

Replication Studies

Introduction and overview

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Plan

- What do I know about replication research?
- What is replication and why is it important?
- Considerations for selecting a study to replicate
- Recommended practices for executing and writing up a replication study

What do I know about replication research?

- Before we start:
 - What is (or is not) a replication study?
 - Why are replication studies important?
 - Other thoughts about replication research

<https://tinyurl.com/6zy3yrws>



What is replication research?

What is replication research?

- Replication is a research tool used to confirm, consolidate, and advance knowledge and understanding within empirical fields of study
- A replication study
 - repeats a previous study's research design and methods with or without changes
 - collects new data
 - compares previous study's results with those from the new study

(Brandt et al., 2014; Isager et al., 2021; Marsden et al., 2018; National Academies of Sciences, Engineering, and Medicine, 2019; Nosek & Errington, 2020; Porte & McManus, 2019)

What is replication research?

- A replication study is defined as a new empirical study with new data that addresses the same or similar research question and/or hypothesis as a previous study

(Brandt et al., 2014; Isager et al., 2021; Marsden et al., 2018; National Academies of Sciences, Engineering, and Medicine, 2019; Nosek & Errington, 2020; Porte & McManus, 2019)

Why are replication studies
important?

Why are replication studies important?

- Replication:
 - allows us to better understand how a study's research data were collected, measured, analyzed, and interpreted
 - provides a systematic framework for reconsidering, refining, extending, and sometimes limiting prior research findings

(King & Mackey, 2016; Marsden et al., 2018; McManus, 2022; Peterson & Panofsky, 2021; Plucker & Makel, 2021; Porte, 2012; Porte & McManus, 2019; Porte & Richards, 2012; Zwaan et al., 2018)

Why are replication studies important?

- In many fields, replication = corner-stone of the research process
- Revisiting established claims and previous studies is a long-accepted means of advancing knowledge, understanding, and theory-building
 - That is, replication is an essential and established part of the research process
 - Result = greater confidence in findings
 - Result = stronger foundation for future research

Why are replication studies important?

- Claims that replication studies are infrequent and poorly designed are troubling
 - indicates an uncritical approach to how a field accumulates knowledge and builds theories
- Strong reason why calls for replication are becoming more common and why resources are needed to support the conduct of replication studies

Approaches to doing replication research

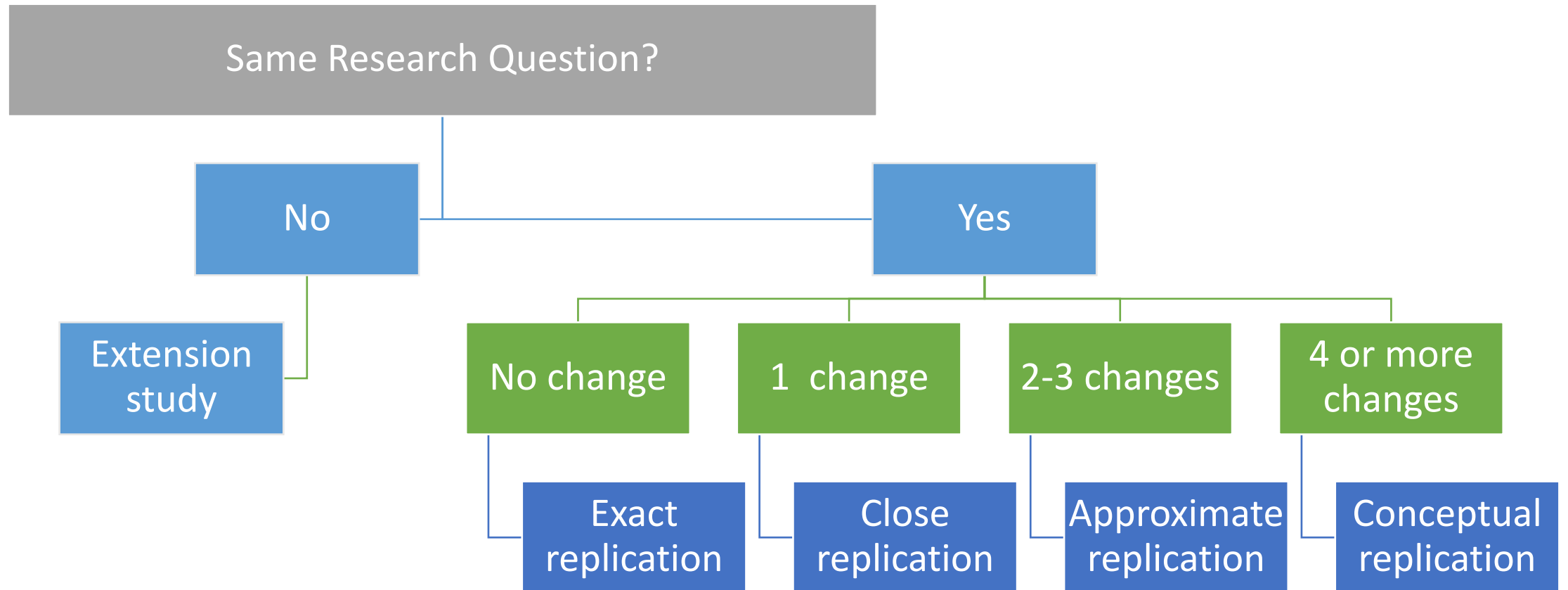
Approaches to doing replication research

- Aim is to design and report a new empirical study that repeats a previous piece of research in some way, with systematic comparison throughout
- The amount of change between the initial study and the replication should be reported in the study's title, abstract, and main text
 - exact replication, close replication (also partial), approximate replication, and conceptual replication

Approaches to doing replication research

- Exact replication
 - previous study's entire design, methods, and procedure is followed without alteration
 - uses same data sample (i.e., participants), research questions, design, and methods
- Close replication
 - modifies only one major variable, with everything else unchanged
 - E.g., features of the data sample, or the data collection materials, or the procedures, or the analyses
- Conceptual replication
 - Asks same general research question as a previous study but typically with differences in the research design and/or methods (e.g., different data sample, materials)

Flow chart of decisions for replication type



(adapted from Porte & McManus, 2019)

What to replicate and why?

What to replicate and why?

- The question of what to replicate and why has received comparatively little attention
 - Constitutes a critical step toward guiding and encouraging the conduct of replication studies
 - Relevant because we work under resource constraints (e.g., time, money)
- How do researchers decide which claims/studies to replicate?
 - Can understanding this question tell us something about the claims that we hold important and/or value the most?

What to replicate and why?

Reason	Description
Statistical	Statistical results inconsistent, power, precision
Theoretical	Finding is theoretically important
Methodological concern	Threats to validity, failed/few replications
Personal interest	Author's own interest/curiosity in topic
Year of publication	Current/relevant research questions
Citations	Finding is frequently/widely cited
Public/societal impact	Finding used in popular press, policy, education
Surprising findings	Finding is unexpected/odd
Bayesian decision making	Bayes factors to identify statistically ambiguous claims
Availability of materials	materials, data, analysis protocol available

(Brandt et al., 2014; Field et al, 2019; Isager, 2018; Isager et al., 2021; Mackey, 2012, Marsden et al., 2018; McManus, 2021, 2022; Nosek & Lakens, 2013; Porte, 2012, 2013; Porte & McManus, 2019)

What to replicate and why?

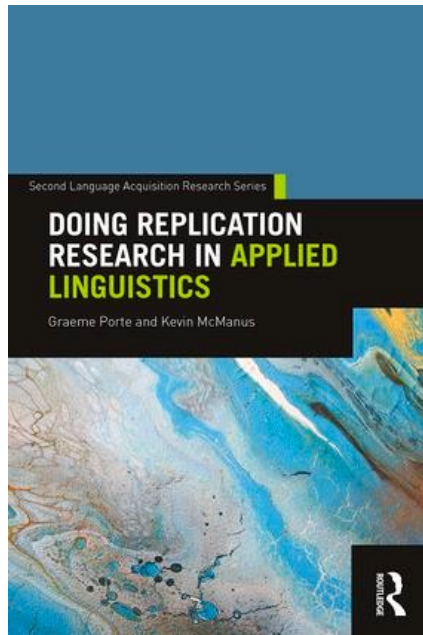
- Findings most in need of replication are studies in which:
 - the initial study's methodology and importance/value are sound
 - but the (statistical) evidence is ambiguous
- Important/valuable claims with strong evidence are less likely to need additional corroboration
- Isager et al. (2021) recommend prioritizing four factors:
 - a) Value/importance of the research topic
 - b) Uncertainty of evidence underlying the claim
 - c) Ability of the replication study to reduce uncertainty about the claim
 - d) Costs and feasibility of executing a replication study

Recommended practices for
executing and writing up
replication studies

Recommended practices for executing and writing up replication studies

1. Replication is defined by comparison
2. Don't change too much
3. A replication needs a motivation
4. Clearly identify your replication study

- For more recommendations, including models for writing up, see



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Thank you!

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Questions? Comments?

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