Commuting & Wellbeing: How and why commuting influences life satisfaction

Ben Clark, Kiron Chatterjee & Adrian Davis
Wellbeing in Britain

November 2010

‘well, of course, you say these things in opposition, but when you get into government you’ll never actually do anything about it’.

…today the government is asking the Office of National Statistics to devise a new way of measuring wellbeing in Britain.

…we’ll start measuring our progress as a country, not just by how our economy is growing, but by how our lives are improving; not just by our standard of living, but by our quality of life.
Subjective Wellbeing

Three measures:

1. **evaluative wellbeing** - how satisfied individuals are with their lives
2. experiential wellbeing - how often individuals experience different emotions
3. eudaimonic wellbeing - whether individuals feel they are fulfilling their potential

(ONS, 2011)
Evidence on commuting

• Impacts of commuting on wellbeing are receiving attention

• Evidence indicates
  • *Longer commutes* associated with lower wellbeing
Questions

1. Are longer duration commutes associated with lower life satisfaction?
2. If so, why?
3. Does the commute mode matter?
4. How large is the effect of commute duration on life satisfaction?
Life satisfaction: Trade offs

Commuting benefits
- Income
- Fulfilling job
- Improved housing
Life satisfaction: Trade offs

- Very satisfied
- Very dissatisfied

- Commuting benefits
- Income
- Fulfilling job
- Improved housing
Life satisfaction: Trade offs

Commuting dis-benefits
- Time commitment
- Stress
Life satisfaction: Trade offs

Very satisfied

Very dissatisfied

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Life satisfaction: Trade offs

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Commuting benefits
- Income
- Fulfilling job
- Improved housing

Very dissatisfied
Data

• Understanding Society
  • Sample of English workers in 2010/11 (N=16,841)

• Analysis method
  • Cross-sectional statistical analysis
  • (Longitudinal analysis to follow)
Sample characteristics

**Commuting mode:**

- Driving: 62% (10460)
- Bus: 7% (1136)
- Rail/Metro: 8% (1288)
- Walking: 13% (2121)
- Cycling: 3% (578)
- Other: 7% (1258)

**Commuting time:**

- Mean commute time: 27 mins (SD 22 mins)
Are longer duration commutes associated with lower life satisfaction?

Yes
Commute time categories and life satisfaction scores:
- 1 to 15 mins
- 16 to 30 mins
- 31 to 45 mins
- 46 to 60 mins
- 61 to 90 mins
- 91 to 179 mins
Regression: + confounders

-ve
-0.00098

Commute Time → Life satisfaction

Confounders
Regression: + confounders

- Compensators (income, job status) not yet controlled for
- The negative coefficient implies that the negative aspects of commuting outweigh the benefits
- **People are not fully compensated for their commute**

Commute Time \( \rightarrow \) Life satisfaction

\[
\text{Commuting benefits: Income, Fulfilling job, Improved housing}
\]

\[
\text{Commuting dis-benefits: Time commitment, Stress}
\]
Regression: + compensators

Commute Time → Life satisfaction

-ve
-0.00150

Compensators
- Income (+)
- High status job (+)

Confounders
Are longer duration commutes associated with lower life satisfaction?

Yes

If so, Why?
Theorised Relationships

- The satisfaction with leisure time is positively correlated with satisfaction with job and negatively correlated with commute time.
- Feeling strained has a positive effect on life satisfaction.
- Commute time negatively affects satisfaction with leisure time.
- Satisfaction with leisure time positively affects life satisfaction.
- Life satisfaction positively affects satisfaction with job.
- Other effects are indicated by a box labeled "+ or -".

Diagram:
- Commute time → satisfaction with leisure time → life satisfaction
- Feeling strained → life satisfaction
- Life satisfaction → satisfaction with job
- Other effects indicated by a box labeled "+ or -"
Wellbeing Scores & Commute Time

Scores indexed on 1 to 15 mins

1 to 15 mins  | 16 to 30 mins  | 31 to 45 mins  | 46 to 60 mins  | 61 to 90 mins  | 91 to 179 mins

Life satisfaction
Strain
Satisfaction with leisure time avail.
Job satisfaction
Self reported health
Regression: + compensators

Commute Time

\[-\text{ve}\]
\[-0.00150\]

Life satisfaction

Compensators
- Income
- High status job

Confounders
Path model: + mediators

Commute Time → Feeling strained (0.017)

Feeling strained → Satisfaction with leisure time avail. (0.014)

Satisfaction with leisure time avail. → Life satisfaction (0.475)

Satisfaction with job → Life satisfaction (0.098)

Confounders:
- Income
- High status job

Compensators:
Does the commute mode matter?

Yes
Path model: Drivers

Commute Time → Feeling strained

Feeling strained → Satisfaction with leisure time avail.

Satisfaction with leisure time avail. → Life satisfaction

Life satisfaction → Compensators
- Income
- High status job

Satisfaction with job → Feeling strained
Path model: Cyclists

Commute Time

- 

Satisfaction with leisure time avail.

- +

Feeling strained

- 

Satisfaction with job

- 

Life satisfaction

+ 

Compensators
- Income
- High status job

Confounders
Path model: Walkers

Commute Time → Satisfaction with leisure time avail. → Life satisfaction

- Commute Time → Feeling strained

- Feeling strained → Satisfaction with leisure time avail.

+ Satisfaction with leisure time avail. → Life satisfaction

- Satisfaction with leisure time avail. → Feeling strained

- Feeling strained → Satisfaction with job

+ Satisfaction with job → Life satisfaction

Compensators:
- Income
- High status job

Confounders:
Path model: Bus

Commutee Time

- Feeling strained
- Life satisfaction
+ Satisfaction with leisure time avail.
+ Satisfaction with job

Compensators
- Income
- High status job

Confounders
Path model: Rail

Commute Time → Satisfaction with leisure time avail. → Feeling strained → Life satisfaction

Satisfaction with job → Life satisfaction

Confounders:
- Income
- High status job

Compensators: 
- Income
- High status job
<table>
<thead>
<tr>
<th>Effect of longer commute times on:</th>
<th>Levels of strain</th>
<th>Sat. with leisure time</th>
<th>Job sat.</th>
<th>Life sat. (direct&lt;sup&gt;a&lt;/sup&gt;)</th>
<th>Total effect on life sat. &lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>All modes</td>
<td>Higher</td>
<td>Lower</td>
<td>Lower</td>
<td>Higher</td>
<td>Negative</td>
</tr>
<tr>
<td>Drive</td>
<td>Higher</td>
<td>Lower</td>
<td>Lower</td>
<td>Higher</td>
<td>Negative</td>
</tr>
<tr>
<td>Bus</td>
<td></td>
<td>Lower</td>
<td></td>
<td></td>
<td>Negative</td>
</tr>
<tr>
<td>Rail</td>
<td>Lower&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Lower</td>
<td></td>
<td>Higher</td>
<td>Positive</td>
</tr>
<tr>
<td>Cycle</td>
<td>Higher&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Lower</td>
<td>Lower</td>
<td></td>
<td>Negative</td>
</tr>
<tr>
<td>Walk</td>
<td></td>
<td>Lower</td>
<td></td>
<td></td>
<td>Negative</td>
</tr>
</tbody>
</table>

Notes:

- <sup>a</sup> the remaining direct effect on life sat after accounting for mediating paths, compensators and confounders
- <sup>b</sup> the total effect of commute time on life sat through both direct and indirect paths
- All relationships are significant at 95% level or higher unless otherwise indicated
- <sup>c</sup> indicates significant at 90% level
Questions

1. Are longer duration commutes associated with lower life satisfaction?
2. If so, why?
3. Does the commute mode matter?
4. How large is the effect of commute duration on life satisfaction?
Income equivalence estimation

On average, to maintain the same life satisfaction score
  • A 10 minute increase in one-way commute time

Needs to be accompanied by
  • A £480 per month increase in gross personal income

If nothing else changes
(e.g. better house, more fulfilling job)
Summary

- Longer duration commutes are linked to lower life satisfaction scores, through
  - Lower satisfaction with leisure time availability
  - Lower job satisfaction
  - Higher levels of strain

- The relationships differ by mode e.g.
  - Strain is more strongly associated with driving
  - Shorter rail/metro commutes are associated with greater strain
Policy Implications

• Measures to reduce commute times will improve life satisfaction across the population e.g.

• Spatial planning
  • Co-locate housing and employment centres

• Transport planning
  • Provide efficient transport links between housing and employment centres

• Public transport provision
  • Improve the journey experience (Comfortable seats, WiFi)
Further work

We will be using longitudinal data to examine how wellbeing is related to commuting and life situation over time.

www.travelbehaviour.com
Wellbeing Scores & Commute Mode

Drivers | Bus/Coach | Rail/Metro | Cycle | Walk

Wellbeing scores indexed on drivers

Life satisfaction | Strain | Satisfaction with leisure time avail. | Job satisfaction | Self reported health

88 | 94 | 96 | 98 | 100 | 102 | 104 | 106
Predicted Life Satisfaction Scores for Typical Commuter*

<table>
<thead>
<tr>
<th>Mode</th>
<th>10</th>
<th>20</th>
<th>40</th>
<th>60 %age change</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>5.47</td>
<td>5.46</td>
<td>5.44</td>
<td>5.41</td>
</tr>
<tr>
<td>Drive</td>
<td>5.49</td>
<td>5.48</td>
<td>5.46</td>
<td>5.45</td>
</tr>
<tr>
<td>Bus</td>
<td>5.70</td>
<td>5.67</td>
<td>5.62</td>
<td>5.56</td>
</tr>
<tr>
<td>Rail</td>
<td>5.30</td>
<td>5.31</td>
<td>5.35</td>
<td>5.38</td>
</tr>
<tr>
<td>Cycle</td>
<td>5.38</td>
<td>5.35</td>
<td>5.28</td>
<td>5.21</td>
</tr>
<tr>
<td>Walk</td>
<td>5.51</td>
<td>5.46</td>
<td>5.35</td>
<td>5.25</td>
</tr>
</tbody>
</table>

* Female 30-44 with partner, children and mean income
feeling strained

commute time

satisfaction with leisure time

life satisfaction

satisfaction with job

All modes 0.01403**
Drive 0.01808**
Bus -0.00196
Rail 0.05560**
Cycle 0.02540
Walk -0.02825

All modes 0.01627**
Drive 0.03302***
Bus 0.04065
Rail -0.05068*
Cycle 0.08663**
Walk 0.01169

All modes -0.05719***
Drive -0.04618***
Bus -0.06980**
Rail -0.07096**
Cycle -0.09348**
Walk -0.01894

All modes -0.12819***
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Bus -0.15027***
Rail -0.11003***
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<tr>
<th>Mode</th>
<th>Percentage using mode</th>
<th>Mean one-way commute time (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full sample</td>
<td>Males</td>
</tr>
<tr>
<td>Drive</td>
<td>58</td>
<td>60</td>
</tr>
<tr>
<td>Lift from household member</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Lift from someone else</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Taxi</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bus/coach</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Train</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Metro</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cycle</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Walk</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Work from home</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>


n=21,566
# Measures

## Commuting

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute time</td>
<td>About how much time does it usually take for you to get to work each day, door to door (in minutes)?</td>
</tr>
<tr>
<td>Commute mode</td>
<td>And how do you usually get to your place of work?</td>
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## Subjective wellbeing

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<th>Question</th>
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<td>Life satisfaction</td>
<td>How dissatisfied or satisfied are you with your life overall?</td>
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<tr>
<td>Strain</td>
<td>Have you recently felt constantly under strain?</td>
</tr>
<tr>
<td>Sat with leisure time</td>
<td>How dissatisfied or satisfied are you with the amount of leisure time you have?</td>
</tr>
<tr>
<td>availability</td>
<td></td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>How satisfied or dissatisfied you are with your present job overall?</td>
</tr>
</tbody>
</table>
# Measures

## Commuting

**Commute time**
About how much time does it usually take for you to get to work each day, door to door (in minutes)?

**Commute mode**
And how do you usually get to your place of work?

## Subjective wellbeing

**Life satisfaction**
How dissatisfied or satisfied are you with your life overall?

**Strain**
Have you recently felt constantly under strain?

**Sat with leisure time availability**
How dissatisfied or satisfied are you with the amount of leisure time you have?

**Job satisfaction**
How satisfied or dissatisfied are you with your present job overall?
Model development

- Control for confounding factors (age, gender, education...), but not compensators for commuting (income, high status job)
  - Is the relationship still negative?
  - If yes, this implies dis-benefits of commute journey outweigh compensators

- Then control for compensators (income, high status job)
  - This should increase the negative component of commute time relationship
  - Since underlying positive component teased out
Life satisfaction: Trade offs

Very satisfied

Commuting benefits
- Income
- Fulfilling job
- Improved housing

Commuting dis-benefits
- Time commitment
- Stress

Very dissatisfied