



MEASURING COMMUTING PEDESTRIANS' CONCERNS FOR PERSONAL SAFETY AND THE INFLUENCE OF LIGHTING ON THESE CONCERNS

V. K. Dravitzki, B. S. Cleland, D. Walton, and J. N. Laing

ABSTRACT

Measures to increase the proportion of journeys made by walking need to ensure that pedestrian routes satisfy pedestrians' desires for pleasurable, inviting and safe walking environments. This study examined the extent that people walking home from work would have increased concerns for their personal safety in winter darkness compared to early autumn. Methods of measuring this concern were developed and applied to pedestrians leaving the Wellington CBD for the inner suburbs. Views on the adequacy of street lighting and of the desirability of walking were also measured and correlated with concerns for personal safety.

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1. INTRODUCTION

1.1 MOVES TO INCREASE WALKING

Walking is a key mode of transport for New Zealanders with 18.7% of all our trips made on foot¹. All journeys by public transport involve some walking, for example to get to the bus stop, to transfer from bus to train, or to walk from a bus stop to work. Journeys by private car usually involve some walking, even if just from the car parking building to final destination. However, the number of short journeys in which walking is the sole mode of transport is declining. In 1989/90, 17% of all journeys were walk-only journeys, but this had dropped to 14% in 1997/98, with most of the shift being to the private motor vehicle (NZ Pedestrian Profile, 2001).

Recently there has been a renewed emphasis on promoting walking for short journeys (less than 2km) as traffic congestion increases and we look for more environmentally friendly ways to move around our cities. Forty-six percent of all journeys in New Zealand are less than 2km in length and of these, it is short journeys made by car that are the focus of pro-walking and cycling campaigns (NZ Pedestrian Profile, 2001).

Walking journeys can be classified according to the purpose of the trip, including those to educational facilities, leisure and recreation, entertainment, shopping and commuter journeys to work. We have focused in this study on commuter journeys, which currently make up about a fifth of all walking journeys (NZ Pedestrian Profile). Commuting to work is a journey type where a modal shift from car to walking, or to bus and walking is desirable. These journeys by car currently create the peak time travel that results in congestion, with its attendant problems of lengthened travel time for business and a degraded environment. Yet many commuter journeys are short and typically vehicle occupancy is low.

1.2 ATTRIBUTES OF PEDESTRIAN ROUTES

To encourage walking, there is a need to become more focused on pedestrian needs and wants. Pedestrian design guides are available (such as 'Design Guidance: Accommodating Bicycle and Pedestrian Travel: A Recommended Approach', FHWA, 2002) to provide information on designing for pedestrians, focusing on road safety. However, there is an important difference between providing facilities so that pedestrians *can* walk, and providing conditions so that they *want* to walk. We need an understanding of how to provide a walking environment that is safe, attractive and comfortable for pedestrians, and encourages people to walk for short journeys.

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¹ The New Zealand Travel Survey defines a trip as each leg of a journey, with a new trip beginning each time the mode of transport or purpose of travel changes

Research on good pedestrian design has identified a wide range of network and route attributes that have an impact on the pedestrian experience. The urban designer, however, needs to know not only the attributes which are significant for pedestrians, but the proper weighting to give to the attributes in the route design, and “walkability” models are one way in which to combine and weight these factors.

The range of models that has been developed shows a progression from models encompassing a moderate number of physical factors, such as walk area width, traffic volume, and pedestrian flow density (for example, Landis et al, 2001; Mozer, 2002) to more complex ones that attempt to capture the pedestrian's response to the route and its surrounds, such as visual appeal, and sense of safety (for example, Khisty, 1994; Gallin, 2001). The simpler physical models can be viewed as identifying facilities so that people can walk while the complex models include the factors that will affect whether people want to walk.

The more complex models that include pedestrian responses to the route quality are currently highly qualitative and often not well defined. For example, Gallin's (2001) model includes “personal security” as a factor, which is to be rated from unsafe to excellent, but offers little guidance on how to decide which of these is the appropriate rating, or of the factors to be considered in making the rating.

1.3 MEASURING SUBJECTIVE RESPONSES

Despite some difficulties in measuring qualitative aspects, it is important to develop our understanding of these subjective responses, as they can contribute to the success of a pedestrian route as much as the more easily measured physical parameters. Although they may appear abstract, many of the pedestrian's feelings about the route will be invoked by the physical nature of the route and good design can create a physical environment that people will enjoy.

One way of finding out about this relationship is to survey pedestrians. Care is needed here, as simple surveys of user views where they are asked to state an opinion or preference may provide misleading results. They may, for example, identify as a preference the middle of the range of possibilities provided, as they have anticipated that they have been presented with a range from poor to very good; or they may identify a very high level of service because it is the ideal.

A more robust methodology for identifying the nature of the relationship between a physical parameter, and the human response derives from using surveys within a quasi-experimental design, using psychometric indices as dependent measures. In the survey, clusters of questions work together to form a measure (or scale) of opinions, with the patterns of questions varying and their placement in the overall survey being such that this clustering is not apparent to the participant. Real life “quasi experiments” can then identify correlations between these user views as measured by these scales and observed changes in peoples' behaviour, with statistical control being applied to those variable which could not be controlled otherwise.

This paper, within the context of examining the views of pedestrian commuters of their perceived personal safety in varying lighting conditions also illustrates how a subjective response such as feelings of personal safety can both be measured and linked to the physical parameters of the pedestrian route, in this instance the level of lighting

1.4 PERCEIVED PERSONAL SAFETY AND LIGHTING

The international literature identifies that peoples concerns for personal safety increase at night time, and that good street lighting is one way of improving their sense of safety (Painter, 1996; City of Melbourne, 2000). Figures 1 and 2 show how the percentage of people feeling safe drops after dark in New Zealand cities. Fear increases after dark because there are fewer people around, contributing to feelings of isolation from help if needed, and because visibility is reduced, which may provide offenders with more opportunities for concealment and may make it more difficult to identify escape routes should they be necessary (Oc & Tiesdell, 1997; Samuels, 2001). Good lighting can improve visibility and decrease such fears, and may therefore increase pedestrian street use (Atkins, 1989; Oc & Tiesdell, 1997).

Figure 1: Percentage of respondents who felt 'Very safe' or 'Safe', in their neighbourhood (2000)

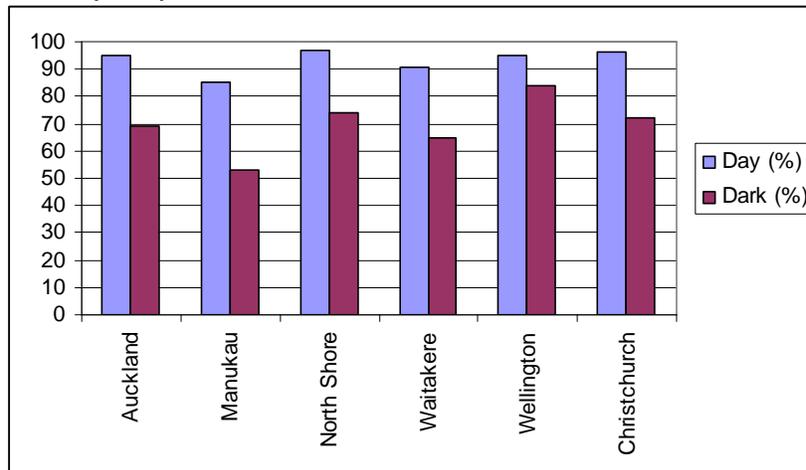
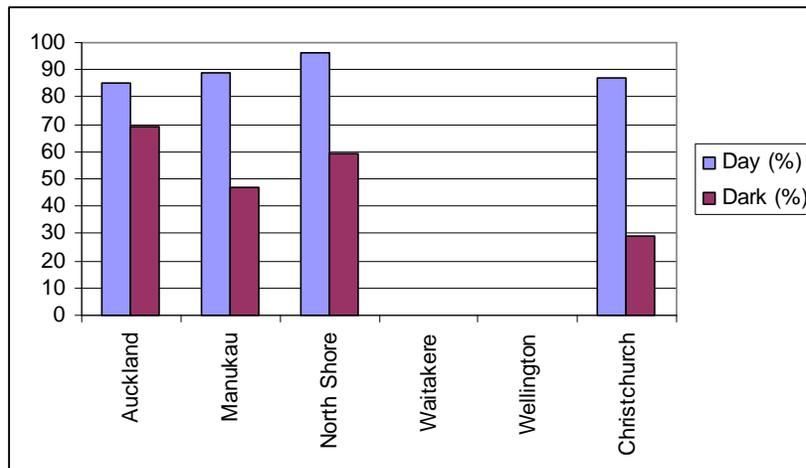


Figure 2: Percentage of respondents who felt 'Very safe' or 'Safe', in town (2000)



Note: there was no data for perceptions 'In town' for Waitakere or Wellington
Source: Quality of Life in New Zealand's Six Largest Cities, 2001

The rationale for the study was that in New Zealand cities, pedestrian commuters who leave work in the period 5-6 p.m. will in summer be making this journey in sunny daylight (sunset about 8-8.30 p.m.) and in winter will be making this journey in twilight and early darkness under streetlight (sunset about 5-5.30 p.m.). Based on the literature, it is likely that pedestrians concerns for personal safety will be higher when it is dark with street lights, compared to daylight, or early twilight conditions (Oc & Tiesdell, 1997). Our hypothesis was that there would be an increased level of concern with pedestrian commuter journeys made in winter darkness, and that this may affect travel behaviour, for example by having shorter journey times, for example walking home directly versus lingering; longer journeys not being made; walking less frequently; or not walking at all over winter.

It is also possible that a portion of the population prepared to walk to and from work in the light of summer would not be prepared to walk in the dark of winter because their concerns for personal safety would increase. The mode choice they made for winter may become a habit and determine how they travel to work year round, therefore not walking at all.

This paper describes the first part of this study, of current rather than potential pedestrians. It identifies:

- Are pedestrian commuters more concerned for their personal safety in winter than in summer?
- Is the street lighting considered adequate and are any personal security concerns related to the levels of street lighting?
- What indications are there of pedestrian commuters walking in summer only but not in winter?

2. METHOD

Within the study's Wellington context we assessed peoples' concerns for activities ranging from antisocial behaviour such as verbal abuse and fighting through to property offences such as graffiti and vandalism. The wording of the questions ranged from feelings (feeling intimidated), interactions (being verbally harassed) to seeing (witnessing vandalism occurring).

2.1 BASIC SURVEY

A 35-item survey was constructed to measure people's perceptions of antisocial behaviour and factors that might influence these perceptions. Five Likert scale items collected information on the persons walk that evening, including: whether they walked the same route every day; whether they enjoyed their walk more if there were a lot of other people around; whether carrying a cell phone made them feel safer; if an increased presence of police would give an improved sense of security of their walk; and whether they had confidence in their ability to defend themselves from physical attack.

Seven items asked for the likelihood that an antisocial act would occur if they were to make the same journey in three weeks time. The forecast of three weeks' time enables people to factor in the probability with which they expect antisocial events to occur, otherwise it would simply be a record of what they actually saw that night. Participants were asked about the likelihood of: witnessing an act of vandalism; feeling threatened by a drunk; feeling intimidated by a group of teenagers; being verbally harassed by a stranger; being physically threatened by a stranger; witnessing disorderly conduct; and of being approached for money (other than for a charitable donation).

Fourteen Likert questions asked about the walking journey. Nine of these questions were directed at the perception of lighting during the walking journey e.g. "I am aware of poorly lit, dark areas on my walk". Four questions sought people's general opinion on walking e.g. "Walking is a great form of exercise" and functioned as distracter questions. One question investigated whether the presence of graffiti indicates an area is unsafe. A summarised version of the questions is shown in Table 1.

Table 1: Summary of survey questions

1. Walk the same route 2. Enjoy walk more if other people around 3. Carrying a cell phone feels safer 4. Increased presence of police improves sense of security 5. Confidence in ability to defend self from attack
6. Likelihood of witnessing an act of vandalism, such as graffiti 7. Likelihood of feeling threatened by a drunk 8. Likelihood of feeling intimidated by teenagers 9. Likelihood of being verbally harassed by stranger 10. Likelihood of being physically threatened by a stranger 11. Likelihood of witnessing disorderly conduct, such as a fight 12. Likelihood of being approached for money
13. Aware of poorly lit, dark areas 14. Prefer to walk longer distance in well lit area than shorter distance in poorly lit area 15. Council should put in more street lighting 16. Walking is a great form of exercise 17. Street lights are primarily for the benefit of pedestrians 18. Walking to work is more interesting than driving 19. Wellington has more streetlights than it needs 20. Brighter bulbs that use the same energy should replace older bulbs in streetlights 21. Compared to other New Zealand cities, Wellington is really well lit at night 22. Street lighting should be reduced 23. I prefer to walk to work rather than drive to work 24. Presence of graffiti indicates that an area is not safe 25. The council is prompt in replacing streetlight bulbs 26. Walking in winter is as pleasant as in summer

Seven items collected demographic information: the time usually taken for the journey; whether it was likely that the person would make the journey in three weeks time; how long they had been walking to work; age; how many times they had walked to work in the past week; and the amount walked last week compared with a typical week.

Participants were asked to write in a code consisting of parts of their name and phone number to act as a unique but anonymous identifier, how long it had taken them to fill out the survey, and were provided with a place to write comments.

2.2 PROCEDURE

Four versions of the survey were created, and administered to people walking out of the Wellington CBD in the period 5:15 to 6:30 p.m. over the period March to July 2003. Between mid-March and early July, sunset changed by almost three hours due to the seasonal decrease in daylight hours and the ending of daylight saving. Survey 1 was administered on March the 13th when sunset was 7:42 p.m. Survey 2 was administered three weeks later on April the 3rd when sunset was 6:07 p.m. Surveys 3 and 4 were administered on the 8th of July when sunset was 5:04 p.m. Apart from the changing daylight, the weather each time was very similar, with clear calm conditions and non rain. The surveys differed slightly in the wording of the preamble to the questions, about the likelihood that an antisocial act would occur if they made the same journey in three weeks time.

For survey 1 the preamble was:

“Daylight savings ends this weekend and the days are getting shorter. In three weeks’ time, if you were to make the same journey you made tonight, at the same time of day, you would be walking after the sun has set. Please answer the following questions in regards to your walk home in three weeks’ time.”

For Survey 2 the preamble was:

“Over the past three weeks the days have gotten shorter. In three weeks’ time, if you were to make the same journey you made tonight, at the same time of day, you would be walking after the sun has set. Please answer the following questions in regards to your walk home in three weeks’ time.”

For surveys 3 and 4 the preamble was altered to ask participants to imagine walking home one hour later (survey 3) and 6 hours later (survey 4).

Surveys were administered simultaneously at three different sites in central Wellington that were highly trafficked by commuters at that time. Location 1 was on Willis St by the intersection with Vivian St. Location 2 was on Molesworth St, just after the exit from State Highway 1, on the southern side. Location 3 was in Glenmore St, between the two main park entrances on the south side of the street. Surveyors approached walkers and asked them if they would like to participate in the study. At all sites there were more walkers passing than were handed the surveys. If walkers said yes they were handed a survey to complete and return by post. A \$1 instant kiwi scratch and win ticket was provided to encourage survey completion.

3. PARTICIPANTS

An analysis of the participants’ demographics was undertaken to identify if there were any significant changes in the makeup of the pedestrians between the different surveys, or in the patterns of walking. This analysis covered age; gender; time spent walking; length of period for which they had walked home; and frequency of walking. The analysis showed an essentially stable profile of commuter pedestrians within these surveys. The participants comprised about 50% each of males and females (slightly more females) of working age with few young or elderly. The majority have walked year round and walk most days (4 or 5). There is an indication of a slightly younger age distribution for survey 1. The time spent walking remained essentially constant at around 28 minutes. The analysis showed little indication of people

walking in summer but not winter, of journeys being shorter or quicker, or being less frequent. Table 2 summarises the participant profile.

Table 2: Profile of participants

		Survey			
		1	2	3	4
Gender (%)	Female	59	51	54	51
	Male	41	49	46	49
Time spent walking (minutes)	Mean	28	28	26	27
	Std dev.	12	12	10	12
Make same journey in 3 weeks time (%)	Yes	96	94	99	99
Age (%)	Under 16	1	1	0	}*
	16-25	31	20	21	}
	26-45	48	53	52	}
	46-60	18	25	25	}
	61 or more	2	2	3	}
Total participants	N	152	174	147	}
Period of walking (%)	Less than 1 week	1	1	0	0
	1-4 weeks	3	3	1	3
	1-6 months	15	17	15	22
	6-12 months	10	12	10	18
	More than 1 year	72	65	74	56
How many times walked last week (%)	0	1	1	0	0
	1	1	2	5	3
	2	4	7	10	12
	3	14	11	8	7
	4	22	24	10	18
	5 or more	59	55	67	61

* Surveys 3 and 4 are aggregated

4. RESULTS

4.1 SCALE CREATION

The first part of the analysis of the commuters' responses tested the extent that the clusters of questions could function as reliable scales of opinion and the questions that should be included within these scales. Three groups of questions formed three psychometric scales to investigate walking. These scales are:

- Likelihood of antisocial behaviour
- Adequacy of street lighting
- Attitude towards walking

4.1.1 Likelihood of Antisocial Behaviour Scale

Items 6-12 explored the likelihood of various antisocial acts occurring if the person walked home in three weeks time. These items were combined forming a scale ranging from 0 (not going to happen) to 10 (certain to happen) that has excellent inter-item reliability, with a Cronbach's Alpha of .94. This scale can be interpreted as measuring the perceived likelihood of the occurrence of broad antisocial behaviour.

4.1.2 Adequacy of Street Lighting Scale

Items 13-15, 17, 19-22, and 25 explored the perception of street lighting during the walking journey. Items 19, 21, 22, and 25 were reversed. Item 17, "Street lights are primarily for the benefit of pedestrians", was removed as it lowered reliability of the scale in Study 1. The remaining eight items formed a scale ranging from 1 (lighting is provision is inadequate) to 5 (lighting provision is adequate) with a Cronbach's Alpha of .71.

4.1.3 Attitude Towards Walking Scale

Items 16, 18, 23, and 26 investigated the attitude towards walking. Item 26 "Apart from being colder, walking is as pleasant in winter as it is in summer" was removed as it lowered the reliability of the scale in Study 1. The remaining three items were combined to form a scale ranging from 1 (positive attitude towards walking) to 5 (negative attitude towards walking) that had a Cronbach's Alpha of .68.

4.2 ANALYSIS USING SCALES

Table 3 shows the data for the antisocial behaviour scale. Table 3 shows that there is no difference in the extent of the pedestrians concerns of experiencing antisocial behaviour in between surveys 1, 2 and 3, even though the lighting conditions have changed from light (where they were asked to imagine early twilight, to under street lights in early night time in survey 3). However, Table 3 also shows that they have heightened concerns if they consider making the same journey 6 hours later. The variation between the groups is significant ($F(3,475) = 6.594, p < .05$) and a Scheffé post hoc revealed that the mean for the 6 hr group was significantly higher than the other groups but that there were no other differences between the groups. No significant differences were found between the groups for either the adequacy of the street lighting scale ($F(3,463) = .174, p > .05$) or for the attitude towards walking scale ($F(3,473) = .666, p > .05$).

Table 3. Mean rating of likelihood of experiencing antisocial behaviour over four surveys antisocial behaviour scale.

Survey	Mean	Std. Deviation	No. of participants
Light (Survey 1)	2.1	1.6	154
Twilight (Survey 2)	2.1	1.5	172
Dark and 1 hour later (Survey 3)	1.8	1.5	74
Dark and 6 hours later (Survey 4)	2.9	2.1	75

The analysis of relationships between the scales found a moderate negative relationship between the likelihood of antisocial behaviour and the extent that street lighting was considered inadequate ($R = -.293$, $P < .05$), i.e. the more street lighting is considered inadequate, then the greater the perceived likelihood of experiencing antisocial behaviour. A weak positive relationship was found between the adequacy of street lighting and attitude to walking ($R = .155$, $P > .05$).

4.3 GENDER AND AGE DIFFERENCES

4.3.1 Gender Differences

Separate analyses of gender and age differences were undertaken for the two groups of surveys; 1 and 2, and 3 and 4. Similar trends were found for both groups. The statistics for groups 1 and 2 are reported here. The statistics for surveys 3 and 4 differ only slightly.

- Females perceived a greater likelihood than males of antisocial behaviour occurring ($t(312) = 4.666$, $P < .05$) and that lighting was less than adequate ($t(313) = -.5338$, $P < .05$).
- There was no significant difference between females and males in attitude to walking ($t(301) = .225$, $P > .05$).
- Females were significantly younger ($U(313) = 9846.5$, $P < .05$) than males and a weak negative relationship was found between age and the perceived likelihood of antisocial behaviour ($S(326) = -.240$, $P < .05$). This raises the possibility that the differences between females and males on the antisocial behaviour scale and on lighting scale were due to age differences.
- Analysis of covariance (ANCOVA) controlling for age found that females still perceived a greater likelihood of antisocial behaviour occurring ($F(1, 310) = 16.555$, $P < .05$) and that lighting was less than adequate ($F(1, 310) = 5.141$, $P < .05$).
- Females were more likely to enjoy their walk more if there were other people around ($t(312) = -2.697$, $P < .05$); to feel safer if carrying a cell phone ($t(313) = 5.741$, $P < .05$); and less confident in their ability to defend themselves from physical attack ($t(312) = 6.130$, $P < .05$) than males.
- There was no difference between males and females on whether an increased presence of police would give improved security ($t(313) = -1.290$, $P > .05$).
- Males and females did not differ significantly on whether they walked the same route every day ($t(312) = 1.403$, $P > .05$).

4.3.2 Factors that Influence Scale Scores, with Gender and Age Controlled For

Because gender and age affect scale scores, age and gender need to be controlled for when investigating other factors that may affect scale scores. Partial correlation, with age and gender controlled for, showed a number of weak trends:

- As the perceived likelihood of antisocial behaviour occurring increased, people were more likely to report that they would enjoy their walk if other people were around ($R = -.1307$, $P < .05$), that carrying a cell phone would make them feel safer ($R = -.2410$, $P < .05$), that an increased presence of police would give them improved security ($R = -.2488$, $P < .05$), and that lighting was less satisfactory ($R = .2053$, $P < .05$).
- As reported adequacy of the street lighting decreased, people were more likely to report that carrying a cell phone would make them feel safer ($R = .1889$, $P < .05$) and that an increased presence of police would give them improved security ($R = .3299$, $P < .05$) but there is no relationship with whether they would enjoy their walk more if there were a lot of other people around ($R = .0264$, $P > .05$).

4.4 VALUE OF SCALES

The likelihood of antisocial behaviour was measured on a scale ranging from 0 (not going to happen) to 10 (certain to happen). The mean values for each survey are reported in table 3. Any positive value indicates a perception that antisocial behaviour will occur. This scale need not be linear and it measures perception not actual occurrence.

Adequacy of street lighting was measured on a 5-point scale ranging from 1 (lighting is provision is inadequate) to 5 (lighting provision is adequate). A score of 3 represents neither adequate of inadequate. The average score on the lighting scale was 2.3 (SD = .43) so in general people considered that lighting was slightly inadequate.

Attitude to walking was measured on a scale ranging from 1 (positive attitude towards walking) to 5 (negative attitude towards walking). A score of 3 represents a neutral attitude towards walking. The average score on the attitude to walking scale was 1.52 (SD .57) so in general people had a positive attitude towards walking.

4.5 LOCATION DIFFERENCES

Within the first two surveys an analysis of covariance, controlling for age and gender, found a significant difference in the likelihood of antisocial behaviour occurring between the locations ($F(2, 308) = 8.323$, $P < .05$) but no significant difference in the adequacy of street lighting ($F(2, 308) = 1.090$, $P < .05$) or the attitude to walking ($F(2, 306) = .964$, $P < .05$). Participants at location 1 had a higher perception of the likelihood of antisocial behaviour occurring. A corresponding analysis of surveys 3 and 4 showed almost identical findings on street lighting and attitudes to walking, but no location effect.

5. DISCUSSION

This study has shown that it is possible to measure what may appear to be an abstract concept such as sense of safety, and link it to readily quantified physical aspects of the route such as lighting and the presence of other people. It also shows

the value of studies that link opinions to actual behaviour. While there is a modest linkage between the perceived adequacy of the street lighting and the feelings of the likelihood of experiencing antisocial behaviour, the study has found that under a wide range of actual lighting conditions which include street lighting and early twilight which would be much brighter than the best street lighting there was no change in the perceived likelihood of antisocial behaviour.

Although the study results may seem to run counter to the general view that higher levels of illumination are associated with reduced fear of crime and antisocial behaviour, there is a possible explanation. One of the reasons fears of experiencing crime and antisocial behaviour are believed to increase at night time is because activity levels decrease with the result that there are fewer people around. However, as shown by the demographics and habits of the participants, during the commuting period in which we handed out surveys, there are in fact a lot of people about, with activity levels dropping off after this peak period. So a person walking home in the survey period of 5:15 – 6:30 is likely to be walking at a time when there is a lot of traffic and other walkers around. The study does show, however, that when asked to imagine walking at a later time, when there are less people around, that pedestrians anticipated antisocial behaviour as more likely. The study showed that most of the pedestrian commuters were highly familiar with the neighbourhoods surveyed. Many had walked for 6 months or more, and the majority had walked for more than 12 months. A study of bus passengers in North Carolina, USA, showed that regular users were much more likely to make realistic assessments of the likelihood for crime or antisocial behaviour to occur (Ingalls, Hartgen, & Owens, 1994)

Some Australian and UK municipalities are moving from incandescent lighting to high-pressure sodium lighting, which can dramatically improve illumination levels while also saving on energy (Planning SA, 2002). However, colour rendering is not as good with this yellow light as it is with white light, which is more expensive (Oc & Tiesdell, 2001). White light reveals natural colours of surfaces, and provides a more accurate sense of the size and shape of objects (City of Melbourne Lighting Strategy, 2000). The literature indicates that lighting for pedestrians should be high enough for facial recognition at 15 metres, because this is considered a reasonable distance at which to make eye contact with someone you are about to pass (Oc & Tiesdell, 2001; Planning SA, 2002). Lighting on many Wellington commuter routes is not up to this standard.

There is some further work needed to give this Wellington study more context. We have surveyed people commuting from the CBD to inner suburbs, in part because these would be logical targets for campaigns to promote a modal shift to walking. However, all the suburbs included in this study were reasonably affluent, and the relationship between lighting levels and perceived likelihood should also be tested in different types of neighbourhood. The surveys have not assessed peoples' concerns about antisocial behaviour during full sunlight, only as bright as early twilight. This could also be investigated. The finding that pedestrian concerns of antisocial behaviour increasing when considering walking at later hours needs further exploration. This needs to be examined both to get better definition of how this varies with time of day and night, and whether they would walk at that time. The impact of having more people around also needs to be more specifically examined.

A further area for study would be to examine the perceptions of street lighting held by those who commute a short distance to work by car: a logical group to target for modal shift to walking. It is common for those who do not use a mode of transport to overestimate the hazards and difficulties of that mode of transport (Ingalls et al.,

1994) so it would be of interest to investigate their perceptions of the adequacy of street lighting, in comparison to the perceptions of existing walkers.

Improving our knowledge of the factors that may deter people from walking, for example concerns for safety, and of the role of measures such as improved street lighting to reduce these concerns, is one area of research in ongoing international efforts to increase understanding of how the environment affects pedestrian behaviour. Such knowledge will be applied in improving pedestrian infrastructure, which will complement strategies to encourage walking for short journeys.

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