



The Structure and Scale of Hunter-Gatherer Societies

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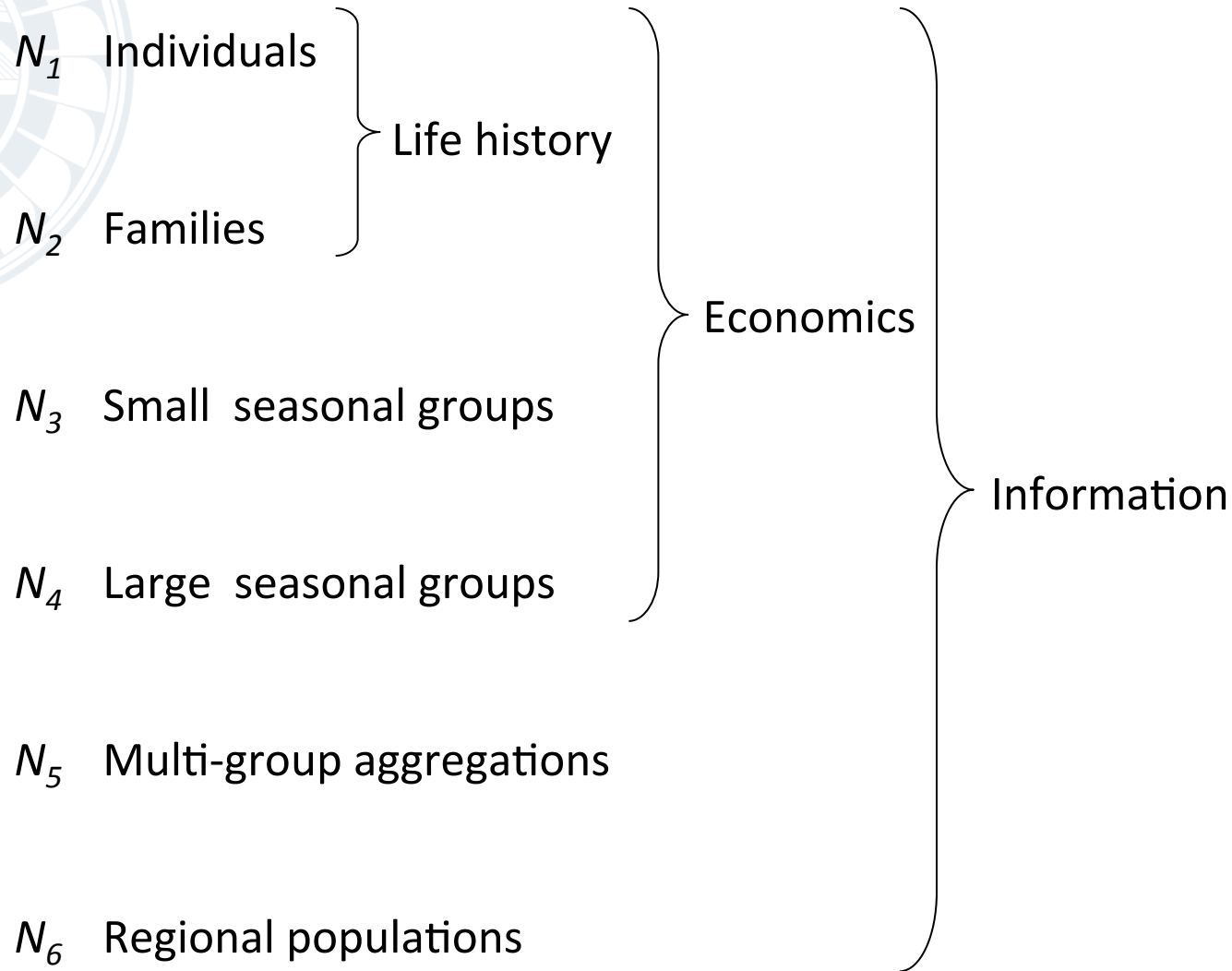


Hunter-gatherer societies

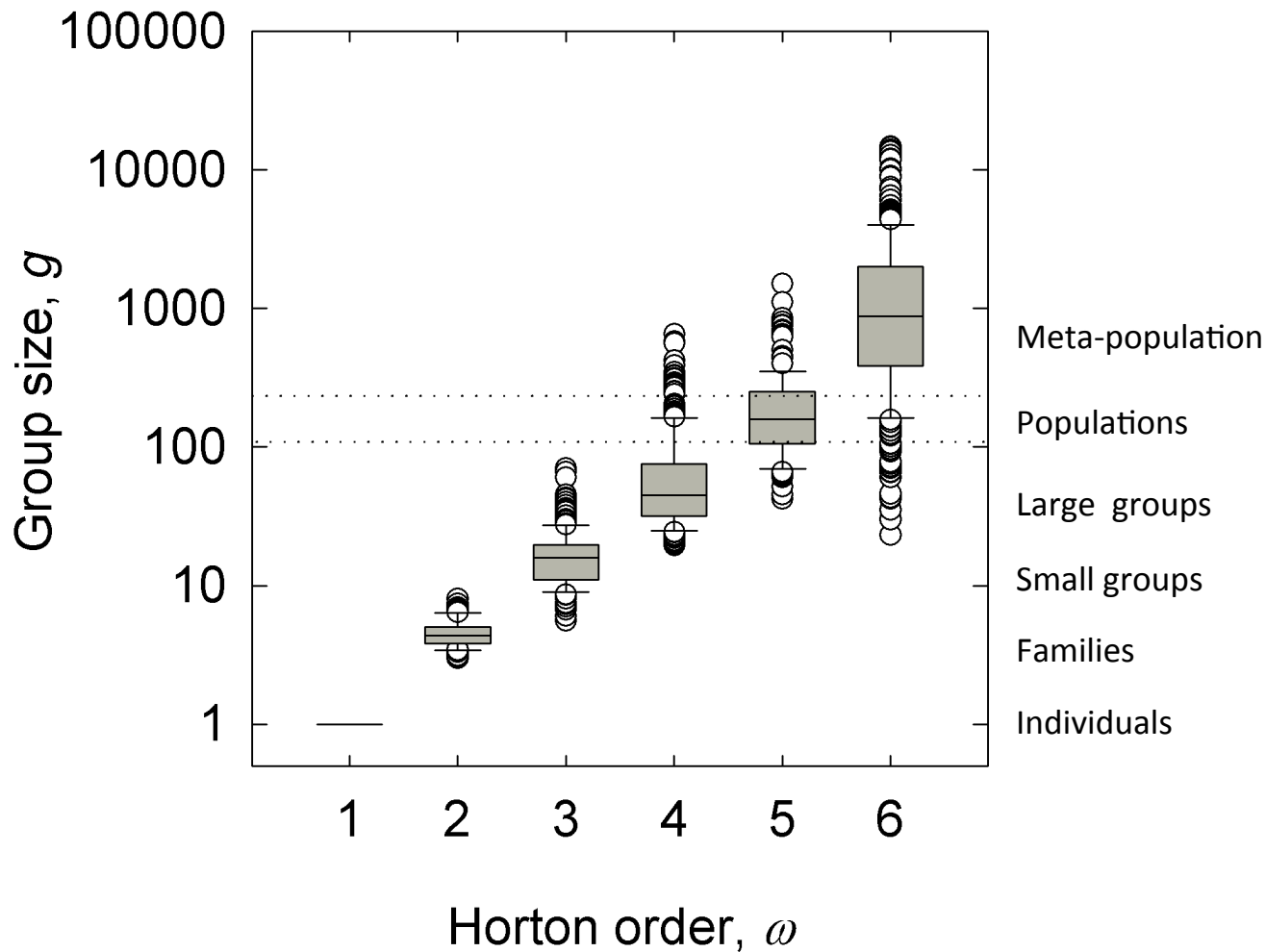
- Harvest all resources from wild plants and animals
- Global
- Highly endangered lifestyle
- Socio-economic framework for human evolution
- Politically egalitarian
- Residentially mobile
- Technologically, culturally, and behaviorally diverse, yet...



Structure of hunter-gatherer societies



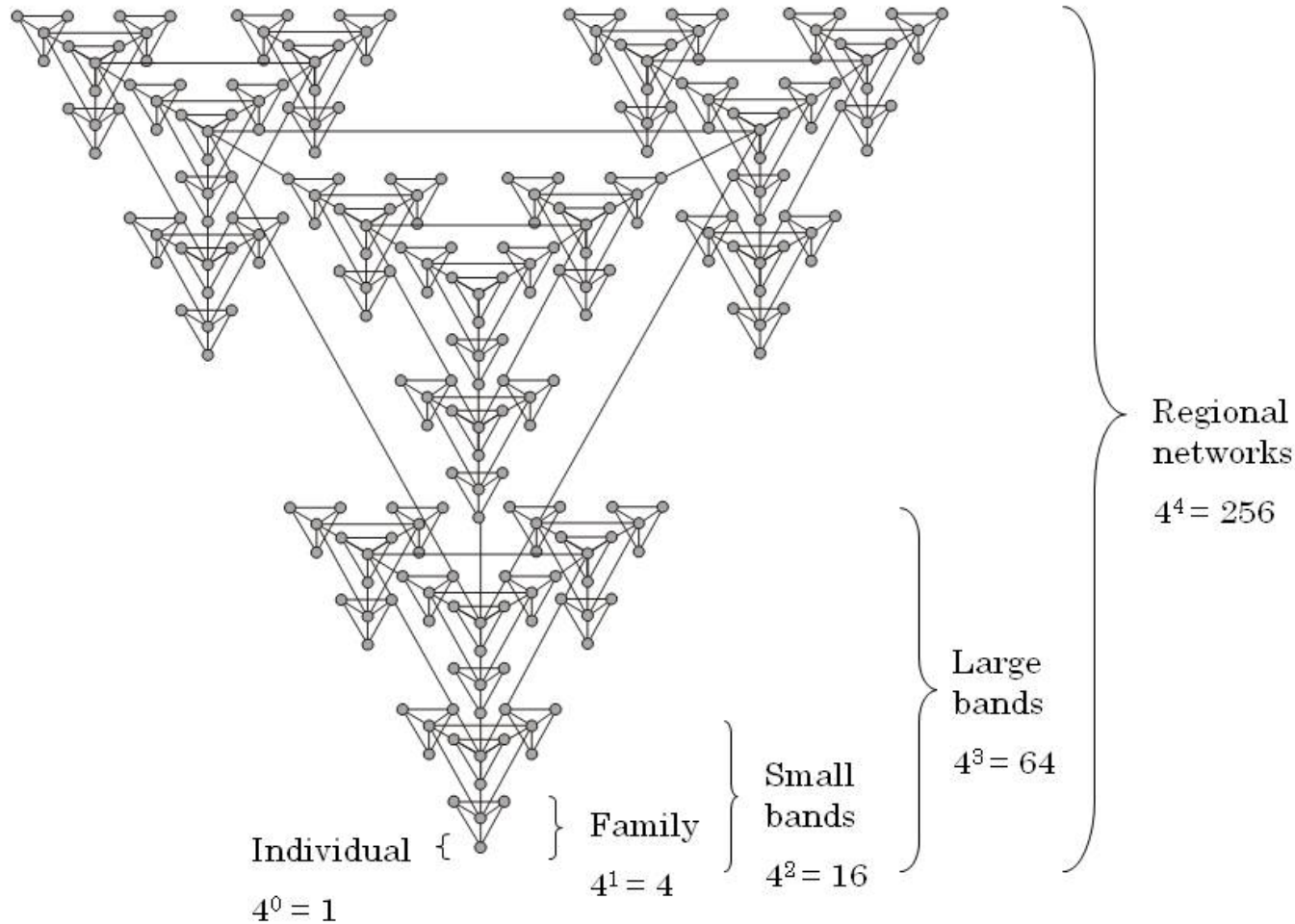
Geometric scaling of sub-group sizes



- Data from Binford (2001): sample = 339 groups worldwide
- Hamilton et al (2007) *Proc B*



Modular, hierarchical structure of social organization



- Hamilton et al (2007) *Proc B*
- Burnside et al (2011) *Biol Rev*

Ecological energetics of space use

Whole organism metabolism

$$B \propto M^{3/4}$$

Home range

$$H = B / R$$

Population level metabolism

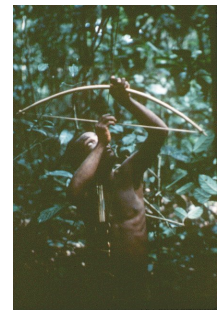
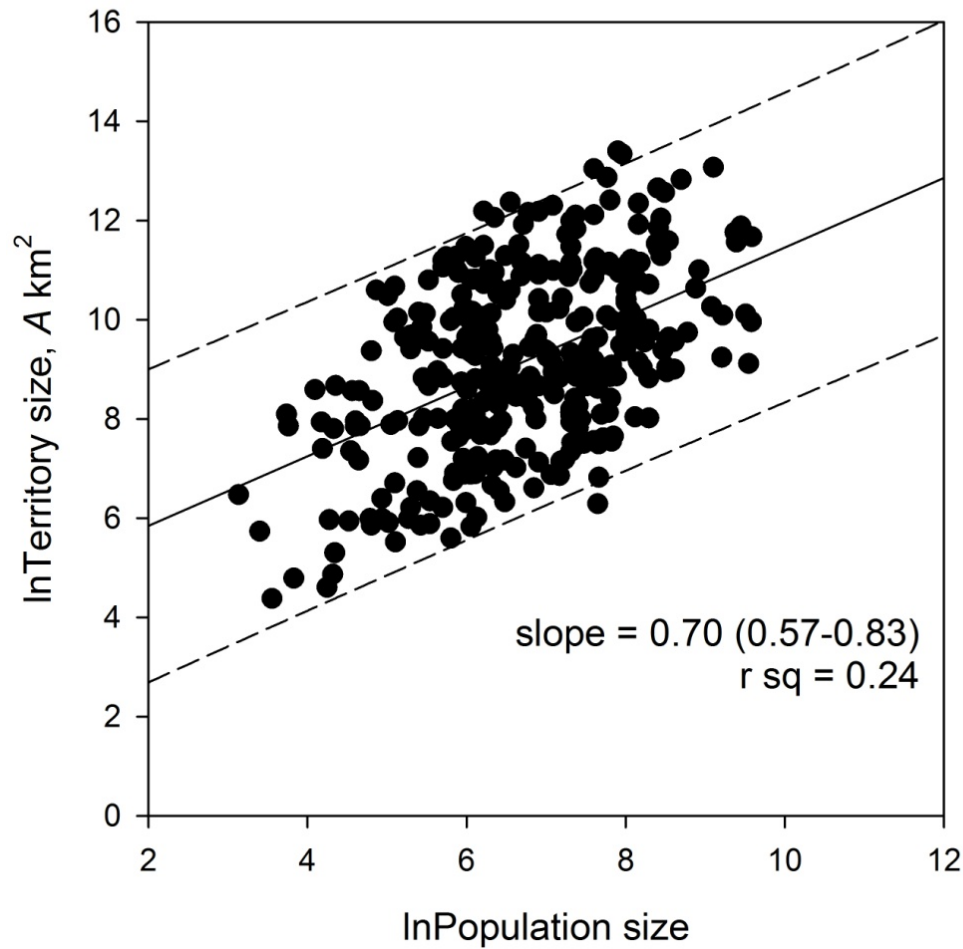
$$NB \propto NM^{3/4}$$

Population space use

$$A \geq NH = N \left(B_0 R^{-1} M^{3/4} \right), \text{ or } A \propto N^1$$

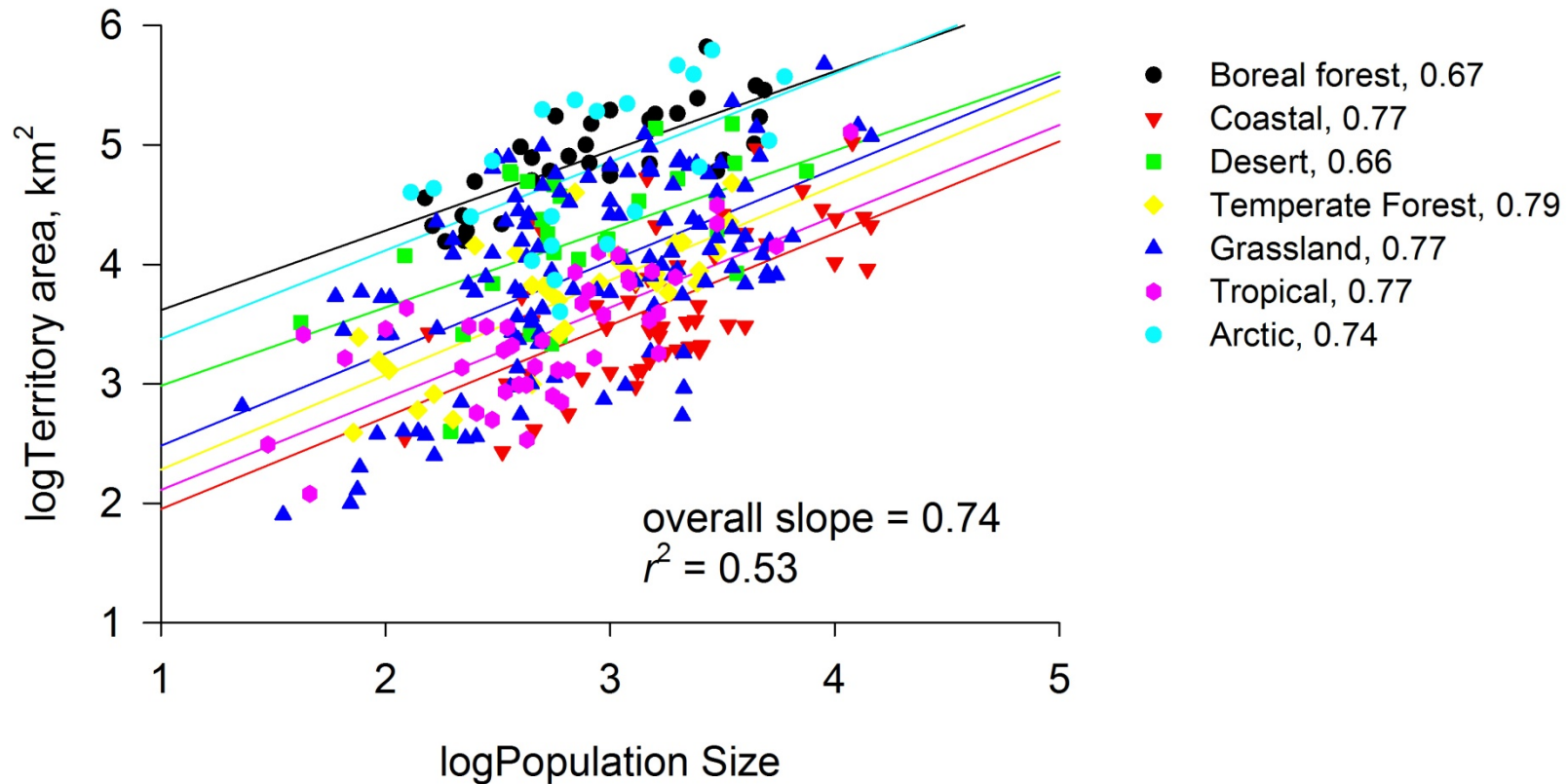


Hunter-gatherer economies of scale



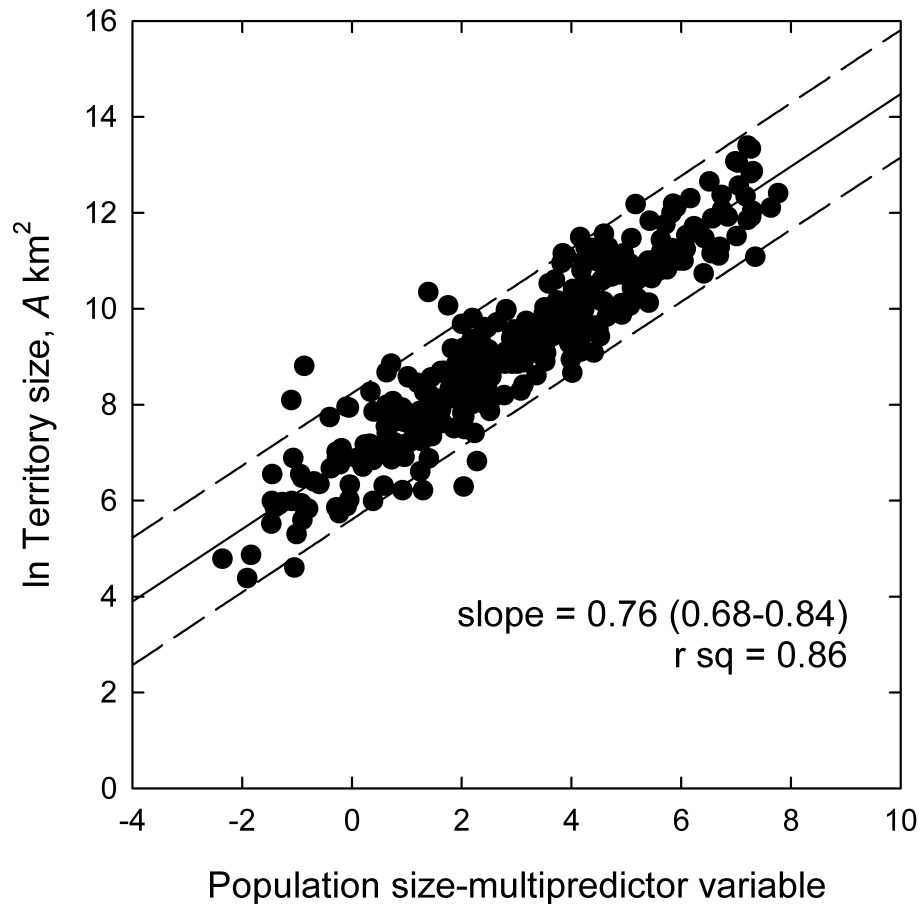
- $N = 339$
- Hamilton et al (2007, 2009) *PNAS*

Hunter-gatherer economies of scale



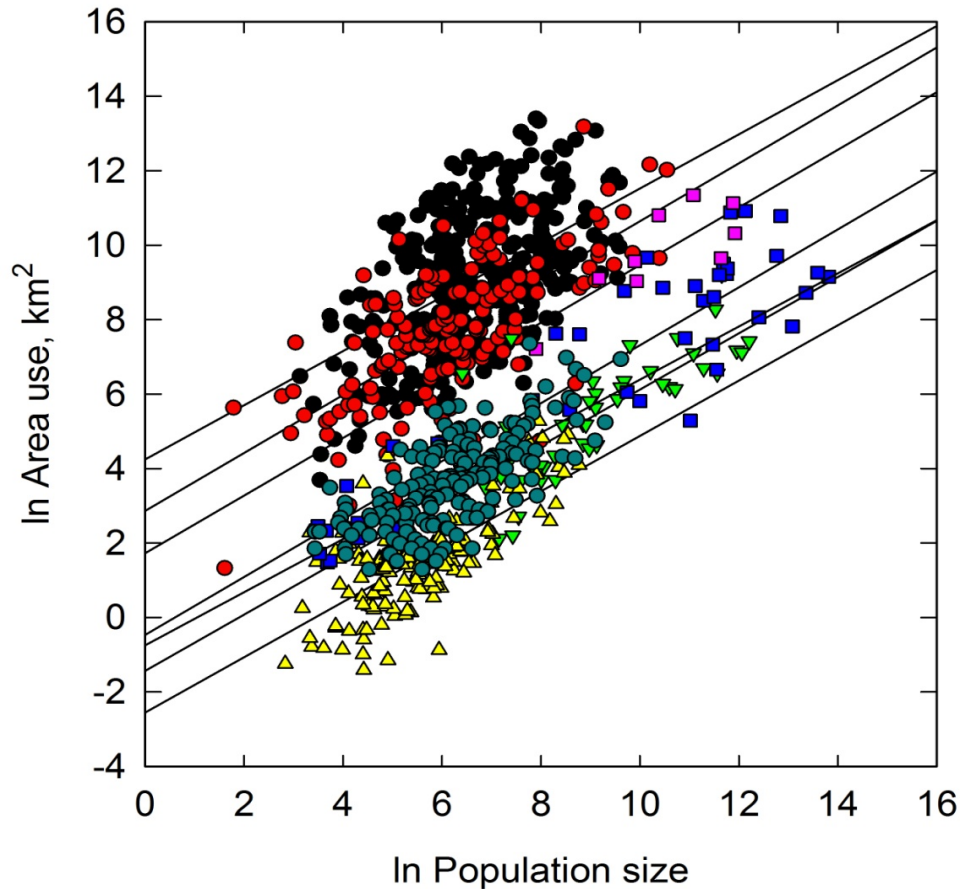
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Hunter-gatherer economies of scale



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Economies of scale in subsistence societies



- Hunter-gatherers, 0.73
- SA horticulture-forager, 0.75
- ▼ Island horticulturists, 0.76
- ▲ Shifting cultivators, 0.74
- Agriculturalists, 0.77
- Pastoralists, 0.78
- PNG horticulturists, 0.71

Sample:

1,030 cultures

8,897,927 individuals

16,959,398 km² (13% of the
world's land surface)

- Hamilton et al (2012) *Wiley-Blackwell*

- Hunter-gatherer societies have a complex (and complicated) social structure
- Hunter-gatherer societies (and subsistence-level societies in general) exhibit economies of scale in ecological energetics
- Economies of scale and complex social systems are fundamental characteristics of human ecology



"I FIND IT SO DIFFICULT TO THINK OF MYSELF
AS A HUNTER GATHERER."



**SANTA FE
INSTITUTE**

Home range scaling in mammals

