Courtney Bornholdt
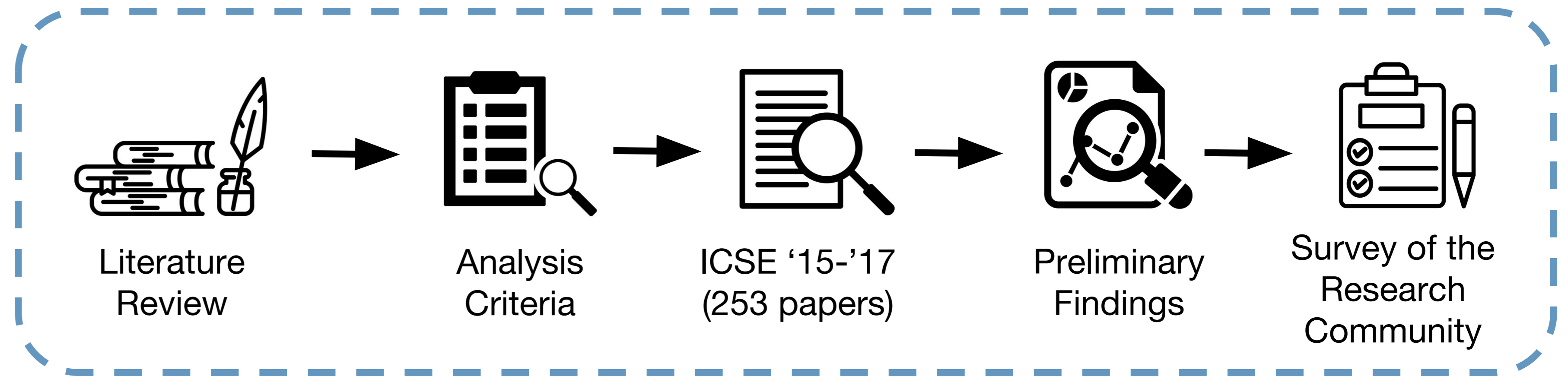courtneybornholdt@gmail.com

University of Victoria

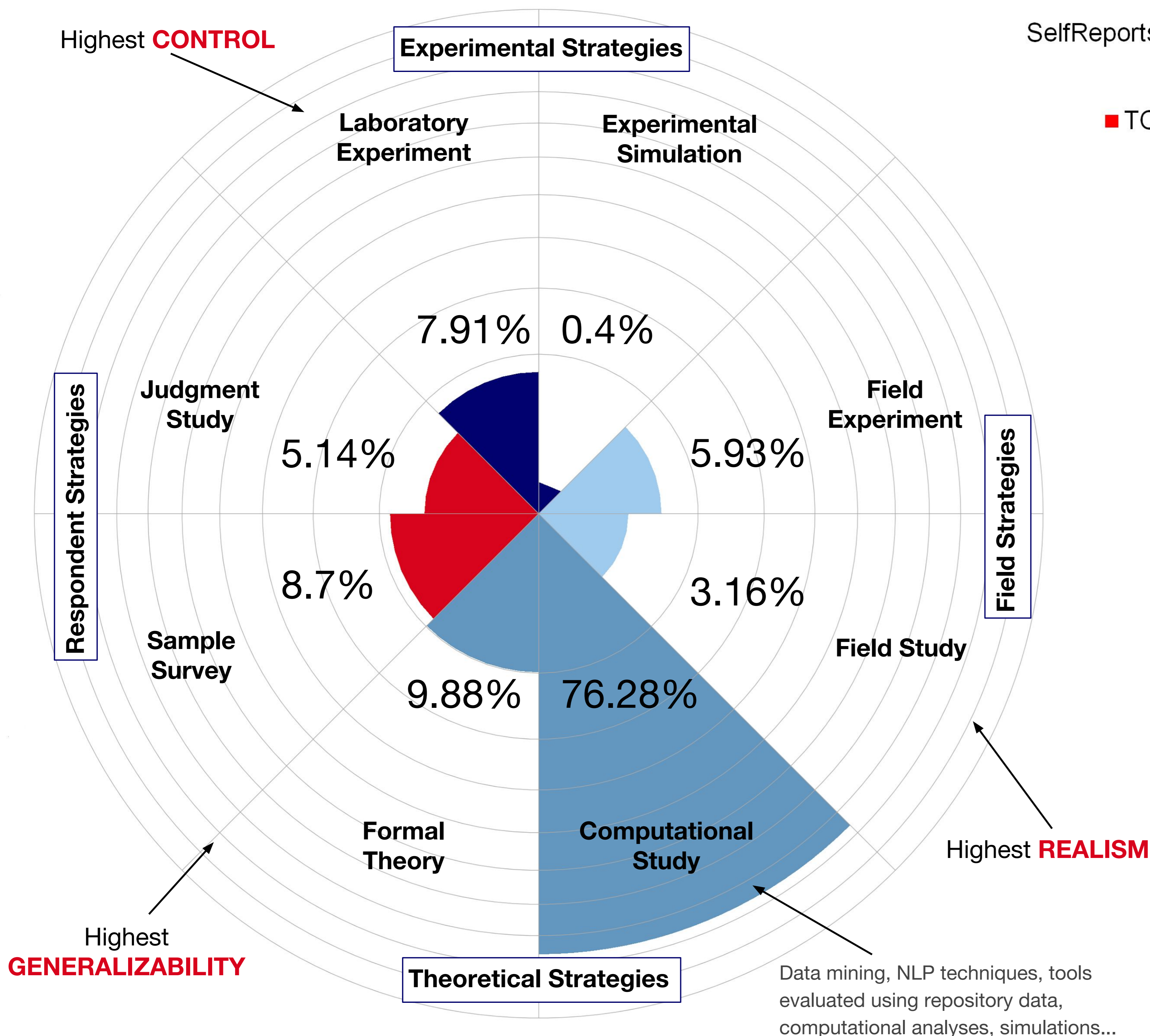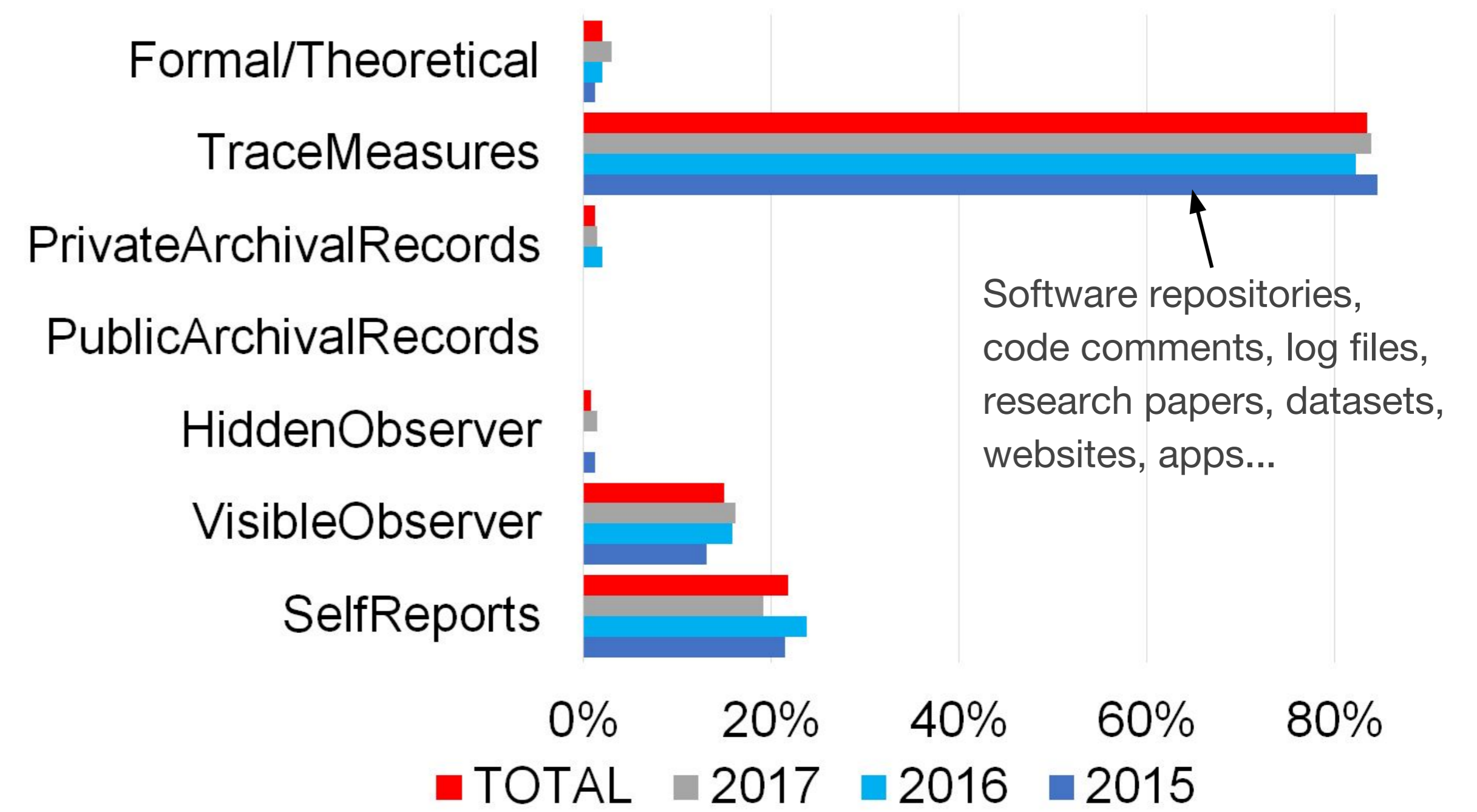# Is There a Research Method Bias in Software Engineering?

Questions

- What behavioral **research strategies** and **data sources** are used at ICSE?
- What implications does this have for elements of research quality?

Literature Review → Analysis Criteria → ICSE '15–'17 (253 papers) → Preliminary Findings → Survey of the Research Community

Preliminary Findings

- The vast majority of empirical data comes from **Trace Measures** of human behavior
- **Computational Studies** dominate over all other research strategies, leading to an imbalance that prioritizes **generalizability** and **realism** over **control**

Bar chart categories: Formal/Theoretical, TraceMeasures, PrivateArchivalRecords, PublicArchivalRecords, HiddenObserver, VisibleObserver, SelfReports. X-axis: 0%, 20%, 40%, 60%, 80%. Legend: ■ TOTAL ■ 2017 ■ 2016 ■ 2015

Software repositories, code comments, log files, research papers, datasets, websites, apps...

Highest **CONTROL**

Experimental Strategies

Laboratory Experiment — 7.91%
Experimental Simulation — 0.4%
Field Experiment — 5.93%
Field Study — 3.16%
Computational Study — 76.28%
Formal Theory — 9.88%
Sample Survey — 8.7%
Judgment Study — 5.14%

Respondent Strategies

Field Strategies

Theoretical Strategies

Highest **GENERALIZABILITY**

Highest **REALISM**

Data mining, NLP techniques, tools evaluated using repository data, computational analyses, simulations...

Takeaways

- The research community can reflect on our body of work as a whole
- We call for a discussion on whether this balance reflects our collective values
- Is change required to align our research method choices with our collective goal for the future of software engineering?

"The meaning of research evidence, in any area of science, is inherently tied to the means or methods by which that evidence was obtained."
- J. E. McGrath

"All methodologies, even the most obvious ones, have their limits."
- P. Feyerabend

chisel
Computer Human Interaction & Software Engineering Lab

Courtney Bornholdt
courtneybornholdt@gmail.com

Alexey Zagalsky
alexeyza@uvic.ca

Eirini Kalliamvakou
ikaliam@uvic.ca

Margaret-Anne Storey
mstorey@uvic.ca