Background
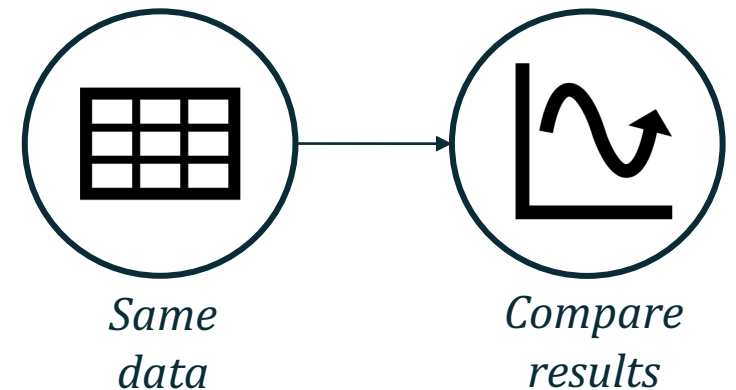

Supervised by Dr. Joe Warne

What is replication?

Replication is retesting a claim using the same analyses and new data (Nosek et al, 2020)

Same methods → *New sample and data* → *Compare results*

Reproducibility is retesting a claim using the same analyses and same data (Nosek et al, 2020)

Same data → *Compare results*

Types of replication

Exact
replication

Systematic
replication

Direct
replication

Conceptual
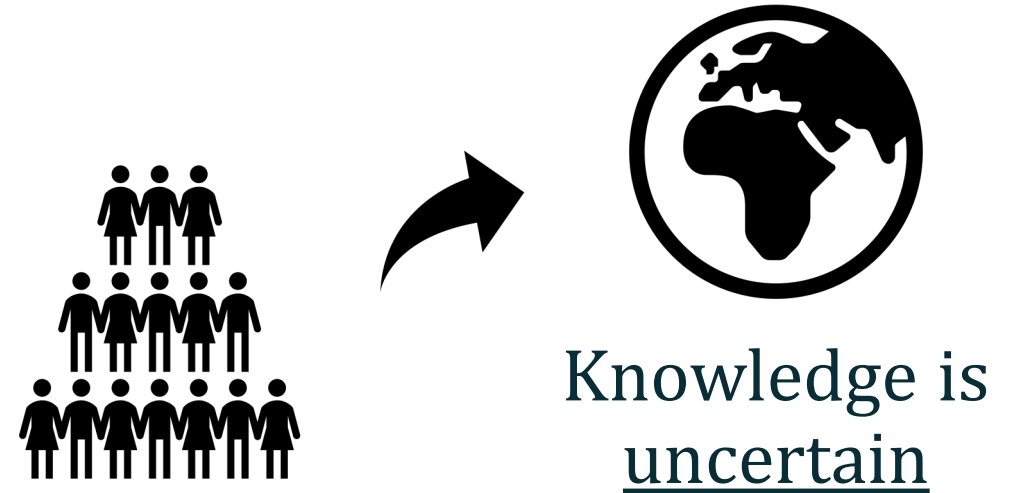replication

Close
replication

Literal
replication

Operational
replication
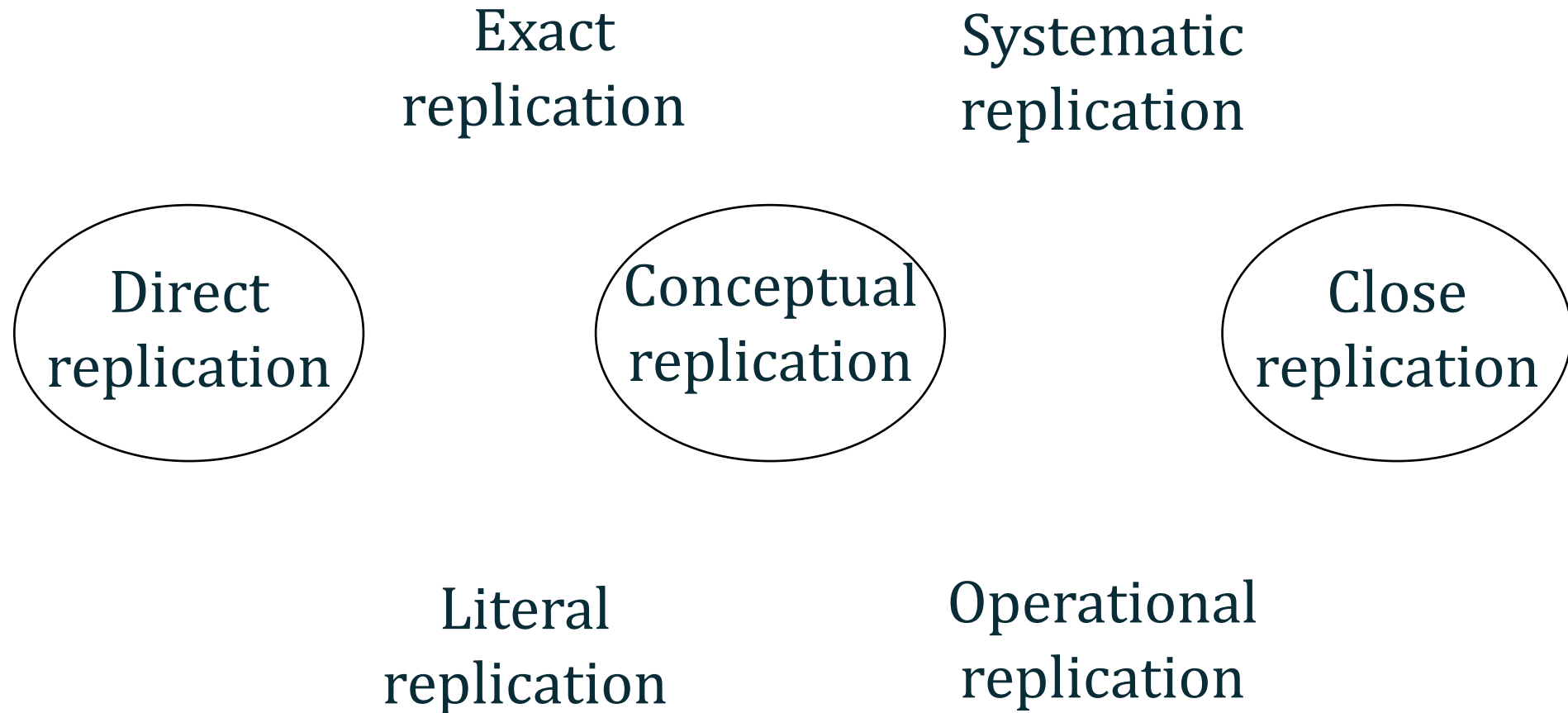
Why replicate?

Rigorous science is the "*theoretical or experimental approaches undertaken in a way that enhances confidence in the veracity of their findings*"

(Casadevall and Fang, 2016, p1)

Knowledge is <u>uncertain</u>

Purpose:
- Increase confidence in findings
- Reaffirm findings
- Update boundaries on external validity
- Identify type 1 errors

The problem with Sports Science

Focus on novel or exciting effects

Questionable research practices

€ Invested interests

Low statistical power & small sample sizes

Lack of transparency

Change is coming

Strengthening the Practice of Exercise and Sport-Science Research

in International Journal of Sports Physiology and Performance

Israel Halperin, Andrew D. Vigotsky, Carl Foster, and David B. Pyne

View Less —

Moving Sport and Exercise Science Forward: A Call for the Adoption of More Transparent Research Practices

Aaron R. Caldwell[1] · Andrew D. Vigotsky[2,3] · Matthew S. Tenan[4] · Rémi Radel[5] · David T. Mellor[6] · Andreas Kreutzer[7] · Ian M. Lahart[8] · John P. Mills[9] · Matthieu P. Boisgontier[10] · Consortium for Transparency in Exercise Science (COTES) Collaborators

Education review

Call to increase statistical collaboration in sports science, sport and exercise medicine and sports physiotherapy 🔓

Kristin L Sainani [1], David N Borg [2], Aaron R Caldwell [3], Michael L Butson [4], Matthew S Tenan [5], Andrew J Vickers [6], Andrew D Vigotsky [7], John Warmenhoven [8, 9], Robert Nguyen [10], Keith R. Lohse [11], Emma J Knight [12], Norma Bargary [13]

Correspondence to Dr Kristin L Sainani, Epidemiology and Population Health, Stanford University, Stanford, California, USA; kcobb@stanford.edu

- STORK
- Registered Reports
- Preregistration
- Data sharing

Sports Science Replication Centre

SSRC

The Sports Science Replication Centre

Aim

- Evaluate the replicability of sports science research

Objectives

- Establish a collaborative lab network worldwide
- Undertake replication trials of different effects
- Report replication outcomes using meta–analytic procedures
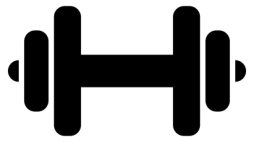- Present an initial overview of the replicability of sports science research

Large replication projects
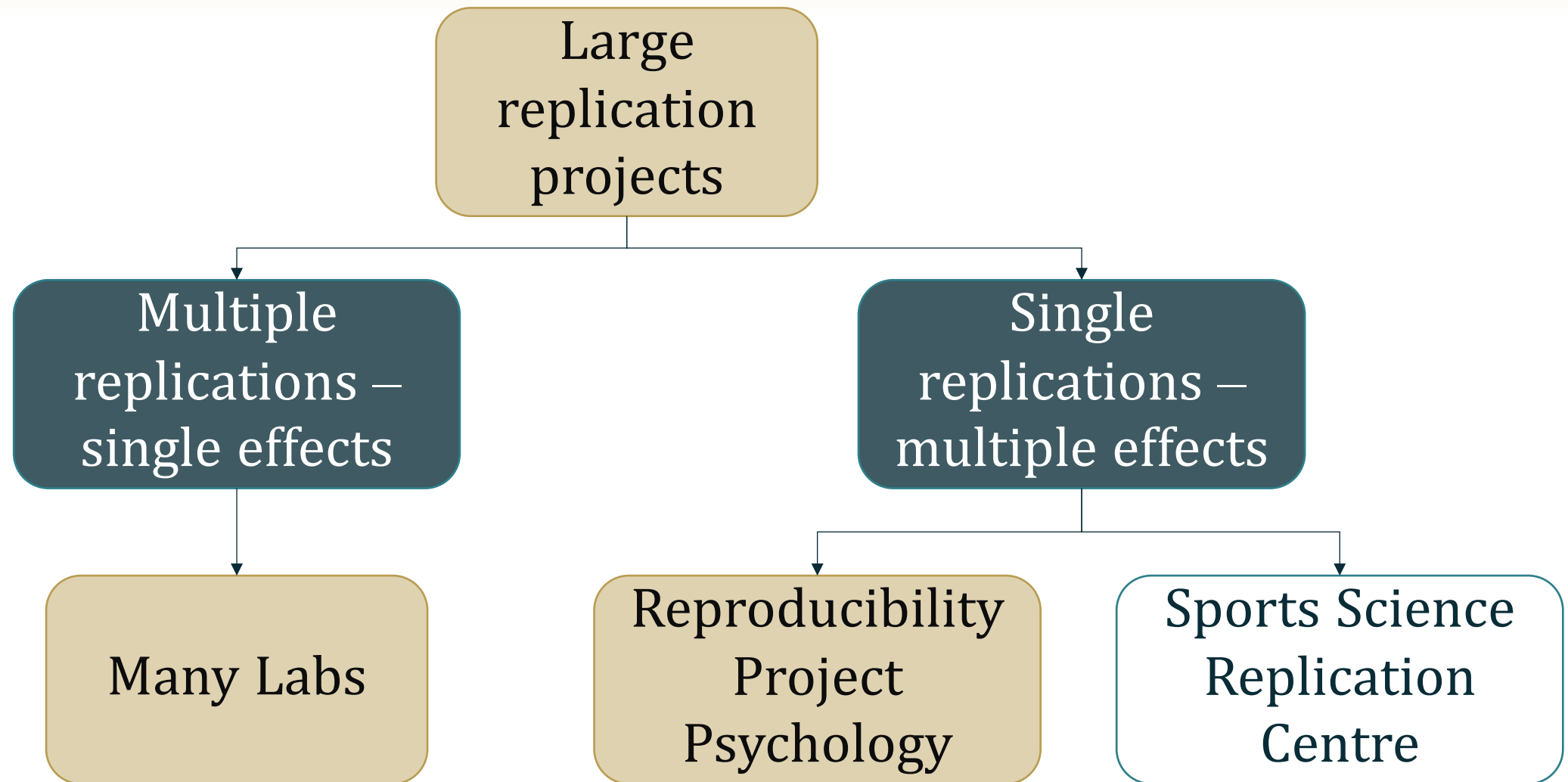
Timeline（short term）
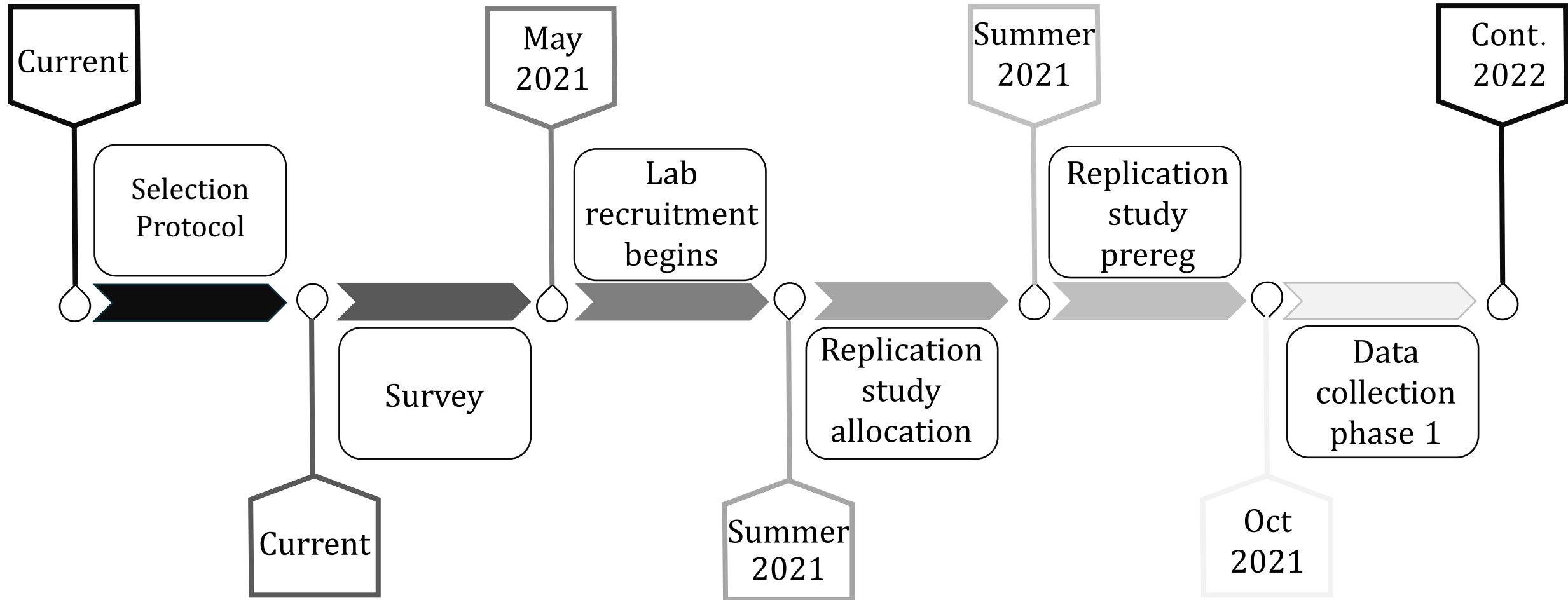
Lab recruitment

Who?

Sports and exercise science researchers

Where?

Worldwide!

Suggestions for conducting a replication study:

Conduct it yourself

Undergrad project

Research internship

Postgrad project

Why become involved?

1. Contribute towards the first *collaborative* replication project in sports and exercise science

2. Lead the way towards *open science* in the field

3. All *methods and analysis are preplanned* by the team leader

4. Write up and *final analysis will be completed* by the team leader

5. Each lab will receive a study that is *feasible* to conduct

6. Each author who makes a substantial contribution will receive *authorship*

Selection Protocol

Year of publication and journal ranking

→

- Previous 5 years
- Q1 journals

Research disciplines

→
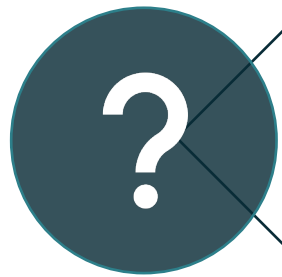
- Applied sport and exercise science

Selection Protocol

Study types →
- Experimental studies
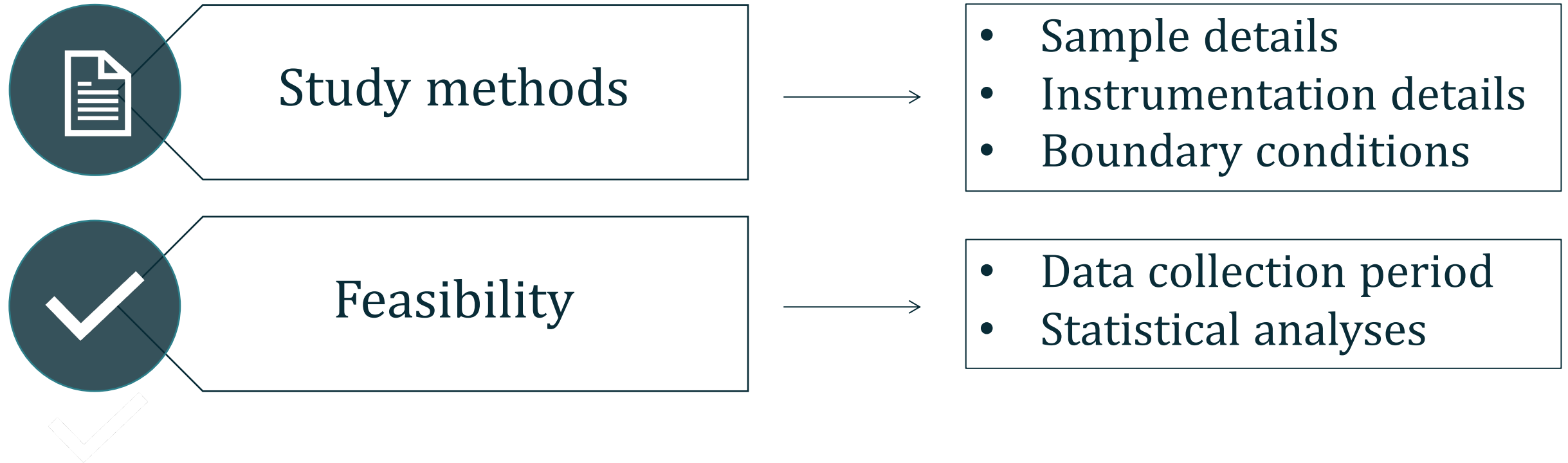 - Effect of IV on DV
- Means, effect size and confidence intervals

Research question and key variable →
- One dependent variable
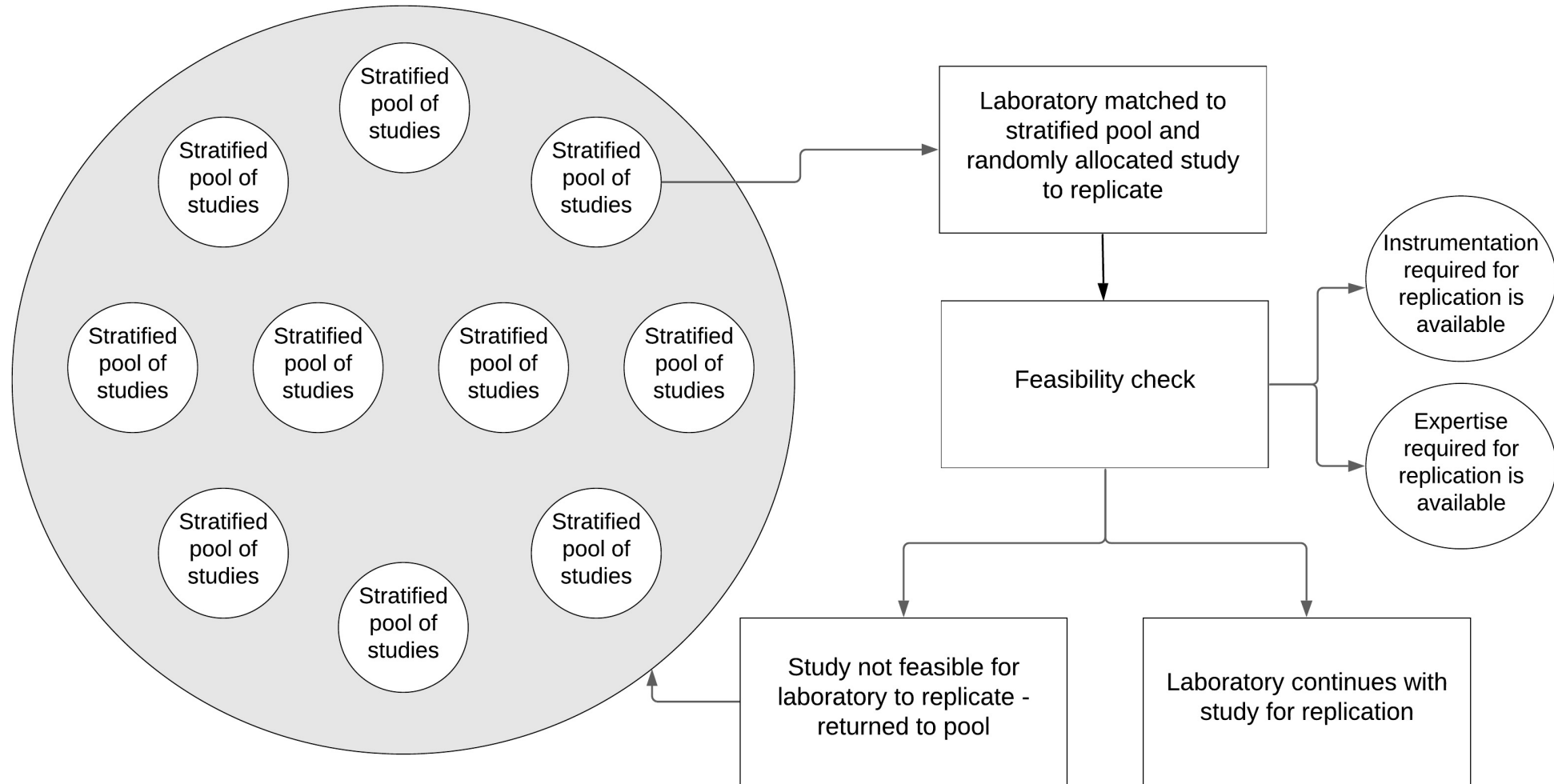- Stated in first hypothesis or abstract

Selection Protocol

Study methods →
- Sample details
- Instrumentation details
- Boundary conditions

Feasibility →
- Data collection period
- Statistical analyses

Allocation to lab

Conducting the replication

Statistical Power

- High powered replication studies (95%)
- Correction for publication bias
- Correction for effect size uncertainty
- Anderson and Kelley's R package "BUCSS" (2017)

1 Local ethics approval

2 Data sharing agreement

3 Follow sample guidelines

4 Follow procedural guidelines

5 Collect data

6 Send raw data back

Assessing the outcomes

Multiple inferential strategy
1. Replication effect size is statistically significant
2. Same direction as original effect size
3. Original effect size falls into 95% confidence interval of replication effect size

Descriptive information
1. Normalized differences in the magnitude of the effect sizes
2. Included and excluded studies as per selection protocol
3. Original author response rates

Reporting the outcome

Successful replication 👍

Failure to replicate ?

- Original effect is false
- Replication is false
- Methods differed
- Error

What this project is not

A personal attack on researchers in the field

The final evaluation of replicabilty

Statistically significant & non-significant effects

Published & non-published research

Future

Focus on specific sub–disciplines	Popular effects	Self–replications
Personal interests	Highly cited effects	Conceptual replications
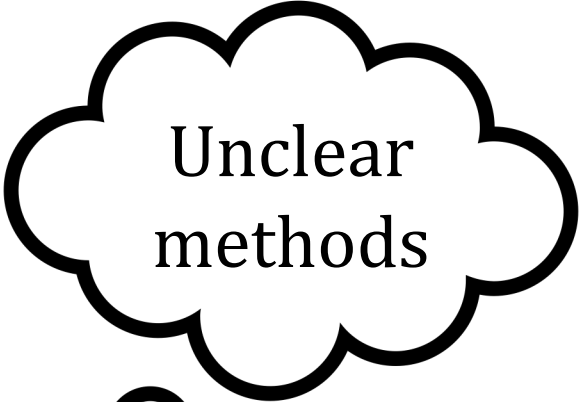
Considerations and barriers

Conclusion

📢 **Help us – volunteer labs needed!**

Contact us:

💻 https://ssreplicationcentre.com
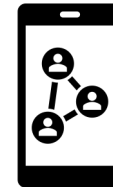
📱 @JennyMurphy2

✉️ Email: x00170612@mytudublin.ie

Thank you!

https://ssreplicationcentre.com

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