Pedestrian Risk Taking while Road Crossing: A Comparison of Observed and Declared Behaviour

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BACKGROUND

Two main groups of methods for the analysis of pedestrian behaviour:
(i) **Field observations:** video recordings (e.g. at a junction area, on a train station, etc.), following and tracking pedestrians by means of a GPS or similar device, or - more recently - experiments in a virtual environment.
(ii) **Questionnaire surveys:** various scenarios for pedestrians to indicate their crossing intentions, or interviews on preferences, attitudes and behaviours.
Both methods have **advantages and limitations**.

- Field observations are more cumbersome and often require a degree of interpretation of the observed behaviour by the researcher.
- Questionnaire surveys benefit from more control over the design of the experiment and easier recruitment of the participants, however suffer from the known limitations of self-reported data.

In only a few studies behaviour observations are combined with questionnaire survey in order to validate the two approaches. The results suggest that pedestrian **observed and declared behaviour may differ** in several occasions.

OBJECTIVES

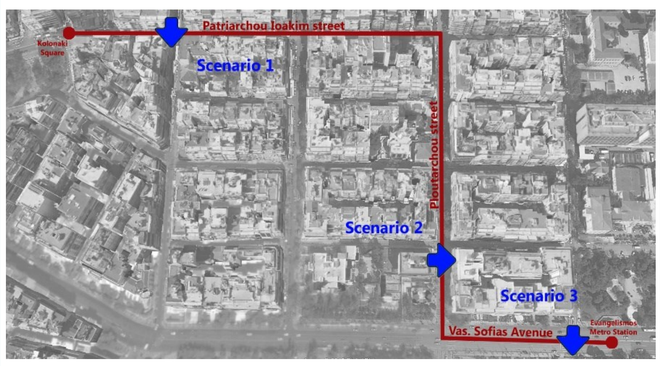
The objective of this research is the comparative analysis of observed and declared behaviour of pedestrians as regards road crossing in urban areas.

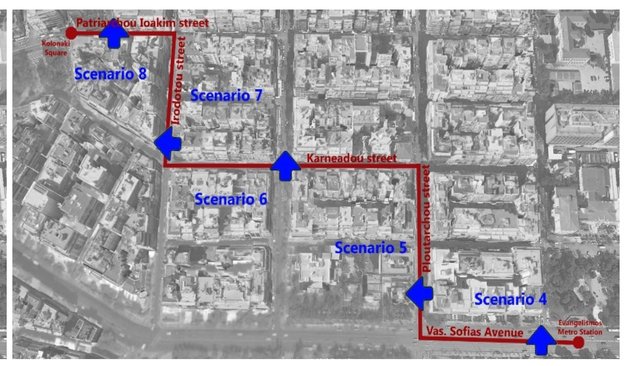
- A field survey in Athens, Greece, combining declared behaviour data through a questionnaire with actual observations of pedestrian crossing behaviour.
- Data cross-tabulated to identify cases where observed and declared behaviour are concordant or discordant, for two crossing behaviours: diagonal crossing and mid-block crossing.
- Results analysed for different road types: major urban arterials, main urban roads or minor / residential roads.
- Age and gender effects are also explored.

FIELD OBESERVATIONS

The field survey site is located in Athens, from Evangelismos metro station to Kolonaki square.
A **panel of 75** young and middle-aged pedestrians (out of which 40 males) were asked to walk in different road and traffic conditions.
Three walking conditions and eight crossing scenarios (see Figure):

- Crossing a main urban road with signal controlled and uncontrolled crosswalks: scenarios 1, 8;
- Crossing a minor (residential) road with marked crosswalks: scenarios 2, 5, 6, 7;
- Crossing a major urban arterial with signal controlled crosswalks: scenarios 3, 4.





QUESTIONNAIRE

- Section A: Demographics
- Section B: Mobility and travel motivations
- Section C: Attitudes, perceptions and preferences
- Section D: Self-assessment and identity
- Section E: Behaviour, compliance and risk taking
- Section F: Opinion on drivers

E	As a pedestrian, how often do you adopt each one of the following behaviours:
E1_i.	I cross diagonally
E1_ii	I cross at midblock at major urban arterials
E1_iii	I cross at midblock at urban roads
E1_iv	I cross at midblock in residential areas
E1_v	I cross at midblock when I am in a hurry
E1_vi	I cross at midblock when there is no oncoming traffic
E1_vii	I cross at midblock when I see other people do it
E1_viii	I cross at midblock when my company prompts me to do it
E1_ix	I prompt my company to cross at midblock
E1_x	I cross at midblock when there is a shop I like on the other side
E1_xi	I cross even though the pedestrian light is red
E1_xii	I walk on the pavement rather than on the sidewalk
E2_i	I cross between vehicles stopped on the roadway in traffic jams
E2_ii	I cross without paying attention to traffic
E2_iii	I am absent-minded while walking
	I cross while talking on my cell phone or listing to music on my headphones
E2_iv	I cross even though obstacles (parked vehicles, buildings, trees, etc.) obstruct visibility
E2_v	I cross even though there are oncoming vehicles

RESULTS

Diagonal Crossing

	Observed					
Declared	Never	Rarely	Sometimes	Often	Always	**Total**
Never	2	4	1			**7**
Rarely	11	11	2			**24**
Sometimes	5	8	10	1		**24**
Often	2	4	9			**15**
Always			1	1		**2**
Total	**20**	**27**	**23**	**2**		**72**

	Observed					
Declared	Never	Rarely	Sometimes	Often	Always	**Total**
Never	2,8%	5,6%	1,4%			**9,7%**
Rarely	15,3%	15,3%	2,8%			**33,3%**
Sometimes	6,9%	11,1%	13,9%	1,4%		**33,3%**
Often	2,8%	5,6%	12,5%	0,0%		**20,8%**
Always			1,4%	1,4%	0,0%	**2,8%**
Total	**27,8%**	**37,5%**	**31,9%**	**2,8%**	**0,0%**	**100,0%**

Mid-block crossing per road type

Major roads

Observed				
Declared	Never	Sometimes	Always	Total
Never	19	11	1	31
Sometimes	16	20	4	40
Always				0
Total	35	31	5	71

Main / secondary roads

Observed				
Declared	Never	Sometimes	Always	Total
Never	6	2		8
Sometimes	21	44	1	66
Always		2		2
Total	27	48	1	76

Minor / residential roads

Observed				
Declared	Never	Sometimes	Always	Total
Never		1		1
Sometimes	32	20	5	57
Always	3	5	3	11
Total	35	26	8	69

Observed				
Declared	Never	Sometimes	Always	Total
Never	26,8%	15,5%	1,4%	43,7%
Sometimes	22,5%	28,2%	5,6%	56,3%
Always				0,0%
Total	49,3%	43,7%	7,0%	100,0%

Observed				
Declared	Never	Sometimes	Always	Total
Never	7,9%	2,6%		10,5%
Sometimes	27,6%	57,9%	1,3%	86,8%
Always		2,6%		2,6%
Total	35,5%	63,2%	1,3%	100,0%

Observed				
Declared	Never	Sometimes	Always	Total
Never		1,4%		1,4%
Sometimes	46,4%	29,0%	7,2%	82,6%
Always	4,3%	7,2%	4,3%	15,9%
Total	50,7%	37,7%	11,6%	100,0%

Observed and declared frequency of diagonal crossing fully concordant for only 30% of participants.

- Pedestrians declared to **rarely** cross diagonally, but **never** did so (15.3%) Pedestrians declared to **often** cross diagonally, but did so only **sometimes** (12,5%).
- Discordances are mostly among 'neighbouring' categories

On major roads 55% of the participants had fully concordant behaviour

- Some pedestrians declared never crossing at mid-block but did so sometimes (15,5%) or even always (1,4%),
- Others declared sometimes but never actually did so (26,8%).

On main/secondary roads concordance of behaviour is very high
On minor / residential roads only 33.3% of behaviours are concordant

- More than 98% of participants declared that they sometimes or always cross at mid-block, but 50.7% of them never actually did so.
- May be due to the lack of constrains (e.g. low or no traffic), making junctions undistinguishable from mid-block locations

Effects of age group and gender

Young pedestrians (<25 years old)

Major roads

Observed				
Declared	Never	Sometimes	Always	Total
Never	32,4%	13,5%		45,9%
Sometimes	18,9%	29,7%	5,4%	54,1%
Always				
Total	51,4%	43,2%	5,4%	100,0%

Main / secondary roads

Observed				
Declared	Never	Sometimes	Always	Total
Never	12,8%	2,6%		15,4%
Sometimes	33,3%	46,2%		79,5%
Always		5,1%		5,1%
Total	46,2%	53,8%	0,0%	100,0%

Minor / residential roads

Observed				
Declared	Never	Sometimes	Always	Total
Never		2,9%		2,9%
Sometimes	54,3%	22,9%	5,7%	82,9%
Always	5,7%	8,6%		14,3%
Total	60,0%	34,3%	5,7%	100,0%

Middle-aged pedestrians (25-45 years old)

Major roads

Observed				
Declared	Never	Sometimes	Always	Total
Never	20,6%	17,6%	2,9%	41,2%
Sometimes	26,5%	26,5%	5,9%	58,8%
Always				
Total	47,1%	44,1%	8,8%	100,0%

Main / secondary roads

Observed				
Declared	Never	Sometimes	Always	Total
Never	2,7%	2,7%		5,4%
Sometimes	21,6%	70,3%	2,7%	94,6%
Always				0,0%
Total	24,3%	73,0%	2,7%	100,0%

Minor / residential roads

Observed				
Declared	Never	Sometimes	Always	Total
Never				
Sometimes	38,2%	35,3%	8,8%	82,4%
Always	2,9%	5,9%	8,8%	17,6%
Total	41,2%	41,2%	17,6%	100,0%

Male pedestrians

Major roads

Observed				
Declared	Never	Sometimes	Always	Total
Never	15,8%	15,8%		31,6%
Sometimes	26,3%	31,6%	10,5%	68,4%
Always				
Total	42,1%	47,4%	10,5%	100,0%

Main / secondary roads

Observed				
Declared	Never	Sometimes	Always	Total
Never	5,1%	2,6%		7,7%
Sometimes	20,5%	64,1%	2,6%	87,2%
Always		5,1%		5,1%
Total	25,6%	71,8%	2,6%	100,0%

Minor / residential roads

Observed				
Declared	Never	Sometimes	Always	Total
Never				
Sometimes	27,0%	35,1%	13,5%	75,7%
Always	5,4%	13,5%	5,4%	24,3%
Total	32,4%	48,6%	18,9%	100,0%

Female pedestrians

Observed				
Declared	Never	Sometimes	Always	Total
Never	39,4%	15,2%	3,0%	57,6%
Sometimes	18,2%	24,2%		42,4%
Always				0,0%
Total	57,6%	39,4%	3,0%	100,0%

Observed				
Declared	Never	Sometimes	Always	Total
Never	10,8%	2,7%		13,5%
Sometimes	35,1%	51,4%		86,5%
Always				0,0%
Total	45,9%	54,1%	0,0%	100,0%

Observed				
Declared	Never	Sometimes	Always	Total
Never		3,1%		3,1%
Sometimes	68,8%	21,9%		90,6%
Always	3,1%		3,1%	6,3%
Total	71,9%	25,0%	3,1%	100,0%

No significant differences between **males and females** on major or main roads. Females have more discordant declared and observed crossing behaviour on minor roads.
Young pedestrians have lower concordance compared to the average.

- More often declare mid-block crossing than actually observed.

CONCLUSIONS

- Overall, pedestrians **observed behaviour is in accordance with the declared** behavior
- A small share of pedestrians may cross at mid-block even at major roads
- **More discordance in less demanding traffic conditions**
- Weak tendency of females to overestimate their declared behavior on minor roads, the opposite was the case for male pedestrians on major roads.
- A tendency of young pedestrians to declare more frequently crossing at mid-block than they actually did.

NEXT STEPS

- Declared frequencies ('never', 'sometimes' etc.) should be weighted to the **total exposure or walking activity** of pedestrians.
- **Larger sample** and more representative sample
- Future **implications** for practitioners: a rigorous design may not prevent risk-taking intentions and behavior.

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