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ACTIVE TRANSPORT AND THE JOURNEY TO WORK IN NORTHERN IRELAND: A LONGITUDINAL PERSPECTIVE 1991-2011

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Abstract: Policy interventions to encourage the use of healthy and sustainable modes of travel to work (such as walking and cycling) have encountered varying levels of success. In areas such as Northern Ireland, and cities such as Belfast, the car remains the dominant mode for journeys to and from work. This paper explores why this is the case by examining the individual, household, and geographical factors that govern (a) changing between one census and another to walking or cycling from other transport modes; (b) changing from walking or cycling; and continuing to walk or cycle. The analysis is undertaken using the Northern Ireland Longitudinal Study (NILS), a 28% random sample of the population. The results show that walking or cycling is associated with lower-status jobs, urban locations, with no clear association with better self-reported health. In contrast, car commuting is associated with better education, health, and higher labour market status. The analysis shows that policies to encourage the use of more sustainable and less polluting transport face formidable barriers from status perceptions, time budgets, and the geographical contexts of Northern Ireland and Belfast.

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Introduction

Travel to work accounted for about 20% of daily travel in the UK (Kunn-Nelen 2020; Pooley and Turnbull 2000) and European evidence on trends in commuting since indicates that in most countries, times have increased (Gimenez-Nadal et 2021; Raza et al 2021) since the 1990s. This means that commuting has become more important as an activity in individual and household time budgets. Greater mobility can be viewed as an economic and social benefit; it allows, for example, more accessibility to employment opportunities, more social interaction, and people to escape harmful residential neighbourhood contexts. Yet, there are some downsides to more work-related mobility. Gimenez-Nadal et (2021) note for instance that, although longer commutes are associated with higher wages, they are also associated with higher stress, lower productivity, and more sickness absences. There are other costs beyond these which have other direct and indirect social and health impacts. These include greater traffic congestion, more carbon dioxide and particulate emissions, and the greater use of scarce and costly energy supplies. In these circumstances, working from home or smaller commutes using active travel modes seem socially attractive. Active transport modes for the commute to work – walking, bicycling – are therefore seen often as yielding direct mental and physical health benefits for those who use them which include better mental health, less depression, and lower body mass index (Raza et al 2021). To these might be added social indirect beneficial externalities such as less pollution and less congestion, making economies far more sustainable. Yet, despite the claimed individual and social benefits of active travel, there have been problems in increasing its modal share (Feehan 2018). One reason, of course, for this has been the overall mobility trend in many European countries – indeed, across the world – for longer commutes and for the dominance of private transport. Another reason is how active travel is viewed and understood. Sociological accounts of active travel, for example, remain strongly socio-economic with walking viewed as either a practice for the poor who have no alternative or for the middle-class who are concerned by health and the local environment (Green 2009), both perceptions perhaps being unattractive in different ways to differing sections of the population.

The general commuting trends noted above vary between countries, mediated by state policies and local geographical contexts. The paper therefore aims to contribute to the literature by considering active commuting and health in the Northern Irish context. This is an interesting case study because Northern Ireland has shared in the same economic and global trends as other parts of the advanced world (and so is a useful exemplar) but also has its own unique regional situation of devolution and of being a post-conflict society. Northern Ireland (NI) also includes a wide variety of social environments ranging from the large regional city of Belfast to an array of small towns, and to remote rural areas sometimes with significant upland. The other contribution of the paper is that it is longitudinal. Longitudinal commuting studies are not novel (see for instance Trang et al 2012; Grunfelder and Nielsen 2012) but

population-level longitudinal analyses, in this case using census records from a 28% sample of the NI population in 1991, 2001, and 2011, are seldom seen.

The paper aims to answer four main questions. Firstly, who, and where, were active-travel commuters in 1991, 2001, and 2011. Secondly, who moves from active travel to use other modes? Thirdly, who becomes an active traveller? Finally, how is active travel perceived and understood? In answering these questions, the next section of the paper briefly outlines the NI context. Then, literature on commuting mode choice, with special reference to active travel, and health is considered. Following this, the data and methods that were used are described and descriptive statistics and regression coefficients are interpreted. Finally, the paper concludes by musing on the conundrum of active travel and discussing the obstacles in promoting this beneficial behaviour.

The NI context

As will be seen in the review of modal selection, individual choice is modified by geographical context, social circumstances, and elements of transport, economic, and health policies. It is for all these reasons that the NI situation is now briefly introduced. NI lies on the Atlantic fringes of Western Europe and is peripheral to strongest economic regions of the UK state and the Republic of Ireland (respectively London and the South-East and Dublin). Alongside its peripherality, NI also has high rates of rurality, with 93.8% of the total land area classified as rural and 36.4% of residents classified as rural dwellers; compared to 20% of English residents (Pateman, 2011). However, the definition of 'rural' differs across the UK; in NI rural (see Figure 2) is defined as any area with a population of less than 5,000 (NISRA, 2015) whilst in England and Wales the settlement limit is 10,000 residents (Bibby and Brindley, 2013). NI is dominated by the Belfast Metropolitan Area (BMA) in the East, which is home to almost one-third of the population and is the major employment centre. It is also characterised by a dispersed settlement pattern with a distinctive east / west divide, a largely rural west, and a chiefly urban east. Although NI's second city, Derry, is situated in the North-West, and is in close proximity to a number of smaller settlements, significant parts of the West of NI remain isolated, with large sections falling outside the 30-minute drive-time of a significant urban centre, as shown in Figure 3. This East / West divide wider implications stemming from the presence of a largely catholic / Nationalist population in the west and a largely protestant / Unionist population in the East.

The economic dominance of the more urban (and protestant) East creates an overall area identifiable as the more accessible east in comparison to a less accessible (and catholic) west. However, social/religious segregation also occurred (and occurs still) at smaller spatial scales, and this has had a profound and continued effect on labour mobility as the so-called 'chill-factor' restricted labour movements during the civil unrest of 'The Troubles' from 1969, with fear preventing people from working

in or travelling through the 'other side' (Shuttleworth and Green 2009; Shuttleworth et al. 2000). The fear associated with the 'chill factor' impacted local and regional mobility patterns, with people choosing daily spatial practices to avoid certain areas, and on employment policy as pressure grew on political institutions to counteract restricted job opportunities by providing locally-based employment (DEL 2014, p51). Localism increased as people lived and worked in their local areas resulting in a reduction in activity spaces, declining between-settlement cohesion, and restricted perceptual horizons (Green et al 2005). Although violence has largely ceased, this heritage continues to be a burden that influences current behaviour.

All aspects of the transport infrastructure and servicing in NI are devolved to the NI Assembly apart from air and sea travel which are reserved responsibilities to the UK government. NI tends to follow the lead of England but there are some exceptions – the 1990s wave of the privatisation of public transport, for example, did not happen there. A two-tier structure of planning governance emerged in NI post-devolution (after 1998) with the Department of Regional Development (DRD) taking a high level, strategic policy formulation role supported by the DoE who held responsibility for the creation and enforcement of local development plans and road safety. The first major piece of strategic guidance was published by the DRD in 2002: '*Shaping Our Future – The Regional Development Strategy for Northern Ireland'*. This document initially provided strategic guidance for NI up to 2025, however it was reviewed in 2008 and again in 2012 when the guidance was extended to 2035. The RDS 2035 does not include a dedicated transportation section but rather a single policy contained within the 'economy' guidance: RG2: Deliver a balanced approach to transport infrastructure (DRD 2012a, p5). Under this policy information is provided on how it can improve connectivity, maximise the potential of the Regional Strategic Transport Network, use road space and railways more efficiently, improve social inclusion, manage the movement of freight, improve access to towns and cities and improve safety. Without providing any clarity on specifics including initiatives or funding this single policy aims to be all things to all people. Further guidance was provided within three geographically differentiated areas; the metropolitan area centred on Belfast, a north-west region centred on Londonderry and the rural area comprising the rest. The RTS was developed in keeping with the direction of transportation policy in the rest of the UK post 'A New Deal for Transport,' namely addressing the need for a more sustainable approach, tackling problems of pollution and congestion, and large-scale improvements to public transport options. The aim of public transport investment was to increase modal shift from private forms of travel to more sustainable modes for example bus, train, walking and cycling (DRD 2002b). The publication of an Active Travel Strategy in 2013 and a corresponding Action Plan in 2014 alongside a specific Bicycle Strategy for Northern Ireland in 2015 highlighted a continued push towards providing alternatives to the car and to, "*Put walking and cycling at the heart of our local transport arrangements, encouraging a healthier, less stressful, and increasingly lower cost alternative to the car for many shorter daily journeys*" (DRD 2013 p2).

Literature on modal choice

Policy, spatial economic structure, and history set the background against which individual choices are made, limiting them, shaping them, and in some situations enabling them (Gimenez-Nadal et al 2021). In some cases, there is no choice – for instance, in rural areas where there is infrequent or no public transport – but the legacy of history, for example the perceived avoidance of sectarian danger in car travel in Northern Ireland, can exert a more subtle influence on behaviour, as can individual preferences where one travel mode is, rightly or wrongly, seen to be more prestigious than another. Residents of urban areas tend to have access to more, and to more frequent, public transport services due to high population densities enabling more efficient and cost-effective services (de Hoyos and Green 2011; Levinson 1998). Walking and cycling remain predominately urban activities due to the proximity of workplaces in urban centres making active commuting a viable option (Barton 2009). Private transport commuting is generally higher in rural areas due to the distances involved and the lack of alternatives (de Hoyos and Green, 2011; Shuttleworth and Green, 2011), factors which increase the reliance upon private transport for rural dwellers (Champion 2001). However, private transport commuting also remains high in urban areas indicating that location and proximity to employment are not the sole motivating factors.

Socio-economic factors are also important. More deprived households generally have lower levels of car ownership (Lucas 2012) and are therefore more reliant upon public transport or active travel. Analysis of the 2011 English and Welsh census data identifies a proportionally high modal share of walking and public transport commuting in more deprived areas (Goodman 2013). These reduced travel options can restrict mobility, force a compression of useable activity spaces, create isolation from the employment market as well as having health implications and the promotion of social exclusion. The 'transport poor' (Nutley 2005) therefore 'take more time, expend greater effort, and pay and higher marginal cost to reach the same destinations as people with cars' (Clifton and Lucas 2004). On the other hand, higher income households might actively 'trade-off' between preferred residential locations and an extended commute, typically undertaken by private transport (Goodman 2013; Green 1997; Moss et al. 2004; Shuttleworth and Lloyd 2005). As such higher status workers can choose to live at a distance from their place of work (for example, a suburban / (semi)rural location), a process which has increased commuting distances and produced a greater reliance upon private transport. Education is often also important. Through its links to occupation and earnings, more highly-educated workers are likely to commute further often by private transport. On the other hand, some highly-educated workers because of lifestyle choices may welcome active travel modes, especially if in a location that permits this.

Important for all groups as a crosscutting issue is gender. In some dual-earner households, women might be less advantaged because private transport is

appropriated by men. This is reportedly the result of a gender divide in employment outcomes including traditionally lower paid female positions (Roberts et al. 2011; Shuttleworth and Green 2011) and the greater level of household responsibility borne by females (Gimenez-Nadal and Molina 2015). This burden is a key element of the Household Responsibility Hypothesis and the claim that the division of labour in the home has resulted in gender differences in everyday mobilities (Gimenez-Nadal and Molina 2015).

Preferences and cultural norms also influence modal choice. Though non-material, they can have far-reaching impacts. The social dominance of the motorcar as part of the everyday further embeds its use as a 'normal' part of modern life. However more than a habitual practice, the motorcar is, for many, an object of desire associated with a range of feelings and emotions (Sheller 2004) including pleasure, anger (road-rage), excitement, liberation, empowerment, autonomy, prestige, control, and mastery (Gatersleben and Uzzell 2007). Whilst Sheller (2004) identifies issues of social exclusion and disempowerment for those without access to a motorcar, as previously alluded to, less is currently known regarding those who are forced into car ownership. Nevertheless, the dominance of the motorcar resulted in a reduction in the perceived pleasure and usefulness of walking (Urry 2000) and sociological accounts of active travel remain strongly socio-economic with walking viewed as either a practice for the poor who have no alternative or for the middle-class who are concerned by health and the local environment.

The implications for active travel, considering the review material, are that this mode might be more favoured in urban and socially-deprived areas as a consequence of the density of job opportunities, and the spatial propinquity of home and work, making it more feasible and also because private transport might be less affordable for poorer people who are thus forced into walking and cycling. It might also be that some more affluent and highly-educated urban residents actively choose this mode on grounds of sustainability and the environment. There is also a possibility that government policies to encourage active travel might face an uphill struggle given preferences and social norms that favour the car.

Data and methods

At this stage it is worthwhile restating the questions the paper started with. These are: Firstly, who, and where, were active-travel commuters in 1991, 2001, and 2011. Secondly, who moves from active travel to use other modes? Thirdly, who becomes an active traveller? Finally, how is active travel perceived and understood? The first three questions require the use of quantitative data, the final question needs qualitative methods to get an answer.

The quantitative data used is the Northern Ireland Longitudinal Study (NILS). This is a large-scale, data linkage study which includes around 28% of the NI

population, equating to around 500,000 people and 50% of households (Johnston et al. 2010) sampled from 104 out of 365 birthdates. It is part of a UK-wide longitudinal studies programme. The NILS dataset is housed in the Northern Ireland Statistics and Research Agency (NISRA) in Belfast. Access to the data is made via the safe-setting and all results must be cleared before they can be removed from the building. It is a product of linkage between demographic data from the NI Health Card Registration System and Census returns from 1981-2011 and is supplemented by other administrative sources. This longitudinal dataset therefore provides a novel means of exploring commuting, which has until now relied upon cross-sectional data, allowing change through time to be understood. The population under investigation included 16-74-year-old employed NILS members in 1991, 2001, and 2011. Analysis of modal change between census is, by definition, restricted to those who were in employment in two censuses – individuals who exit from the employment, for whatever reason, are thus excluded.

The analysis focusses on commuting mode as the dependent variable. Mode was categorised into three groups: private transport, active travel, and public transport. A wide range of independent variables were included in the analysis and as noted, the breadth of these variables reflects the number of factors identified throughout the literature review and the availability of variables within the NILS. The following outlines the details of each independent variable. The analysis of location involved the use of 'settlement band' as a proxy indicator for service accessibility and population density. An east/west indicator was also created to assess the impact of NI's unique spatial structure. A binary variable identified if a someone was resident east or west of the River Bann (0=east, 1=west) A binary ten-year residential and workplace Super Output Area (SOA)[1] address change variable was computed by the research identifying moves between 1991-2001 and 2001-2011 (0=no change, 1=change). Area deprivation for place of residence was measured using the Townsend Score to ensure full comparability over time. This is a continuous score ranging between -1 and +1 with negative values indicating below average area level deprivation and positive values above average area level deprivation.

Age was controlled using a continuous variable, as available from the NILS, recording the age of the individual in years (April of each Census year), whilst gender is included in binary format (0=male, 1=female). Limiting Long Term Illness (LLTI) was used in 1991 in the absence of a self-reported health question (1=yes, 2=no). Self-reported health was used in 2001 and 2011. The 2001 3-point scale (1=Good, 2=Fair, 3=Poor) was changed, to a 5-point scale in 2011 (1=very good, 5=very bad); to ensure a meaningful comparison the researcher recoded the 2011 variable back into the 2001 framework. A rather crude measurement of health transition was then computed using these variables (0=no change, 1= declining health, 2 = improving health). The employment status and highest qualification

[1] A UK census output geography normally of around 2,000 residents

variables were included to act as proxy indicators for income. As all unemployed NILS members were removed from the analysis the employment status variable identifies those working full-time and self-employed relative to part-time. All qualifications below degree level were coded together, whilst degree/higher degree were also combined and these were referenced against the base category of 'zero qualifications'. The number of employed adults per household was included in the analysis to investigate the impact of dual-earner households and households with multiple employed adults, relative to single-earner households. A binary variable indicating the presence of dependent children was calculated (0=no dependent children, 1=dependent children),

After descriptive analysis, the paper investigates the determinants of commuting mode – this formed the basis of the longitudinal element. For commuting mode, a binary logistic regression approach was adopted due to the categorical nature of the dependent variable and the ability to assess the relationship with continuous and categorical independent variables. Collins and Chambers (2005) also employed this approach to predict transport mode choices of commuters based on psychological and situational influences. Logistic regression analysis 'employs binomial probability theory in which there are only two values to predict; that probability (p) is 1 or 0, the event / person belongs to one group rather than the other' (Burns and Burns, 2008). A list-wise deletion technique was employed with analysis conducted only on cases which had data available for every dependent and independent variable.

The final question requires qualitative information to give an answer. This was obtained by one-to-one interviews and focus groups. In these, the analysis involved the consideration of personal and group reflections as well as the opinions of professionals working within the transport and health arenas in NI. The qualitative data is used to answer two specific research questions; what factors do households consider when they make decisions about the daily commute? (this includes the role of household and workplace requirements) and what impact do external cultural and social influences have on the development of commuting practices? The focus groups and interviews covered all the locational contexts that were identified in NI, employers in different sectors, and also commuters using different travel modes. Nine focus groups were undertaken with more than 30 individuals involved, together with eight one-to-one interviews.

Results

The first descriptive results do not make good reading for policymakers in NI given the various initiatives highlighted earlier which seek to increase active travel. Full census data for 1991, 2001, and 2011 shows that the proportion using active travel fell from 14% of commuters in 1991 to 11% in 2001, and 9% in 2011. Within this active category, walking forms the largest share and saw the largest fall from 13%

of 1991 commuters to 8% in 2011. However, Maps 1 and 2, respectively for NI and Belfast, confirm the literature on the predominantly urban location of active travel. Map 1 highlights Belfast, Derry, and small towns scattered across NI, as the places with the highest levels of active travel and Map 2 shows that active travel is concentrated in the urban core of Belfast with people living and working in the city centre (still the largest employment concentration in NI) travelling to work on foot or by bicycle with small proportions of suburban commuters using either walking or cycling.

As was noted earlier, other economic and demographic factors, beside location, are important influences on commuting mode and these are explored in a unified framework in the logistic regression models for 1991, 2001, and 2011. These show (a) differences between the three main modes (active, public, and private) and (b) differences between the years. Considering location, there are major differences by settlement type. Compared to Belfast, areas of other types are consistently more likely to be associated with higher rates of private transport and much lower rates of public transport usage. The picture for active travel is far more mixed; there are greater rates of active travel in medium and small towns relative to Belfast in 1991 and 2001 but by 2011 these differentials have become statistically insignificant suggesting an easing of geographical differentials. However, active travel usage is consistently lower in villages and rural areas in all years. The effects of neighbourhood social deprivation are more consistent as are those of age. Increased deprivation is associated with higher rates of public transport and active travel usage and lower rates of private transport usage. The same relationships apply with regard to age with increasing age equating to more private transport and lower public transport and active travel. Female disadvantage, if advantage is defined as use of private transport for commuting, appears to be live and kicking in NI with women being consistently more likely to use active travel and public transport modes than men. For active travel, there are no consistent patterns by health, but those in poorer health are more likely to use public transport than the healthy with the reverse pattern for private transport, suggesting once again that active travel is associated with the less well off, something reinforced by the patterns by education with those with qualifications being more likely to use private transport, than the other modes, relative to those with no qualifications. There are some intriguing patterns with reference to the household structure variables. For the active travel mode, having two employed others in the household decreases usage relative to one employed person, but have having three plus increases active travel. The same patterns are seen for public transport, the reverse for private transport.

Table 1: Social and demographic associates of commuting mode 1991, 2001, and 2011

	Active Travel – Exp(B)			Private Transport – Exp(B)			Public Transport – Exp(B)		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Belfast									
Derry	.970	.863**	.732**	1.312**	1.376**	1.542**	.751**	.749**	.617**
Large towns	1.487**	1.344**	.966	1.382**	1.256**	1.489**	.352**	.401**	.404**
Medium towns	1.639**	1.279**	.994	1.490**	1.373**	1.521**	.209**	.273**	.271**
Small towns	1.478**	1.199**	.980	1.479**	1.335**	1.536**	.307**	.370**	.392**
Intermediate settlement	.988	.887**	.605**	1.663**	1.513**	1.742**	.387**	.448**	.474**
Villages	.892**	.975	.666**	1.563**	1.381**	1.789**	.392**	.407**	.329**
Open countryside	.429**	.380**	.252**	1.505**	1.337**	1.594**	.357**	.301**	.271**
Townsend	1.157**	1.175**	1.184**	.855**	.880**	.892**	1.108**	1.085**	1.050**
East of the River Bann									
West of the Bann	1.057**	1.027	.963	1.118**	1.109**	1.113**	.709**	.641**	.597**
Age in years	.991**	.988**	.986**	1.009**	1.006**	1.006**	.977**	.972**	.981**
Male									
Female	1.532**	1.383**	1.107**	.581**	.765**	.889**	1.990**	1.616*	1.194**
No LLTI 91/Good health 01 & 11									
LLTI 91/Fair health 01 & 11	1.069	1.109**	1.008	.748**	.870**	.909**	1.319**	1.204**	1.169**
Poor health 01 & 11		.969	.745**		.916**	.939		1.321**	1.403**
Employed part-time									
Full time employed	.368**	.425**	.506**	1.947**	1.696**	1.551**	1.243**	1.053	.878**
Self employed	.150**	.212**	.216**	.598**	.429**	.562**	.157**	.180**	.214**
No qualifications									
Qualifications - < Degree	.527**	.523**	.629**	1.654**	1.540**	1.477**	.722**	.822**	.929**
Qualifications - Degree +	.364**	.404**	.431**	2.748**	1.931**	1.771**	.377**	.611**	.825**
1 employed adult/household									
2 employed adults/household	.841**	.814**	.843**	1.292**	1.193**	1.219**	.760**	.786**	.830**
3+ employed adults/household	1.083**	1.038	.943**	.921**	.940**	1.068**	1.053**	.1048	.925**
No dependent children									
Has dependent children	.826**	.790**	.715**	1.269**	1.240**	1.262**	.804**	.762**	.713**
N:	**150,567**	**168,124**	**192,045**	**150,567**	**168,124**	**192,045**	**150,567**	**168,124**	**192,045**

Source: NILS
** is significant at the 0.05 level

Tables 2 and 3 present information on transitions between modes for 1991-2001 and 2001-2011 respectively. The 'other' category includes working from home and no fixed workplace. There are similarities in the transition patterns in the two decades each time, roughly a third of people who were in active travel at the start of

the census period were in it at the end. Looking on the diagonals, active travel and public transport, have far less 'stickability' than private transport in the proportion using the same mode as in the previous census. In short, there are far more transfers in and out of active travel (and indeed public transport) than those for private transport. The main destination for active mode leavers in each decade is private transport. The inflows to active travel are less dominated by one mode, drawing on them all, but public transport is the largest origin.

Table 2: Transitions between modal groups, NI, 1991-2001

1991 Commuting mode	2001 Commuting mode (%)				
	Work from home	Public transport	Private transport	Active travel	Other
Work from home	62.5	0.6	31.1	4.6	1.2
Public transport	3.6	23.1	64.4	8.4	0.4
Private transport	7.6	2.4	86.0	3.4	0.5
Active travel	5.0	5.5	54.9	34.1	0.5
Other	12.9	4.5	57.5	5.9	19.1

Source: NILS

Table 3: Transitions between modal groups, NI, 2001-2011

2001 Commuting mode	2011 Commuting mode (%)				
	Work from home	Public transport	Private transport	Active travel	Other
Work from home	44.2	1.8	48.9	3.6	1.5
Public transport	6.4	29.2	55.1	8.8	0.5
Private transport	7.7	3.1	85.1	3.4	0.6
Active travel	9.7	6.3	50.1	33.5	0.4
Other	11.6	3.4	58.2	2.7	24.1

Source: NILS

Table 4 presents a model of the associates of transiting into active travel between 1991-2001 and 2001-2011 from all other modes. These associates closely resemble those noted in Table 1 in that older people are less likely to make this transition, as are those in smaller, more remote, and rural settlements. Those more likely to transition to active travel are residents of more socially-deprived areas and those who changed workplace between censuses. People who have educational qualifications are less likely to transition relative to those with none, but there is an interesting positive effect for those with three or more employed household members for 2001-2011.

Finally, this section of the analysis homes in on age and health as elements in active travel in Figure 1 and Table 5. Figure 1 graphs the interaction between age and active travel for 1991, 2001, and 2011. It shows declining use of active travel (from higher rates for the younger) to those in the prime employment decades of the thirties and forties with a peak for older workers in 1991 and 2001 but a general decrease with age

from a lower level in 2011. Table 5 shows that there is a better self-reported health for those who transit to active travel but the evidence is not what it seems as a similar improvement in observed for those who make transitions into other modes. These tables, figures, and maps go some way to answering the first three questions that were set. The ways in which active travel, relative to other modes, is perceived is now considered using material from the qualitative element of the research.

Table 4: Transitions to active travel 1991-2001 and 2001-2011

	1991-2001	**2001 - 2011**
Belfast		
Derry	.960	1.175
Large towns	1.114	1.137**
Medium towns	1.061	1.009
Small towns	1.090	.899
Intermediate settlement	.831	.644**
Villages	.839	.822**
Open countryside	.632**	.455**
Townsend	1.083**	1.104**
East of the River Bann		
West of the River Bann	.988	.918
Age in years	.988**	.991**
Male		
Female	1.341**	1.046
No LLTI 91/ Good health 01 & 11		
Has LTI 91/ Fair health 01 & 11	1.257	1.135**
Poor health 01 & 11		1.180
Employed part-time		
Employed full-time	.903	.764**
Self employed	1.095	.719**
No qualifications		
Qualifications – < degree	.575**	.644**
Qualifications – degree+	.425**	.542**
1 employed adult/household		
2 employed adults/household	.991	.967
3+ employed adults/household	1.083	1.104**
No dependent children		
Has dependent children	.984	.967
Did not move residential SOA		
Moved residential SOA 91-01/01-11	.873**	.949
Did not move workplace SOA		
Moved workplace SOA 91-01/01-11	1.268**	1.464**
N:	**79,455**	**100,782**

Source: NILS
** is significant at the 0.05 level

Interestingly however some of the most vocal perceptions of active travel came from participants who are not active commuters. These participants identified issues of safety, physical appearance and perceived hygiene concerns as influencing their perceptions. These issues subsequently acted as barriers to the uptake of active commuting:

"*…I am incredibly vain so I would hate to think what I would look like if I cycled to work, my hair would just be everywhere*" (Female, 40s, Call Centre, Belfast – driver)

"*…the walking thing…you're alright and then you go into the heat and you just don't feel fresh…and you're in work all day then*" (Female, 40s, retail, Derry – passenger)

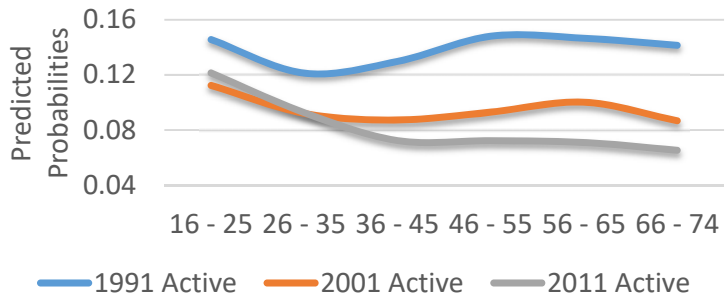
Table 5: Modal group transitions and changing health status, NI, 2001-2011

2001-2011 Transition	Self-reported health	
	Health decline (%)	Health improvement (%)
Private to active	8.8	14.2
Private to public	8.8	13.9
Active to private	7.5	14.1
Public to private	6.4	13.5

Source: NILS

These respondents also reported that a lack of suitable facilities in their workplace prevented them from overcoming these issues. However, in workplaces where facilities were available the response focussed on the number of facilities and how they would inevitably have to queue for the shower. This gave the impression of a desire to erect barriers which enabled them to account for their decisions. This often occurred when cajoled by other members of staff who are active commuters, identifying the role of social pressure and the influence of significant others in decision-making.

Figure 1: Interaction between age and time: active travel commuting, NI, 1991-2011



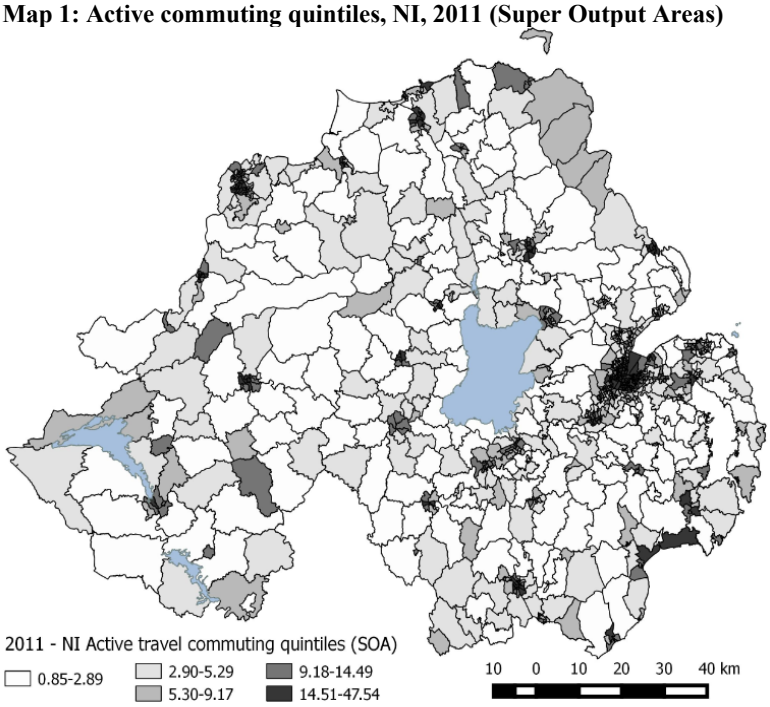
Indeed, just as social pressures exist around the ownership of private motorcars, social pressure also emerged regarding active travel practices. This developed through increased social visibility whereby the uptake of 'alternative practices' had the impact of improving perceptions as they become more normalised and therefore socially accepted. Such was the influence of this increased visibility that it emerged as a potential area of change.

"*…I'm a bit of a laggard in that I've actually bought a bicycle but I haven't cycled to work yet, but as more and more colleagues do it, it's getting me thinking that I should too…it's certainly creating an atmosphere where you might re-examine*" (Male, 50s, Technology, Belfast – driver)

Furthermore, this normalisation was identified as a key policy driver behind altering cultural perceptions of active travel:

"*…we need to create a cultural shift…the Belfast Bikes are helping because people are starting to see them…there's more of them on the roads so they feel safer…you see people on the Belfast Bikes who aren't in lycra, who aren't in Hi-Viz vests with helmets, it's people in suits, in skirts….so it starts to normalise it*" (Public Health Agency)

Map 1: Active commuting quintiles, NI, 2011 (Super Output Areas)



Source: NINIS (2016) – 2011 NI Census

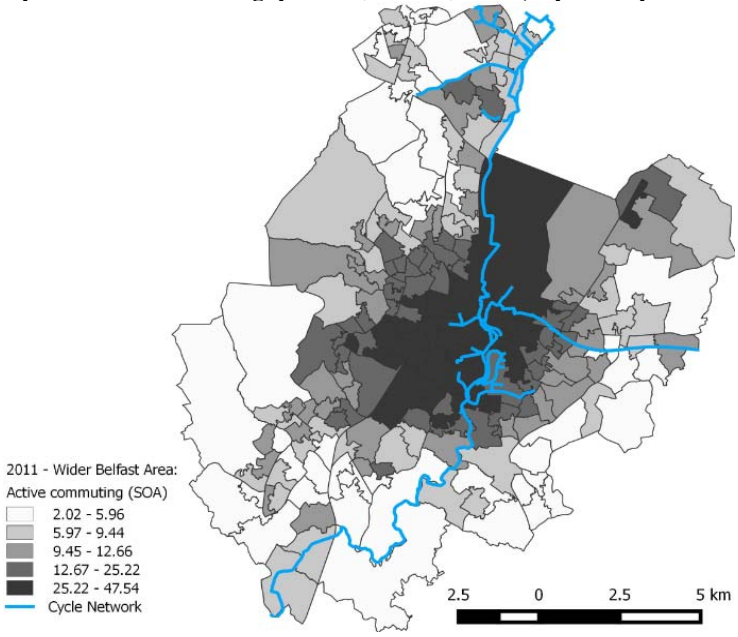
However, care must be taken as evidence suggests that social pressures and perceptions can also have the opposite effect. One participant reported that she had previously endeavoured to undertake the 50-minute walk to work, however she reported receiving 'looks' from her colleagues and was directly questioned about her practices. This caused her to reflect upon her decision to walk as 'a bit mad' and ultimately resulted in her returning to private transport commuting (Female, 30s, Retail, Derry – driver). This type of perception coincides with the identity formation connected with the motorcar and provides evidence for the description of walking as 'counter-cultural' (Hodgson, et al. 2012).

The health benefits of physical activity are well documented and so individual accounts are not outlined. The details provided within the qualitative data are therefore important in order to attempt to further understand if health does feature as part of the decision-making process, irrespective of this ambiguity. Firstly, it is worth noting that most active commuters did make a direct reference to health as a determining factor in their decision-making:

"*…the reason I'm cycling…is for health…it keeps me a bit active and keeps my weight under control*" (Male, 30s, Technology, Belfast – cyclist)

"*I do prefer walking….and I do see the health benefits…I always feel better in the morning whenever I walk*" (Female, 30s, Consulting, Belfast – walker)

Map 2: Active commuting quintiles, Belfast, 2011 (Super Output Areas)



Source: NINIS (2016) – 2011 NI Census

This evidences a gender divide regarding the use of self-reported health (as used in the quantitative analysis) with females considering health in terms of stress, well-being and happiness whilst males referenced issues including physical health, the absence of illness and visits to the doctor. Indeed, many males stated that they would '*never even think about mental health*' (Male, 40s, Consulting, Belfast – multi-modal).

Health was also cited as a trigger for changes to the commute, with one participant reporting that they leave the train one-stop earlier to get the health benefits of a longer walk whilst another reported health as key to her decision to change mode:

"*…I thought about my health and I started a slimming club…I kick myself now when I think 'why were you getting taxis*" (Female, 50s, Retail, Strabane – walker)

However, this was not shared by all participants, with some questioning the association based on their perception of the distances travelled and level of intensity undertaken by public transport and active commuters:

"*…on a bus you're not active...even on a train…. you're not going to be active….no matter what way you do your commute*" (Male, 40s, Manufacturing, Rural Lisburn – driver)

"*I wouldn't really consider that [walking to work] exercise because you are just walking…. It wouldn't be as intense as you'd need it*" (Female, 20s, Manufacturing, Rural Lisburn – driver)

Interestingly these statements were made by self-confessed habitual drivers, who, in a rather defensive tone, expressed proudly their extra-curricular activities, in an effort to defend their travel behaviours. However, a similar comment was made by an active commuter:

"*… there are health benefits [of cycling to work], but it's not much of a taxing cycle… you are not over-exerting yourself*" (Male, 30s, Consulting, Belfast – cyclist)

This perspective identifies an important drawback in guidance issued to commuters and may partly explain the non-transitioning from private transport, as health benefits are not always considered as a realistic outcome of modal shift. Whilst this evidence does provide an indication that health does feature, for some, as part of the decision-making process, there is a strong indication that as a whole this is reflective of personal circumstance, current health status and locational constraints which form barriers. This may therefore provide some understand for the rather ambiguous link identified by the quantitative analysis.

Discussion and conclusion

Who and where were active travel commuters? The results show that active travel in NI struggles against the same barriers that have been identified elsewhere since users of active travel are closely identified with urban areas with dense population, social deprivation, and employment opportunities. Moreover, they are relatively more likely to be female, and from households with three or more employed people, and to make shorter commutes. These features are consistent for 1991, 2001, and 2011. In contrast, in this car-reliant society (NI Assembly 2020), the use of private transport is associated with longer commutes, higher education, and more remote areas, and is perceived as more prestigious. Some of this is attributable to the geography of Northern Ireland – the dominance of Belfast as *the* major employment centre in a political unit with a generally dispersed population – and some to the underinvestment in public transport (DRD 2002a), which would be more likely to lead to multimodal trips that include active travel. Private transport was also historically privileged as being more anonymous and flexible during The Troubles when active travel, such as walking, or the use of buses, was seen as making people far more vulnerable to attack. Car commuters, in contrast, can travel into and out of areas without having to engage so closely with the sectarian geography of NI as those on foot.

Secondly, who moves from active travel to use other modes? The results show that active travel is one of the least stickable modes over the decade-long period between censuses. Unfortunately, there is no model available of the transition into active travel, but it seems clear looking at the balance of evidence that those who enter this mode tend to be urban dwellers, often from socially-deprived areas, who are younger, and less educated. The analysis also shows that the majority of active travellers at one census succumb to the lure of private transport by the next.

Thirdly, who becomes an active traveller? People using active travel at one census are drawn from all the other modes, but the most important is public transport. The personal and spatial factors that seem to select for moves into active travel are residence in large towns, in more deprived areas, being younger, having moved workplace SOA between censuses, and being less qualified. The presupposition that active travel might be seen as a lifestyle choice seems quite unlikely given this profile – if anything, it seems more likely that for many active travellers there is little choice or the decision is enforced through disadvantage. Although, as will be seen below, the health advantages of active travel are individually recognised, there seems to be no clear message from the quantitative data about its relationships with health. There seem to be detectable benefits but there is some evidence that people with 'fair health' – relative to good health – are relatively more likely to enter this mode so paradoxically active travel might be associated with poorer health for some.

Finally, how is active travel perceived and understood? The qualitative evidence cited shows on the positive side of the ledger that commuters understand the health

benefits of walking and cycling. However, on the negative side, the car as the main method of private transport remains the dominant and preferred commuting mode. For some people, there is no choice – active travel is not feasible because of lengthy commutes, and it should be remembered that commutes in NI and elsewhere have increased. On the other hand, for some people active travel is feasible, but in these cases, the material quoted indicates that walking and cycling have perceptual baggage that makes them less attractive.

Overall, the declining proportion of NI commuters between 1991 and 2011 who use active travel, and the continued growth of private transport do not bode well for sustainability – an issue not mentioned in the qualitative material – and health agendas. Much of this comparative failure can be attributed to the special context of NI, its settlement and economic geography, and its policy context which over the long term has seen underfunding of public transport and continued governance problems. In these circumstances, the attempts to promote active travel have a long way to go to effect major changes. Information from the 2021 NI Census, when linked to the NILS sometime in 2023 or 2024, will provide an opportunity to update the analysis. Since the data were collected when Covid restrictions were in place, it is probable that there will be much greater homeworking than in any of the previous census rounds but then the question will whether this will become permanent or merely a temporary shock.

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AKTIVNI TRANSPORT I PUTOVANJE NA POSAO U SEVERNOJ IRSKOJ: LONGITUDINALNA PERSPEKTIVA ZA PERIOD 1991-2011.

Apstrakt: Političke intervencije za podsticanje korišćenja zdravih i održivih načina putovanja do posla (kao što su hodanje i vožnja biciklom) naišle su na različite nivoe uspeha. U oblastima kao što su Severna Irska i gradovima kao što je Belfast, automobil ostaje dominantan način putovanja na posao i sa posla. Ovaj rad istražuje zašto je to slučaj tako što se ispituju individualni, domaćinski i geografski faktori koji utiču na (a) prelazak između jednog i drugog popisa na pešačenje ili vožnju biciklom sa drugih vidova transporta; (b) prelazak sa hodanja ili vožnje bicikla; i nastavljanje hodanj ili vožnje bicikla. Analiza je sprovedena korišćenjem Longitudinalne studije Severne Irske (NILS), sprovedene na 28% slučajnog uzorka populacije. Rezultati pokazuju da su hodanje ili vožnja biciklom povezani sa poslovima nižeg statusa, urbanim lokacijama, bez jasne povezanosti sa boljim zdravstvenim stanjem koje sami procenjuju. Nasuprot tome, putovanje kolima je povezano sa boljim obrazovanjem, zdravljem i višim statusom na tržištu rada. Analiza pokazuje da se politike za podsticanje korišćenja održivijeg i manje zagađujućeg transporta suočavaju sa ogromnim preprekama u pogledu statusnih percepcija, vremenskih budžeta i geografskog konteksta Severne Irske i Belfasta.

Ključne reči: političke intervencije, održivi načini putovanja, pešačenje i vožnja biciklom, putovanje kolima, Longitudinalna studija Severne Irske (NILS).

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Ian Shuttleworth is a senior lecturer in Human Geography at Queen's University Belfast. Educated at the University of Leicester and Trinity College Dublin, his research interests include migration and divided societies with a special focus on religion and identity in Northern Ireland. He is director of the Northern Ireland Longitudinal Research Support Unit (NILS-RSU), one of the family of ESRC UK Census Longitudinal Studies, and has experience of working with Census and other official statistics.

Claire Feehan completed her PhD on travel-to-work and transport modes at QUB in 2018. Her mixed-methods project involved longitudinal analysis of census data, using the Northern Ireland Longitudinal Study (NILS), and the collection of perceptual and experiential material via interviews. She is currently employed as a government statistician.