (≤5 seconds)	**Group**
Street connectivity	% heavy vehicles	With children
Pedestrian environment (pavements)	Gap between pedestrian and vehicle	With other adult
	Headway (time between vehicles)	Others ahead (≤5 secs.)
	Position	
	Distance to nearside kerb	
	Distance to farside side	
	Distance to central reservation	

Where?

- Entrances to residential areas
- Bus stops

18.3 Pedestrians/m²

0

22.8 Seconds/m²

0

How?

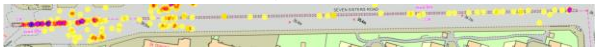
1.35 Pedestrians/m²

0

Stop

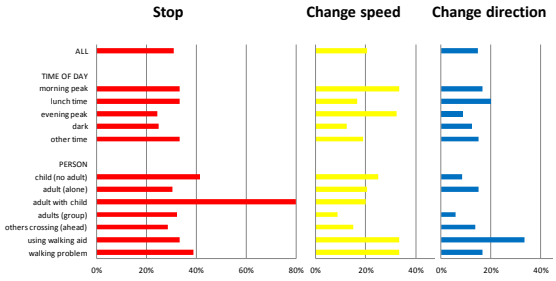
Change speed

Change direction



When?

Who?



Why?

Dependent variable

Density of starting point

n=766
(Regular points along kerb)

R^2=0.38

Nearside pavement

Bus alightings.* dist$^{-0.002}$	-0. 07***
Distance to crossing facilities	-
Shared space	0.39***
Dropped kerbs	0.13*
Obstructions	0.12**
Ped. environment (pavement)	0.15**
Ped. environment (crossing)	-0.55**

Farside pavement

Bus boardings* dist$^{-0.002}$	0.09***
Distance to crossing facilities	-
Shared space	1.02***
Dropped kerbs	0.13*
Obstructions	-
Pedestrian environment	-

Area (nearside)

Pop. * dist.entrance$^{-0.002}$	0.49***
Street connectivity	0.03***
Ped. envir. (pavements)	-

Area (farside)

Pop. * dist.entrance$^{-0.002}$	-0.43***
Street connectivity	-0.02***
Ped. envir. (pavements)	-

Infrastructure

U-turn	0.16*
Central reserv. (flushed)	0.14*

Why?

Dependent variable

Probability of stopping, changing speed, or changing direction

n=529
(each pedestrian)

R^2=0.13

Time of day

Morning peak	1.51**
Lunch time	-
Evening peak	0.73**
Dark	-

Mobility

Child	0.93*
Walking aid	-
Walking problem	-
Carrying large object	-
Using phone	1.61***

Group

With children	1.56***
Group size (adults)	-0.48***
Others ahead	-0.34*

Carriageway

Bus stop (nearside)	0.52*
Bus stop (farside)	-0.83**
U-turn	-
Marked central reserv.	-0.71*
Carriageway width	0.35***

Approaching traffic

Platooning	0.80***
Bus departing/arriving	
Average gap to pedestrian	-0.52*
Average headway	1.08*

Why?

Dependent variable

Density of points where pedestrians stop, change speed, or change direction

n=13744
(Regular points along crossing paths)

R^2=0.49

Carriageway

Bus stop	0.01*
Bus lane	-0.04***
Outside lane	-
U-turn	0.07**
Central reservation (with step)	0.02***
Central reservation (flushed)	0.31***

Approaching traffic

Number	-
% heavy vehicles	-
Platooning	0.45***
Gap	-0.42***
Headway	0.60***

Position

Distance to nearside pavement	0.02***
Distance to farside pavement	0.02***
Distance to central reservation	-0.02***

Conclusions

Large number of pedestrians crossing outside designated crossing facilities, and with irregular crossing behaviours (stop, change speed, change direction)

Higher incidence of crossings starting near entrances to residential areas and ending near bus stops. Dropped kerbs and other pavement and carriageway characteristics also significant

Probability of irregular crossing behaviours and their location on the carriageway depend on time of day, person, situation, and characteristics of infrastructure and traffic

Thank you for your attention!

http://www.ucl.ac.uk/street-mobility

https://streetmobility.wordpress.com

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Current team members:, Peter Jones, Paulo Rui Anciaes , Jennifer Mindell, Muki Haklay, Laura Vaughan, Ashley Dhanani, Shaun Sholes, Jemima Stockton and Nora Groce