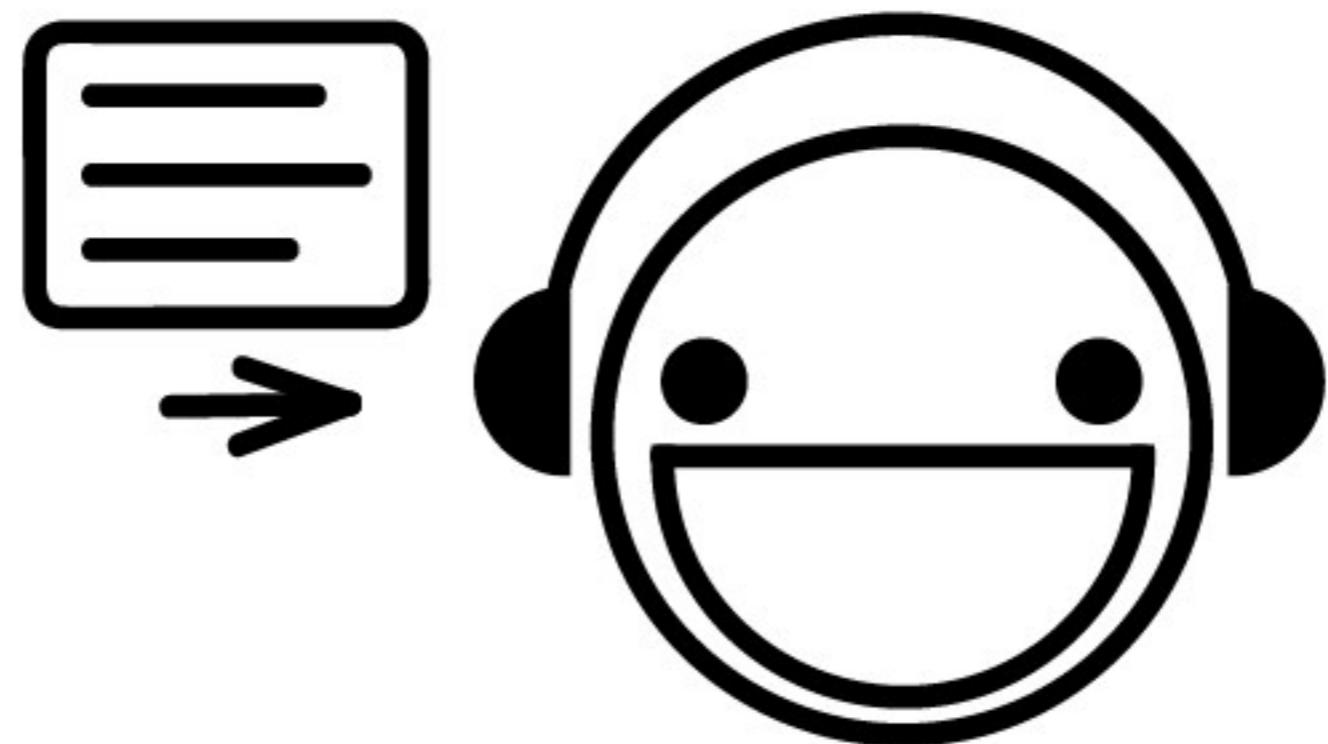


# Quantitative Synthesis Interpretation



@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

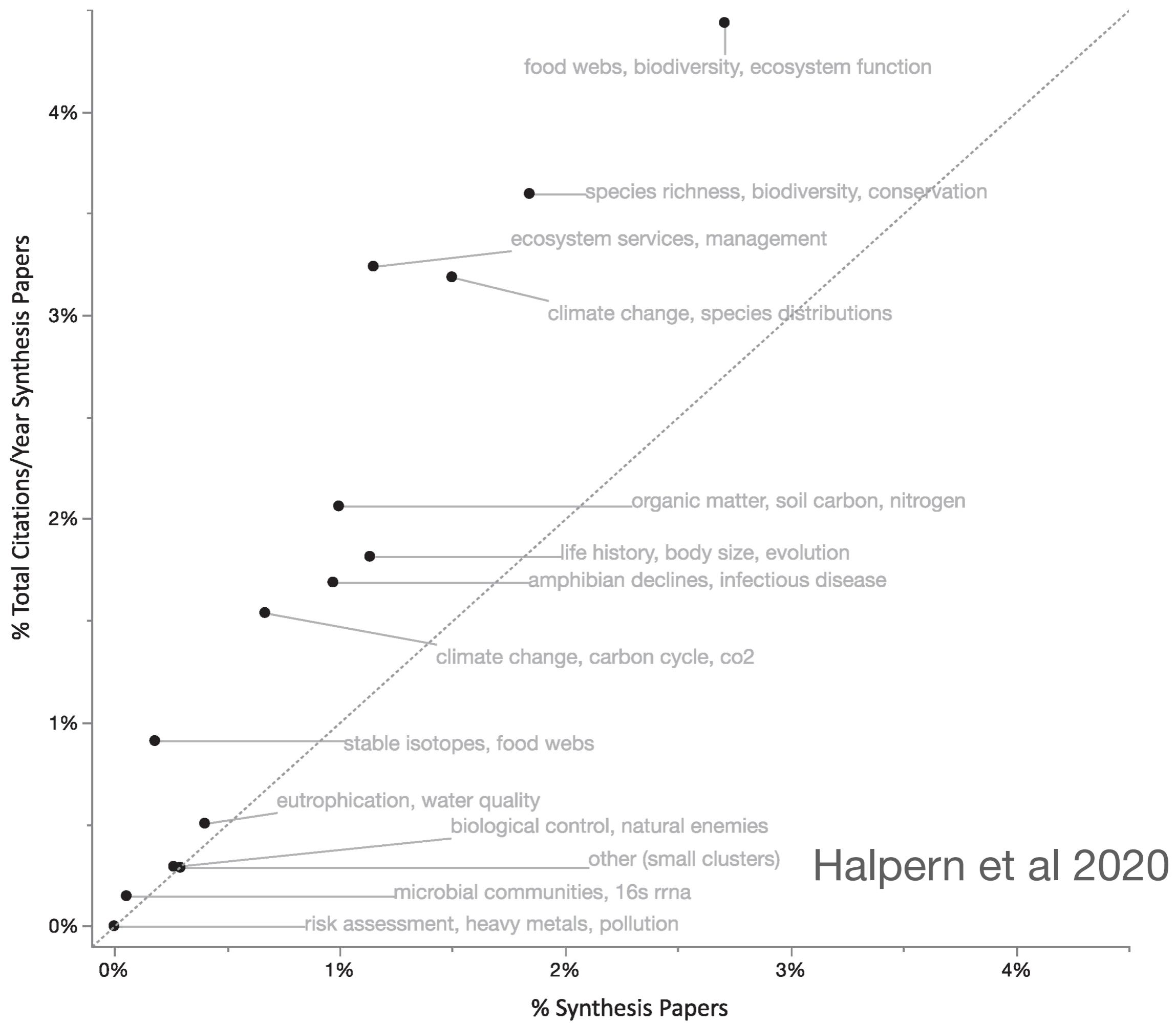
science < art

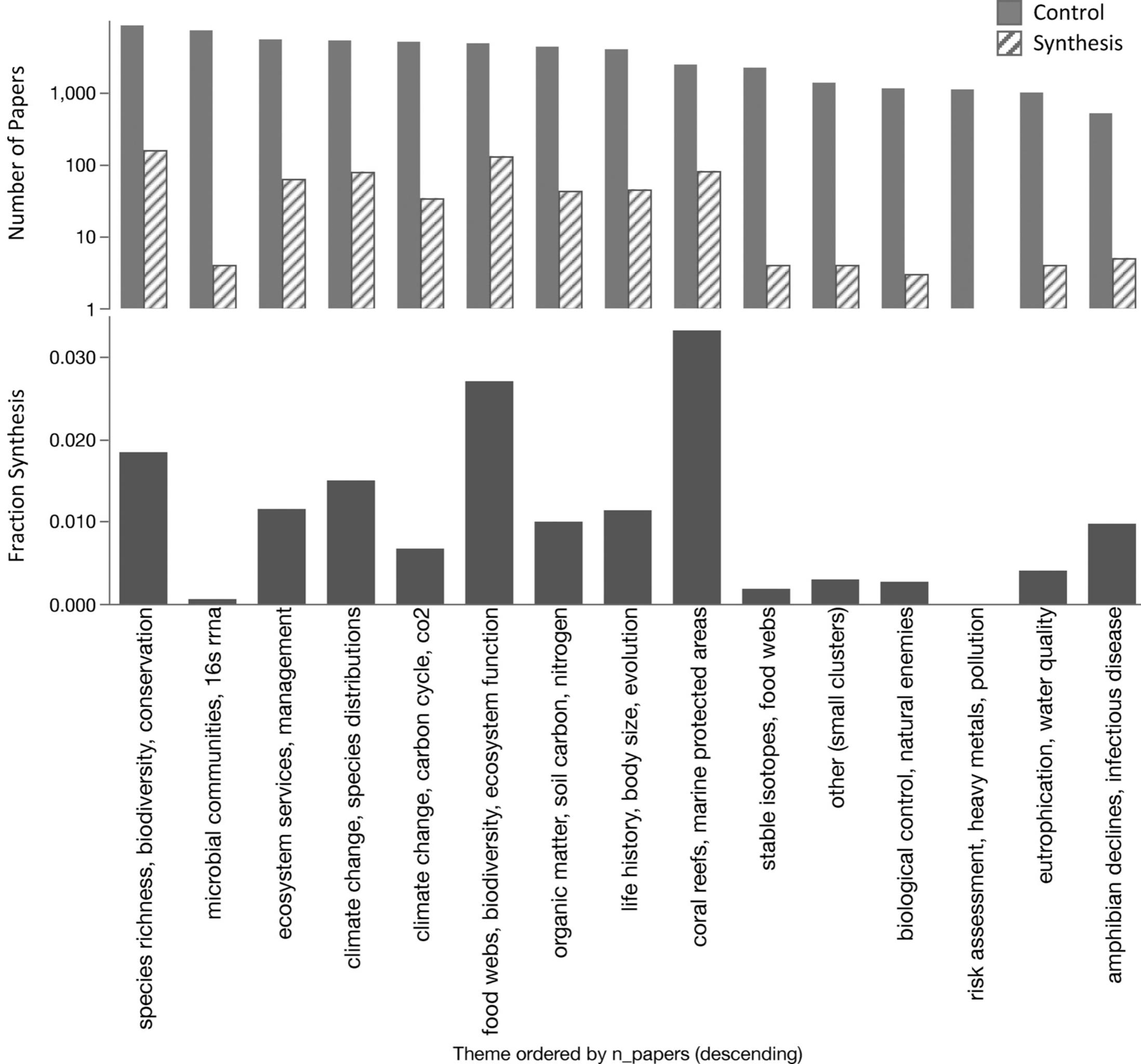
**Representativeness** must be considered within the synthesis for the following:

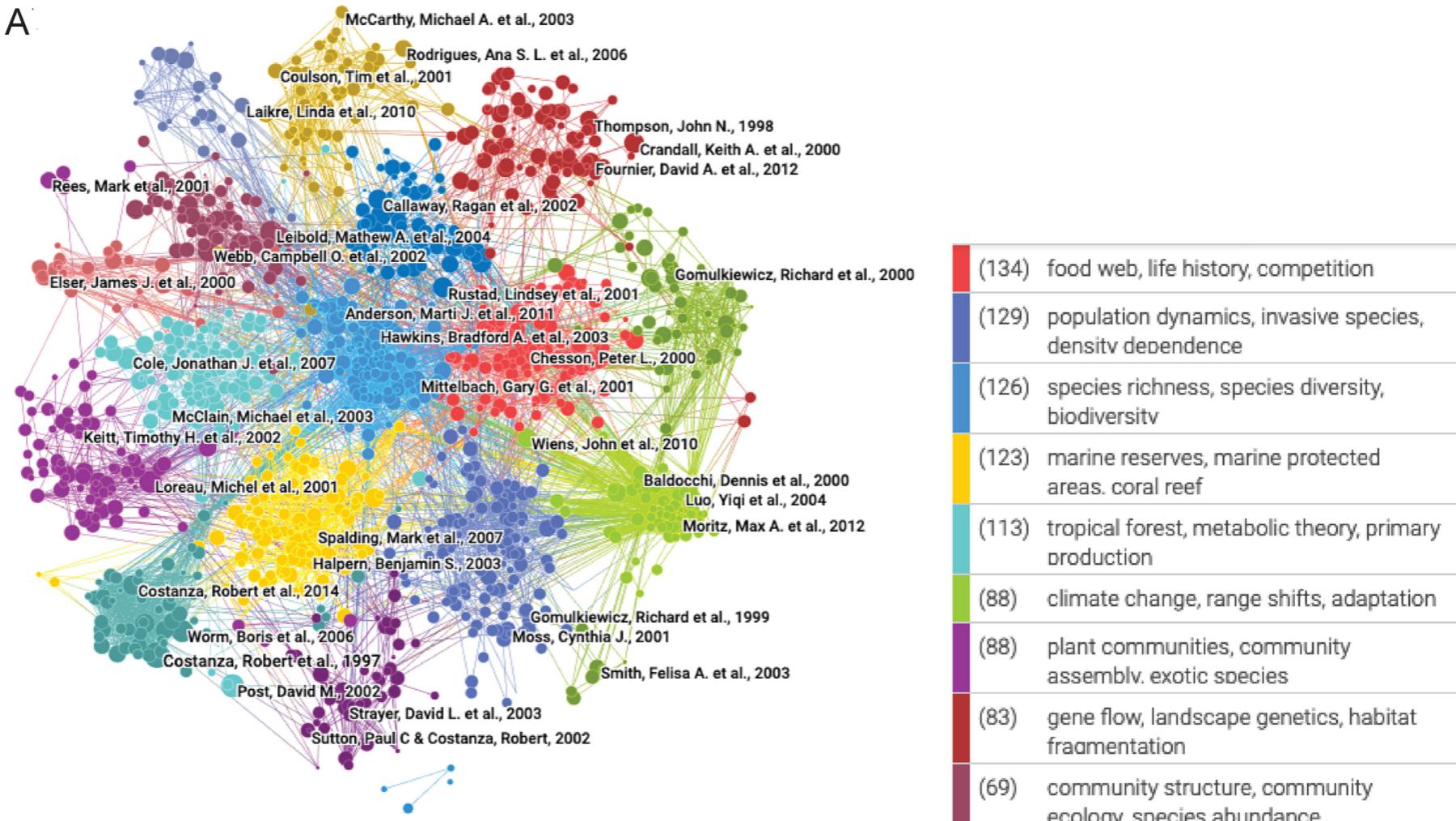
- a. The primary studies
- b. The process tested



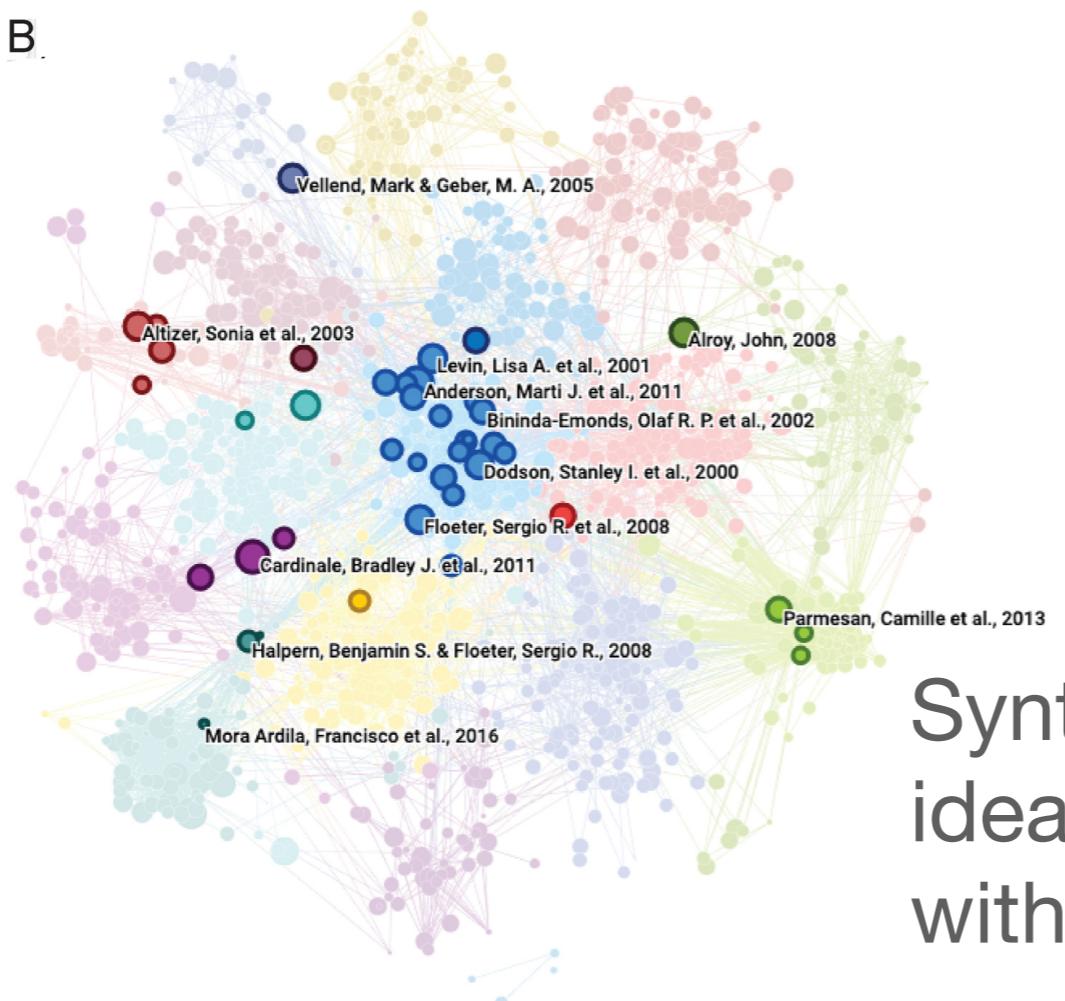
Syntheses and their interpretations are important







(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

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18 SEP 2018 · BY JOP DE VRIEZE

# Study population (of papers)

	FURUKAWA ET AL., LANCET PSYCHIATRY, 2016	KHAN ET AL., WORLD PSYCHIATRY, 2017	
<b>Number of studies included</b>	 252	 85	
<b>Type of studies</b>	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	
<b>Number of patients on placebo</b>			 = 2000 patients
<b>Outcome measure</b>	Proportion of patients who had a 50% or greater reduction of symptoms	Average decrease of symptoms, expressed as a percentage	
<b>Statistical method</b>	Metaregression	Linear regression	
<b>Key finding</b>	Placebo response <b>stable</b> since 1991; on average, 36% of patients on placebo were cured.	Average placebo response has <b>increased</b> 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<sup>1†</sup>, Biljana Macura<sup>1\*†</sup>, Paul Whaley<sup>2</sup> and Andrew S. Pullin<sup>3</sup>