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Happy Travels?

Policy Insights from Commuting Research in Dublin

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REFERENCE

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1 INTRODUCTION[i]

Effectively managing transport behaviour and transport services are perennial challenges. Individual transport choices have direct implications for climate change, air pollution, and health. Transport choices are also relevant to citizen well-being and the functioning of the economy as a whole. In terms of climate policy in Ireland, reducing emissions from the transport sector is one of the most challenging goals. The desire to encourage both active travel modes and mass transit travel has been clearly articulated in a recent Irish cross Government Plan on Climate Action.[1] However, due to a multitude of reasons it is often difficult to implement hard transport policies, such as taxes, bans, and mandates.

The behavioural sciences suggest to use softer, psychologically-informed policies to encourage a culture of walking and cycling. These policies are sometimes called "Nudges",[2,3] and summarised under the umbrella term "Behavioural Public Policy".[4] At the core of nudging is the idea to make desired behaviours as easy, convenient, and satisfying as possible.[5] When an activity feels pleasant and easy to enact, people are more likely to repeat the activity, thus cr eating feedback loops and forming habits. Moreover, transportation research suggests that satisfaction with a given travel mode positively influences attitudes towards this travel mode and can thus influence mode choice as well.[6]

As such it is essential to understand the experiences of travellers when seeking to design attractive and appropriate transport services, and/or trying to foster and encourage alternative, sustainable travel mode choices. This policy brief presents some key results from a travel survey that investigated the experiences felt by commuters in over 4000 commutes to one of the largest commuting destinations in Ireland, University College Dublin (UCD). The brief discusses the results' relevance for transport policies that aim to reduce the share of trips made in cars and to encourage a culture of walking and cycling. The brief also presents recommendations for future research in this area. Some segments of this document are based on the academic paper by Lades et al. (2019).

2 THE 2018 UCD COMMUTING SURVEY

This policy brief relies on data from the November, 2018 UCD Commuting Survey. It analyses the responses of 4134 participants who, in their most recent commute to the campus, travelled primarily in a motorized mode by bus, train, tram or a non-motorized mode by foot or by bicycle.[ii]

The survey asked participants to rate how satisfied they were in their most recent commute to the campus. Travel satisfaction was measured using 9 questions that asked participants to rank their most recent commute to the campus along the dimensions described in

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[i] This policy brief is based on the academic paper referenced as Lades, L.K., Kelleher, L. and Kelly, J. A. (2020). Why is active travel more satisfying than motorized travel? Evidence from Dublin. *Transportation Research Part A: Policy and Practice*. Please cite this paper when referring to this work.

ii The sample was composed of 60.84% females, 58.06% were 24 or younger, 73.7 were students and 26.3 university staff.

Table 1. Each question could be answered on a scale from -3 to +3. A higher score implied higher travel satisfaction. The average of these 9 items can be interpreted as an overall travel satisfaction rating.[iii]

Table 1: Satisfaction with Travel Scale

Negative	-3	-2	-1	0	1	2	3	Positive
Bored	O	O	O	O	O	O	O	Enthusiastic
Fed up	O	O	O	O	O	O	O	Engaged
Tired	O	O	O	O	O	O	O	Alert
Stressed	O	O	O	O	O	O	O	Calm
Worried	O	O	O	O	O	O	O	Confident
Hurried	O	O	O	O	O	O	O	Relaxed
Worst I can think of	O	O	O	O	O	O	O	Best I can think of
Low standard	O	O	O	O	O	O	O	High standard
Did not work well	O	O	O	O	O	O	O	Worked well

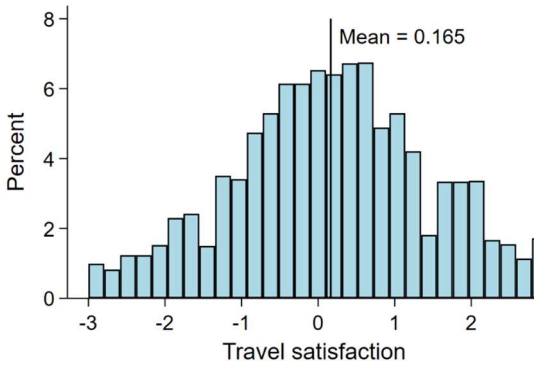
3 KEY RESULTS

3.1 Travel satisfaction

Key result

The average travel satisfaction was 0.165 on the scale from -3 (very low travel satisfaction) to +3 (very high travel satisfaction). Compared to other studies using the same travel satisfaction measure, an average of 0.165 is low. For example a study from Stockholm, Goteborg, and Malmö finds an average travel satisfaction ratings of 0.75, a study from Ghent finds an average travel satisfaction rating of 1.23, and a study from Stockholm, Goteborg, and Karlstad finds an average travel satisfaction rating of 0.87.[7–9] As shown in Figure 1**Error! Reference source not found.**, there is substantial heterogeneity in travel satisfaction and we will explore this heterogeneity in the remainder of the brief.

Figure 1 Distribution of satisfaction with travel



iii The nine items can also be divided into three sub-components: (i) feelings from negative activation to positive deactivation, (ii) feelings from negative deactivation to positive activation, and (iii) cognitive evaluation.

Policy relevance

The relatively low travel satisfaction rating in this study indicates that the transport infrastructure might be worse in Dublin than in other European cities. This suggest that there is potential for investments in services (such as high-quality bus routes) and infrastructure (such as safe and well-lit cycling and walking paths) to increase travel satisfaction.

Recommendations

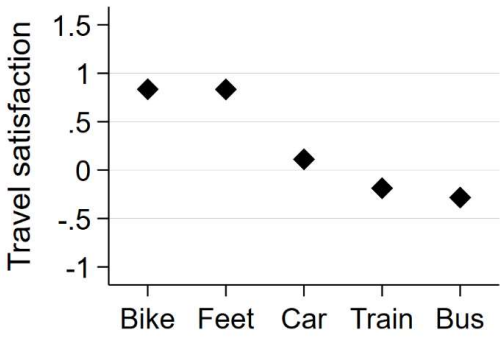
The comparison of travel satisfaction ratings across different studies is not perfect. Although all studies use the same 9-item measure of travel satisfaction, different studies might implement the same measure in slightly different ways which reduces comparability across studies. We suggest that a large, international study comparing travel satisfaction across multiple cities would be beneficial by providing more robust data on comparisons across cities.

3.2 Differences in travel satisfaction across travel modes

Key result

Investigating travel satisfaction for each of the five travel modes separately shows that commuters are most satisfied when they travel actively by bike or when they walk. Commuters are least satisfied when using public transport. These patterns are illustrated in Figure 2. The differences across travel modes are in line with the literature on travel satisfaction where active commutes are consistently rated as more satisfying than motorized commutes.[10]

Figure 2. Average travel satisfaction by travel mode



Policy relevance

Communication campaigns can make use of these findings by informing travellers about the relatively high travel satisfaction ratings associated with walking and cycling. Such information provision might convince people on the margin to try out active travel rather than sticking to their car-based habits. Presenting graphs on mode-specific travel satisfaction in attractive ways at the right points in time might convince more people to join smarter travel initiatives such as the NTA's Smarter Travel Cycle Challenge and the Smarter Travel Campus initiative.[iv]

iv More information about the NTA's Smarter Travel Cycle Challenge can be found here (retrieved on July 9th, 2019) and more information about the NTA's Smarter Travel Campus initiative can be found here (retrieved on July 9th, 2019).

Communicating that satisfaction ratings are higher for active commutes than for motorized commutes might also help to overcome a common misprediction: Research shows that people systematically predict car journeys to be more satisfying than they really are and bus journeys to be less satisfying than they really are.[11] Presenting results about active travel being more satisfying than motorised travel might reduce this error of misprediction.

Recommendations

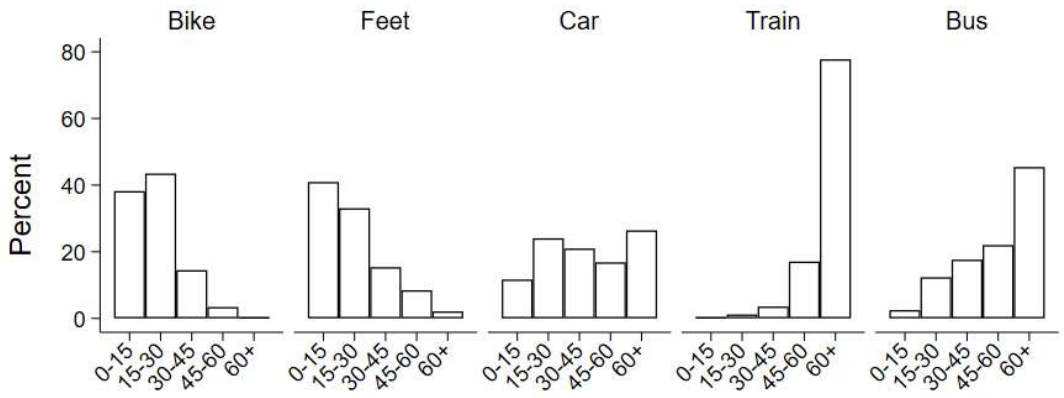
As the differences in travel satisfaction across travel modes might not be causal, more research on this topic is warranted. It might be the case that people who are particularly satisfied with themselves, their lives, and the way they travel decide to commute actively and hence indicate higher travel satisfaction. Moreover, there might be other, unobserved variables that influence both the travel mode choice and travel satisfaction. If these factors explain differences in travel satisfaction across travel modes, switching from car or public transport to commuting actively would not necessarily lead to an increase in travel satisfaction. We suggest that future research should implement causal research designs to test whether it is indeed active travel that causally increases travel satisfaction compared to motorized travel.

3.3 The influence of travel duration on travel satisfaction

Key result

The data from the commuting survey suggests that differences in the duration of the trip are the main factor that is responsible for differences in travel satisfaction. As shown in Figure 3, commutes are relatively short when people cycle or walk to campus and relatively long when people primarily rely on public transport.

Figure 3: Duration of the trip in minutes by travel mode



Moreover, travel duration is a strong predictor of trip satisfaction as shown in Figure 4. For example, the predicted travel satisfaction for trips lasting less than 15 minutes is 0.865 and the predicted travel satisfaction for trips lasting more than an hour is -0.614 on the scale from -3 to +3.

Figure 4: Travel satisfaction by duration of the trip in minutes

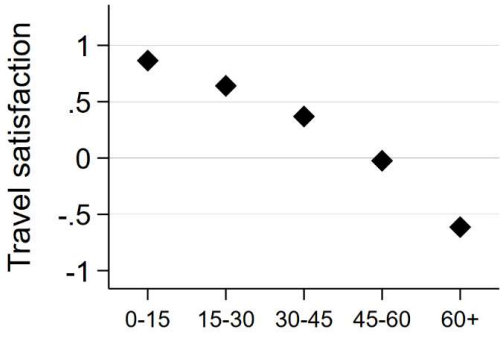
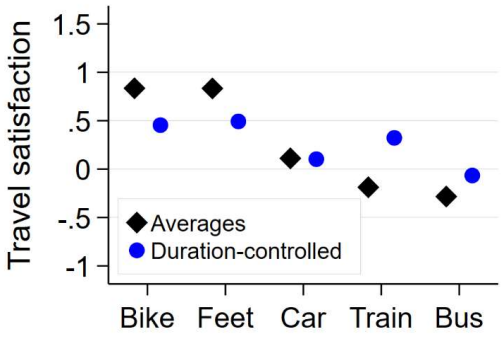


Figure 5: Predicted travel satisfaction by travel mode with and without controlling for the duration of the trip



We can statistically control for the differences in travel duration and calculate the predicted travel satisfaction that people would have indicated *if* all trips had taken the same time. Figure 5 illustrates the importance of trip duration for explaining differences in travel satisfaction across travel modes. The black diamonds show the mean values of travel satisfaction for each mode just as in Figure 2. The vertical difference between the first diamond (biking) and the last diamond (bus) is 1.12 points on the scale from -3 to +3. The blue circles present the predicted travel satisfaction ratings by travel mode controlled for the duration of the trip, i.e. the values that people had indicated if all trips had taken the same duration. The vertical difference between the travel satisfaction when biking and when taking the bus is reduced to 0.52. This reduction of the differences in travel satisfaction across travel modes indicates that differences in travel duration explain a large part of the differences in travel satisfaction.

Policy relevance

The data shows that the main advantage of active travel is its short duration and the main disadvantage of using public transport (especially train journeys) is its long duration. This suggests that policies that reduce trip duration can have a strong and positive influence on travel satisfaction. Long-term strategies can seek to reduce commute distances through, for example, higher density planning.[v] However, this is not an option in the short to medium term. Reducing distance is not the only way to reduce trip duration. For example, the National Transport Authority of Ireland is proposing to re-design the Dublin bus network over the coming years. One of their stated aims is to make bus journeys faster, more predictable, and more reliable.[vi] Where these investments and actions can shorten trips, in particular relative to the

v See for example the compact development concept in the National Planning Framework, as well as details of linked national infrastructure investment plans here (retrieved on July 9th, 2019) and here (retrieved on July 9th, 2019).
vi More information on bus connects is available here (retrieved on July 9th, 2019).

private car, there should be further stimulus for modal shift to active and mass transit modes via increased travel satisfaction in public transport.

The findings also suggest that it may be useful to establish a general ambition for the reduction of trip journey times within a reasonable radius to less than 45 minutes. The suggestion of aiming to reduce inner-city commutes to a maximum duration of 45-minutes is based on a robust drop in travel satisfaction after this mark.[vii]

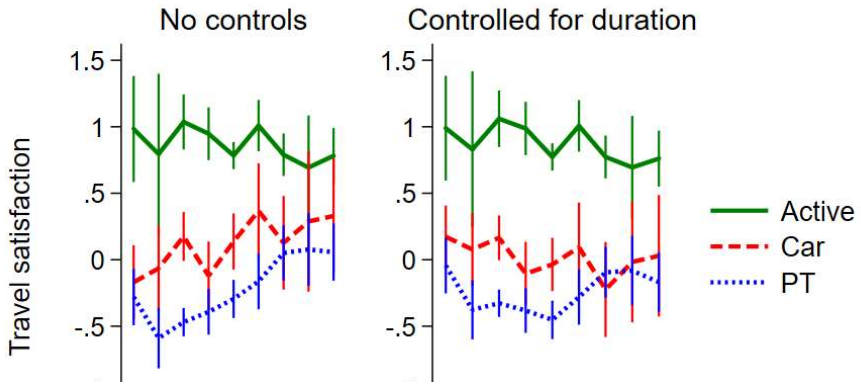
3.4 The influence of time of the commute on travel satisfaction

Key result

The data from the commuting survey suggests that there is a rush-hour effect on travel satisfaction as illustrated in the left panel of Figure 6. When people commute in the car or with public transport during the rush-hour (i.e. between 7am and 9am), they are less satisfied with their commute than when starting the commute later (e.g. at 10am). There is no rush-hour effect for active travel. The shaded areas in Figure 6 represent a measure of precision (95% confidence intervals).

The rush hour effect is entirely explained by travel duration. When we statistically control for the duration, i.e. when we consider a hypothetical situation in which all trips take the same time, travel satisfaction ratings are independent on when people start their commutes. This is illustrated by the almost horizontal red and blue lines in the right Panel of Figure 6.

Figure 6: Predicted travel satisfaction by time of starting the trip and by travel mode with and without controlling for the duration of the trip



vii Future work can set more refined travel time bands to gain additional insight on associated travel satisfaction threshold points.

Policy relevance

The finding of the rush-hour effect on travel satisfaction being entirely explained by the trip-duration suggests an ambitious short-term initiative to increase travel satisfaction. We recommend to consider the introduction of a newly regulated schedule that ensures classes, coursework, and most meetings do not commence before 10am.

Anticipated effects of shifting more than 30,000 staff and students to a deferred starting hour would include:

- Reduced commutes during the peak travel times in the morning and hence reduced journey times for commuters to the campus.
- Reduced road congestion in the mornings and hence eased pressure on the morning peak public transport and travel infrastructure.
- Potentially increased safety for cyclists and pedestrians travelling outside of the busiest period and hence greater levels of non-motorised and mass transit mode choices.

Recommendations

There are of course recognisable challenges that could range from motorists continuing to travel early to secure parking spaces, to challenges from the campus population relating to their own personal scheduling of commitments and activities, and issues relating to university timetabling. However, complementary parking strategies could be developed, and University staff and students are likely to represent some of the most flexible of all morning commuters. University populations are adults, and thus capable of independent travel – something which is often not the case for primary school students. We recommend to tender a detailed report on the positive and negative aspects of this policy that includes the implications for transport in Dublin of such an initiative.

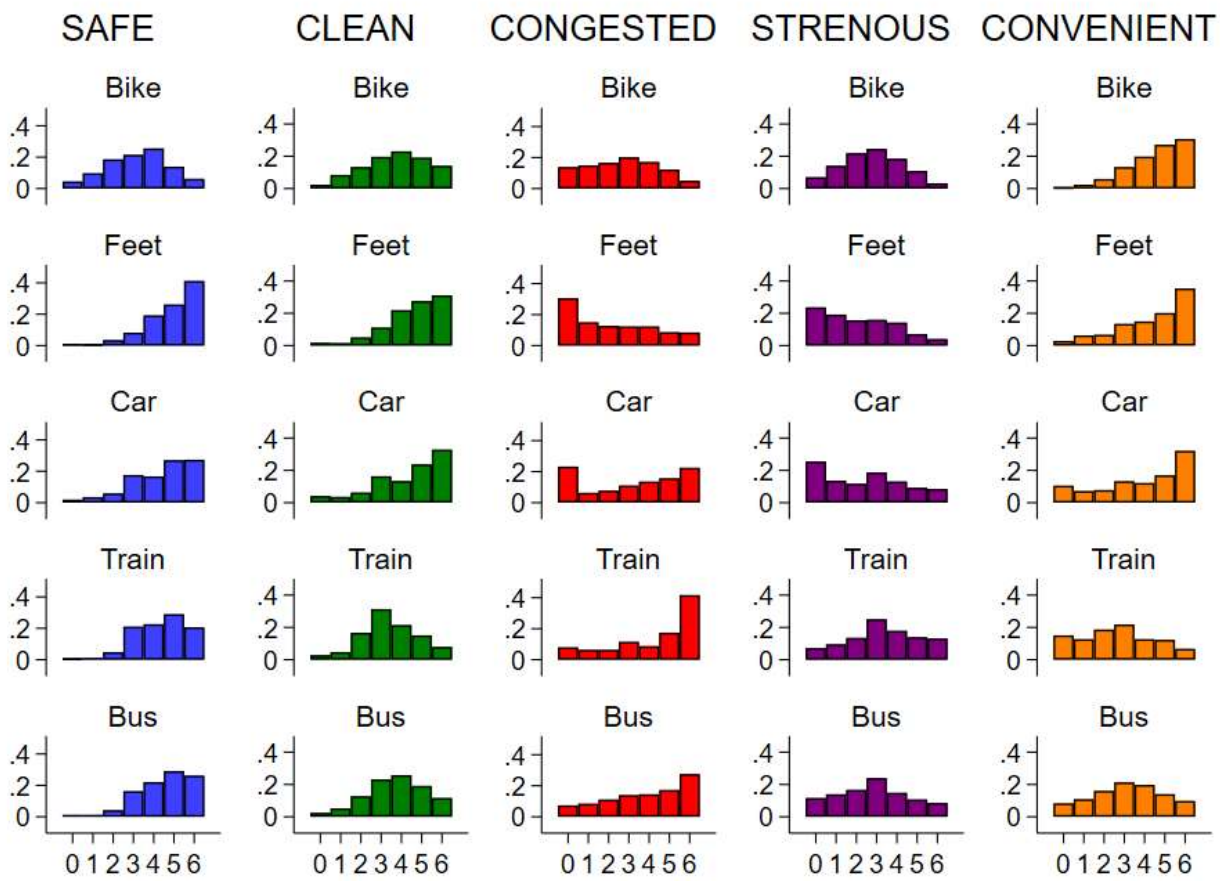
3.5 Subjective evaluations of the trip

Key result

Study participants indicated the extent to which they felt that their commutes were *safe*, *clean*, *congested/overcrowded*, *strenuous*, and *convenient* on a scale from 0 (not at all) to 6 (very much). Figure 7 presents the distributions of these 5 subjective characteristics separated by travel mode. In terms of safety, walking and biking are perceived as the most and least safe travel mode, respectively with means of 4.97 and 3.21. It is important to note that only commutes *to* the campus were evaluated and walking might be perceived as less safe in commutes *from* the campus in the dark hours of the day. The train is perceived the least clean mode (M = 3.41) and walking as the cleanest way to get to the campus (M = 4.57). In terms of congestion/overcrowding, walking is the best (M = 2.21) and the train the worst (M =

4.26). Walking is the least strenuous way to get to campus (M = 2.15) and the train the most strenuous (M = 3.31). Finally, the train is least convenient (M = 2.68) and biking is most convenient (M = 4.53).

Figure 7: Distributions of subjective trip evaluations by travel mode



Policy relevance

It is a sensible transport-policy goal to make travel safe, clean, uncongested, non-strenuous, and convenient. The findings presented in Figure 7 suggest that policies that aim to improve travel along these dimensions should be travel mode-specific. In terms of safety, our data suggest that most work needs to be done regarding cycle trips as cycling is not perceived as safe. In line with this finding, informal inquiries on the campus about reasons not to cycle suggest that the lack of safe cycling infrastructure is among the most important reasons for not cycling although living close enough to the campus. The commuting survey data and these inquiries support calls for infrastructure investments for safe cycle infrastructure.

Recommendations

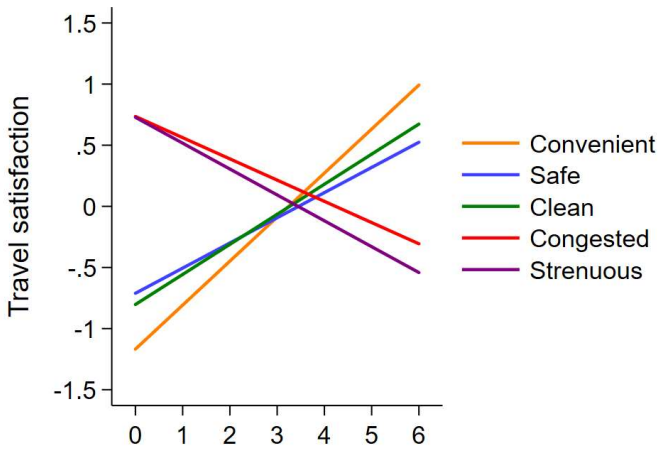
The data suggests that cycling is perceived as the least safe travel option. However, only commuters who chose to cycle to the campus provided data on their most recent cycle trip in this study. Those who consider cycling as particularly unsafe and hence do not cycle to campus have not ranked cycling according to how safe it is. We recommend to conduct future research with a focus on cycling and cyclists' feelings about safety. This research should gather information on the precise routes that cyclists use for their commutes as this would allow correlating the biking infrastructure with perceptions of safety and to identify the routes that are perceived as least and most safe. Specifically, this research should measure factors that policies can influence. Moreover, we recommend to query all commuters about the reasons they do not cycle to the campus and to focus the analysis on the subset of commuters who could, in principle, use the bike to get to the campus.

3.6 The effect of subjective evaluations of the trip on travel satisfaction

Key result

Which of the five subjective trip-evaluations is most important? In order to answer this question, we can correlate the subjective evaluations with the overall travel satisfaction ratings. Figure 8 shows that people are more satisfied with their travel when they perceive it as safe, clean, not congested, not strenuous, and convenient. The most important determinant of travel satisfaction is convenience.

Figure 8: Correlations between travel satisfaction and ratings of the 5 subjective evaluation questions



Policy relevance

Our results suggest that transport policies that increase convenience for travellers are particularly beneficial to increase travel satisfaction. These policies can include efforts to reduce waiting times for mass transit modes, facilitating easier and more direct access to campus via walking, better cycling routes, more parking spaces for car users, and so forth.

3.7 The influence of travel duration on travel satisfaction (2)

One important reason for longer commutes being less satisfying than shorter commutes is that longer commutes are perceived as less convenient. Figure 9 presents the average ratings for the five different trip characteristics (on the vertical axis) for different durations of the trip (on the horizontal axis). In the figure, the orange slope is the steepest, indicating that trip duration has a stronger influence on convenience than on the other 4 subjective trip characteristics.

Figure 9: Correlations between subjective evaluation questions and duration of the trip.

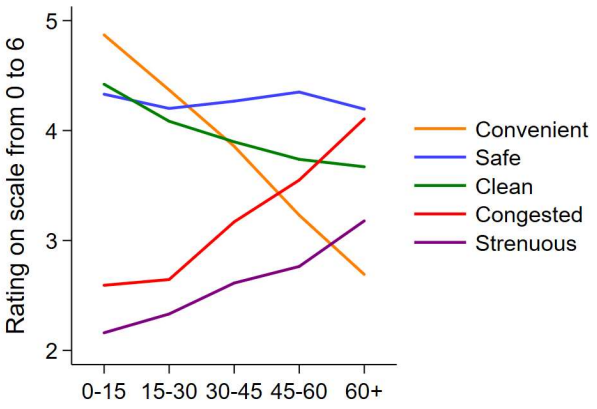
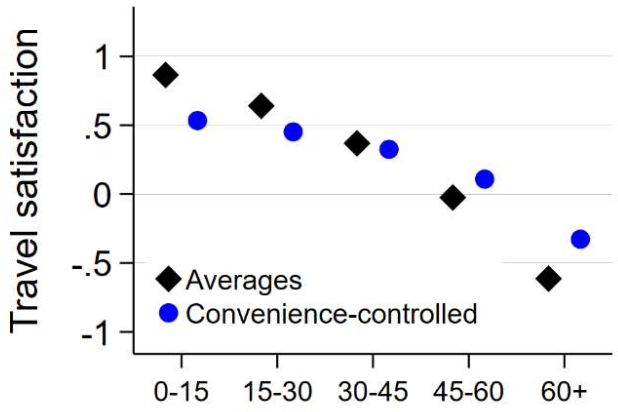


Figure 10: Travel satisfaction by duration of the trip without and with controlling for the convenience of the trip



In order to explore the importance of convenience for the association between travel satisfaction and commuting time, we can calculate the predicted travel satisfaction for each travel duration statistically controlling for convenience. This analysis assumes a hypothetical situation in which convenience is the same across all travel durations, i.e. the analysis assumes that each trip duration had received the same convenience rating on average. Figure 10 shows that once we control for convenience, trip duration becomes a much less important predictor of travel satisfaction as the vertical distances between the blue circles are much smaller than the vertical distances between the black diamonds.

Policy relevance

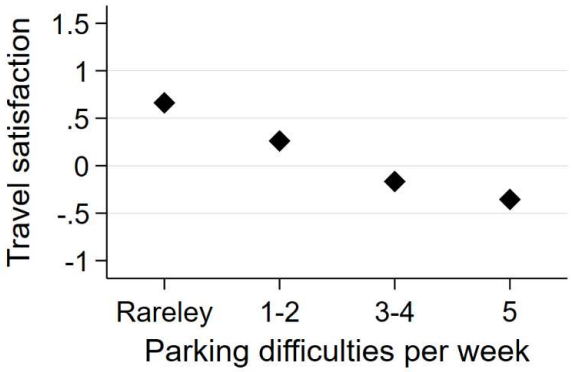
The best way to increase travel satisfaction is to reduce the duration of the travel. However, this is not always possible. Our data suggests that increasing convenience can be a good alternative, especially for trips that last less than 45 minutes. The data suggests that for short trips, it might be more effective to increase convenience rather than to shorten the trips even more. Policies that increase convenience rather than shorten the duration of the trip might be more effective and cost-effective.

3.8 The effect of parking difficulties on travel satisfaction

Key result

The data suggests that those study participants who regularly take the car to campus whether they tend to have difficulties finding a parking spot. Figure 11 shows that travel satisfaction ratings differ according to the answers to this question. For example, participants who have only rarely parking difficulties on campus indicate an average travel satisfaction of 0.66 (on the scale from -3 to +3). However, people who experience parking difficulties 5 times per week, indicate an average travel satisfaction of -0.36.

Figure 11: Travel satisfaction by parking difficulty for sub-sample of 1381 participants who drive regularly to campus



Policy relevance

The strong negative effect of parking difficulties on travel satisfaction reinforces the importance of parking policy and strategy with regard to encouraging modal shift and influencing private car journeys to campus. Whilst the immediate response may be to consider the provision of additional parking spaces, the lower relative travel satisfaction of car journeys where parking is scarce or strategically priced also represents an opportunity to stimulate additional transfers to non-motorised or mass transit modes of travel to campus. For example, research has distinguished between short-run "pro-bike" policies (e.g. making bicycling safer and more convenient) and long-run "anti-auto" policies (e.g. reducing the convenience of automobile commuting).[12] We bracket here the number of issues that arise with anti-auto policies.

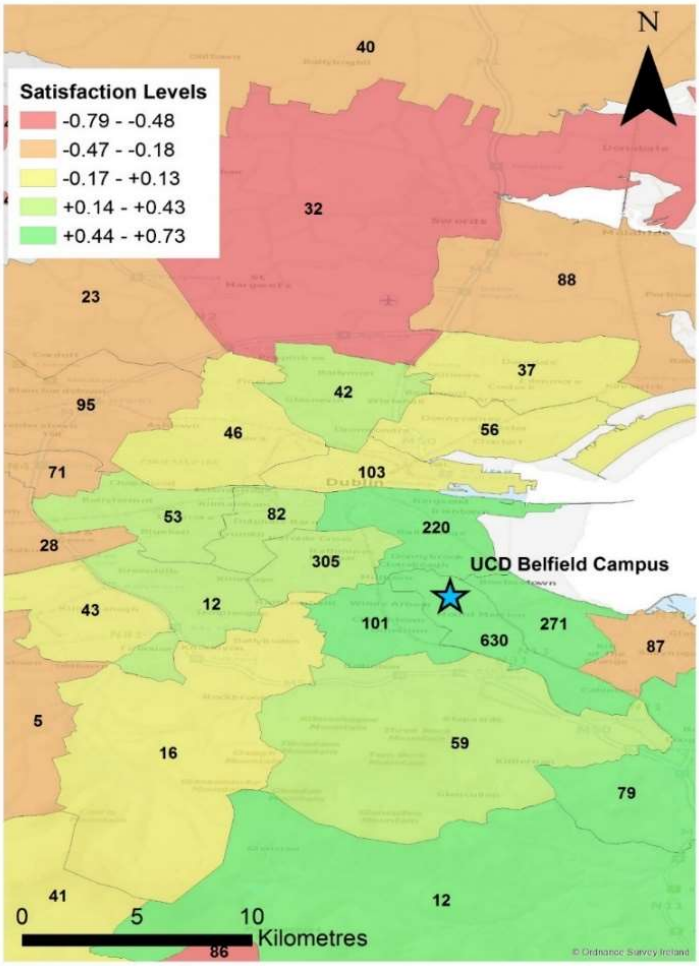
3.9 Geographical differences in travel satisfaction

Key result

Participants also indicated the origin point of their trip using a list of regions that could be accessed from a drop-down menu. Respondents started their trips from 259 different locations with 221 (5.35%) starting from the Campus itself. We mapped all of these locations to the nearest Local Election Area (LEA) and Figure 12 shows the average travel satisfaction rating for each area. The numbers in each LEA in this figure indicate the number of participants who started their trip from the respective area. The color-coding in the same figure indicates the average travel satisfaction rating for each LEA, using a 5-point color-coded classification from dark red, indicating lower levels of travel satisfaction, to green, indicating higher levels of travel satisfaction. The map suggests that the distance to UCD is an important

geographical determinant of travel satisfaction. Moreover, there seems to be a North/South divide with commutes that start in LEAs north of the river Liffey being less satisfying than commutes from south of the river.

Figure 12: Travel satisfaction by area in which the trip started



Recommendations

Geospatial analyses of satisfaction with the commutes to UCD have the potential to provide important input for transport-policies. The current data, however, is not specific enough to conduce more detailed geospatial analyses. We suggest that future studies on trip satisfaction aim to gather data on the origin as well as the route takes in the commutes. Moreover, future research should correlate the geospatial information with external datasets on, for example, transport accessibility, frequency of accidents, congestion, and air quality.

4 CONCLUSION

Research on travel satisfaction can provide valuable information to inform transport policy-making. While some notes of caution are in order and we recommended future research needed, we suggest that there is a lot to learn from travel satisfaction studies. More detailed studies should be conducted that focus on particular travel modes of interest and that evaluate changes in the transport system. For example, a large-scale study should be conducted that compares travel satisfaction ratings before and after the bus network re-design in Dublin in order to identify the causal effect that this re-design has on travel satisfaction

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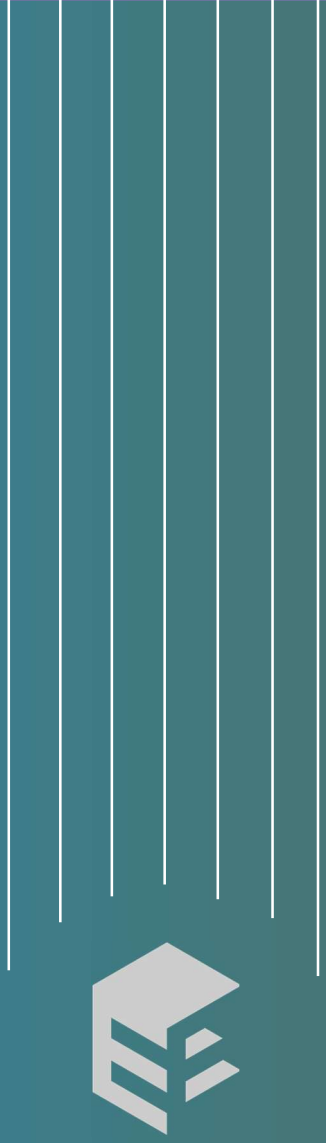

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