

#### Demography, Time and Space

Martin Bell The University of Queensland

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Professor WD (Mick) Borrie



Definition: The scientific study of population, with a central focus on the size, distribution and composition of population, and the processes of population change.

### Essence of a discipline:

- Substantive focus
- Theoretical constructs
- Analytical methods
- Data sources
- Core problems





# fissiparous

/fɪˈsɪp(ə)rəs/

adjective

inclined to cause or undergo division into separate parts or groups. "the fissiparous tendencies innate in tribalism"

BIOLOGY

(of an organism) reproducing by fission. "small fissiparous worms"

https://www.google.com.au/#q=fissiparous

#### End of the Demographic Transition?



### Table 1:The most important population<sup>a</sup> issues facing the world in the next<br/>20 years

	According to respondents in:					
Issue	Asia/	Africa	South	Europe	North	Total
	Oceania		America		America	
Population aging	36	12	36	31	29	30
Large-scale migration flows	13	14	20	12	16	14
HIV/AIDS	9	32	4	13	10	13
Above-replacement fertility	8	8	9	16	17	12
Urbanization	16	15	16	6	8	12
Infant mortality	9	13	7	12	10	10
Women's reproductive rights	8	5	4	6	9	7
Population decline	3	2	4	2	2	2
Total	100	100	100	100	100	100
N =	199	104	70	188	157	718

(a) Respondents were asked to rank at most three issues. A number of respondents filled in more than 3 population issues and to make a fair comparison we only include the respondents who ranked at most 3 issues and subsequently selected what they considered the most important issue.

Source: NIDI (2009)

Source: van Dalen and Henkens 2012 DOI: 10.4054/DemRes.2012.26.16



## Demography and Time

#### **Demographic Transition Theory**





## "...the central preoccupation of modern demography." Caldwell 1996



Lexis Diagrams



### Age at Migration & Life Course Events



THE UNIVERSITY

**OF OUEENSLAND** 

AUSTRALIA

Source: Bernard, A., Bell, M. and Charles-Edwards, E. [2014]: Life-course transitions and the age profile of internal migration, *Population and Development Review*, 40(2): 213-239



## Demography and Space



http://uuushh.files.wordpress.com/2011/04/on-the-mode-of-communication-of-cholera\_john-snow\_1855.jpg http://www.darpa.mil/uploadedImages/Content/NewsEvents/Releases/2014/London1854CholeraMapAlteredImage.jpg

http://upload.wikimedia.org/wikipedia/c ommons/c/cb/John\_Snow\_memorial\_a nd\_pub.jpg

#### The European Fertility Project





in source, van de wane (1974).



### **Ecological Fallacy:**

 Making inferences about processes at the level of individuals from analysis of data about the groups to which they belong

### **MAUP – Modifiable Areal Unit Problem:**

 Aggregated values vary according to (a) the number of units into which a region is divided (scale effect) and (b) the way the boundaries are drawn (pattern effect)



- 1. Spatial differentiation
  - GWR, Spatial clustering, Moran's 'I'
- 2. Modelling spatial diffusion
  - Event history, Multi-level regression
- 3. Location/allocation modelling
  - Thiessen polygons, SIMs
- 4. Areal estimation
  - Remote sensing, areal interpolation

### **Estimating Population**







#### Population Distribution; Cyprus Source: Landscan

http://web.ornl.gov/sci/landscan/images/cyprus2011.png



#### Population Density India Source: CIESEN/GRUMP http://sedac.ciesin.columbia.edu/maps/gallery

#### Gridded Population Data 100m<sup>2</sup>





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#### Example of aggregation: Germany





#### The MAUP and the MEI





### **Comparing Migration Effectiveness**





Source: The IMAGE Project: see http://www.gpem.uq.edu.au/image



### • Space-time convergence

#### **Global Migration Intensities**





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Source: The IMAGE Project: See Bell, M, Charles-Edwards, E, Ueffing, P., Stillwell, J., Kupiszewski, M. and Kupiszewska, D. [forthcoming]: Internal migration and development: comparing migration intensities around the world, <u>http://www.gpem.uq.edu.au/image</u>

#### Mobility in Space and Time







## Coupling Space and Time – Mobility and Migration

#### Tracking Mobility in West Africa





#### Mobile Phone Flowmaps

Source: http://www.worldpop.org.uk/ebola/

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#### Tracking Tourists in Noosa





See Charles-Edwards, E., Bell, M. & Corcoran, J. [2014]: Integrating undergraduate fieldwork into the study of human mobility, *Australian Geographer*, 45(4): 505-519 DOI:10.1080/00049182.2014.953734

#### **Tracking the St Lucia Campus Population**





See: Charles-Edwards, E. and Bell, M. [2013]: 'Estimating the service population of a large metropolitan university campus', *Applied Spatial Analysis and Policy, 6(3): 209-228* DOI 10.1007/s12061-012-9079-y

#### **Space-Timelines : Daily Activity Patterns**







Figure 6.6. (a) Activity programmes of the individuals in a Swedish family over a single day. (After Dagens Nyheter, 1976)

Father:	0900	leaves home
	0930	bank
	1000	post office
	1015	home
	1210	lunch at university
	1300	home

- Mother: 0750 leaves home
  - 0820 drops off child at school 0830 work
  - 1100 shopping
  - 1130 returns from shops
  - 1700 leaves work
  - 1720 picks up child 1800 home

Child: 0820 scl 1720 lea

0820 school 1720 leaves school 1800 home

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Source: Parkes and Thrift (1980) : Times, Spaces, and Places: A Chronogeographic Perspective, Wiley, New York

#### **Capturing Life-Spaces**





Source: Biographies et entourage survey

Lelievre, E. and Robette, N (2010) A Life Space Perspective to Approach Individual Demographic Processes, Canadian Studies in Population, Vol. 37.1-2: 207-244



Age

Figure 11 Residential moves and family association of a freeholder's daughter.

Source: Hagerstrand Figure 11 in Carlstein, Parkes and Thrift (1978) : Timing Space and Spacing Time



### Conclusions