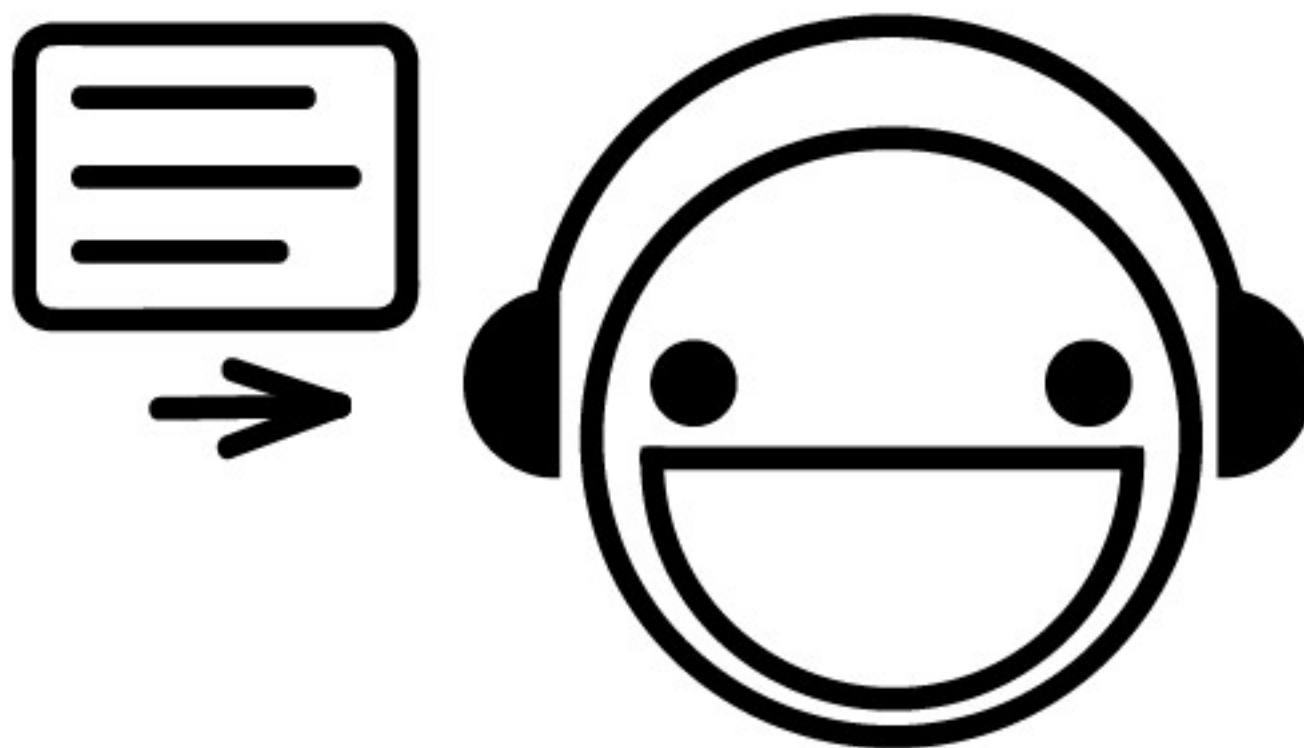


Quantitative Synthesis Interpretation



@cjlortie

Interpretation of meta-analyses is an art and a science

Clear explanations of how evidence was leveraged
will reduce reuse and error propagation from syntheses

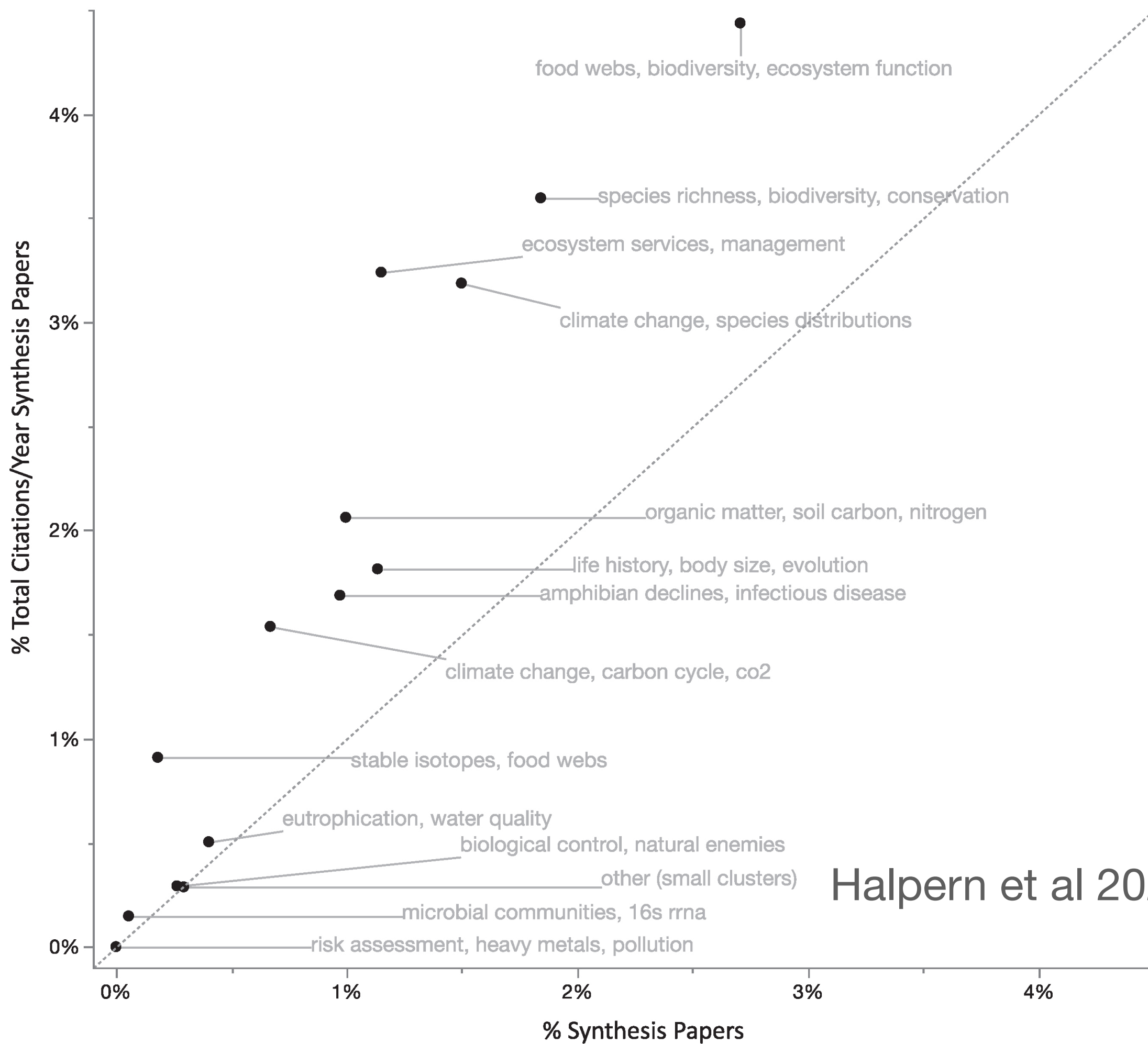
science < art

Representativeness must be considered within the synthesis for the following:

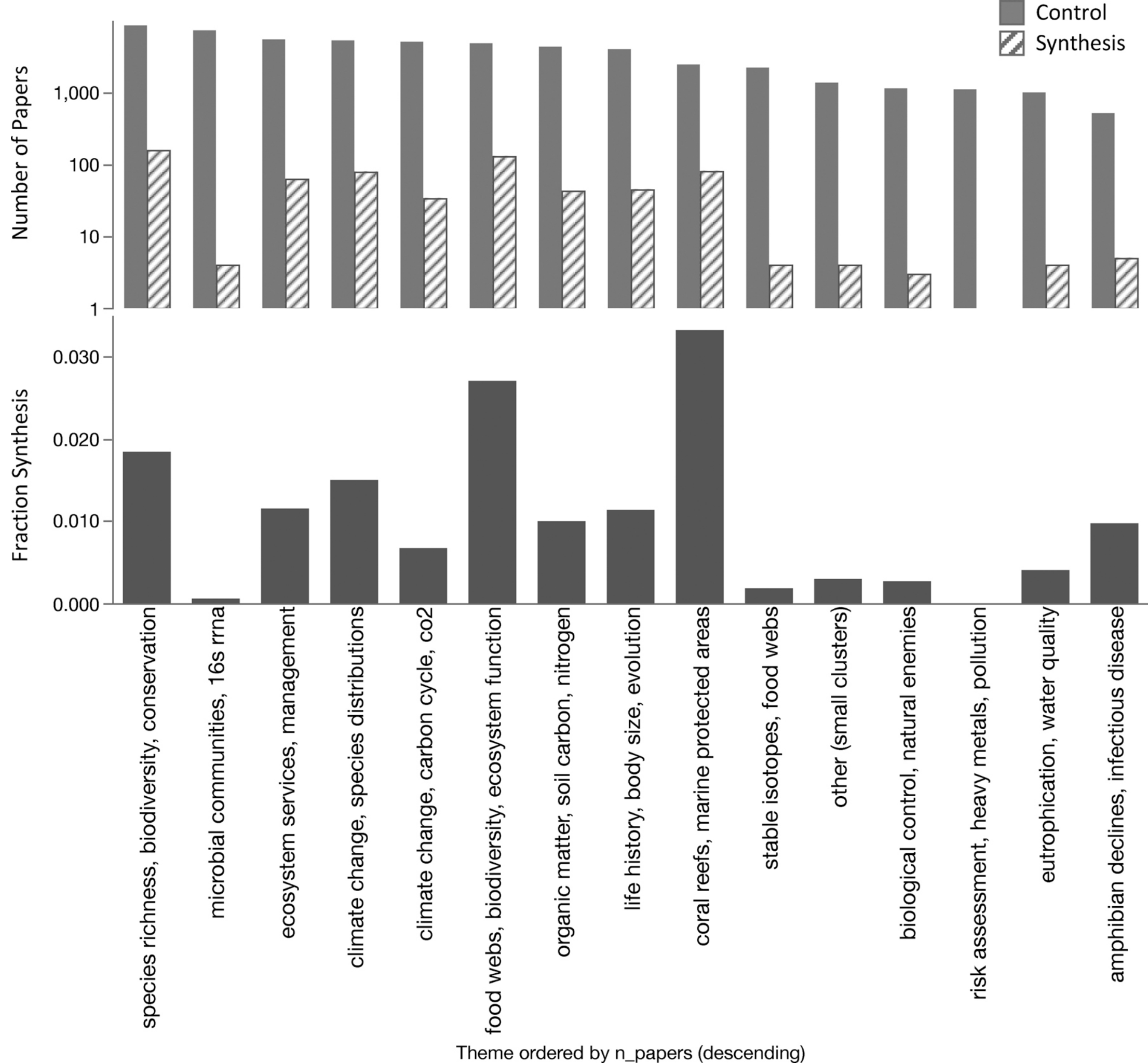
- a. The primary studies
- b. The process tested



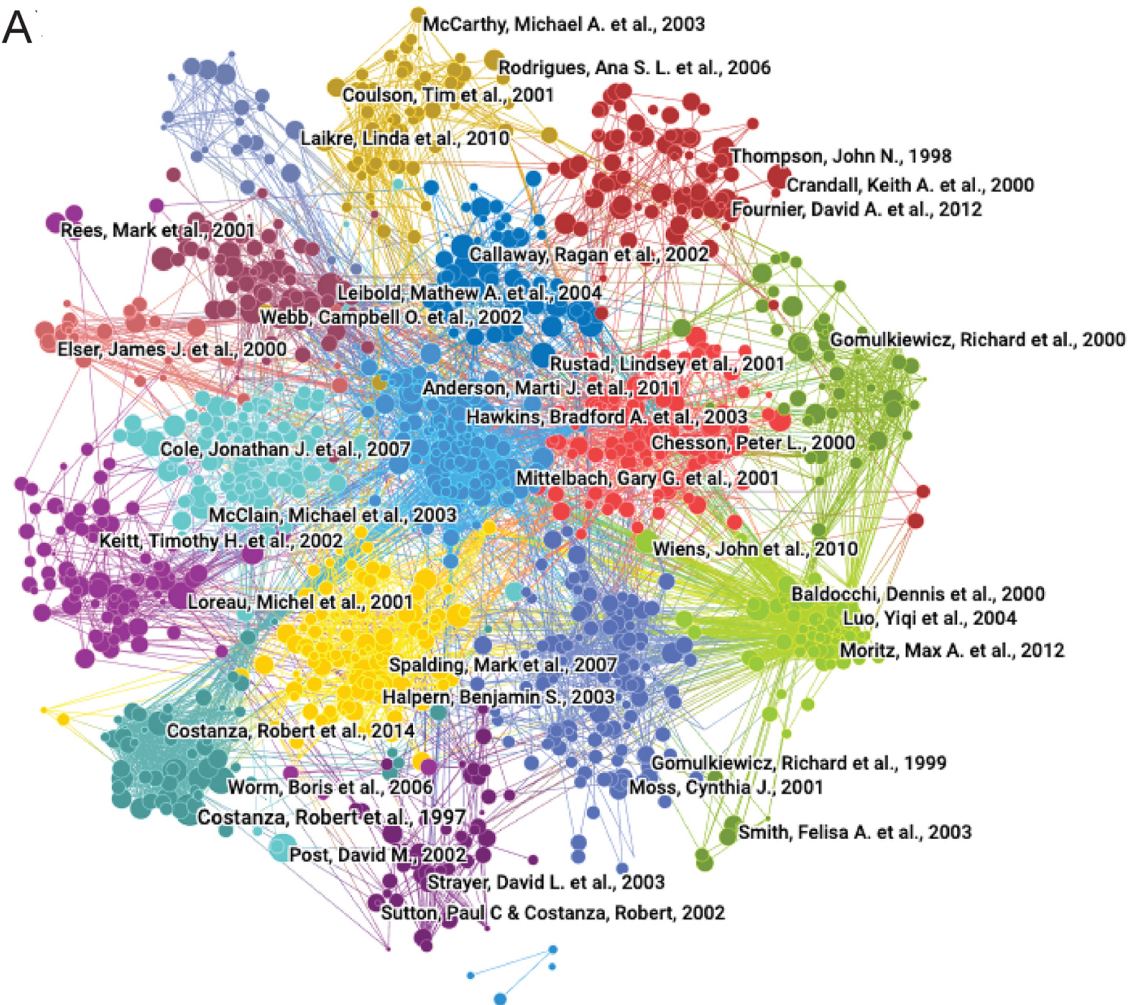
Syntheses and their interpretations are important



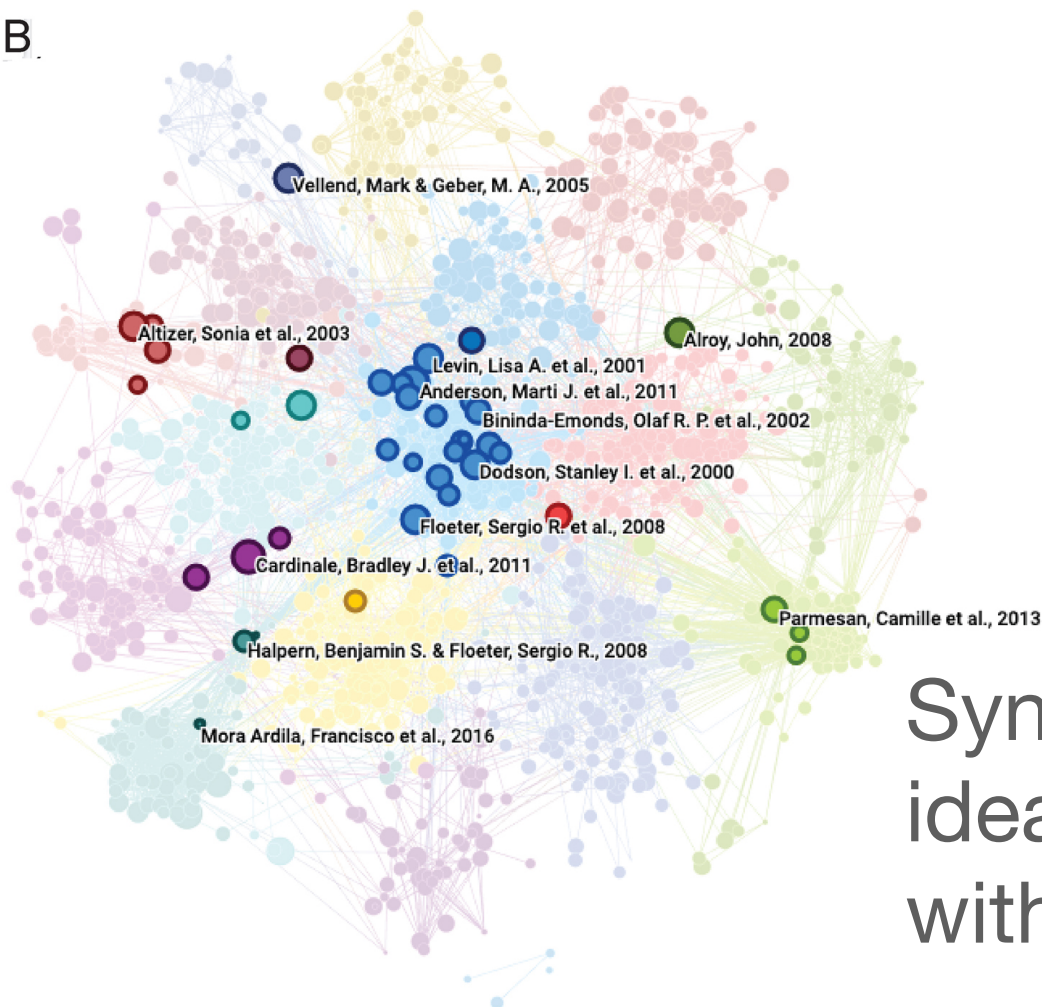
Halpern et al 2020



A



B



(134)	food web, life history, competition
(129)	population dynamics, invasive species, density dependence
(126)	species richness, species diversity, biodiversity
(123)	marine reserves, marine protected areas, coral reef
(113)	tropical forest, metabolic theory, primary production
(88)	climate change, range shifts, adaptation
(88)	plant communities, community assembly, exotic species
(83)	gene flow, landscape genetics, habitat fragmentation
(69)	community structure, community ecology, species abundance
(64)	species interactions, meta analysis, global change
(63)	endangered species, extinction risk, population viability analysis
(60)	ecosystem services, gis, cultural ecosystem services
(57)	body size, body mass, allometry
(49)	north america, land use, remote sensing
(35)	food webs, infectious disease, predator prey
(23)	coral reefs, genetic diversity, native and introduced ranges
(8)	misc small clusters

Syntheses also CONNECT ideas that are not easily resolved within primary studies

Consequently, publication bias and the inclusion of representative (and at times diverse studies) is foundational to more truthful interpretations and assessment of underlying processes and patterns



Relevant to society at large






NEWS | SCIENTIFIC COMMUNITY

Meta-analyses were supposed to end scientific debates. Often, they only cause more controversy

Compiling the evidence from dozens of studies doesn't always bring clarity

18 SEP 2018 • BY JOP DE VRIEZE

Study population (of papers)

	FURUKAWA ET AL., LANCET PSYCHIATRY, 2016	KHAN ET AL., WORLD PSYCHIATRY, 2017
Number of studies included	 252	 85
Type of studies	Every published and unpublished randomized clinical trial done between 1978 and 2015 that the team was able to collect	Only studies reported in Food and Drug Administration reviews, for drugs approved between 1987 and 2013
Number of patients on placebo		 
Outcome measure	Proportion of patients who had a 50% or greater reduction of symptoms	Average decrease of symptoms, expressed as a percentage
Statistical method	Metaregression	Linear regression
Key finding	Placebo response stable since 1991; on average, 36% of patients on placebo were cured.	Average placebo response has increased by 6.4 percentage points since 2000.

Trust and burden of reporting

Uses and Reuses of Scientific Data: The Data Creators' Advantage

by Irene V. Pasquetto, Christine L. Borgman, and Morgan F. Wofford

Published on Nov 15, 2019

Synthesis scientists have an obligation to lead & inform

Contrast meta-analysis interpretations with conclusions
from other syntheses (and large primary studies)

Explore conceptual and statistical sensitivity

List moderators and interpret a specific synthesis from
the lens of contextual capacities
(field, lab, tools used etc)



Univariate contrasts versus meta-regression
Full versus reduced models
Effect size sensitivities
Analytical tool and functions used to model data

We now have synthesis capacity to use contrasts of high-level research to inform decisions in many disciplines

Haddaway et al. *Environ Evid* (2018) 7:7
<https://doi.org/10.1186/s13750-018-0121-7>

Environmental Evidence

METHODOLOGY

Open Access



ROSES RepOrting standards for Systematic Evidence Syntheses: *pro forma*, flow-diagram and descriptive summary of the plan and conduct of environmental systematic reviews and systematic maps

Neal R. Haddaway^{1†}, Biljana Macura^{1*†}, Paul Whaley² and Andrew S. Pullin³