lES Committee Meeting on Special Education

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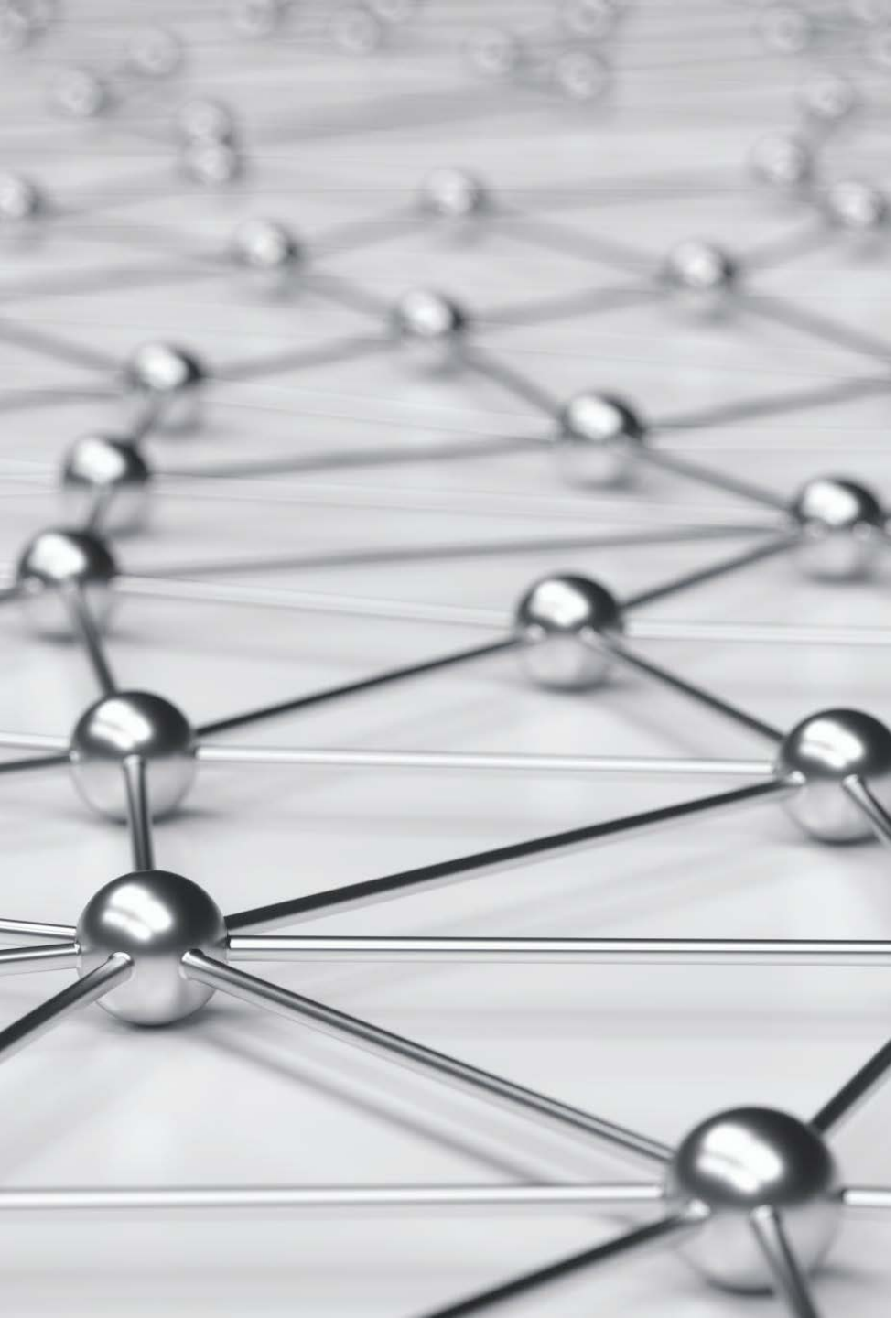


Team Science

- Growing recognition that traditional paradigms to research poses challenges for generating replicable, generalizable knowledge (Makel et al., 2019).
- Coordinated research efforts have emerged to examine the replicability and generalizability of results.
  - Coordinated efforts combine resources, expertise, and technical skills for addressing scientifically important questions that could not be achieved by teams individually.
  - May be large-scale “many lab” efforts (e.g. in psychology, developmental psychology, in education, in ecology)
  - May be smaller-scale collaborations between research teams at three sites.

Example: Special Education Research Accelerator (SERA)

The long-term vision for SERA is to develop a validated infrastructure, procedures, and affiliated network of special education researchers to conduct high-quality, large-scale, and open replication studies with diverse samples to address critical questions in the field.

- Goals is to build a platform for conducting crowd-sourced data collection efforts to address important questions in the field.
- Questions may be generated by researchers in the field
- Questions may be about intervention effects or be descriptive.
- Network includes 330 special education researchers from 45 states plus DC.
- Enthusiasm and interest from the field.
- Supported by NCSER.

Team science approaches have the potential to democratize the research process, to increase diversity of educational researchers, and to improve representation of samples, settings, and conditions included in studies

Methods, Infrastructure, and Incentives for Promoting Team Science - Methods

Methods for linking replication with the generalization of effects

- Need to acknowledge constraints on generality of scientific findings produced from single studies.
- Generalization requires effects are both replicable and representative of target population of interest.
- Need new methods for team science approaches.
  - To identify ”generalization boundaries” by examining where effects are replicable, and where they are not
  - But current replication studies are planned in ad hoc ways – often unbeknownst to the researcher.
    - Moderated effects obtained from these efforts are usually confounded → making generalization impossible.
  - Need research designs for planning prospective studies to make valid inferences about the replicability and generalizability of effects.

Methods, **Infrastructure**, and Incentives for Promoting Team Science - Infrastructure

Infrastructure for collecting, processing, and analyzing data.

- New technologies have created opportunities to collect data in naturalistic ways: direct assessments, surveys, audio and text files, video files, mobile and wearable devices
- Data flow typically involves multiple types of software, platforms, and servers
- But, error prone and leads to inefficiencies
  - At UVA, we pay undergraduate and graduate research assistants to check, track, and validate data collection (often not directly charged to the grant)
- Need more data infrastructure for collecting and processing data
  - Infrastructure includes software and hardware, but also technical expertise
  - Methods exist in computer and data science; no need to reinvent the wheel
  - Software exists, but it is expensive and not tailored for data collection for social scientist
  - The more open-source platforms we can provide to researchers for collecting, processing, and managing data in easy and secure ways, the more we can “democratize” the process.
  - Currently, very limited funding to build data infrastructure for supporting data collection and processing efforts.

Methods, Infrastructure, and **Incentives** for Promoting Team Science - Incentives

Incentives for Team Research

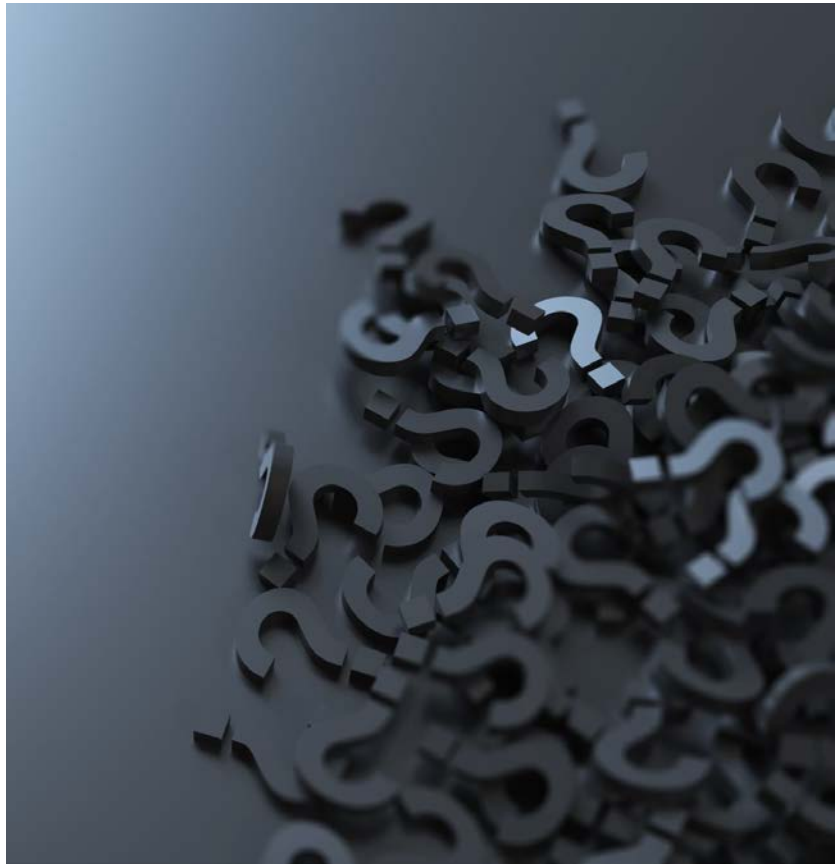
- Funding process can incentivize diverse research teams by promoting teams with different:
  - Disciplines, methodologies, backgrounds and characteristics of researchers, institutions, and geography
- Examples:
  - Collaboratory Replication Lab: Researchers in special education, teacher preparation, reading education, methodology
  - SERA includes 330 special education researchers from across the country
  - TeachSim includes 3 teacher education programs to evaluate coaching PD in simulated classrooms.
- Need time and processes to collaborate and develop new networks and a common language for communicating.

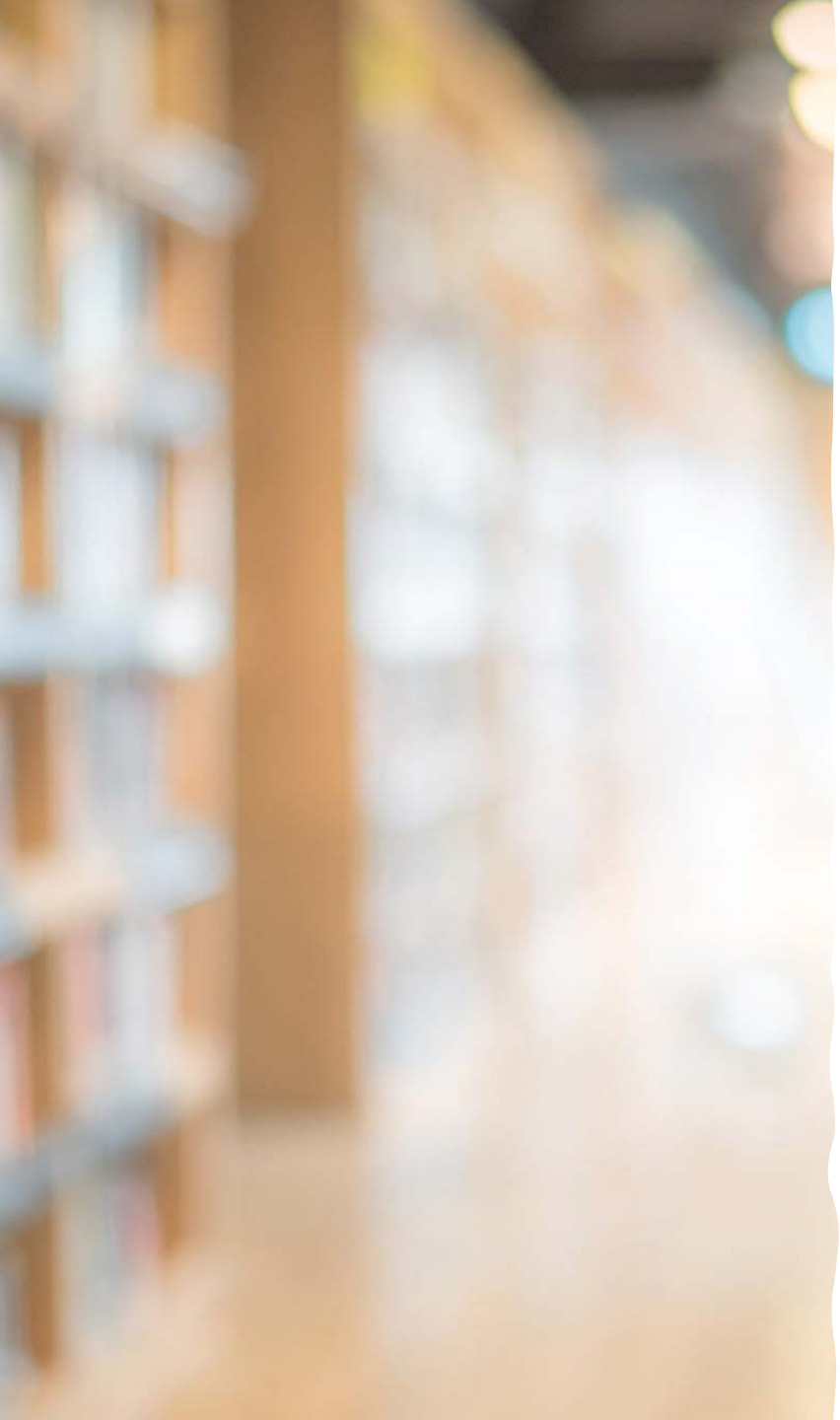
Rules of Thumb In Methods are Tricky

Example: "RCTs are the gold standard method"

- Good statistical reasons for this; empirical support for this as well
- But "methodological rules" should not supplant good conceptual thinking, rigorous thinking, or penalize creativity.
- Unintended consequences of "rules"
  - Example 1: Effects as averages – but for whom, what, when and where? What are the constraints of the estimated effect?
  - Example 2: Prioritizes interventions, programs and policies applied at the individual level, but what about systematic and institutional interventions?

    → So why use RCTs at all?
- All good methods require qualitative, substantive knowledge
  - Every method requires a qualitative assumption about the state of the world; easy to forget when the assumption is represented as Greek letters.





Take Home Messages

Advancing equity in education research should:

- Promote “team approaches” to research
- Incentivize diverse research teams (with respect to methods, geography, institutions, samples)

For team approaches to succeed requires:

- New methods and tools for planning multiple studies;
- Funding to support backend infrastructure for collecting data in high quality, open and transparent ways;
- Time, processes, and a common language for ensuring that partnerships are truly collaborative and equitable (given the inherently hierarchical structure of universities, positions, and roles).