

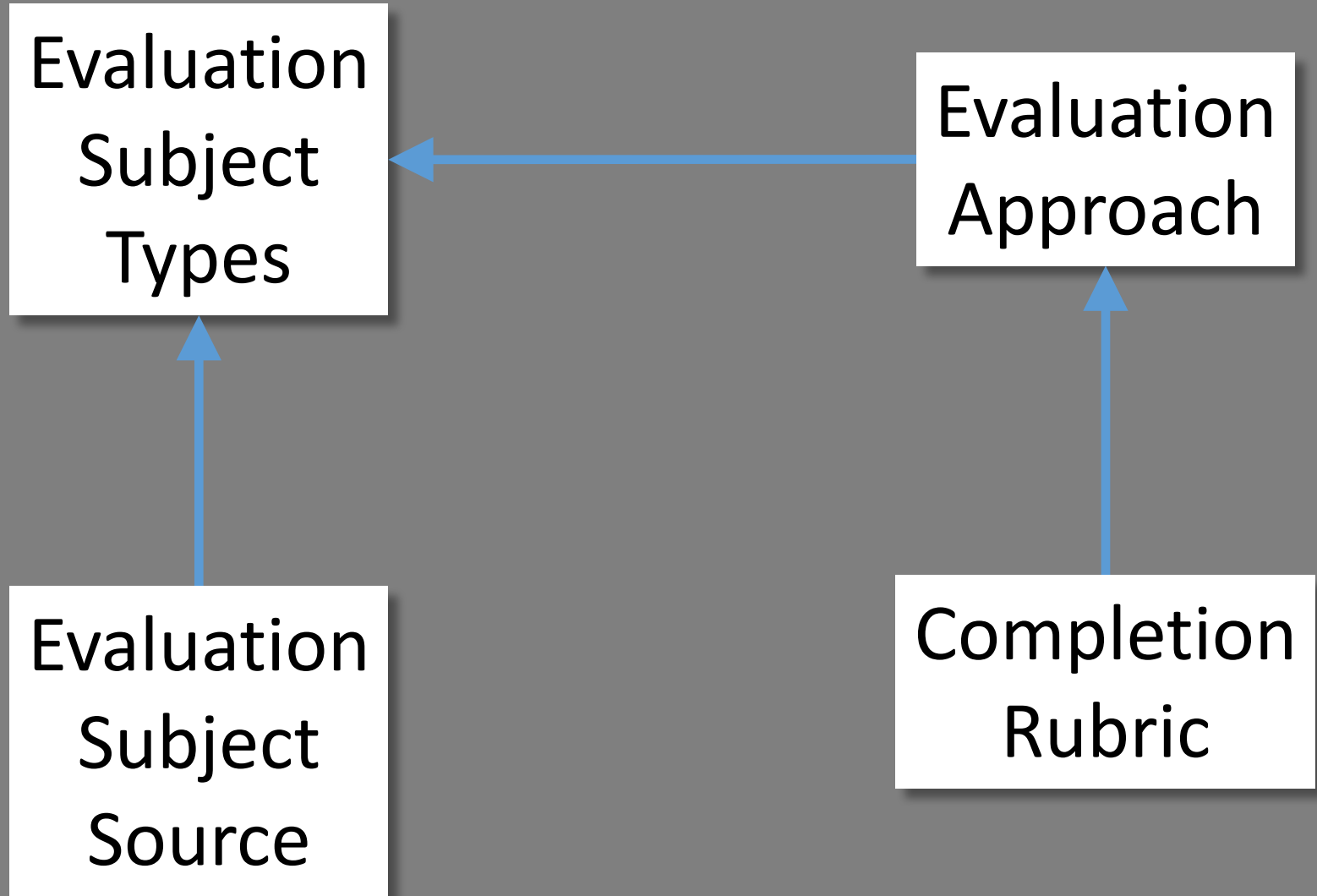
Characterizing Scientific Reporting in Security Literature: An analysis of ACM CCS and IEEE S&P Papers

Presented by:
Jeffrey Carver

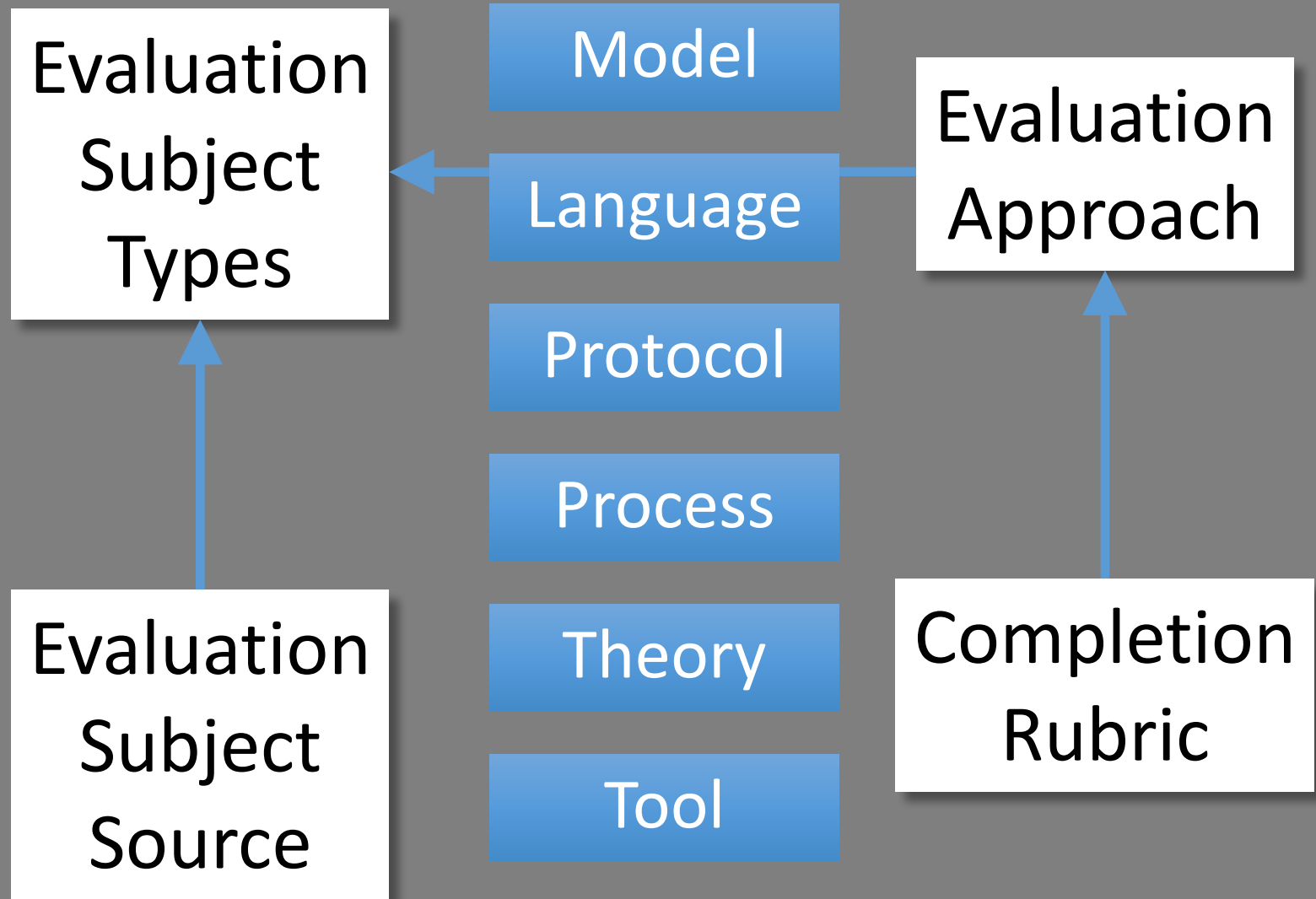
Research Questions

- RQ1: What are the characteristics of the artifacts and evaluations contained in the papers?
 - RQ1.1: What Artifacts are evaluated?
 - RQ1.2: What Evaluation Methods are used?
 - RQ1.3: Do papers build on prior work?
 - RQ1.4: What is the relationships between Artifact and Method?
- RQ2: Do the papers contain all the information necessary to support the science of security?

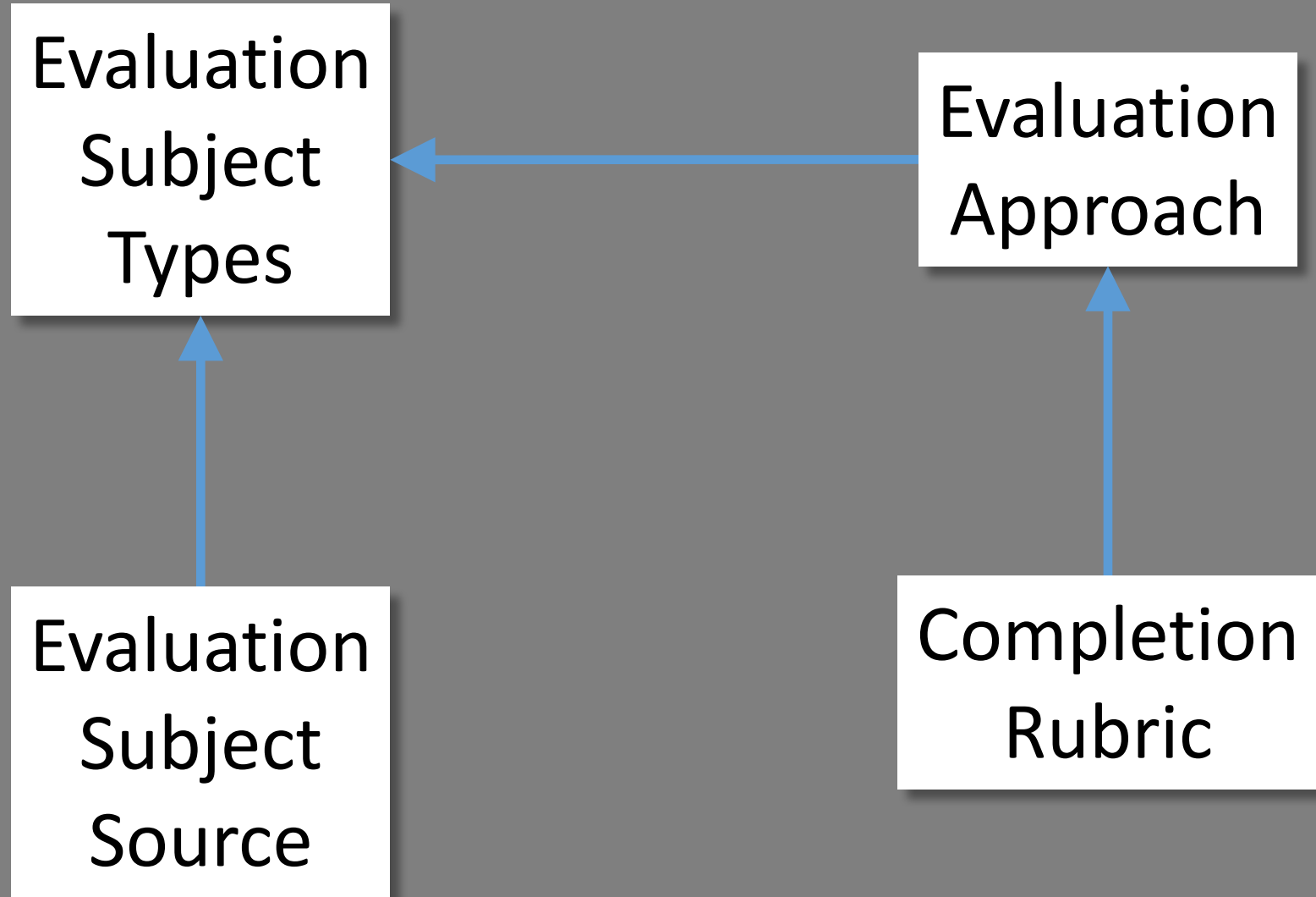
Study Overview



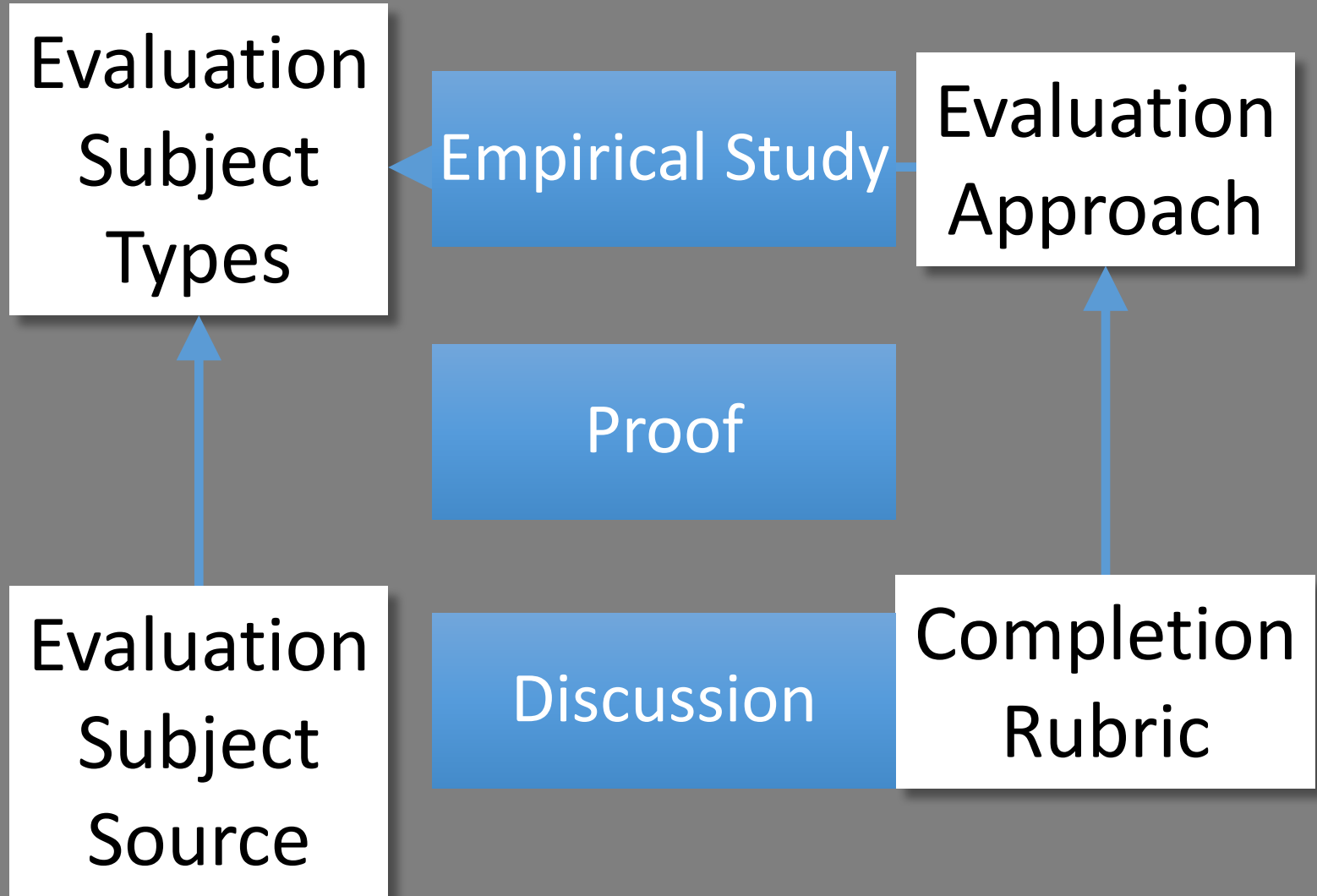
Study Overview



Study Overview



Study Overview



Study Overview: Empirical Study

Simulation

Humans

Systems

Self-reported

Observed

Automated

Participant
Type

Study
Type

Data
Type

Comparison

Observational

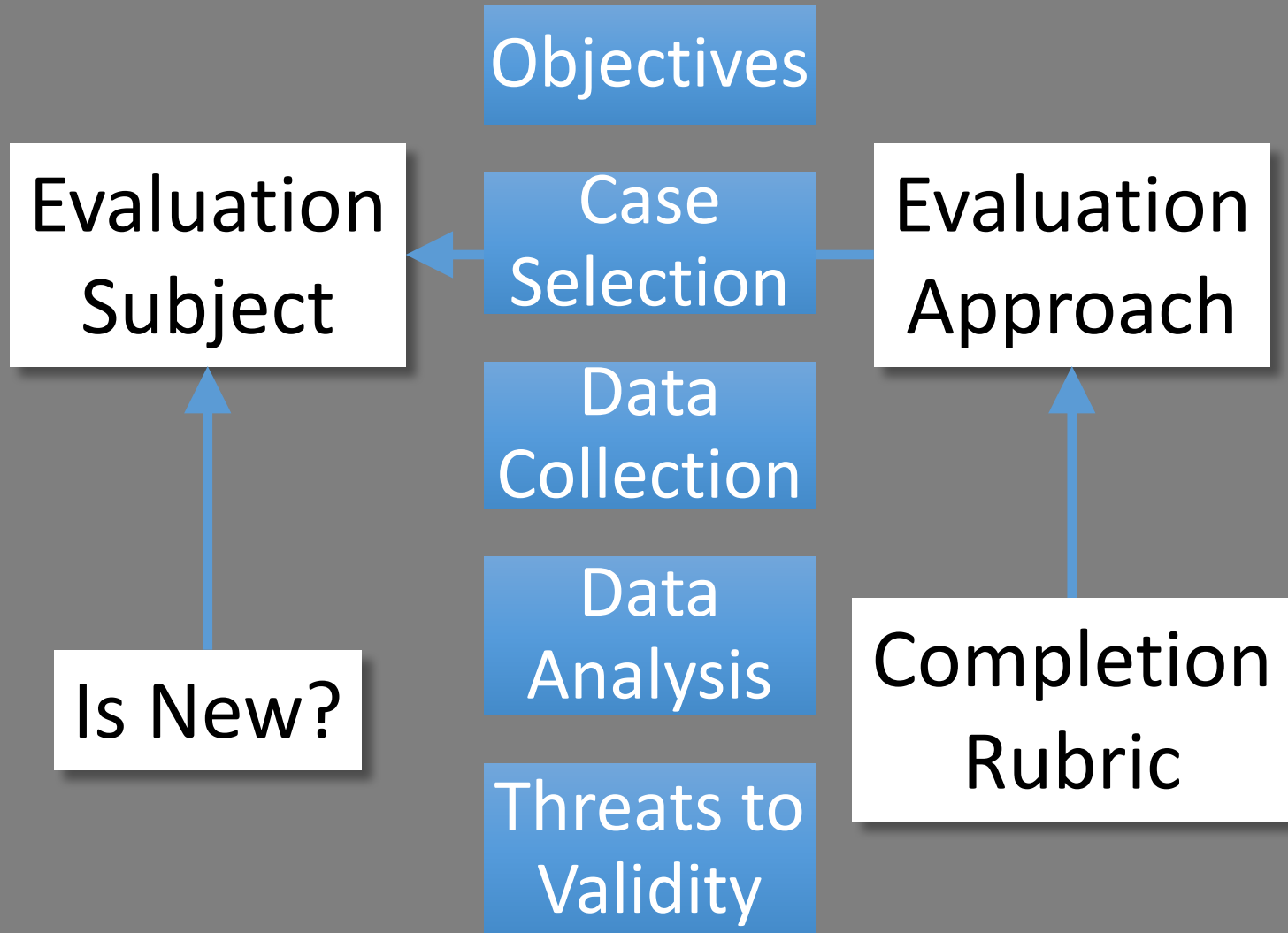
Interventional

Historical

New

None

Study Overview



Appendix: Paper Rubric Items - Empirical Study

Rubric Item	Yes	Partial	No
EM1: Are the research objectives of the study described? (e.g., goals, questions, hypotheses)?	<i>Clearly defined early in the paper (i.e. not in the results or discussion) and labeled (e.g. in bold, italics, underlined or set apart from the text with labels like Research Question, RQ, Objective)</i>	<i>Included in the text but either in the wrong location or not clearly labeled (see Yes above)</i>	<i>Not present</i>
EM2: Is the context of the study described? Does the paper offer details on what is being tried to solve	<i>The paper explicitly defines the context of the study (i.e. the problem background or why it is important to study</i>	<i>The defines some, but not all, of the above</i>	<i>The paper defines none of the above</i>

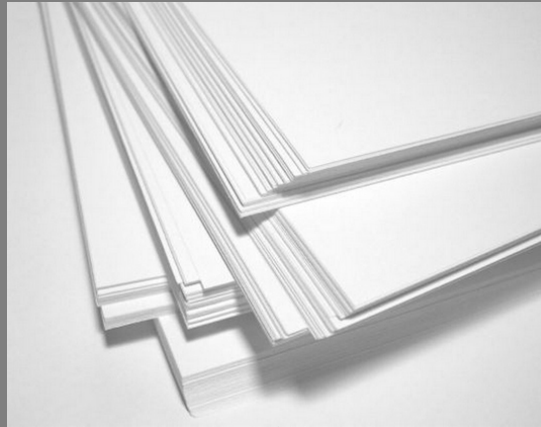
Rubric Item	Yes	Partial	No
EM3: Are the methods for subject sampling described? (e.g., recruitment/ selection process, inclusion/ exclusion criteria)?	<i>The paper explicitly describes how the cases were selected including the rationale for selecting the particular case(s)</i>	<i>N/A</i>	<i>The paper does not explicitly describe how the cases were selected</i>

Rubric Item	Yes	Partial	No
EM8: Do they discuss results in relation to the research objectives? (e.g., hypotheses evaluated, questions answered, or "big picture")	<i>There is a separate discussion section</i>	<i>Results are discussed, but not in a separate section</i>	<i>Results are not discussed</i>
EM9: Do they discuss and provide reasoning for "why" the results had the given outcome?	<i>There is a discussion of why a particular outcome occurred in the study. Rather than presenting only the results, the authors explain "why" such results were obtained.</i>	<i>N/A</i>	<i>No reasoning for the outcome of the study is given.</i>
EM10: Is there a dedicated discussion of the threats to validity to the experiment (i.e., limitations or mitigations)?	<i>There is a separate Threats to Validity Section</i>	<i>Threats to validity are discussed, but not in a separate section</i>	<i>Threats to validity are not discussed</i>

Methodology

128 Papers (CCS)
55 Papers (S&P)

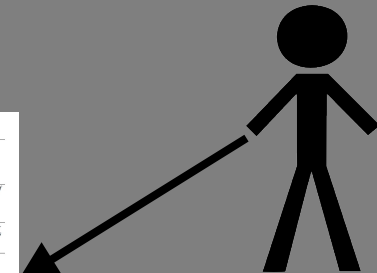
7 Reviewers



Author

TABLE III
DATA REUSE (DR) - CALL STRS

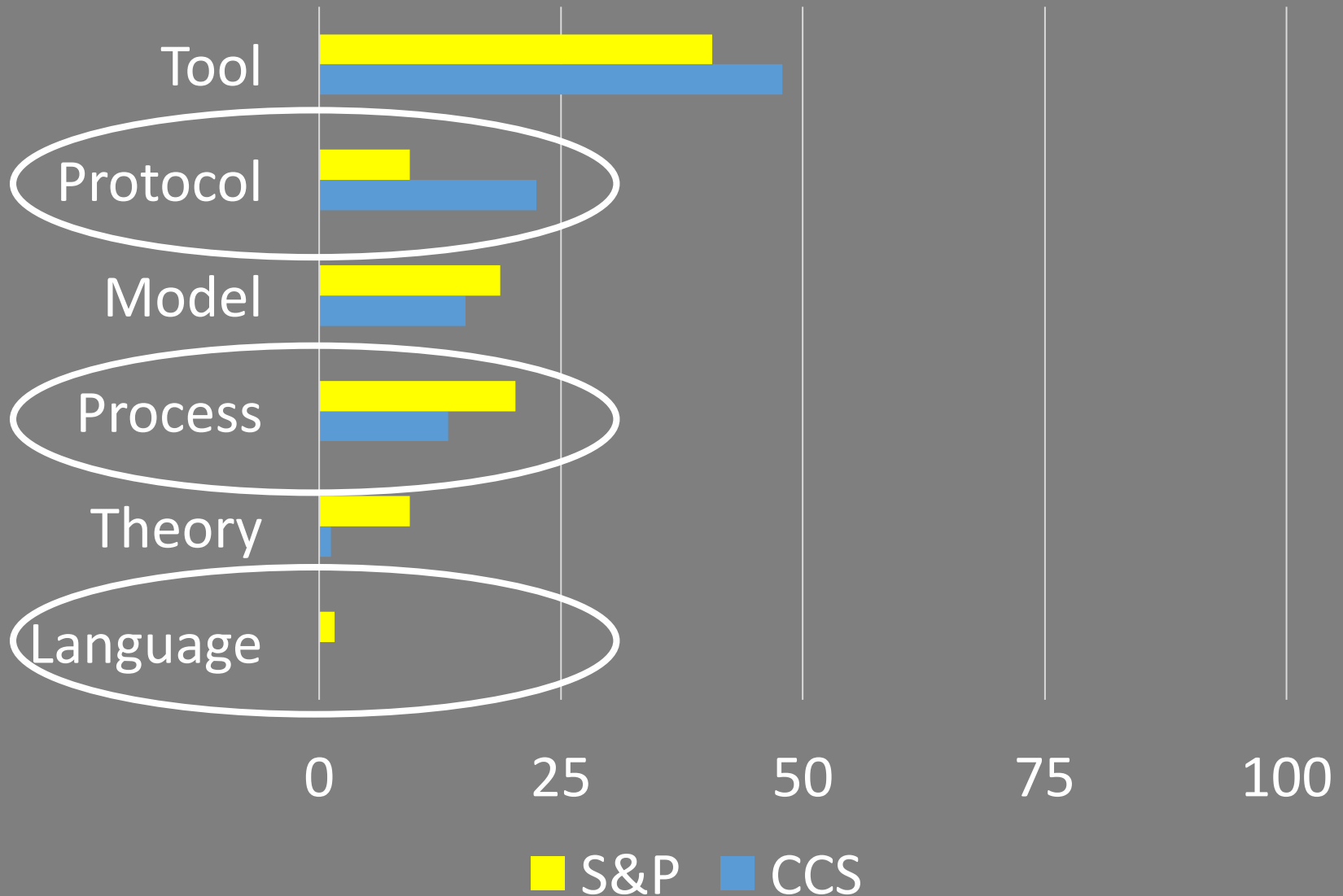
Relative Item	Yes	Partial	No
Q1: Are the research objectives described (i.e., goals, questions, hypotheses)?	Clearly defined early in the paper (i.e., in the results or discussion and the field (e.g., in bold, underlined, or in quotes from the one with labels like Research Question, RQ, Objective, ...))	Included in the text but either in the wrong location or not clearly labeled (see the above)	Not present
Q2: Are the case and its units of analysis described (i.e., what is the context of the study, what is being studied)?	The paper explicitly defines the context of the study (i.e., the problem being studied or why it is important to study these particular research questions or problems) and where it being studied	The defines some, but not all, of the above	The paper defines some of the above
Q3: Are the methods (or analysis) described (i.e., how was this done)?	The paper explicitly describes how the cases were selected (including the characteristics for selecting the particular events)	Not described in the text	The paper does not explicitly describe how the cases were selected
Q4: Are the data collection procedures (i.e., how was this completed and research instruments (i.e., questionnaire, rating tools, performance measurement, ...) described)?	Paper includes both the instrumental items described (e.g., hypothesis checks, statistical tests, practices, performance metrics, procedures, ...) and the results of instrument use (including p-values, accuracy, false positive, false negative)	Paper includes one of the above	Paper includes none of the above
Q5: Is data presented with appropriate descriptive statistics to provide an understanding of the analysis (e.g., means, standard deviations to describe the data, etc.)?	Paper contains a description of the data, its mean, median, standard deviation, frequency, charts, tables to describe the data, etc.	NA	Paper does not contain a description of the data
Q6: Do the findings (results) relate to the research objectives (i.e., hypotheses evaluated, questions answered, or "big picture")?	There is a separate discussion section	The results are discussed, but not in a separate section	The results are not discussed
Q7: Is there a dedicated discussion of the threats to validity (i.e., limitations or mitigations)?	There is a separate threat to validity section or Limitations Section	Threats to validity are discussed, but not in a separate section	Threats to validity are not discussed



Results

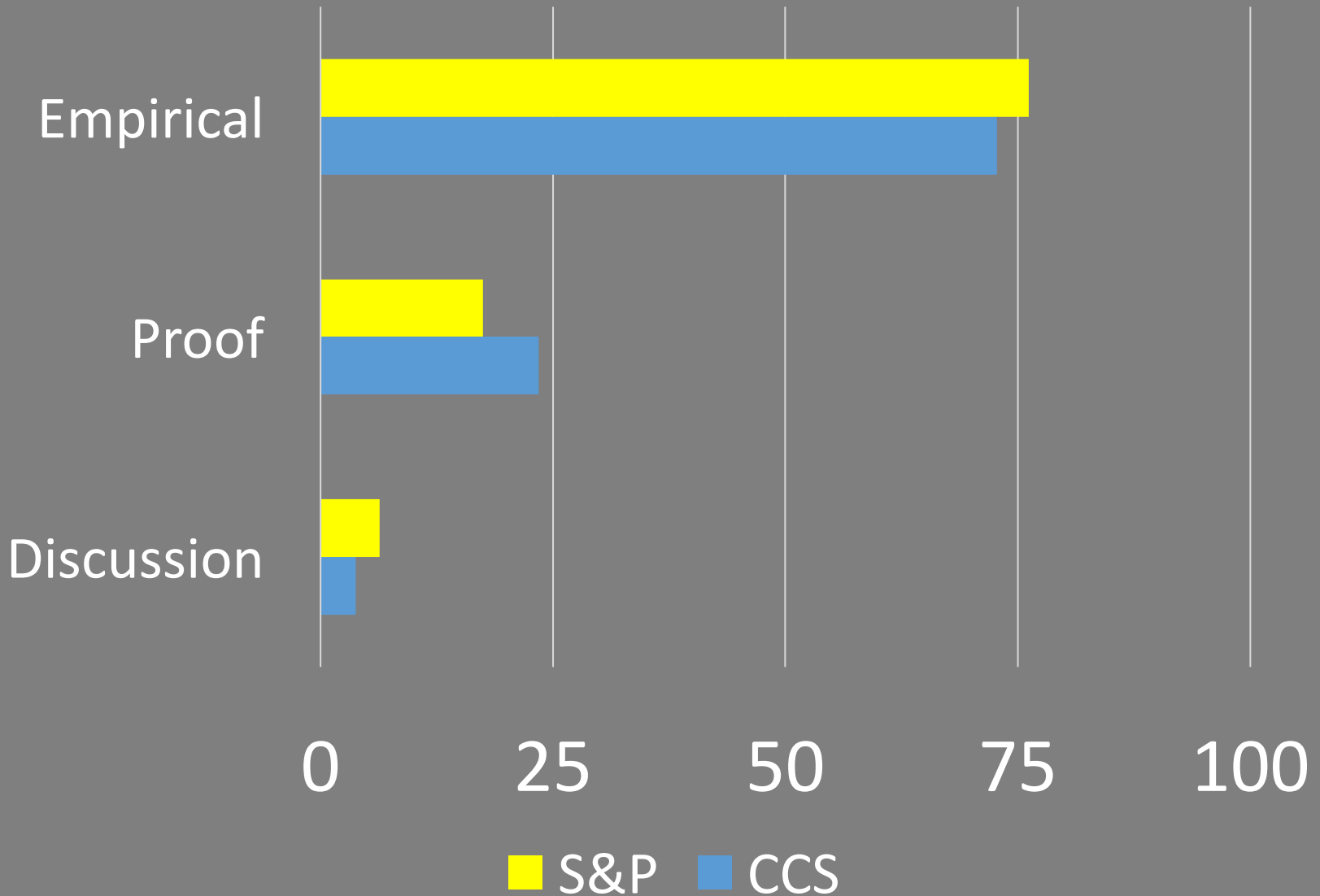
RQ1: Paper Characteristics

RQ1.1: Type of Artifact



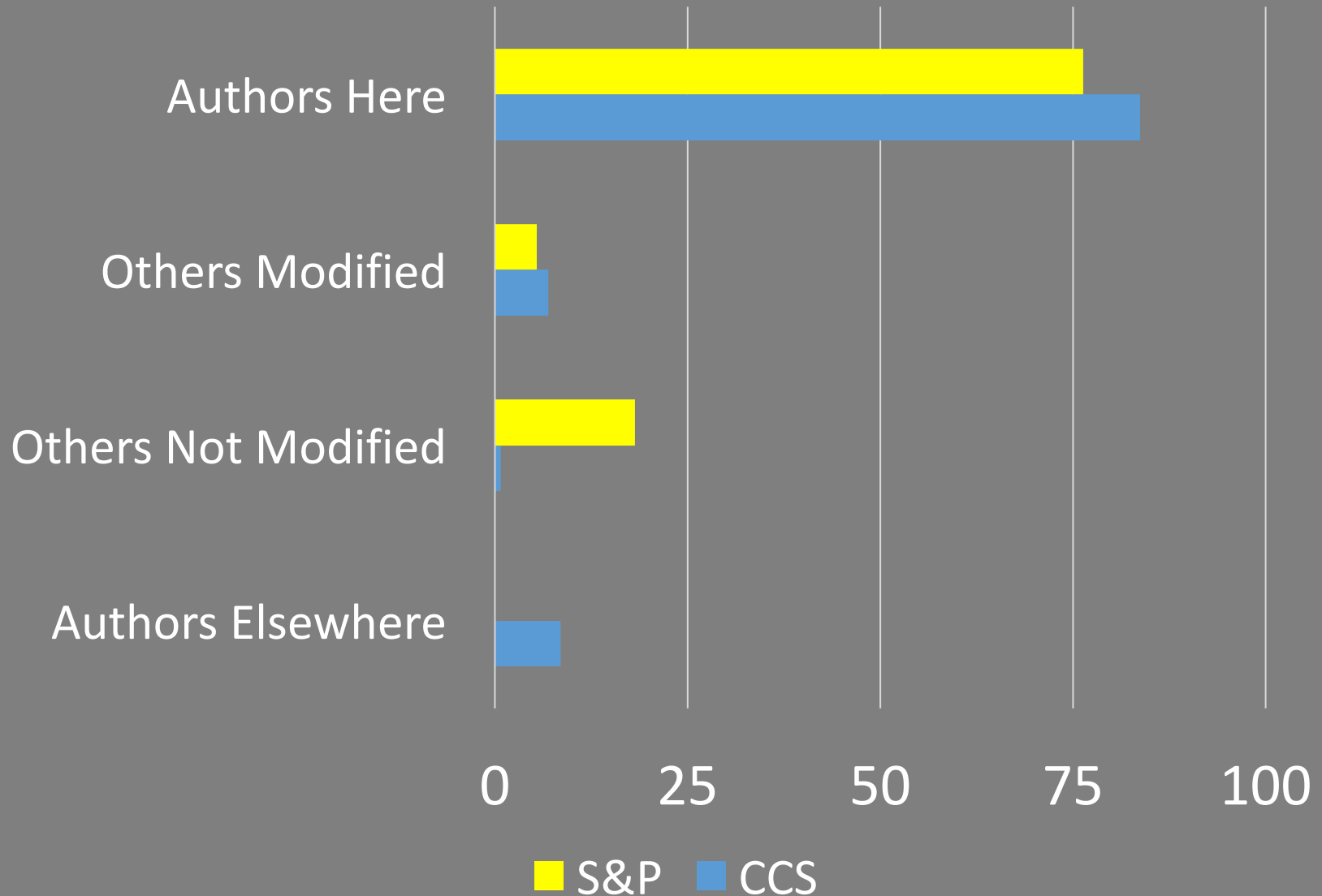
R1: Paper Characteristics

RQ1.2: Method of Evaluation



R1: Paper Characteristics

RQ1.3: Building on Prior Work

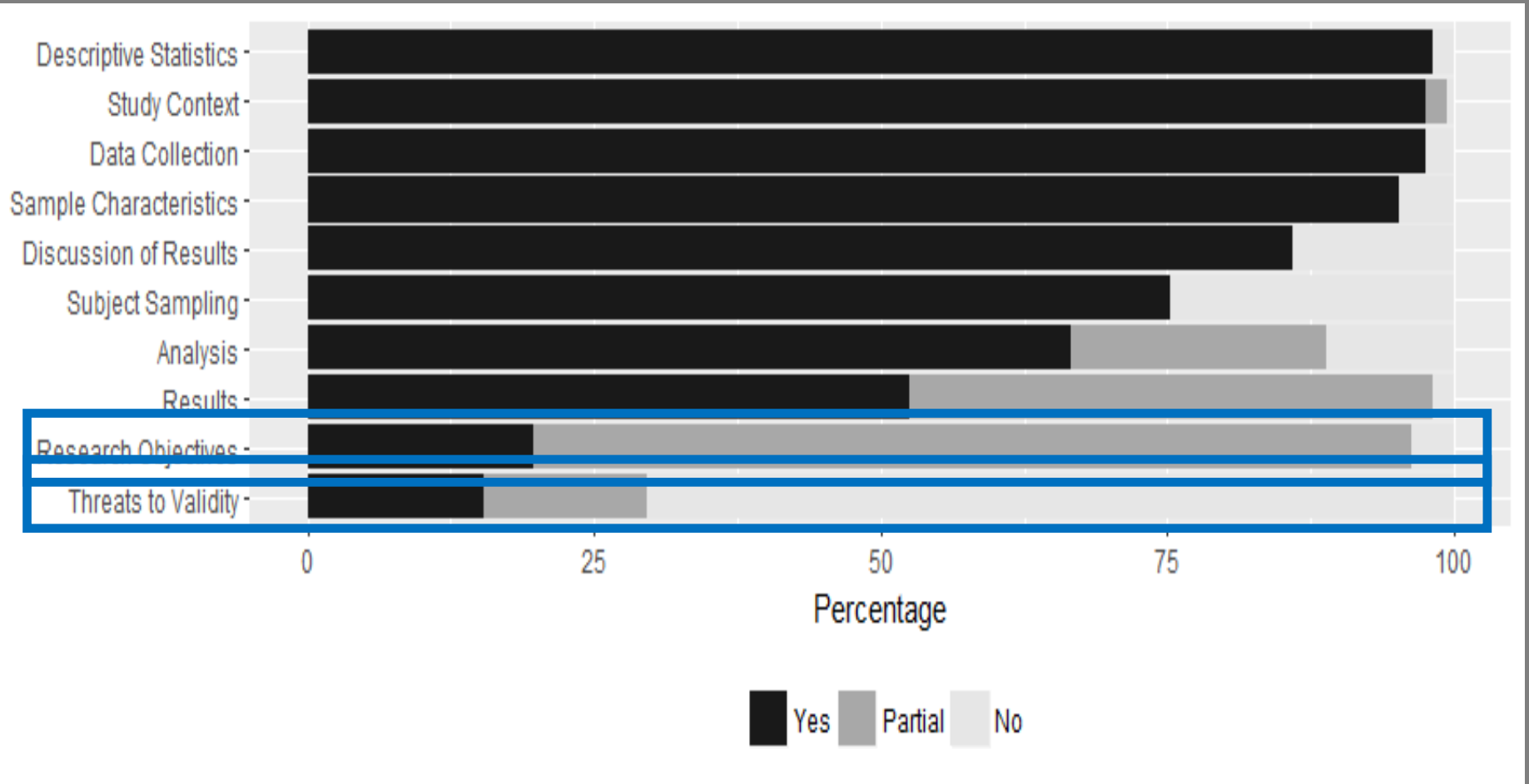


RQ1: Paper Characteristics

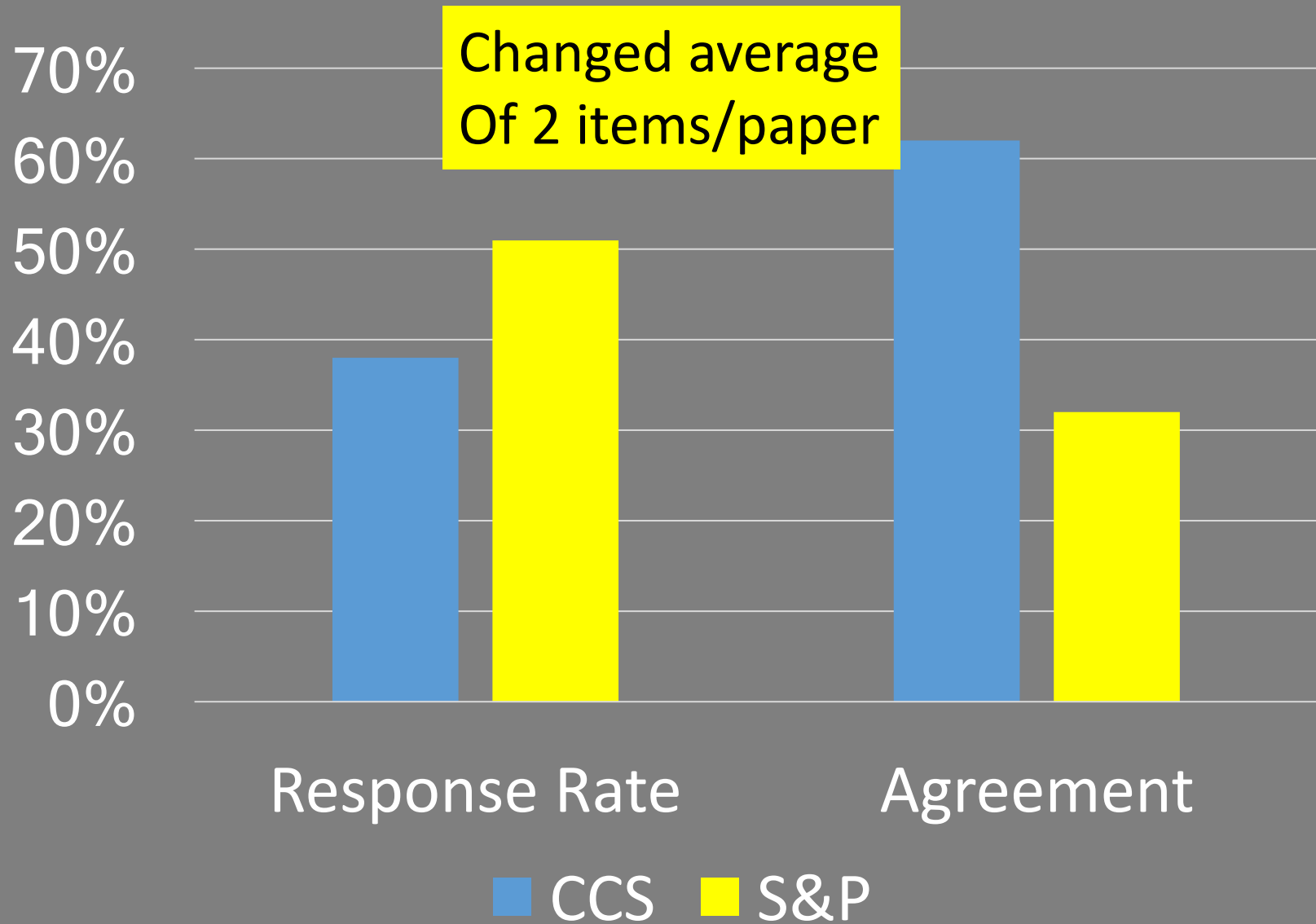
RQ1.4: Subject Type x Approach Type

	Empirical	Proof	Discussion
Process	27	9	2
Tool	104	3	3
Model	23	18	0
Protocol	21	20	5
Theory	7	0	0

RQ2: Paper Completeness



Author Feedback



Author Feedback: Changes

No

Partial

Yes

Threats to
Validity

Analysis
Procedures

Research
Objectives

 S&P

 CCS

Comparison with Prior Results

- Most common Evaluation Subject - **Tools**
- Most common Evaluation Approach – **Empirical Studies**
- Little evidence of Replication
- Most studies missing Threats to Validity

The Team



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