Dimensions and boundaries: Comparative analysis of occupational structures using social network and social interaction distance analysis

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Social interaction data: census records on within-household links				
	Number of m-f couples with occs	Occupational unit		
United States, 2000	2191104	US Census 2000 occupations (475 units)		
Romania, 2002	221950	ISCO-88 3-digit (116 units)	Some divergences from ISCO scheme	
Philippines, 2000	262855	ISCO-88 3-digit (130 units)	Ditto	
Venezuela, 2001	108273	ISCO-88 3-digit (115 units)	Ditto	
Determined from IDUNAC Internetic and survey increases				

Data accessed from IPUMS-International, <u>www.ipums.org</u>

- Data on educational level (4 levels for US, Ro, Ph; 3 for Ve)
- Various derived metadata on occs including microclass translation codes and label files (see <u>www.geode.stir.ac.uk</u>)



Source: IPUMS-I, N=778k with occ data Data is coded here to ISCO88 3-digit minor groups

# 1) Social interaction distance analysis

- Using CAMSIS approaches, <u>www.camsis.stir.ac.uk</u>
- First dimension of SID scales is usually 'social stratification'
  - We'd interpret it as the contour of social reproduction
  - Gradational, but 'lumpy' for operational reasons (occ.s)
  - 'Specificity' (many scales!)
- Dimensions:
  - 1 main one
  - numerous subsidiary patterns
- Boundaries:
  - *None(?)*

### *Dimensions*=1; *Boundaries*= none; or maybe 1 in Ro?



All microdata from IPUMS-I. CAMSIS scales at www.camsis.stir.ac.uk. Histograms show distribution of male scale for all adults in work. Scatterplots show unweighted male-female scores unweighted, ISCO88 3-digit or census SOC for USA

1101. Jurists 1103. Professors and instructors 1105. Statistical and social scientists 1107. Accountants 1109. Engineers 1202. Managers 1202. Managers 1202. Managers 1204. Building managers and proprietors 1302. Aircraft pilots and navigators 1304. Elementary and secondary school teachers 1306. Creative artists 1308. Professional, technical, and related workers, n.e.c. 1310. Workers in religion 1312. Health semiprofessionals 1314. Nursery school teachers and aides 3102. Other agents 3104. Cashiers 3203. Office and clerical workers 4101. Craftsmen and kindred workers, n.e.c. 4103. Electronics service and repair workers 4105. Locomotive operators 4107. Tailors and related workers 4109. Blacksmiths and machinists 4113. Cabinetmakers 4115. Welders and related morkers 4117. Butchers Bricklayers, carpenters & related 4201. Truck drivers 4203. Miners and related workers	<ul> <li>1102. Health professionals</li> <li>1104. Natural scientists</li> <li>1106. Architects</li> <li>1108. Journalists, authors, and related writers</li> <li>1201. Officials, government and non-profit organizations</li> <li>1203. Commercial Managers</li> <li>1301. Systems analysts and programmers</li> <li>1303. Personnel and labor relations workers</li> <li>1305. Librarians</li> <li>1307. Ship officers</li> <li>1309. Social and welfare workers</li> <li>1311. Nonmedical technicians</li> <li>1313. Hospital attendants</li> <li>3101. Real estate agents</li> <li>3103. Insurance agents</li> <li>3103. Insurance agents</li> <li>3204. Postal and mail distribution clerks</li> <li>4102. Foremen</li> <li>4104. Printers and related workers</li> <li>4106. Electricians</li> <li>4110. Jewelers, opticians, and precious metal workers</li> <li>4111. Bakers</li> <li>41118. Stationary engine operators</li> <li>4202. Chemical processors</li> <li>4205. Food processors</li> <li>4207. Sawvers and lumber inspectors</li> </ul>	
4208. Metal processors 4210. Forestry workers 4302. Transport conductors	4209. Operatives and kindred workers n.e.c. 4301. Protective service workers	USA
4304. Food service workers 4306. Service workers, n.e.c.	4303. Guards and watchmen 4305. Mass transportation operators	Romania
4308. Newsboys and deliverymen 4310. Housekeeping workers	4307. Hairdressers	Phillipines
4312. Gardeners	4311. Janitors and clemers	
9990. Members of armed forces	5202. Farm labours	<ul> <li>venezuela</li> </ul>

Male CAMSIS scale scores across four countries using 'microclass' units.



Data from IPUMS. Points show scale scores for units defined by cross-classifying occupation and education.

For Venezuela and Phillipines, units are for all occupations with or without 'secondary' level or above.

For Romania units are for all occupations with or without 'university' level.

For USA, only occupations in SOC range 1-196 & 370-593 were disaggregated by university level, with others coded to modal level.

# 2) A social network analysis of occupations

- The same data on {pairs of} connections between occupations could be analysed as network links
  - Without any controls, most occupations will have at least one connection with most others in a large dataset
  - We've used criteria which define whether occupational connections occur more often than would be expected given their national prevalence ('k-core' approach to map them)
  - Some descriptions plus illustrative do files at our website, e.g. <u>http://www.camsis.stir.ac.uk/sonocs/do/pajek.do</u>, which compiles records of pairs of connected nodes & expected versus actual occurrences





Red to violet for low to high CAMSIS (grouped into 7).

Structures similar to CAMSIS scales. Using Kamada-Kawai algorithm and no manual adjustment (expect removing some occs with no ties/relations)



<- Low levels of graduate work (??) higher levels of graduate work ->



#### Microclasses\*univ. educ

Blue = graduates, red = non-graduates. Distinction between graduates / non-graduates in Romania & Philippines, but slightly more interaction in US.





### Internal-external ties between macroclasses



# Summary: Dimensions and boundaries and cross-national comparisons

**SNA** 

#### SID

Dimensions	<b>1</b> that matters = Stratification	<b>3</b> = Stratification; education/ institutions; modernisation/ industrialisation
Boundaries	None (?or education)	Many boundaries/channels of linkage (apparent policy relevance)
Cross- national differences	<b>Slight</b> (positive skew of less modernised economies; gender segregation; relative economic differences in selected jobs)	Moderate (changing diffusion patterns by education and professionalisation level of occupations; different boundaries and channels)
Further work	New versions and scales	Systematic statistical descriptions; Models of mechanisms of social inheritance/reproduction

## Conclusions (& SONOCS project 2010-12)

- Analyse occupational stratification over different countries and time-points to understand more about the underlying structure of how social hierarchies are formed/sustained
- SNA and SID here use similar stats but have different emphasis
- ...and a plug for some new resources!...

www.camsis.stir.ac.uk/sonocs/

- Refreshing CAMSIS scales/methods
- Social network analysis methods and maps for occupational data
- Associated metadata on occupations (also at <u>www.geode.stir.ac.uk</u>)