

What is diversity?

DIVERSITY

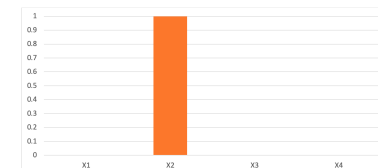
- Diversity is a property of **groups**
- It is a **gradeable** property: groups can be more or less diverse
- Note: *Individuals* are also sometimes misleadingly called 'diverse'
Meaning: their addition to a group would increase its diversity
- It is **relative to a dimension of variation** (aka variable) X such that each group member instantiates one of its possible values $X_1, \dots, X_m$
Example of X : gender, belief, height, age, ethnicity,...
- The variable can be **quantitative** or **qualitative**
- Diversity wrt one dimension (e.g. ethnicity) **needn't entail** diversity wrt another (e.g. problem solving heuristics)!

Defining diversity

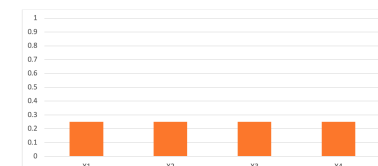
- Unresolved philosophical issue: how to **define** diversity
- This is important in many areas, e.g.:
 - science policy
 - conservation (biodiversity)
 - social policy
- Teachman (1980): uncontroversial constraints on measuring diversity of a group D wrt a **qualitative** variable X ($D_X(G)$)

Defining diversity: Constraints

- The diversity of a group G ($D(G)$) is minimal when everyone is identical wrt X

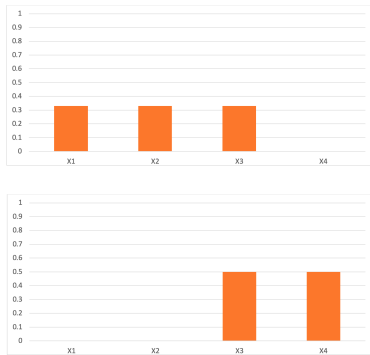


- $D(G)$ is maximal when everyone is different wrt X



Defining diversity: Constraints (ctd)

- If n categories of X are present in G_1 at proportions of $1/n$ each, m categories of X are present in G_2 at proportions of $1/m$ each, and $n > m$, then $D(G_1) > D(G_2)$

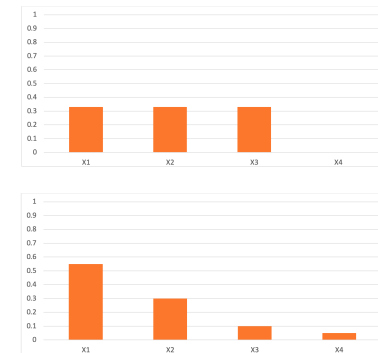


Defining diversity: Measures

- Two popular measures that satisfy Teachman's 3 constraints:
 - **Gini-Simpson Index:** $D = 1 - \sum_{i=1}^m f_i^2$
 - **Shannon Index:** $H = -\sum_{i=1}^m f_i \log f_i$
- For a discussion of these and *many* more other measures see McDonald & Dimmick (2003)

Defining diversity: Constraints (ctd)

- But this still leave many comparisons undecided!

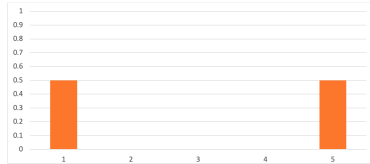


Defining diversity: Similarity

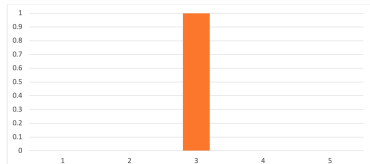
- Issue: some values of a variable might be more or less “similar” to each other
- Examples:
 - Religion: Catholic vs Protestant vs Hindu
 - Office days: Mondays + Tuesdays vs Mondays + Fridays vs Wednesdays + Thursdays
- This seems relevant but the measures proposed earlier ignore it
- How to factor this in isn't obvious (suggestion: expected dissimilarity between 2 random members?)

Defining diversity: Similarity (ctd)

- For **quantitative variables**, similarity can *sometimes* be captured by numerical difference (e.g. 6ft vs 6ft₁ vs 5ft₃)
- This motivates measures like **variance** ($\frac{\sum(x_i - \mu)^2}{n}$)
- Maximised here



- Minimised here



Defining diversity: Ambiguity

- Steel *et al* (2018) claim “diversity” is ambiguous (≥ 3 interpretations)
- We’ve discussed their “egalitarian” interpretation

References

- Anderson, E. 2006. The Epistemology of Democracy, *Episteme*, 3(1-2): 8–22.
- Landemore, H. 2013. *Democratic Reason: Politics, Collective Intelligence, and the Rule of the Many*. Princeton University Press.
- McDonald, D. & J. Dimmick 2003. The Conceptualization and Measurement of Diversity. *Communication Research* 30(1): 60–79.
- Steel, D. *et al* 2018. Multiple diversity concepts and their ethical-epistemic implications. *Euro Jnl Phil Sci* 8:761–780.