Individual belonging to local neighbourhoods; neighbourhood effects and individual mobility

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Overview

This presentation will address methodological and theoretical (conceptual) issues with reference to neighbourhood effects, mobility and individual belonging to neighbourhoods.

(Doctoral research) Hypothesis: remaining in materially deprived neighbourhoods, or moving into materially deprived neighbourhoods, will act to reduce levels of belonging to neighbourhoods and talking to neighbours for low income groups.

Present context and development of hypothesis with reference to conceptual issues.

Discussion on methodological challenges and present models that can incorporate longitudinal and multilevel aspects.

Results and conclusions.

Context: Clusters of homogeneity, a problem of bias or an expression of underlying selection mechanisms?

Individuals with similar characteristics and similar outcomes tend to be geographically clustered.

Neighbourhood effects contends that neighbourhood characteristics *cause* poor outcomes for individuals (contextual effects). Independent from the geographical clustering of individuals with similar outcomes (compositional effects).

One of the central methodological challenges for any study looking to determine the extent and nature of neighbourhood effects is the 'endogenous group membership problem‘ (selection bias).

Within neighbourhood effects there is increasing interest in the nature of selection mechanisms and individual mobility. The phenomena of interest may be the mechanisms that lead to and maintain the observed clustering.

Context: Developing a dynamic concept of neighbourhood

Neighbourhoods may be best understood as flows, rather than static entities (Bailey et al 2013).

Methodological challenges to incorporate dynamic aspects (discussed in more detail later).

Also need to develop the conceptual understanding of dynamic neighbourhoods. It may be useful to draw on theoretical perspectives that view place as a process, an event that is always under construction (Massey 2005). When considering process dialectical materialism may prove a useful theoretical framework. (Cornforth 1968)

If neighbourhoods are hybrids comprised of individuals present at any given time (Lippard 1997) then place and mobility not necessarily opposites. The notion of neighbourhood as mobility related encounters (Simonsen 2008).

Context: Belonging and mobility

Has individual belonging to local neighbourhoods decreased in late modernity, as a result of new mobilities? (Taylor 1982, Harvey 1990, Coleman 1993, Urry 2000, Sennett 2012)

Mobility should not be considered as something ‘new’. The way that mobility is expressed, the capacity for speedy movements for example, may be different now than in the past. However, mobility itself is arguably something inherent within the human condition and there are many examples of large scale human movement across history (Hawkins 1811, Hawsbawn 1991, Hatton and Williamson 1994, Ackroyd 2000, Manning 2012).

Smaller scale geographical residential mobility is ‘normal’ behaviour that most individuals engage in at points in their life course. Lack of mobility, while often seen as positive, is in fact more unusual (Rossi 1980, Rossi and Shay 1982).

It may be that the affluent have transcended local place while the poor have remained localised (Massey 1991, Bauman 1998), perhaps increasingly so; a new ‘mobility regime’ (Shamir 2005).

Context: Mobility and choice

In poor neighbourhoods there may be a 'demographic conveyor' where many young people move into poor neighbourhoods and then move out again shortly after (van Ham et al 2013).

Many people experience poor neighbourhoods at points in life course, this may be transient or permanent . The central issue may be the ability to exercise choice during a life course.

Studies using longitudinal data and large representative samples suggest that low income individuals are more constrained to neighbourhoods with high material deprivation, both in the UK (Kelly 2013) and US (Sharkey 2012).

'Elective belonging' (Savage et al 2005, Savage 2010): for some people belonging is not nostalgic, fixed in the past, but related to the exercise of choice. Savage contrasts middle class elective belonging with working class 'dwelling'.

The research question

Often an implicit view that poor individuals lack the resources for interaction and cohesion and that this leads to 'unsuccessful' neighbourhoods (Forrest & Kearns 2001, Wilson: 1987, 2013, Walker & Walker 1997, Madanipour et al 1998, Li et al 2005, Oliver and Wong 2003, Laurence & Heath 2008).

High neighbourhood level material deprivation has been consistently shown to be associated with lower levels of individual belonging (Bailey et al 2012).

The results from empirical studies that address the effects of individual income, or socio-economic status, on belonging to neighbourhoods are mixed, this may be partly due to differences in methodology (Lewicka 2011).

Does individual mobility weaken belonging, or lead to new connections and attachments (Findlay & Nowok 2012 , Oishi et al 2013, Nowok et al 2013).

Hypothesis: that remaining in materially deprived neighbourhoods, or moving into materially deprived neighbourhoods, will act to reduce levels of belonging to neighbourhoods for low income groups.

Data and methods

Multilevel models, that can accommodate clustered data and estimate contextual effects, have proved useful. However, there is a recognised need for more longitudinal studies, able to address neighbourhood effects in relation to change over time.

Longitudinal data from the British Household Panel Survey (BHPS), carried out by the ESRC UK Longitudinal Studies Centre, for three survey waves (1998, 2003 and 2008) where questions regarding individual belonging to the neighbourhood were asked.

Wave (year)	Longitudinal sample with at least one response, excluding individuals with a zero probability of inclusion at any survey wave
1998	8,720
2003	6,483
2008	5,555
Total interviews	20,758

Data and methods: the outcome variable

Belonging to neighbourhood at each survey wave

Belong to neighbourhood	**1998**	**2003**	**2008**
Strongly agree	15.8%	16.3%	16.1%
Agree	53.5%	54.7%	56.2%
Neither	19.3%	19.9%	19.3%
Disagree	9.1%	7.2%	6.7%
Strongly disagree	2.3%	1.8%	1.8%
Valid n	*8,841*	*7,178*	*6,585*
Missing	*23*	*24*	*16*

Source date: BHPS, waves 1998, 2003 and 2008

Data and methods: the longitudinal aspect of the model

1: Basic two level 'empty' model, estimating the overall individual level average.

$$y^*_{ij} = \beta_{0ij} cons$$
$$\beta_{0ij} = \beta_0 + u_j + e_{ij}$$

$$(u_j) \sim N(0,\Omega_u): \ \Omega_u = (\sigma^2_u)$$
$$(e_{ij}) \sim N(0,\Omega_e): \ \Omega_e = (\sigma^2_e)$$

The outcome y^*_{ij} for individual *j* at time point *i* is estimated as the average plus the residual at level two and the residual at level one, both of which are assumed to have a standard normal distribution with a mean of zero. This model enables the separate estimation of within person variance, σ^2_e, and between person variance, σ^2_u.

Data and methods: the longitudinal aspect of the model

In order to investigate trajectories of individual change the empty models can be extended to include a metric of time. Introducing a random slope to the metric of time enables individuals to have different rates of change.

$$
\begin{aligned}
y^*_{ij} &= \beta_{0ij} cons + \beta_{1j} Time_{ij} \\
\beta_{0ij} &= \beta_0 + u_{0j} + e_{ij} \\
\beta_{1j} &= \beta_1 + u_{1j}
\end{aligned}
$$

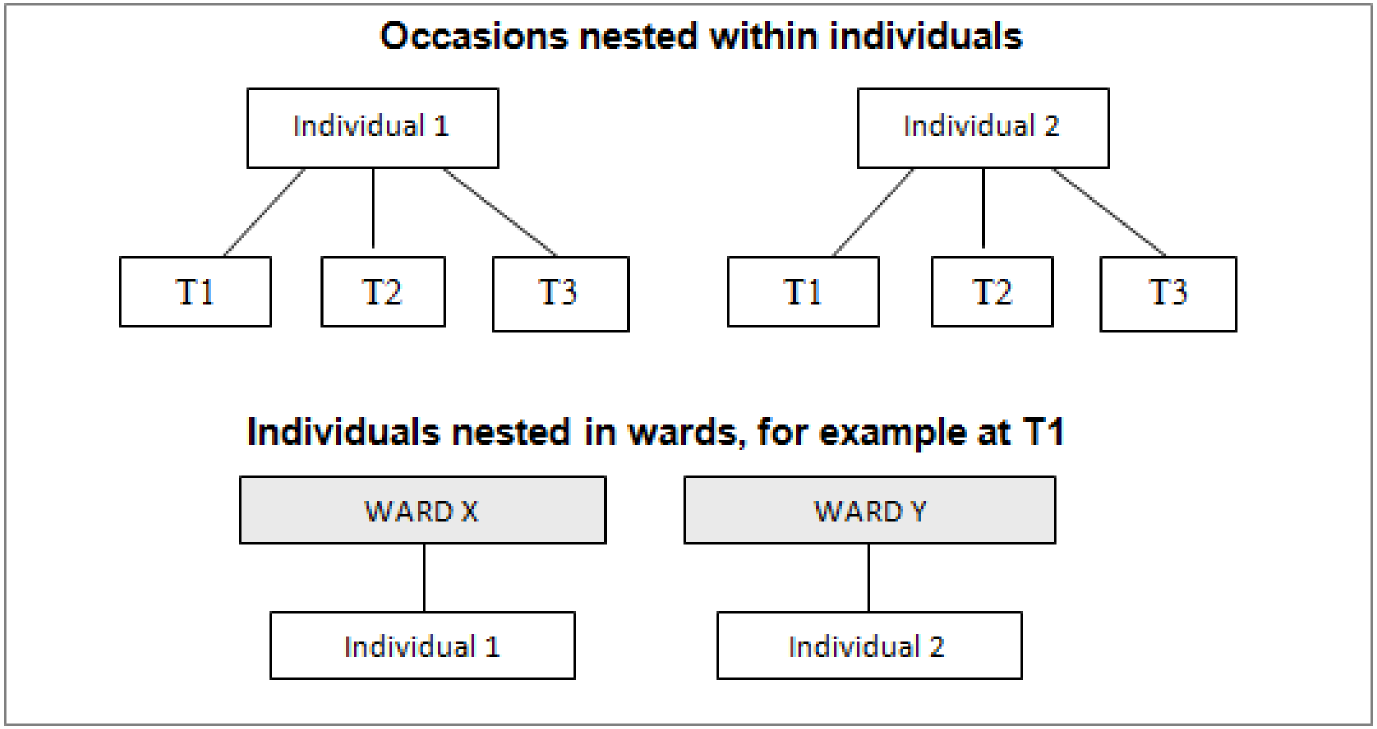
$$
\begin{bmatrix} u_{0j} \\ u_{1j} \end{bmatrix} \sim \mathrm{N}(0,\Omega_u):\ \Omega_u = \begin{bmatrix} \sigma^2_{u0} & \\ \sigma_{u01} & \sigma^2_{u1} \end{bmatrix}
$$

$$
(e_{ij}) \sim \mathrm{N}(0,\Omega_e):\ \Omega_e = (\sigma^2_e)
$$

Now there are two random coefficients estimated at the individual level, variance between individuals as estimated by σ^2_{u0}, and variance in the trajectories of change, as estimated by σ^2_{u1}. Also σ_{u01} is estimated, which is the covariance between σ^2_{u0} and σ^2_{u1}. The additional assumption is that the two random effects at the individual level have a multivariate normal distribution. The term σ^2_{e0} remains the variance within individuals.

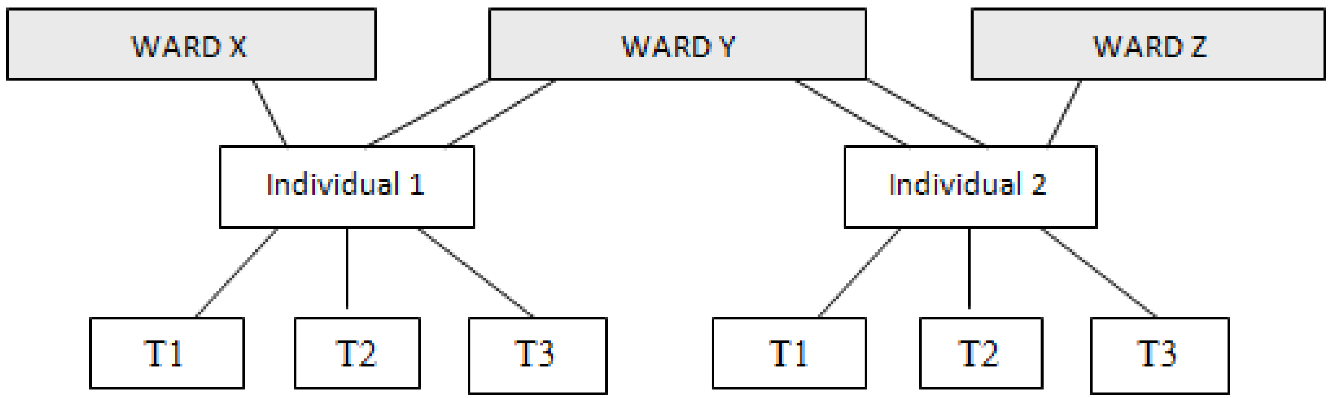
Data and methods: incorporating the neighbourhood level

When two level growth trajectory models are considered, and when each survey wave is considered in a cross-sectional way, then the data are nested in a perfect hierarchy.



Data and methods: imperfect hierarchies across time

However when considering the longitudinal and multilevel nature of the data together these perfect hierarchies break down as individuals can change wards between measurement occasions. For example, individual 1 is in ward X at occasion 1, and ward Y at occasion 2 and 3. Individual 2 is in ward Y at occasion 1 and 2, and ward Z at occasion 3.



In this example individual 1 is in ward X at T1, and ward Y at T2 and T3. Individual 2 is in ward Y at T1 and T2, and ward Z at T3.

Data and methods: cross-classified multilevel models

Based on the notation used by Fielding and Goldstein (2006) and Browne (2012). Each cross classified level is represented by a subscript giving the classification number. This considers the lowest level of classification as level 1 and so individual becomes classification 2, and ward classification 3.

$$y^*_i = \beta_{0i} cons_i + \beta_{1i} Time_i$$

$$\beta_{0i} = \beta_0 + u^{(3)}_{Ward(i)} + u^{(2)}_{0,\ Individual(i)} + e_i$$

$$\beta_{1i} = \beta_1 + u^{(2)}_{1,\ Individual(i)}$$

$$[u^{(3)}_{Ward(i)}] \sim N(0, \Omega u^{(3)}) : \Omega u^{(3)} = [\sigma^2_{u}{}^{(3)}]$$

$$\begin{bmatrix} u^{(2)}_{0,\ Individual(i)} \\ u^{(2)}_{1,\ Individual(i)} \end{bmatrix} \sim N(0, \Omega u^{(2)}) : \Omega u^{(2)} = \begin{bmatrix} \sigma^2_{u}{}^{(2)}_{0,0} & \\ \sigma_{u}{}^{(2)}_{0,1} & \sigma^2_{u}{}^{(2)}_{1,1} \end{bmatrix}$$

$$[e_i] \sim N(0, \Omega e) : \Omega e = [\sigma^2_e]$$

i is the occasion, u(2) and u(3) are the random effects for individual and ward classifications respectively.

Data and methods: the full model

$$y^*_i = \beta_{0i} cons_i + \beta_{1i} Time_i + \beta_2 YOB_i + \beta_3 Time{*}YOB_i + \beta_4 Household\ Income_i$$
$$+ \beta_5 Moved\ Ward_i + \beta_6 Ward\ Townsend_i + \beta_7 Ward\ BME_i + \beta_8 Ward\ Migration_i$$
$$+ \beta_9 Ward\ Townsend{*}Ward\ BME_i \quad + \beta_{10} Ward\ Townsend{*}Household\ Income_i + \beta_{11} Household\ Income{*}Moved\ Ward_i$$

$$\beta_{0i} = \beta_0 + u^{(3)}_{Ward(i)} + u^{(2)}_{0,\ Individual(i)} + e_i$$
$$\beta_{1i} = \beta_1 + u^{(2)}_{1,\ Individual(i)}$$

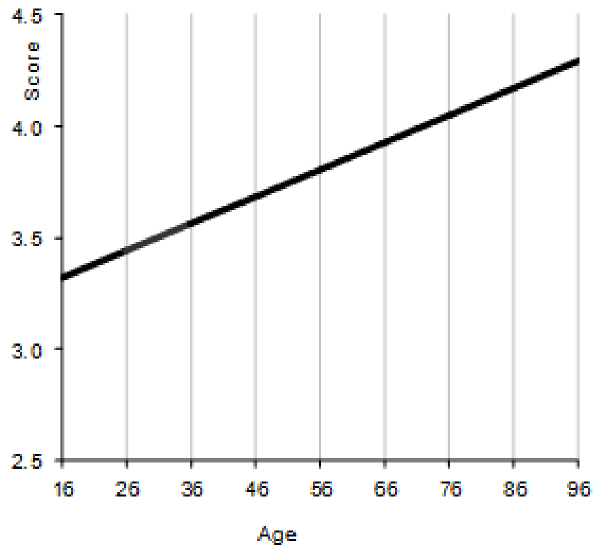
$$[u^{(3)}_{Ward(i)}] \sim N(0, \Omega u^{(3)}) : \Omega u^{(3)} = [\sigma^2_{u(3)}]$$
$$\begin{bmatrix} u^{(2)}_{0,\ Individual(i)} \\ u^{(2)}_{1,\ Individual(i)} \end{bmatrix} \sim N(0, \Omega u^{(2)}) : \Omega u^{(2)} = \begin{bmatrix} \sigma^2_{u(2)0,0} & \\ \sigma_{u(2)0,1} & \sigma^2_{u(2)1,1} \end{bmatrix}$$
$$[e_i] \sim N(0, \Omega e) : \Omega e = [\sigma^2_e]$$

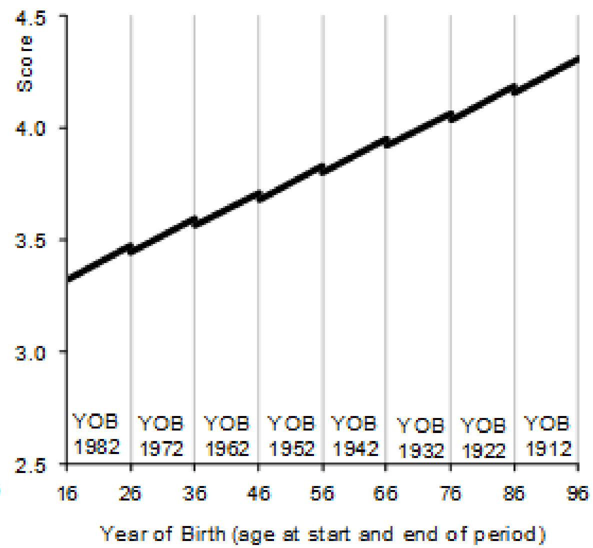
Time in units of one year, mean centred at 5 years. YOB in units of one year, mean centred at 1955. Household income in units of £100, mean centred at £1,400 equivalised net per month. Moved ward is a dummy variable with not moved as the reference category. Ward Townsend score is a z-score. Ward BME is a measure of the percentage of the ward population from ethnic minorities. Gross migration (rate per 100 population). All ward variables estimated for each occasion and mean centred.
Source data: BHPS, waves 1998, 2003 and 2008. Total n = 9,949.

Results:

Longitudinal aspect, considering different metrics of time

Level 1: Occasion (i) Level 2: Individual (j)	Age		Study Period Time	
	Est.	S.E.	Est.	S.E.
Constant (β_0)	3.709	0.008	3.714	0.007
Occasion level:				
Age	0.0122	0.0004		
Study period time			0.0122	0.0013
σ^2_{u0} Between individual variance: intercept	0.285	0.010	0.363	0.009
σ^2_{u1} Between individual variance: slope	0.00010	0.00002	0.00225	0.00027
σ_{u01} Intercept and slope covariance	-0.00108	0.00024	-0.00716	0.00088
σ^2_{u0}, σ^2_{u1} Correlation	-0.202		-0.347	
σ^2_e Between occasion variance	0.445	0.006	0.394	0.008
DIC	48300.12		52610.15	
DIC without random slope	*48400.80*		*52839.81*	

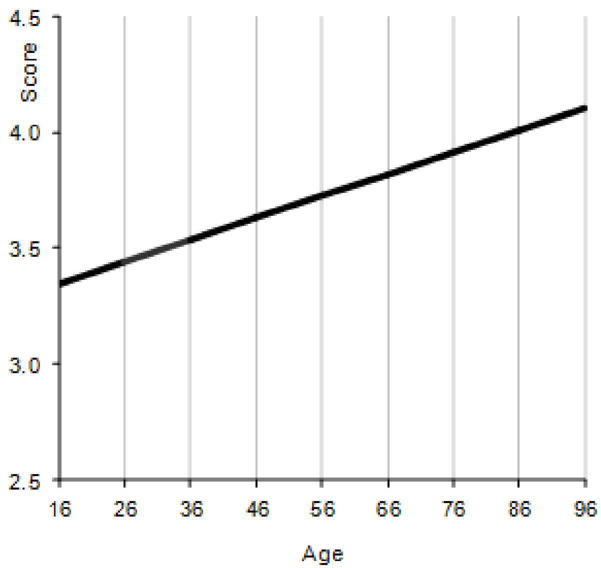


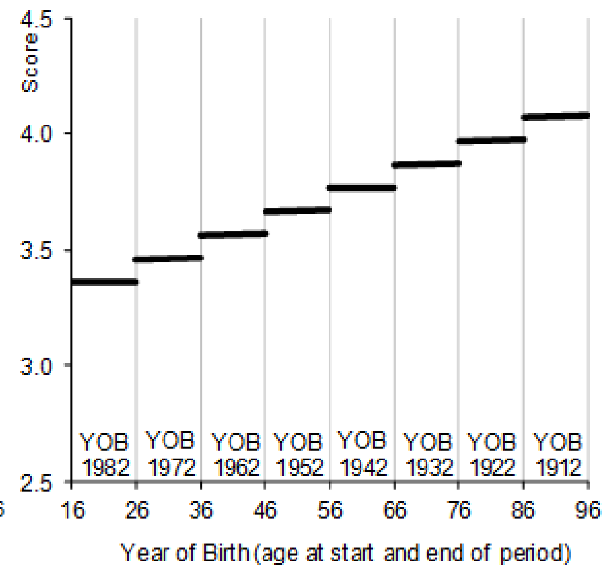


Results:

In contrast
to the results
for the outcome
of talking to
neighbours

Level 1: Occasion (i) Level 2: Individual (j)	Age		Study Period Time	
	Est.	S.E.	Est.	S.E.
Constant (β_0)	3.648	0.001	3.633	0.009
Occasion level:				
Age	0.0095	0.0005		
Study period time			-0.0018	0.0014
σ^2_{u0} Between individual variance: intercept	0.328	0.012	0.429	0.011
σ^2_{u1} Between individual variance: slope	0.00021	0.00003	0.00155	0.00033
σ_{u01} Intercept and slope covariance	-0.00288	0.00033	-0.00172	0.00110
σ^2_{u0}, σ^2_{u1} Correlation	-0.347			
σ^2_e Between occasion variance	0.545	0.007	0.515	0.01
DIC	52610.15			
DIC without random slope	*52839.81*			





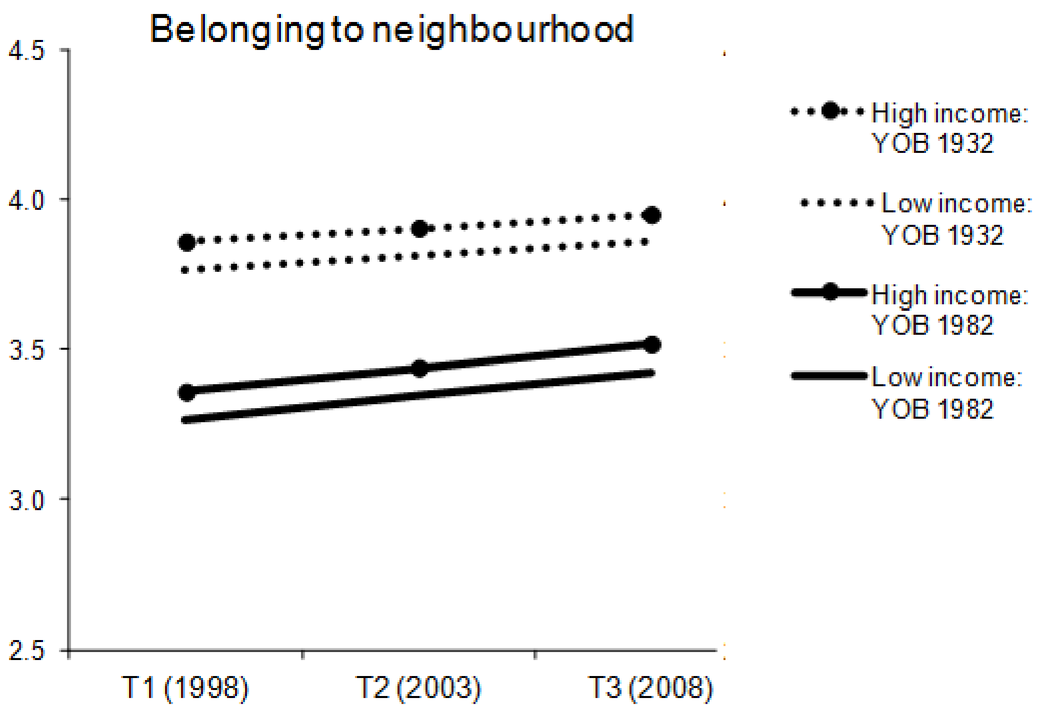
Results: the full model

	Est.	S.E.
Constant (β_0)	3.687	0.013
Occasion level classification:		
Time	0.01212	0.00135
Individual level classification:		
YOB	-0.00967	0.00043
Household income	0.00108	0.00063
Moved ward	-0.124	0.014
Ward level classification		
Ward Townsend	-0.03003	0.00354
Ward BME	-0.00604	0.00160
Ward Migration	-0.07864	0.02026
Individual level interactions: Household income* Moved	0.00197	0.00106
Ward level interactions: Ward Townsend* Ward BME	0.00032	0.00017
Cross level interactions (occasion and individual levels): Time*YOB	0.00013	0.00007
Cross level interactions (individual and ward levels) Ward Townsend* Household income	0.00025	0.00014
$\sigma^2_{u(3)}$	0.104	0.008
$\sigma^2_{u(2)0,0}$	0.252	0.008
$\sigma^2_{u(2)1,1}$	0.00166	0.00024
$\sigma^2_{u(2)0,1}$	-0.00608	0.00077
Correlation ($\sigma^2_{u(2)0,0}/\sigma^2_{u(2)1,1}$)	-0.297	
σ^2_e	0.364	0.007

Level 1: Occasion (i), Classification 2: Individual, Classification 3: Ward
Source data: BHPS, waves 1998, 2003 and 2008. Total n = 9,949

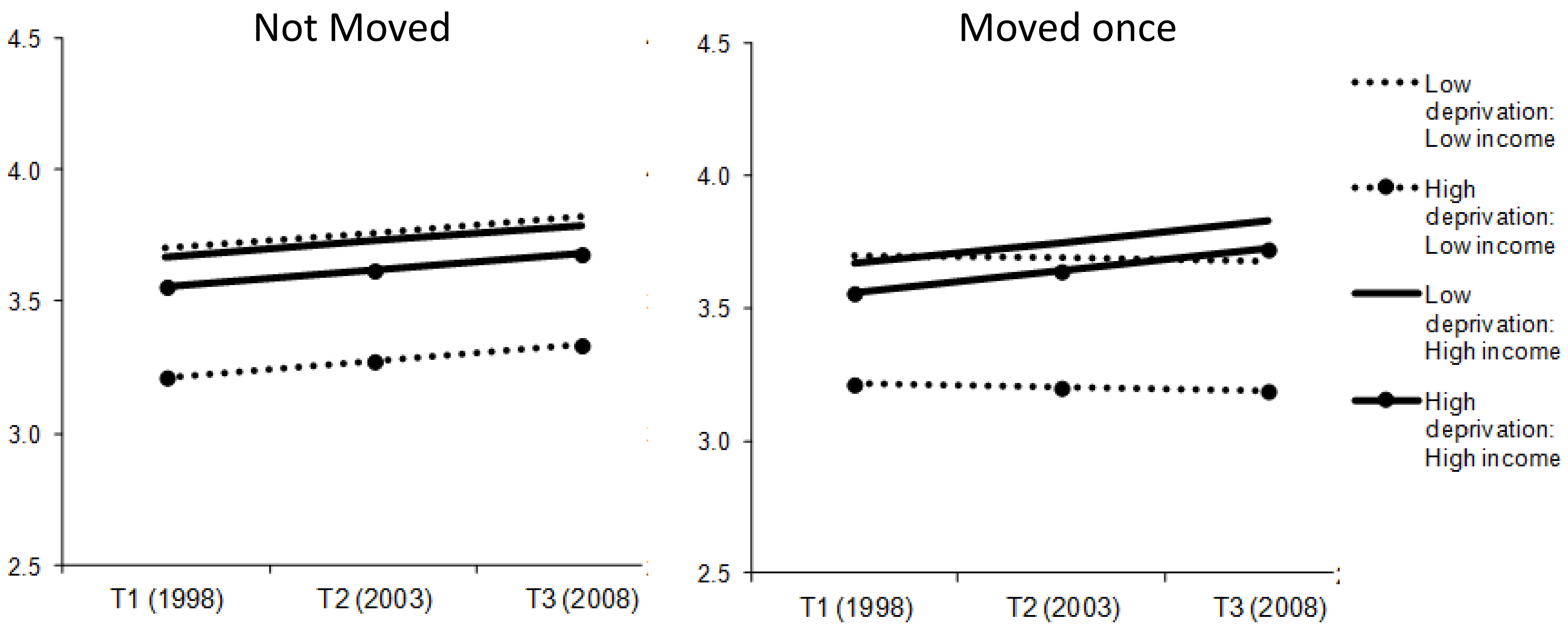
Belong to neighbourhood	2 Level Longitudinal	2 Level Multilevel (average)	3 Level Cross-classified
Total Variance	0.814	0.814	0.855
Ward		28.0%	19.2%
Individual	44.5%	72.0%	33.9%
Occasion	55.5%		46.9%

Results: the full model



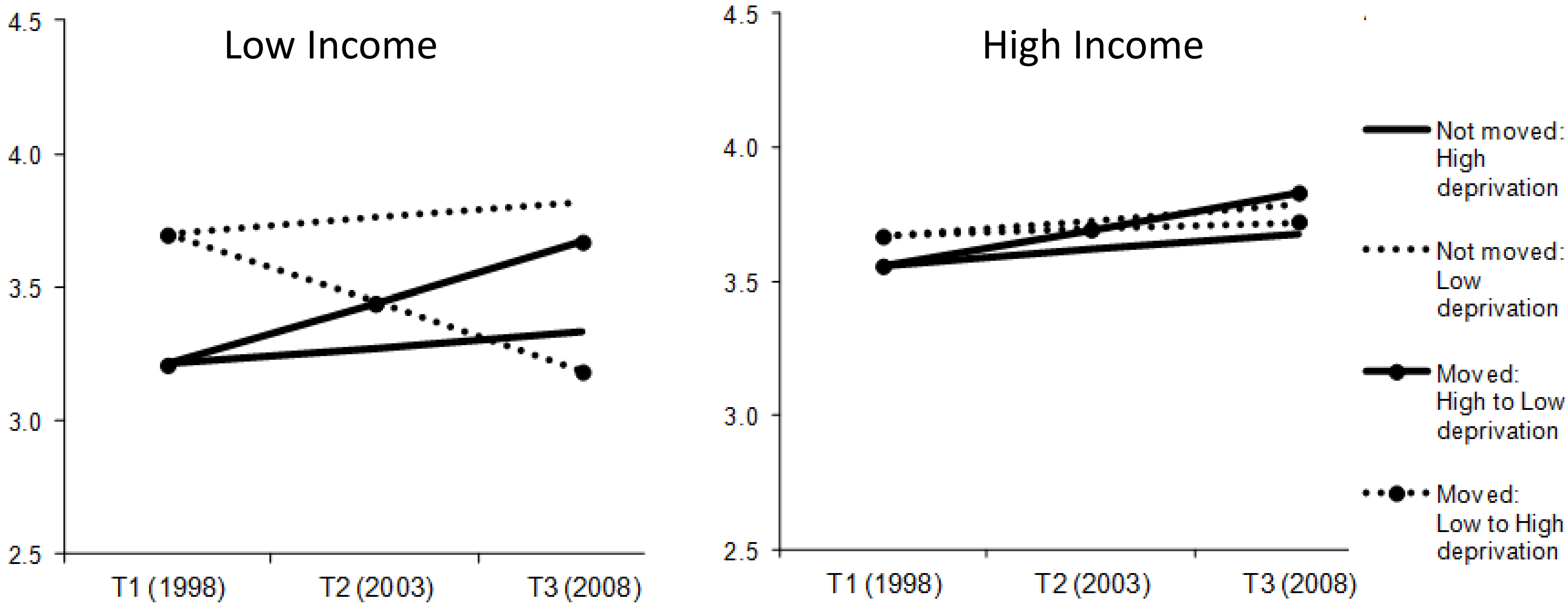
(Net equivalised household income: Low household income £200 per month,
high household income £10,000 per month.)

Results: the full model



(Low ward deprivation = Townsend score minus 5, high ward deprivation = Townsend score 10.)
(Low household income £200 per month, high household income £10,000 per month)

Results: the full model

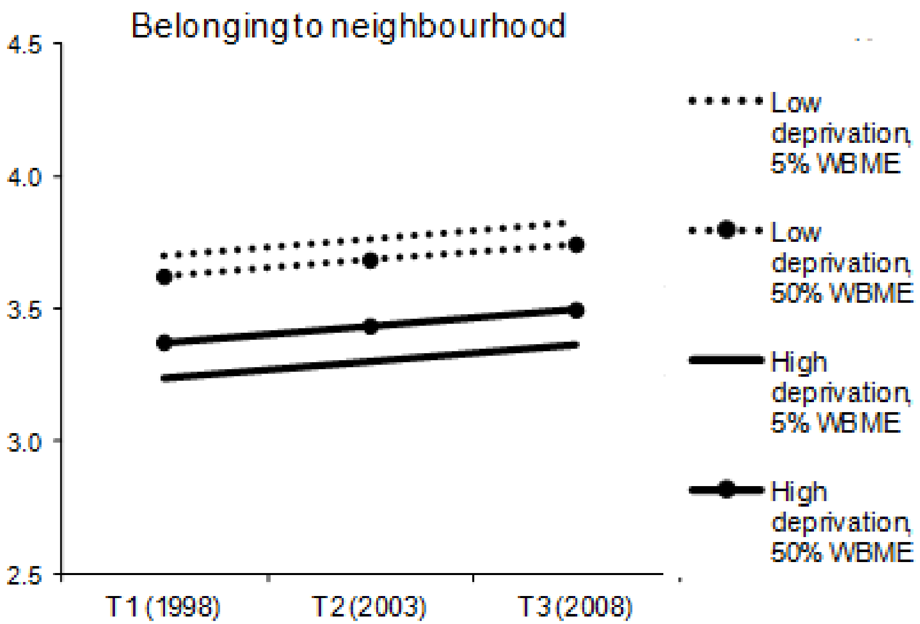


(Low ward deprivation = Townsend score minus 5, high ward deprivation = Townsend score 10.)
(Low household income £200 per month, high household income £10,000 per month)

Results: short note on ward level ethnic diversity

Model	Belong Est.	Belong S.E.
Ward BME	-0.0060	0.0016
Ward Townsend	-0.0300	0.0035
Ward Townsend * Ward BME	0.00032	0.00017

Source data: BHPS, waves 1998, 2003 and 2008. Total n = 9,949



(Low ward deprivation = Townsend score -5, high ward deprivation = Townsend score +10.)

Conclusions

Levels of belonging to the neighbourhood are lowest for individuals in low income households who are also in more materially deprived neighbourhoods.

Moving neighbourhood was not associated with a change in levels of belonging for individuals in high income households, and moreover, there was no substantive effect of moving between neighbourhoods with different levels of material deprivation for individuals in high income households.

Individuals in low income households have lower levels of belonging if they remain in neighbourhoods with high deprivation or move between neighbourhoods with high deprivation.

The processes of geographical constraint may be important in understanding how being 'trapped' in neighbourhoods with high material deprivation acts to suppress belonging to the neighbourhood.

So that living in neighbourhoods with high deprivation does not reduce belonging, only being unable to move from such neighbourhoods does so.

Conclusions

Theoretical :
Selection Bias = Selection Mechanisms = Neighbourhood Effects?

Theoretical :
Still to finalise a theoretical perspective of dynamic neighbourhoods. A general theory? Unique expressions of event always under construction. An open future not the end of history.

Methodological:
Cross classified multilevel, longitudinal models offer potential. However the multilevel models need more data, limitations of sample size at small geographies.

Methodological:
It may be that longitudinal analysis is the key to understand processes of constraint and neighbourhood effects across a life course.

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