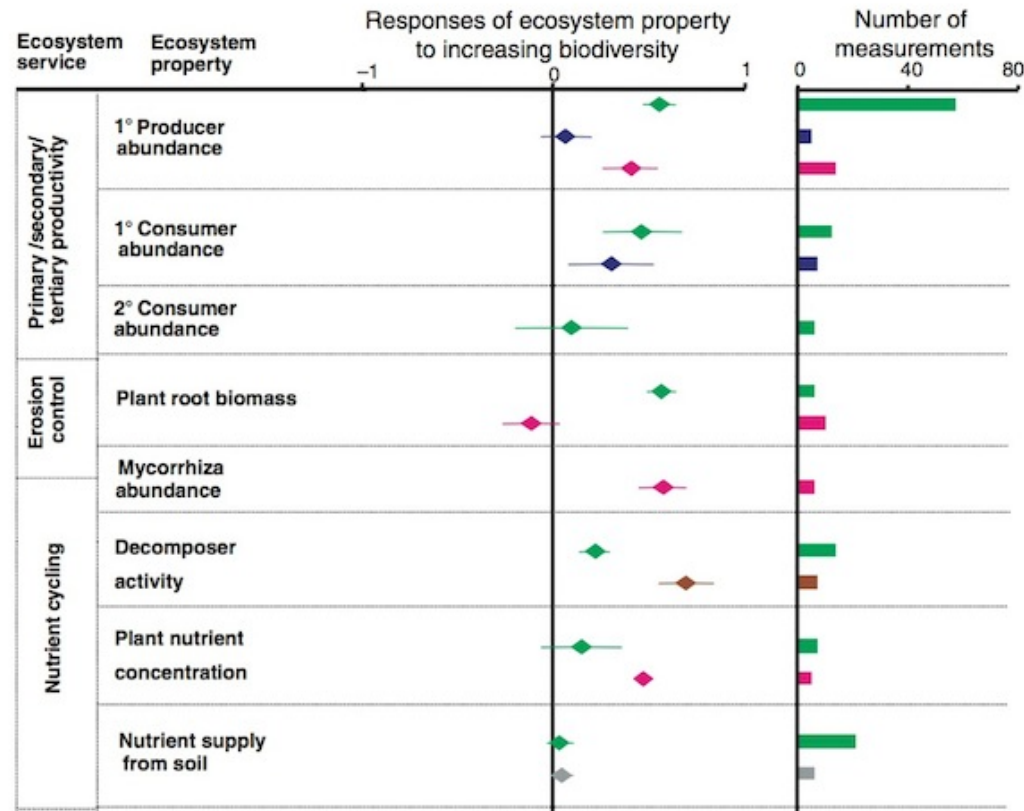


Jarrett Byrnes, Lars Gamfeldt, Forest Isbell, Jonathan Lefcheck, John Griffin,
Andrew Hector, Bradley Cardinale, David Hooper, Laura Dee, J. Emmett Duffy

UMass Boston, University of Gothenburg, University of Minnesota, Virginia Institute of Marine Sciences,
Swansea University, University of Zurich, University of Michigan, Western Washington University, University of
California Santa Barbara, Virginia Institute of Marine Sciences

<http://jebyrnes.github.io/intecol-multifunc>

Meta-analysis Trio: Diversity Affects Function

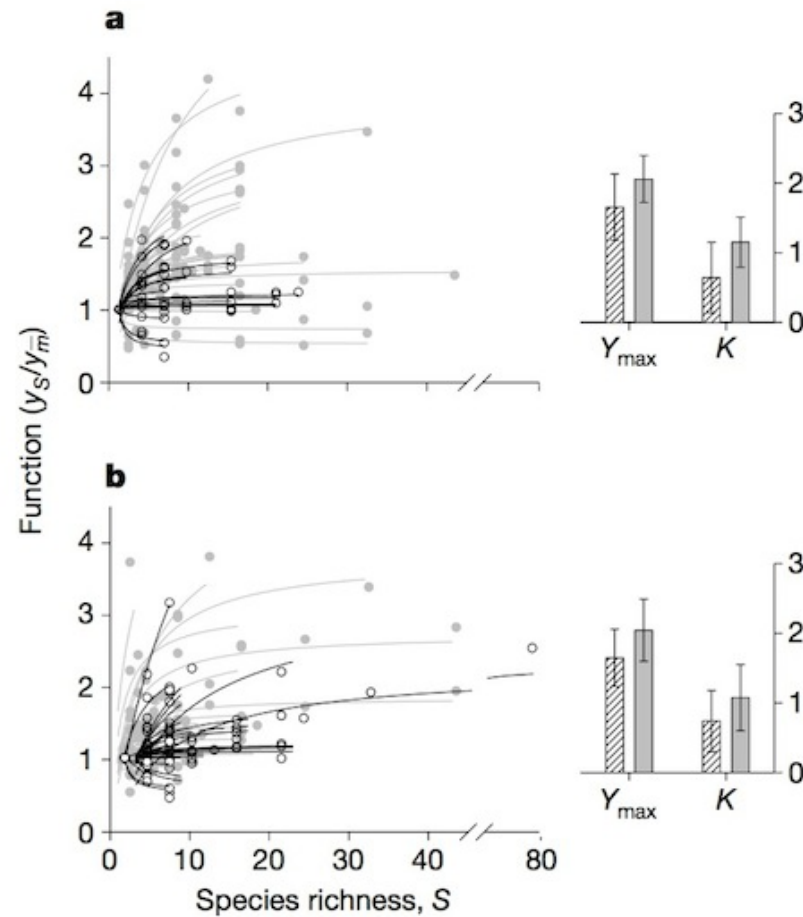


Balvanera et al. 2006 Eco. Let.

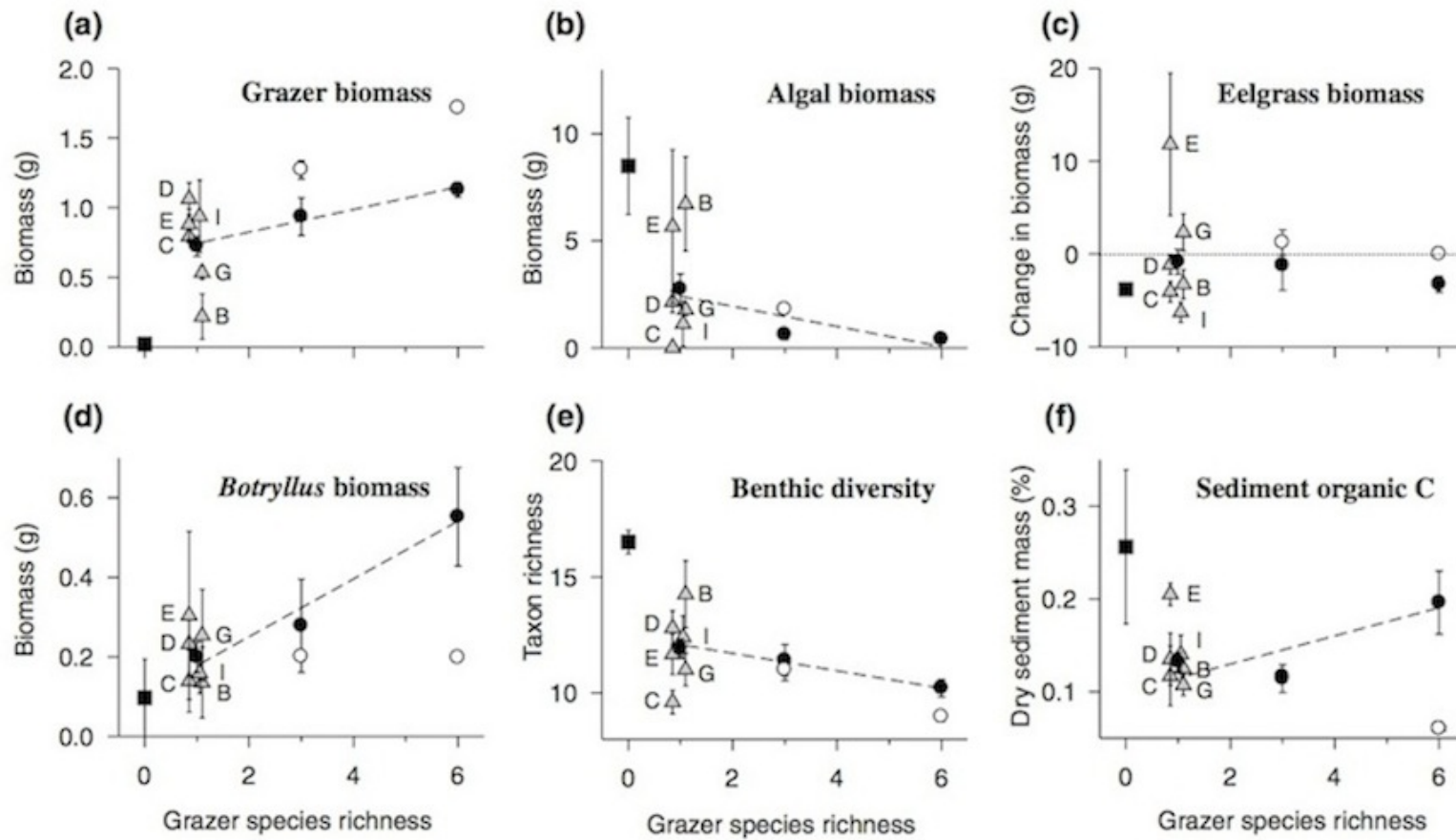
But Are Only Two Species Needed?



Cardinale et al. 2006



Balvanera et al. 2006 Eco. Let.



Duffy et al. 2003
Ecology Letters

Multifunctionality: the simultaneous performance of multiple functions

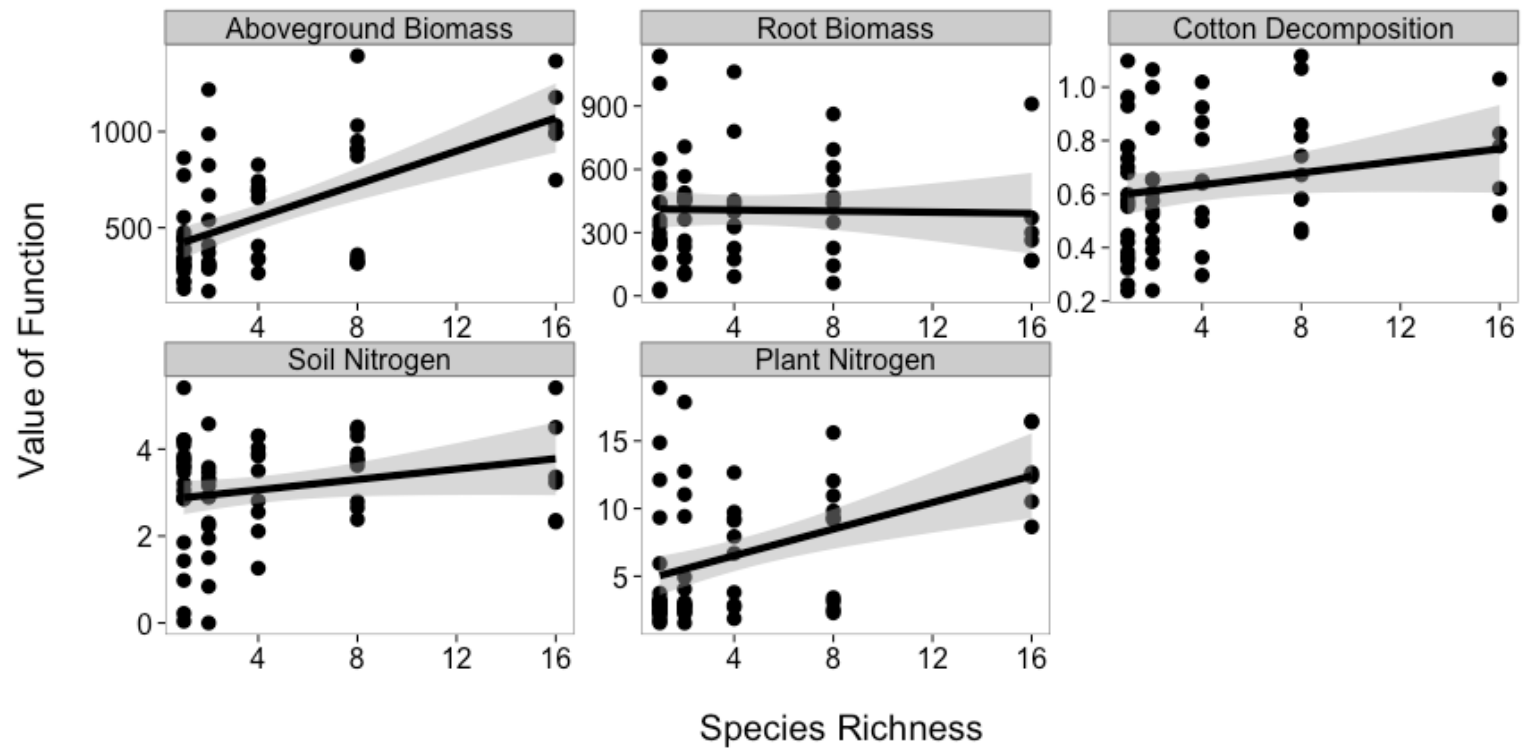
How to Measure Multifunctionality

1. Past Methods of 'Measuring' Multifunctionality
2. At the Threshold of a Solution
3. Future Explorations of BEMF

An Example: Biodepth



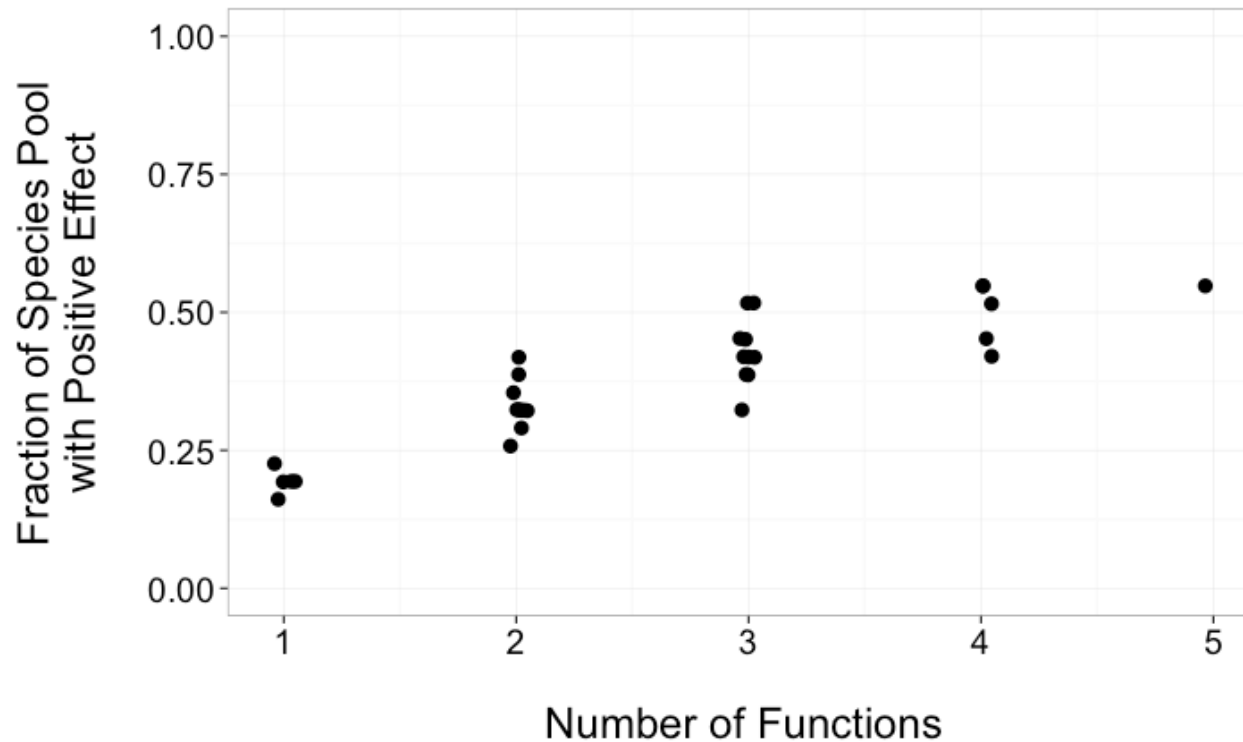
Functions Measured in Germany



Different Ways of Measuring Multifunctionality

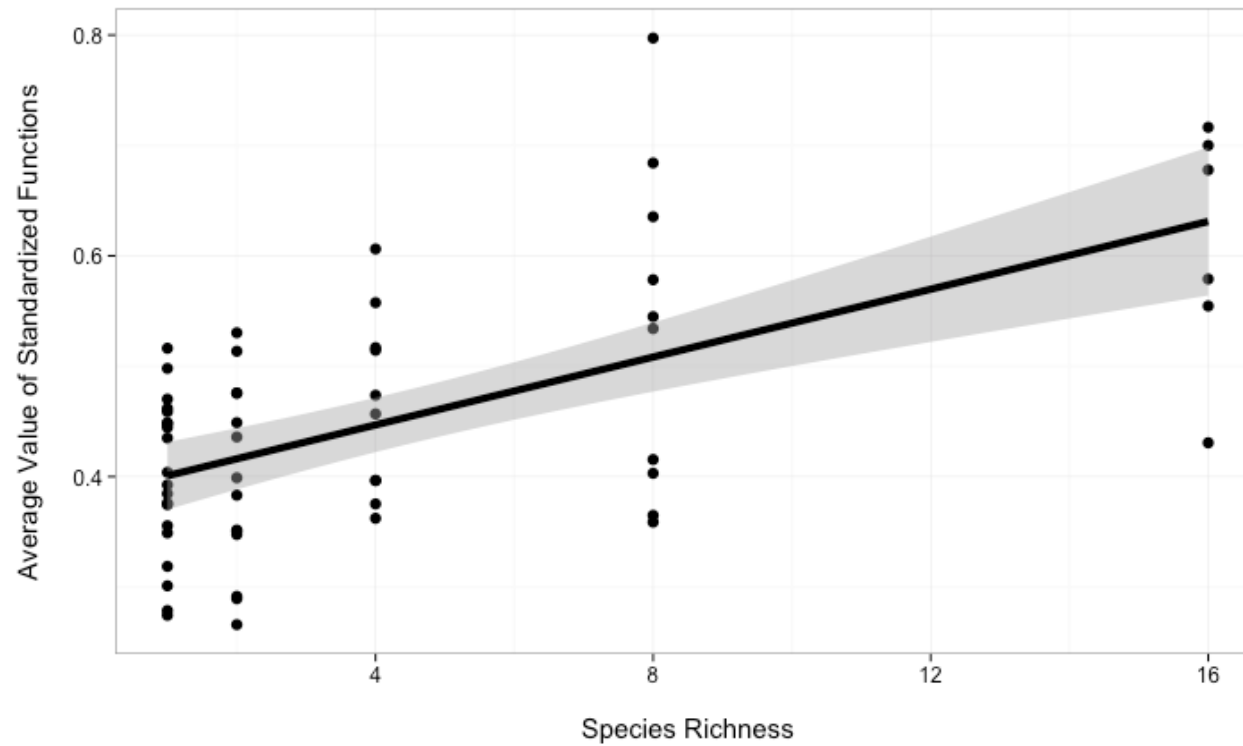
1. Overlap in Species Influencing Function
2. Average Function
3. Number of Functions Performing at a Threshold

Overlap in Species Influencing Function



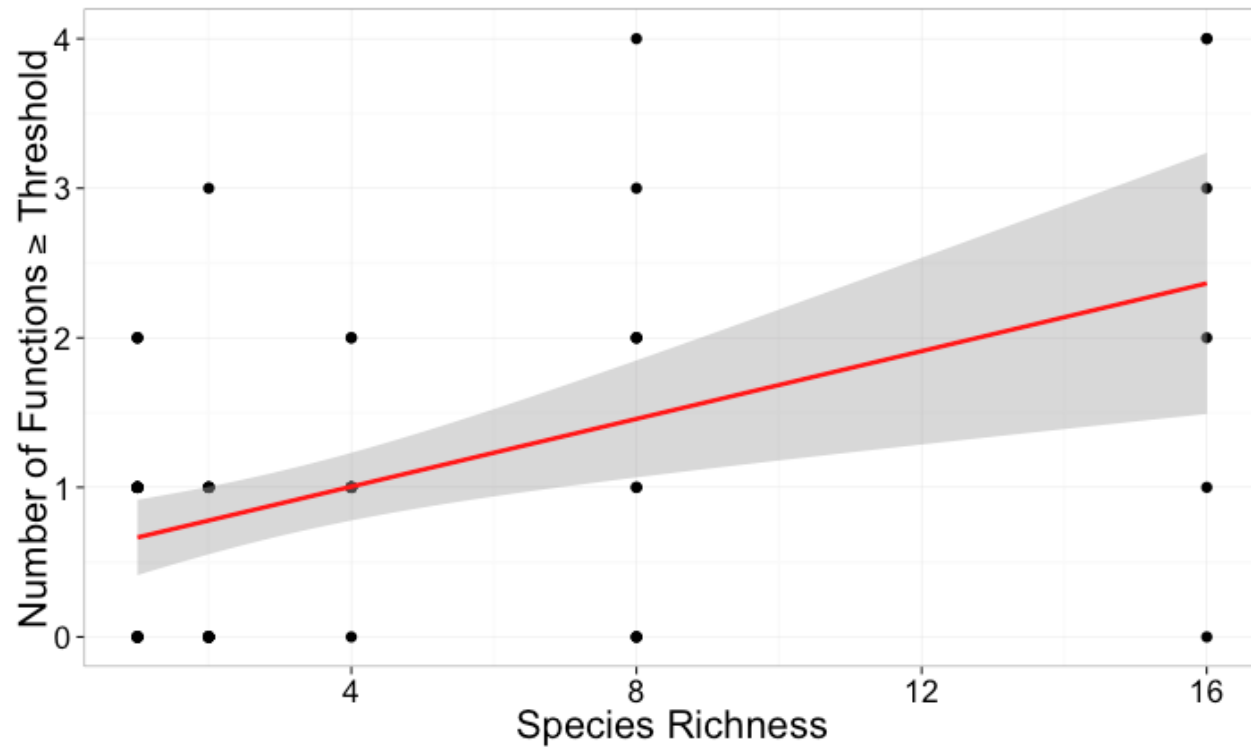
This is not a measure of Multifunctionality

Average of Standardized Function



Many results lead to the same line

Number of Functions Performing at a Threshold

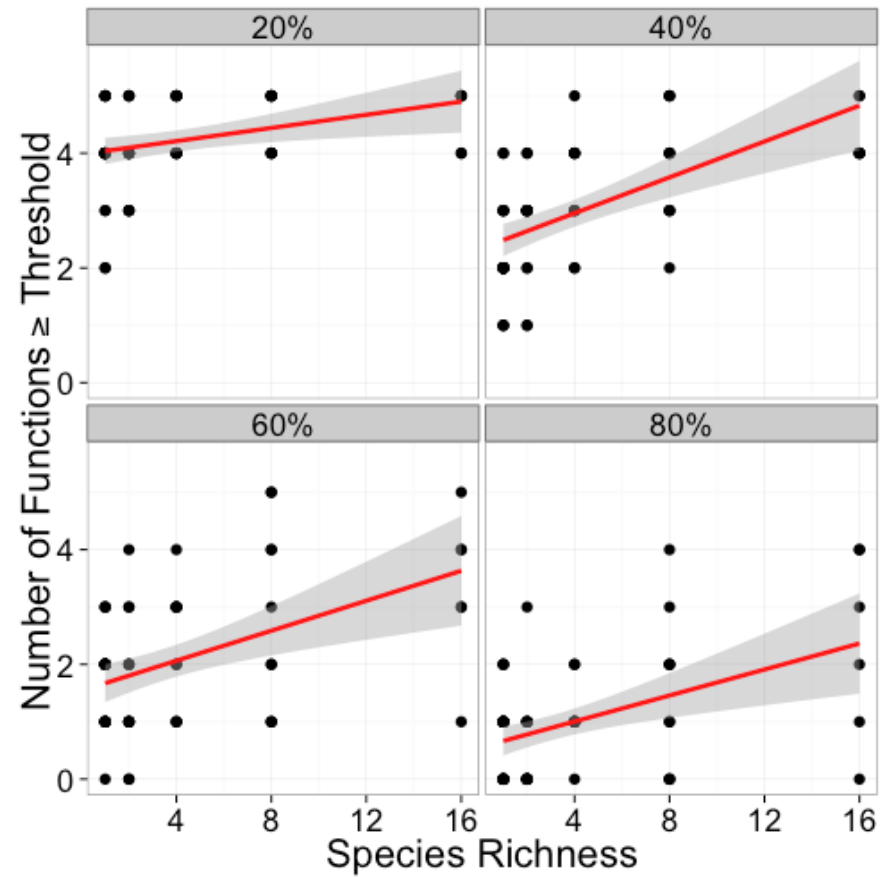


Threshold may be arbitrary

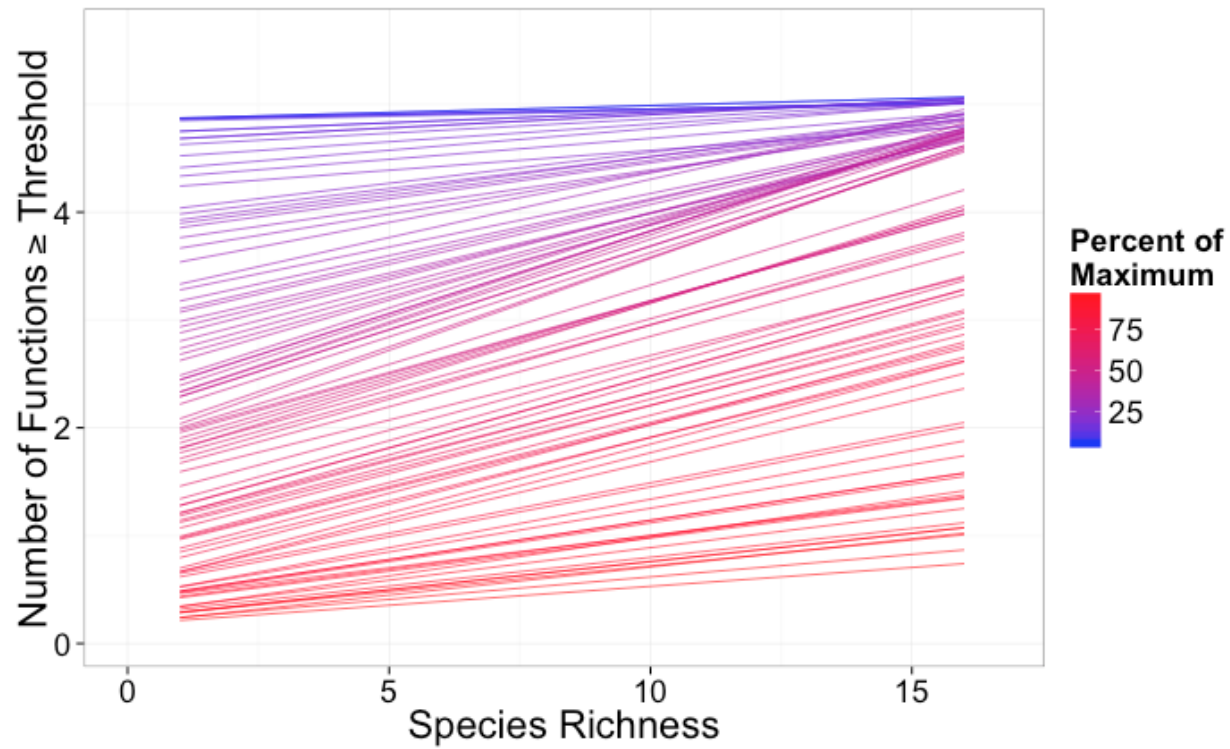
How to Measure Multifunctionality

1. Past Methods of 'Measuring' Multifunctionality
2. At the Threshold of a Solution
3. Future Explorations of BEMF

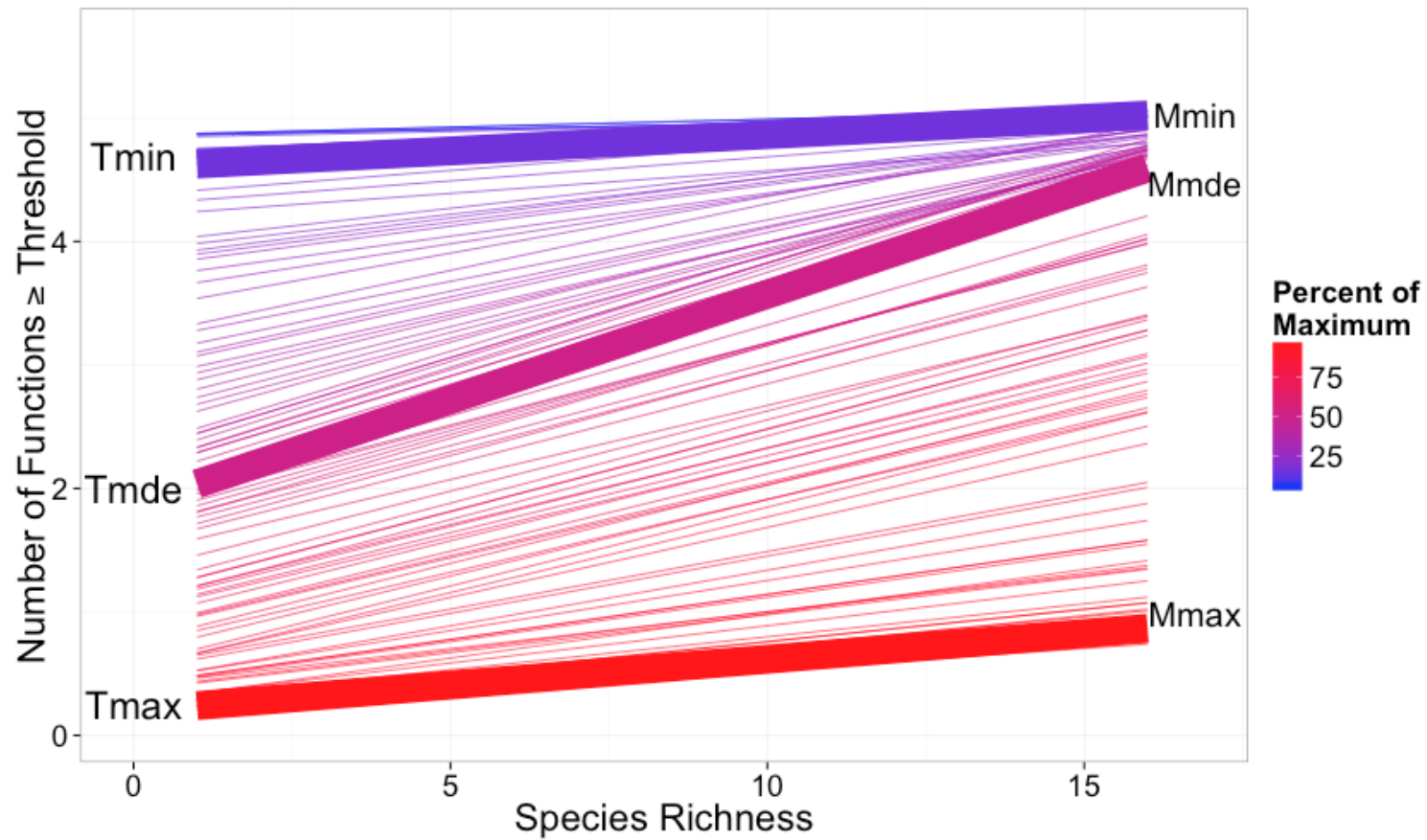
Thresholds Seem Arbitrary



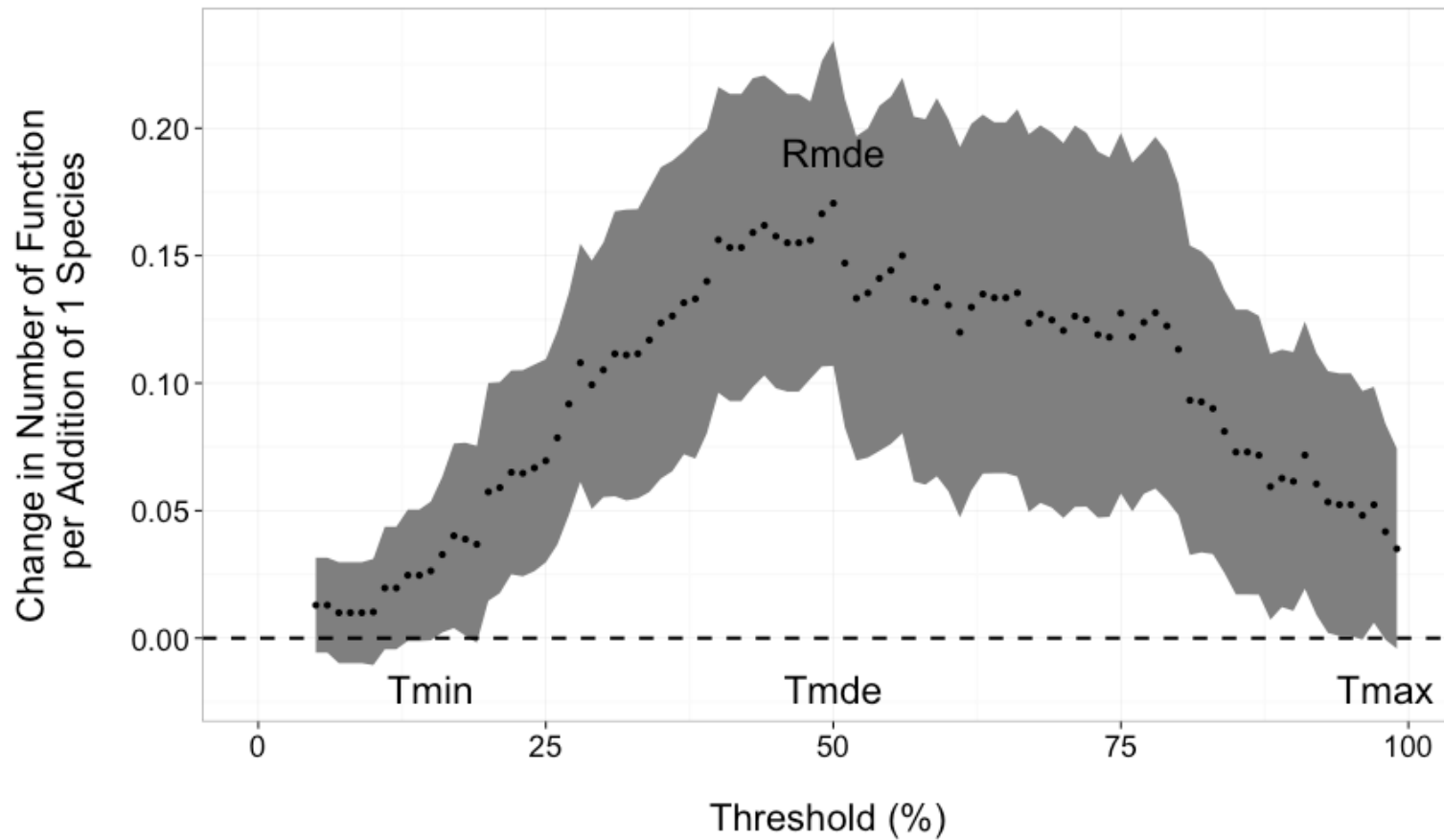
Slope Changes Systematically Across Thresholds



Slope Changes Systematically Across Thresholds



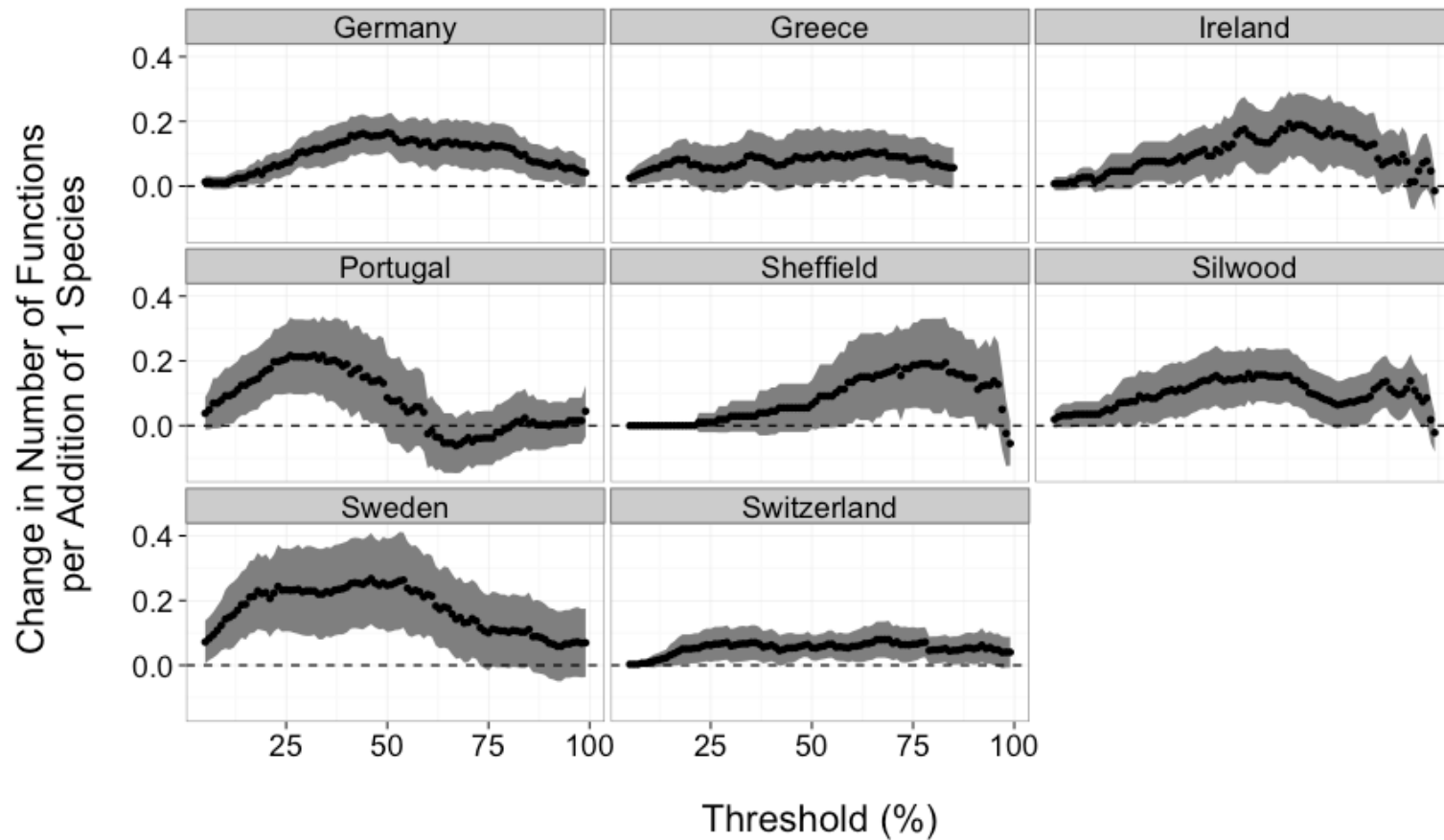
Slope Changes Systematically Across Thresholds



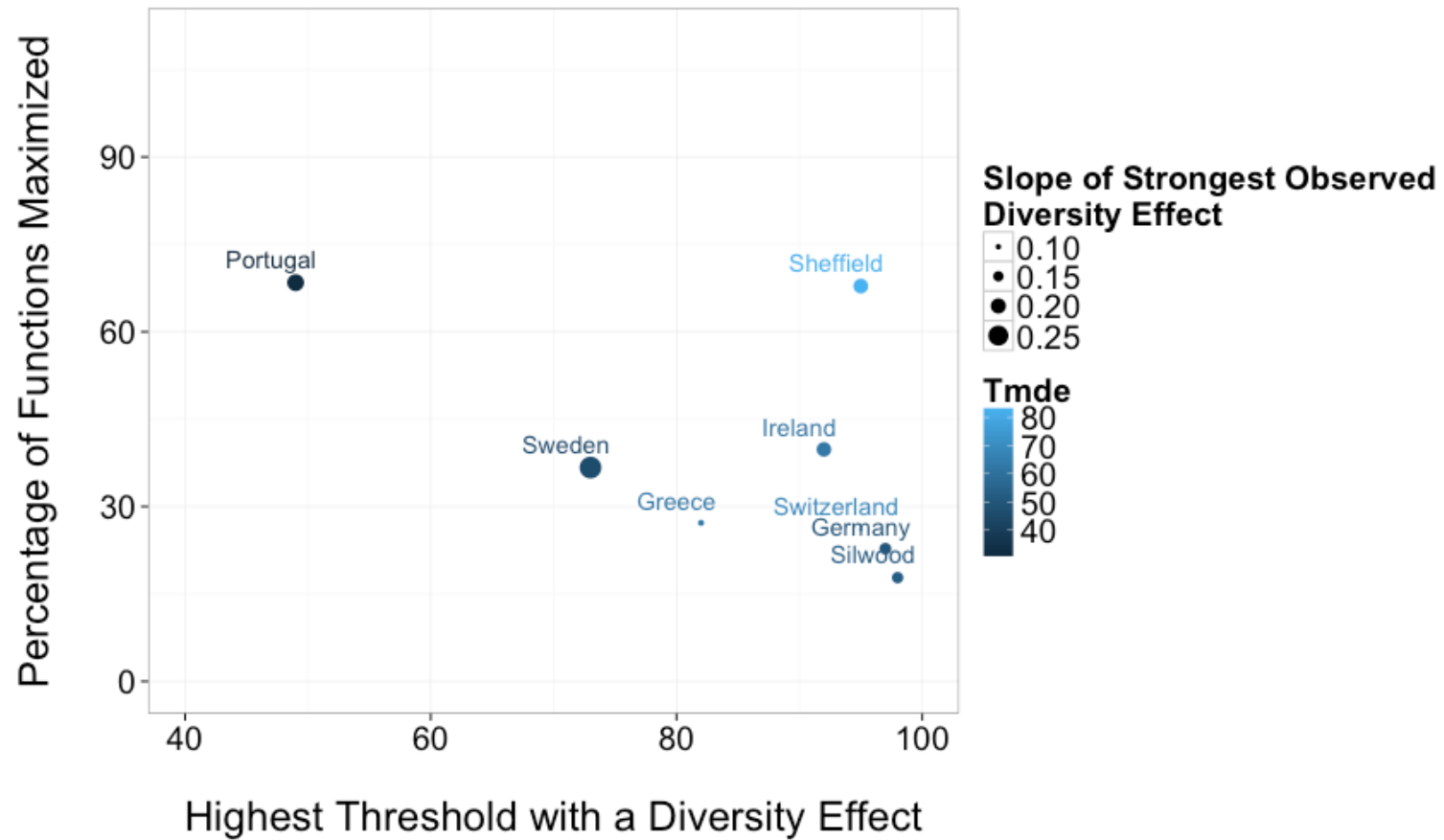
How to Measure Multifunctionality

1. Past Methods of 'Measuring' Multifunctionality
2. At the Threshold of a Solution
3. Future Explorations of BEMF

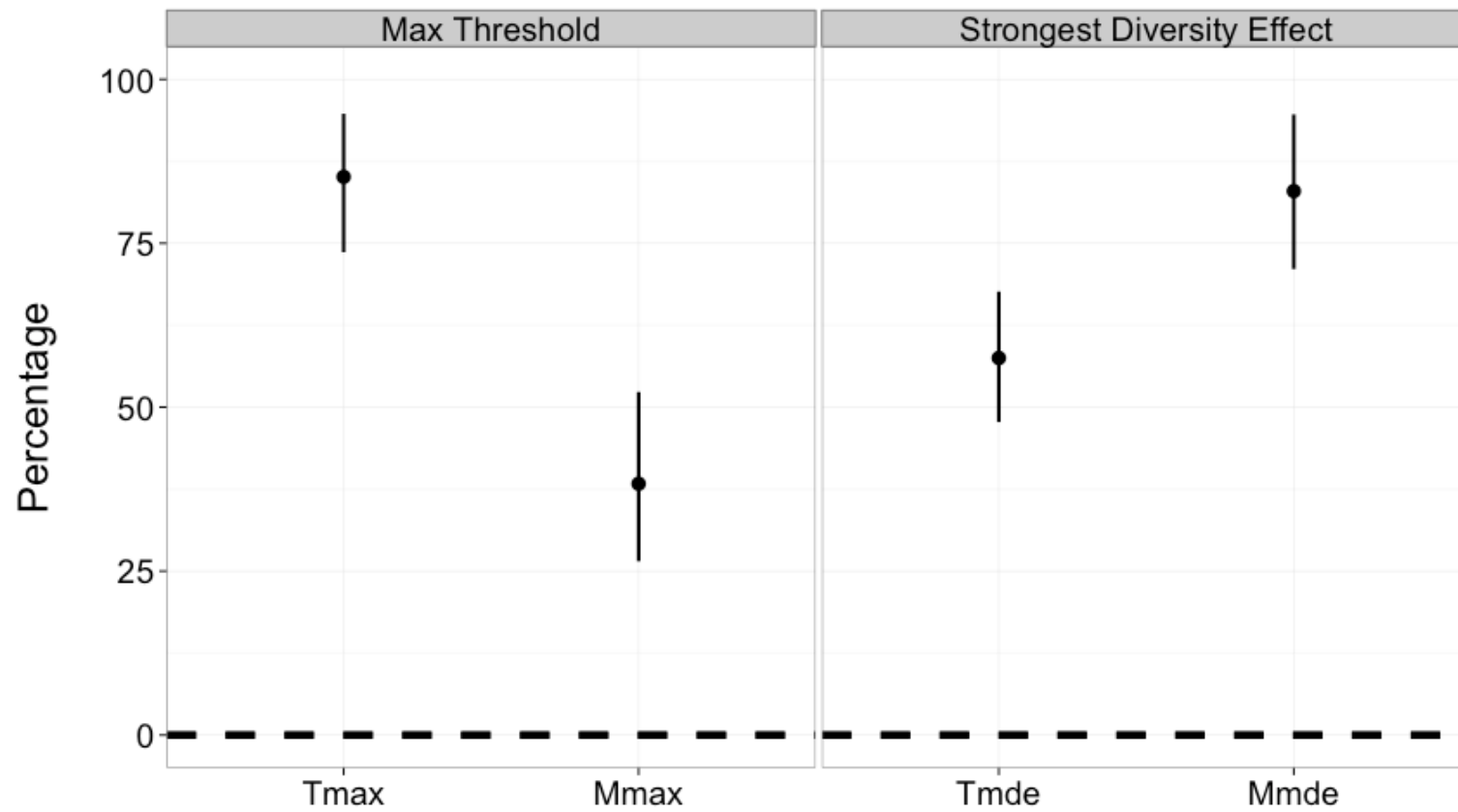
Comparing Systems



Comparing Systems Behaviour



Assessing Generality of Metrics



How do We Measure Multifunctionality?

1. Multifunctionality is a nuanced phenomenon
2. Multiple methods in the literature address different aspects of multifunctionality
3. Examining the relationship between diversity and # of Functions $>$ a threshold at multiple thresholds provides new promising metrics

These methods not limited to biodiversity-ecosystem function research

Thanks to NCEAS & the BEF Working Group



Paper: <http://bit.ly/multifunc>

R Multifunc Library: <https://github.com/jebyrnes/multifunc>

