

# Who Said Pedestrian Means Dull: Teaching Methods in the Measurement of Behaviour Through Observational Studies of Pedestrian Behaviour

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## ABSTRACT

The Measuring Behaviour class (PSYO 3161) at Dalhousie University is designed to teach third year undergraduate students the theoretical and methodological procedures for the measurement of behaviour. For this class, students complete laboratory projects on the behaviour of mice and humans. For one of these projects, students completed observational studies on the behaviour of pedestrians at cross-walks. Students worked in groups to design an experiment to answer a question concerning pedestrian behaviour, and by doing so applied knowledge learned in the class on experimental design, sampling rules, objective definition of behavioural measures and statistical analysis. The students collected data, analyzed the data and then completed written reports describing the results. This poster describes some of the studies completed by students in the Measuring Behaviour class, and demonstrates the value of pedestrian behaviour as an educational tool for classes designed to teach methods for measuring behaviour.

## Author Keywords

Teaching, pedestrian behaviour.

## INTRODUCTION

The theme of pedestrian behaviour is an effective topic of research in an undergraduate class as (1) students can easily relate to pedestrian behaviour, (2) there is an established field of research and many journals publish articles on pedestrian behaviour (3) data on pedestrian behaviour can be quickly obtained and (4) students become motivated based on the growing need for research on pedestrian behaviour. Indeed, pedestrians represent the largest group of road users today [3] and 20-35% of pedestrians cross illegally at intersections [2]. Moreover, the high rates of illegal pedestrian activity increase the potential for

pedestrian-car accidents, which account for 12% of traffic related injuries in the United States of America [1]. As such, research completed by students may help to determine the potential causes and correlates of risky pedestrian crossing behaviour.

## EXPERIMENT 1: DOES A COUNT-DOWN TIMER SIGNAL INFLUENCE CROSSING BEHAVIOUR?

### Background

Countdown timers are used to indicate to pedestrians how much time is left to cross the street before the light will change. This experiment was designed to determine if pedestrians used the count-down timer to regulate their walking speed when crossing the street. Students hypothesized that pedestrians would be faster to cross when the countdown timer was present, than when a walk signal was present. Furthermore, students expected that there would be a positive correlation between the time required to cross the street and the time on the count-down timer.

### Methods

There were 100 pedestrians observed at an intersection in Halifax, Nova Scotia, Canada from 3:30-5:30 pm. The intersection was monitored by a signal-light that displayed a walk signal followed by a countdown timer. The time on the count-down timer when the pedestrian started crossing the street was recorded, and the time to cross the street was measured.

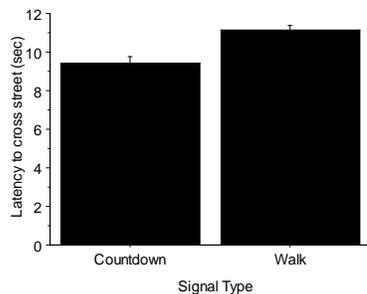
### Results

Pedestrians took significantly less time to cross the street when the count-down timer was present, than when the walk-signal was present ( $t(98) = 4.30, p < 0.0001$ , Figure 1A). Also, there was a significant positive correlation between the time exhibited on the count-down timer and time to cross the street ( $r(41) = .612, p < .001, r^2 = .374$ , Figure 1B). This suggests that pedestrians used the count-down timer to regulate how fast they walked to cross the street, and tended to cross faster when the count-down timer approached zero. Further research is needed to determine if this increase in crossing speed is accompanied by more risk assessment behaviours (looking for on-coming traffic), which may decrease the risk of car-pedestrian accidents.

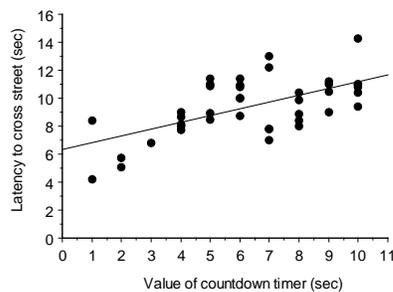
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A.



B.



**Figure 1. (A) The latency (mean, +/- SEM) to cross the street for pedestrians who started crossing when the count-down timer was present was shorter than pedestrians who started crossing when the walk signal was present. (B) The time spent crossing the street was positively correlated with time on the count-down timer.**

## EXPERIMENT 2: DOES THE USE OF PERSONAL ELECTRONIC DEVICES INFLUENCE TIME TO CROSS THE STREET?

### Background

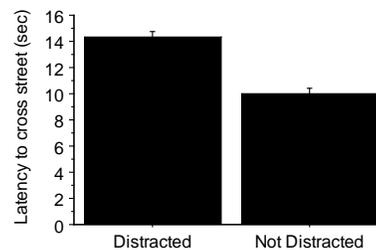
The use of cell-phones and other electronic devices by drivers has been found to increase the risk of car-related accidents [4]. The goal of this study was to determine if the use of electronic devices also influences the behaviour of pedestrians at cross-walks. The students hypothesized that pedestrians using electronic devices (cell phones and portable music devices) would take longer to cross the street than pedestrians not using such devices.

### Methods

Pedestrians (N=50) were observed at a signalized intersection from 11:30 am - 2:30 pm. The time required to cross the street and whether the pedestrian was distracted (i.e., texting/talking on a cell-phone or using headphones) or not distracted was recorded.

### Results

Pedestrians who were distracted took significantly longer to cross the street ( $t(24) = 7.14, p < .0001$ , Figure 2) than pedestrians who were not distracted. This increase in time required to cross the street may be due to impaired attention in pedestrians using electronic devices, as they may not be



**Figure 2. The mean (+/- SEM) latency to cross the street for pedestrians who were distracted was longer than pedestrians who were not distracted.**

attending to signal lights, traffic or other pedestrians. Furthermore, because distracted pedestrians spend more time crossing the street, they may be at an increased risk for a pedestrian-car accident.

### SUMMARY

Results from these observational studies completed by students of the 3161 Measuring Behaviour class provide information regarding factors that influence street crossing behaviour by pedestrians. The data suggest that pedestrians attend to count-down timers on signalized cross-walks, and regulate crossing speed based on the time of the count-down timer. Also, portable electronic devices were found to slow crossing speed. This poster demonstrates that pedestrian behaviour can be used as an effective area of research for classes designed to teach the theory and methodology for the measurement of behaviour.

### ACKNOWLEDGEMENTS

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### REFERENCES

1. Bungum, T.J., Day, C. and Henry, J.L. The association of distraction and caution displayed by pedestrians at a lighted crosswalk. *Journal of Community Health*, 30 (2005), 269-275.
2. Keegan, O. and O' Mahoney, M. Modifying pedestrian behaviour. *Transportation Research Part A*, 37 (2003), 889-901.
3. King, M.J., Soole, D. and Ghafourian, A. Illegal pedestrian crossing at signalised intersections: Incidence and relative risk. *Accident Analysis and Prevention*, 41 (2009), 485- 490.
4. Redelmeier, D.A. and Tibshirani, R.J. Association between cellular-telephone calls and motor vehicle collisions. *The New England Journal of Medicine*, 336 (1997), 453-458.