Complexity and uncertainty in geography of health research: incorporating a 'life course of place' perspective

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Why are places & health related?

Structural Factors

Opportunity structures
- Secure & non-hazardous employment
- Local public services
- Physical environment
- Green spaces

Collective social functioning & practices
- Local norms & values
- Social capital & networks
- Neighbourhood reputation
- Crime levels

Housing quality

Local norms & values

Secure & non-hazardous employment

Neighbourhood reputation

Opportunity structures

Why are places & health related?

Structural Factors
Outline

- Life course of place: what is it?
- Green space & health – what do we know?
- Operationalising a life course of place
- Integrating geographical & individual data over the lifecourse
Life course of place: what is it?
Place, space and health

Important contributions - sociology, epidemiology, demography, anthropology, politics, & elsewhere
  • Cultural, behavioural, materialist, psychosocial, political economy (structural), & life course perspectives

How have geographical ideas helped us?
  • Neighbourhoods & health
  • Environmental justice
  • Mobility & migration
Critiquing work on health & place

- Most work cross sectional
  - Contemporaneous ‘exposures’
  - Few longitudinal studies
- Or consider changes in very short term
  - Interventions
  - Natural experiments
- GISc work on ‘activity spaces’
- Very little work examining environmental circumstances **over the life course**
  - ‘life course of place’
Life course theory

Critical Periods

Accumulation of Risk

In utero
- Nutrition
- Alcohol
- Smoking

Early childhood
- Family structure
- Household SES
- Traumatic experiences

Mid childhood
- Education
- Nutrition
- Physical activity

Adulthood
- Employment hazards
- Job security
- Income
- SES

Older age
- Social support
- Social capital

Healthy ageing
Life course of place: why it matters

**Places - socially produced & dynamic**
- shaped by political processes & power relationships
- reflect macro-level processes that accumulate over decades
- environmental & social differences are inextricably connected

**Local particularities matter**
- mediate relationships through local resources, rules & practices
- in turn can reinforce and rework place-based characteristics
Life course of place: analytical possibilities

Yet few studies tracked historical development of places & considered repercussions for local health & well-being.

Most studies rely on contemporaneous analysis.

Poor understanding of accumulation & critical periods.

We need to get much better at:

• tracking people over time (including ‘activity spaces’)
• tracking places over time
The life course of place: Looking past paradigms and metaphors to the just nature of place-health – A rejoinder to Andrews

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Green space, health & wellbeing: what do (don’t) we know?
Green space & health

- Green space linked to wide range of health outcomes:
  - physical health
  - mental health

- Various pathways:
  - e.g. air quality, physical activity, social cohesion, and stress reduction

- Integral to urban policy development in many countries
  - e.g. WHO

Towards More Physical Activity in Cities
Transforming public spaces to promote physical activity — a key contributor to achieving the Sustainable Development Goals in Europe
Green space & health across the life course

Accumulation of Risk

In utero
Birthweight

Early childhood
Childhood development

Adulthood
Inequalities

Older age
Cognitive ageing
Mental health
Green space & birth weight
How might green space affect birth weight?

Psychosocial: restorative spaces → reduced maternal stress

Physiological: physical activity → improved maternal health

Environmental: reduced maternal exposure to environmental risk factors (noise, air pollution)
Maternal exposure to green space & birth weight

- Sibling study: compares births to same mother
- “Quasi-experimental”: similar to moving mother from one environment to another between pregnancies, and comparing birth outcomes.
- Found total green space (public + private) more important than just public natural spaces
Green space & early childhood development
Possible mechanisms

1. Attention Restoration Theory
   Experiences of natural space may restore child’s attention by giving fatigued cognitive processes the opportunity to rest.

2. Psychoevolutionary Theory
   Natural spaces may support stress reduction through favourable physiological responses.

3. Playful environments
   May offer increase opportunities to play, which in natural spaces is often more creative, adventurous, social & challenging play than elsewhere.

4. Indirect influences
   Via effects on a child’s carer. Exposure to green space linked with better mental health in adulthood; carers mental health can influence early childhood development.
The role of public and private natural space in children's social, emotional and behavioural development in Scotland: A longitudinal study

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ARTICLE INFO

Abstract

Green space (particularly private gardens) contributes to better social, emotional & behavioural outcomes (4-6 years).
Green space & *inequalities* in mental health amongst adults
Predicted mean mental wellbeing by perceived financial strain and ease of access to recreational / green areas.

Are neighbourhood characteristics associated with narrower socio-economic inequalities in mental wellbeing?

- 21,294 urban residents, 34 European nations
- 2012 European Quality of Life Survey
- Associations: mental wellbeing & financial strain
- 5 neighbourhood characteristics (including reported access to green areas)

Operationalising a life course of place
Environments, health & inequalities over the life course

- Can we ‘reconstruct’ past urban environments?
- Examine influence of place over the life course
  - accumulation
  - critical periods
1947
MENTAL SURVEY TEST
SUITABLE FOR PUPILS OF TEN AND ELEVEN YEARS OF AGE

MENTAL SURVEY TEST, 8 pp., 4d.
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INSTRUCTIONS FOR ADMINISTRATION, 8 pp., 4d.

SPECIMEN SET - 9d., post free

UNIVERSITY OF LONDON PRESS Ltd.
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Lothian Birth Cohort 1936

13. John is younger than Jim, and Jim is younger than Bill. Which is the oldest of the three? (... ... ... ... ... (John, Jim, Bill)

(Do not write anything, just underline the right one in the bracket).

In a certain secret writing
lzqkcofu, fftr yggr means
STARVING, NEED FOOD

In the same secret writing you find this. Write below it what it means:—
yoct kgctkl rtqr.

What number is in the triangle and square but not in the circle? ...
Lothian Birth Cohort 1936
N = 1091

Age 11 in 1947

Age... 70 in 2006
...and 73 in 2009
...and 76 in 2012
...and 79 in 2015

Deary et al. (2007) BMC Geriatrics, 7, 28.
‘Life grid’ technique – local, global and personal events are used to prompt recollection of past home addresses

<table>
<thead>
<tr>
<th>Year</th>
<th>Home address</th>
<th>Local/global/personal events</th>
<th>Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>Lyre Lea cottages, Gorge Road, London</td>
<td>Oil crisis, Married</td>
<td>Self Employed</td>
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<tr>
<td>1972</td>
<td></td>
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<tr>
<td>1974</td>
<td></td>
<td>Margaret Thatcher becomes prime minister</td>
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<td>1976</td>
<td></td>
<td>Falklands War, Father Died</td>
<td>Mobile Fruit Van</td>
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<td>1978</td>
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<td>1980</td>
<td>Harrison Gardens, Stratford, East London</td>
<td>Lockerbie bombing, Hillsborough disaster</td>
<td></td>
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<tr>
<td>1982</td>
<td></td>
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<tr>
<td>1984</td>
<td></td>
<td>John Major becomes prime minister</td>
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<td>1986</td>
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<td>1988</td>
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<tr>
<td>1990</td>
<td>Forester Park, Wardour Crescent, E11</td>
<td>Diana Princess of Wales dies, Scottish Parliament opened</td>
<td>Self Employed</td>
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<tr>
<td>1992</td>
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<td>9/11 attacks in New York</td>
<td>Block Taxi Driver</td>
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<td>1994</td>
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<td>1998</td>
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<td>2000</td>
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<td>Earthquake and tsunami off coastal Japan</td>
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<td>2002</td>
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<tr>
<td>2014</td>
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</tbody>
</table>
A Civic Survey and Plan for the City and Royal Burgh of Edinburgh, 1949

Sanitary Department Annual Report, Edinburgh City Archives
Mapping the public parks in Edinburgh in 1914, 1949, 1969 & 2009

- **Red**: Public park removed since previous time period
- **Green**: Public park
- **Dark Green**: Additional public park since previous time period
- **Gray**: Survey extent
- **White**: Ward boundary (2001)
Integrating environmental & individual data
Lifetime green space exposure

Green space trajectories of selected LBC participants

Date

% of green space within 1000m buffer around residence

0
10
20
30

LBC142
LBC141
LBC140
LBC139
LBC138
LBC137
LBC136
LBC135
LBC134
LBC133
LBC132
LBC131
LBC130
LBC129
LBC128
LBC127
LBC126
LBC125
LBC124
LBC123
LBC122
LBC121
LBC120
LBC119
LBC118
LBC117
LBC116
LBC115
LBC114
Lifetime area-level SES exposure
Life course analysis

Green space → mental health outcomes
Green space → cognitive ageing
Green space and cognitive ageing: A retrospective life course analysis in the Lothian Birth Cohort 1936


- No association with change in cognitive test score 11-70
- Positive association with change cognitive test score 70-76
- Childhood a particularly sensitive period: affecting cognitive function trajectory in later life
  - Enhanced by green space in adulthood
  - Strongest amongst women, & low SES
Green space & mental health

Hospital anxiety & depression scale: validated instrument, mental health morbidity

- 14 questions, scored 0-3.
- ½ relate to anxiety (relating to anxious mood, restlessness & anxious thoughts)
- ½ relate to depression (loss of interest & diminished pleasure response)

Total HADS score

- influence limited to most socially disadvantaged neighbourhoods
- green space during childhood (10% increase in green space, 14% reduction in HADS total score)

Anxiety outcome

- most socially disadvantaged neighbourhoods
- green space during childhood
- accumulation model also significant (every life course period spent in the top tertile, score reduced by 10%)
Life course of place: how can it contribute?
Life course of place: how can it contribute?

- Responds to call for longitudinal health-place studies
- Examine whether & how places influence health throughout the lifecourse
  - critical periods (e.g. formative experiences)
  - cumulative influences
  - causal relations

Role of place – establishing & perpetuating inequalities

- interplay of historical processes & human lives
- environmental justice literature: need to identify temporalities & evolution of local environments
- who is ‘locked in’?
Limitations

Methodological

- Recall bias
- Survivor bias (LBC)
- Low mobility
- Area-level constructs: data availability, meaning over time, reporting units

Conceptual

- Static snapshots of places, when churning and evolving
Next steps

• More complete environmental assessments – ‘activity spaces’
• Wider set of environmental characteristics
• Scaling up: national level
  • Scottish Longitudinal Study, British Cohorts
  • Auto extraction mapping techniques
• International comparisons
Conclusions

Historical context (eras) rarely acknowledged
- lacks robust evidence & data
- ‘life course of place’

• Green space - related to **several health outcomes** in Scotland
  - Birth weight, developmental outcomes, mental health, cognitive ageing; less so physical activity

• Green space matters at different stages of the **life course**
  - green space environments in the early years have ***lifelong implications*** for health (cognitive ageing & mental health)

• Offers opportunities for addressing **key policy priorities**:  
  - child health & development  
  - cognitive ageing  
  - inequalities & resilience
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References

Life course of place


Green space & health


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Neighbourhood deprivation and total HADS score*

*Hospital anxiety and depression scale validated instrument for determining mental health morbidity

• 14 questions, scored 0-3.
• ½ relate to anxiety (relating to anxious mood, restlessness & anxious thoughts)
• ½ relate to depression (loss of interest & diminished pleasure response)
• Combined total score: 42

Model adjusted for sex, occupational social class of participant and (their father’s) highest educational qualification
Model adjusted for sex, occupational social class of participant and (their father’s) highest educational qualification

Neighbourhood deprivation and total HADS anxiety score
Life course models

• Accumulation models
• Critical periods models
• Effect modification models

Neighbourhood social deprivation ➔ mental health outcomes
Green space ➔ mental health outcomes
Green space ➔ cognitive ageing