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Estimating the prevalence and antecedents of questionable research practices in student theses in psychology from self-reports

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Anand Krishna & Sebastian M. Peter

What are QRPs?

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General Article

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False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant

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Abstract

In this article, we accomplish two things. First, we show that despite empirical psychologists' nominal endorsement of a low rate of false-positive findings (≤ .05), flexibility in data collection, analysis, and reporting dramatically increases actual false-positive rates. In many cases, a researcher is more likely to falsely find evidence that an effect exists than to correctly find evidence that it does not. We present computer simulations and a pair of actual experiments that demonstrate how unacceptably easy it is to accumulate (and report) statistically significant evidence for a false hypothesis. Second, we suggest a simple, low-cost, and straightforwardly effective disclosure-based solution to this problem. The solution involves six concrete requirements for authors and four guidelines for reviewers, all of which impose a minimal burden on the publication process.

Why QRPs?

Scientists employ QRPs because…

- Significant results get published and publishing is necessary for a career

  Shamoo & Resnick, 2003; Song et al., 2000; Tijdink et al., 2014

- They are socialized to do so by mentors and environments

  Swazey et al., 1993; Versteege, 2013

…but there is little research looking at proximal predictors for these processes!

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Possible proximal predictors:

- Expectation of reward from significant results
- Stress

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Possible proximal predictor:

- Attitudes of mentors towards QRPs
- Belief in scientific value of significant results
- Motivation to do good work

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Conduct Your Ow

If you haven't read the original paper, or have forgotten it by now, let me refresh your memory: our original values describe *the amount of carrots served to elementary school children (ages 8 to 11) at lunch in a control condition.*

And, apparently, at least one of them is a Clydesdale horse.

HELLO I AM REGULAR HUMAN CHILD GIVE CARROTS NO

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Search results for “questionable research practices” in r/psychologystudents

Sorry, there were no post results for “questionable research practices”

QRPs in psychology

Students are an important group to investigate!

- Future researchers and leaders of the academic field
- Proper development of critical faculties for research findings as nonacademic professionals
- Purest expression of the field's commitment to high scientific standards

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What is going on with QRPs in the student world?

QRPs in psychology

- The final thesis is the most direct measure of a student's ability to apply scientific principles

- Several possible structural similarities exist between predictors of QRP use in scientists and those in students

Why QRPs?

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Possible proximal predictors:

- Expectation of reward from significant results
- Stress

Why QRPs?

Students may employ QRPs because of perceptions that…

- Significant results lead to better grades
- The advisor expects significant results
  - Significant results are more useful for the advisor!
- Stress
  - Trying to get a simple “story” from the data to ease writing the thesis

Why QRPs?

Scientists employ QRPs because…

- They are socialized to do so by mentors and environments

  Swazey et al., 1993; Versteege, 2013

Possible proximal predictor:

- Attitudes of mentors towards QRPs
- Belief in scientific value of significant results
- Motivation to do good work

Why QRPs?

Students may employ QRPs because of perceptions that…

- The advisor thinks of QRPs as good practice
- Significant results are a sign of good science

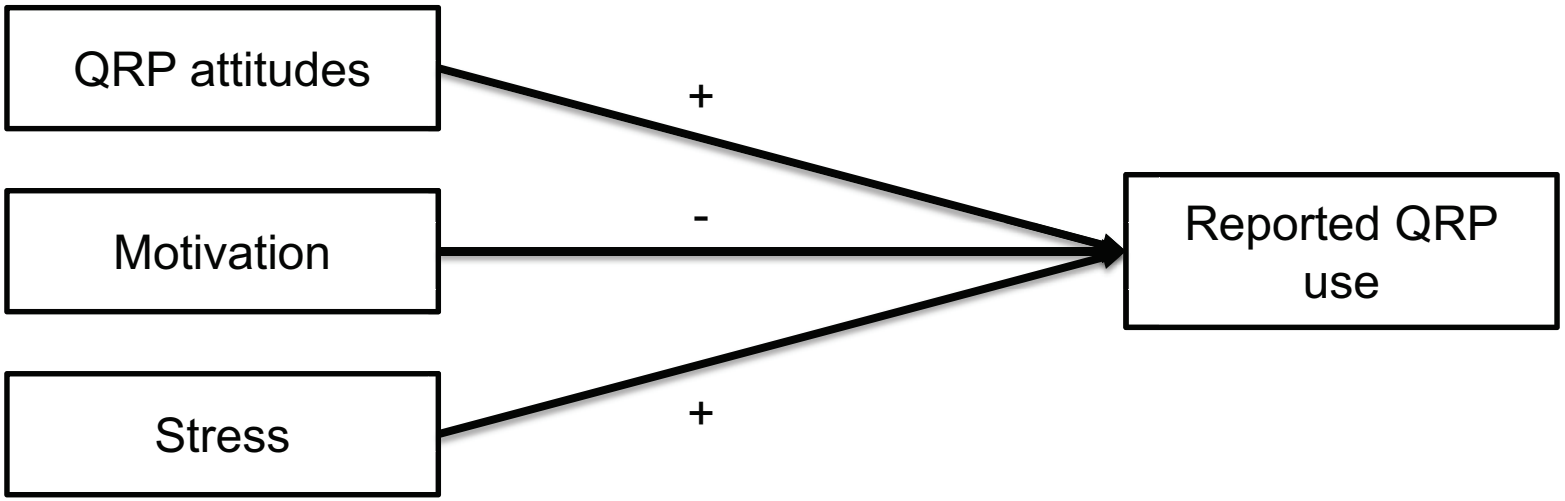
…or because of low motivation to do conscientious work.

Theses – research questions

- How prevalent are QRPs in student theses?
- What attitudes and circumstances lead students to engage in QRPs?
- What influence do advisor attitudes have on students' QRP use?
- Do structural aspects of thesis work affect QRP use?
  - Students may have less control over design aspects of their work than over reporting or analysis

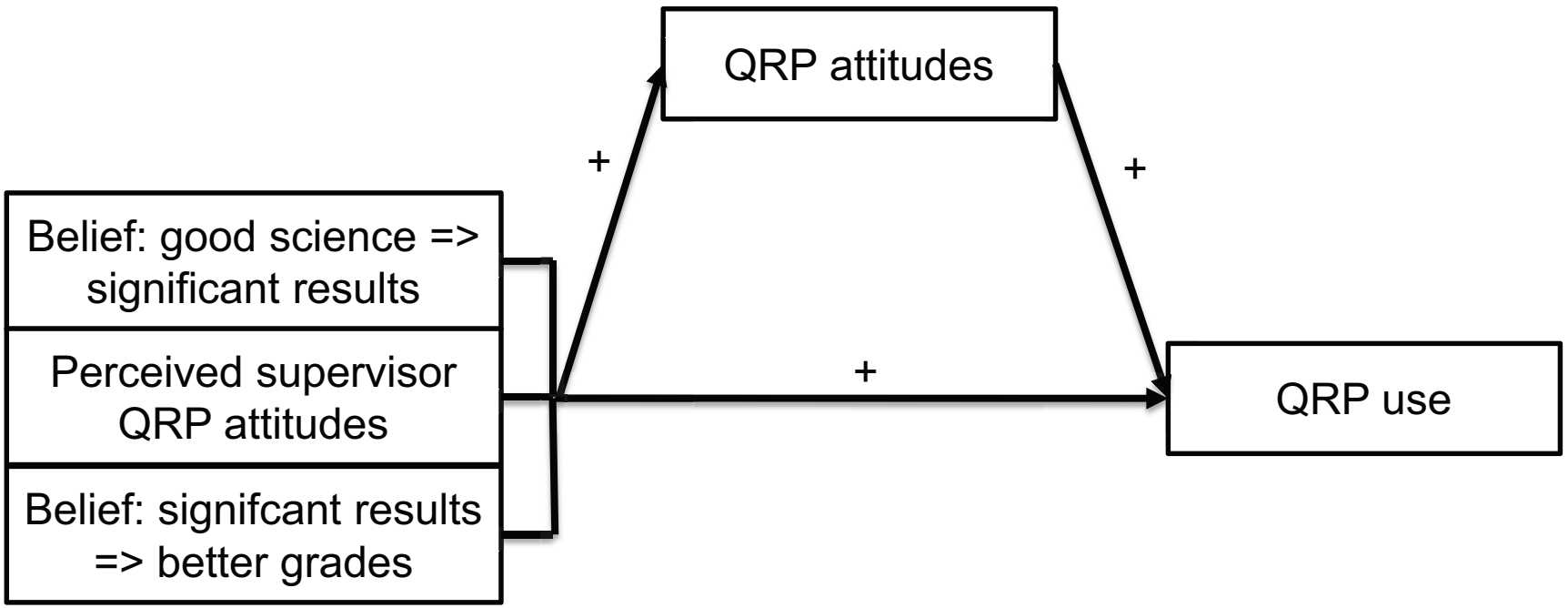
Hypotheses

H1:



Hypotheses

H2:



Hypotheses

H3: All relationships should be stronger for reporting and analysis QRPs than for study design QRPs

Data collection

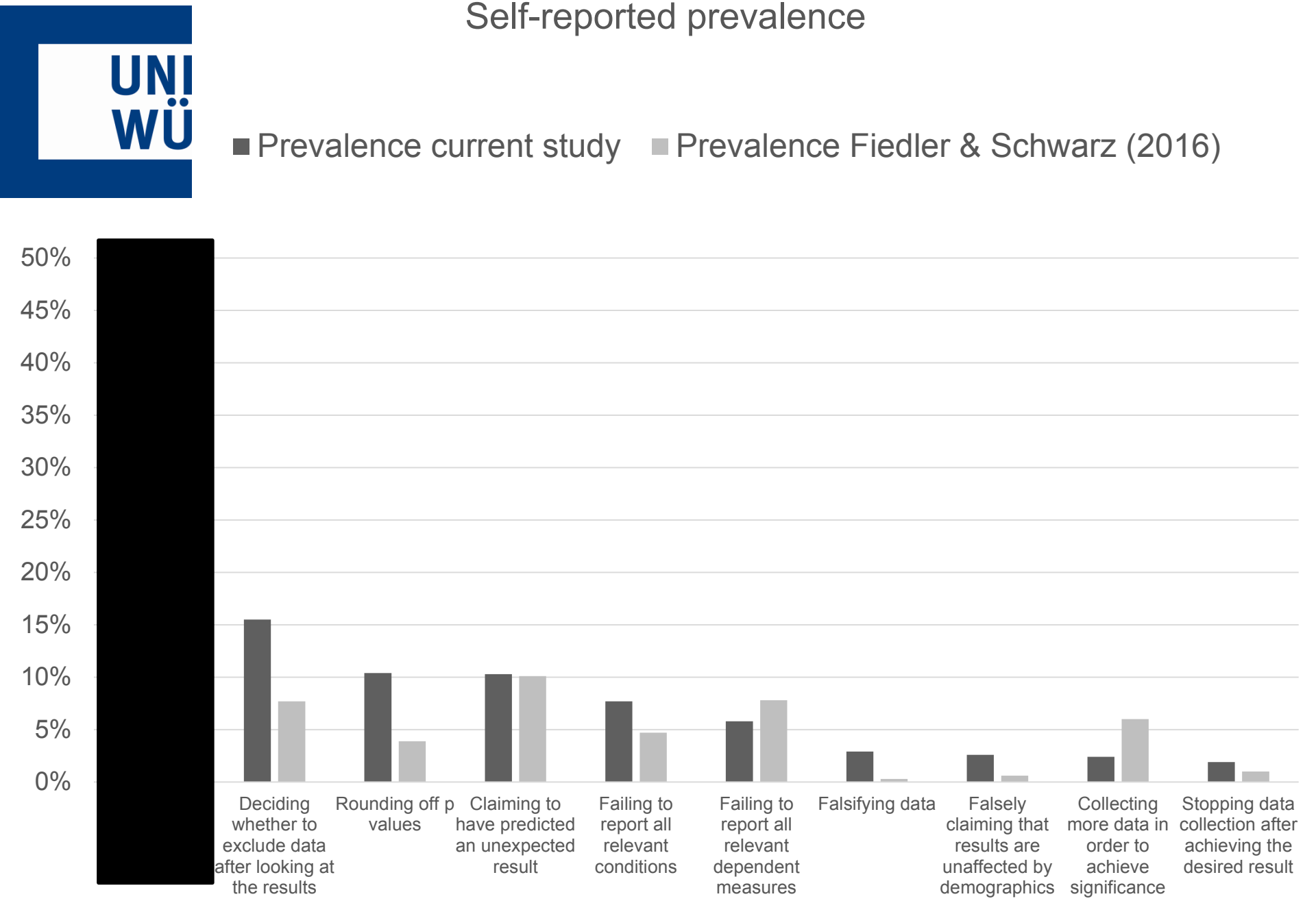
- Data from *N* = 207 students (varies by analysis due to nonresponses)
- QRPs taken from Fiedler & Schwarz (2016), Questions on:
  - implementation in thesis (yes/no)
  - own attitude
  - perceived supervisor attitude

    (attitude items scored 1 – problematic to 5 – sensible)
  - All questions had “don’t know” option

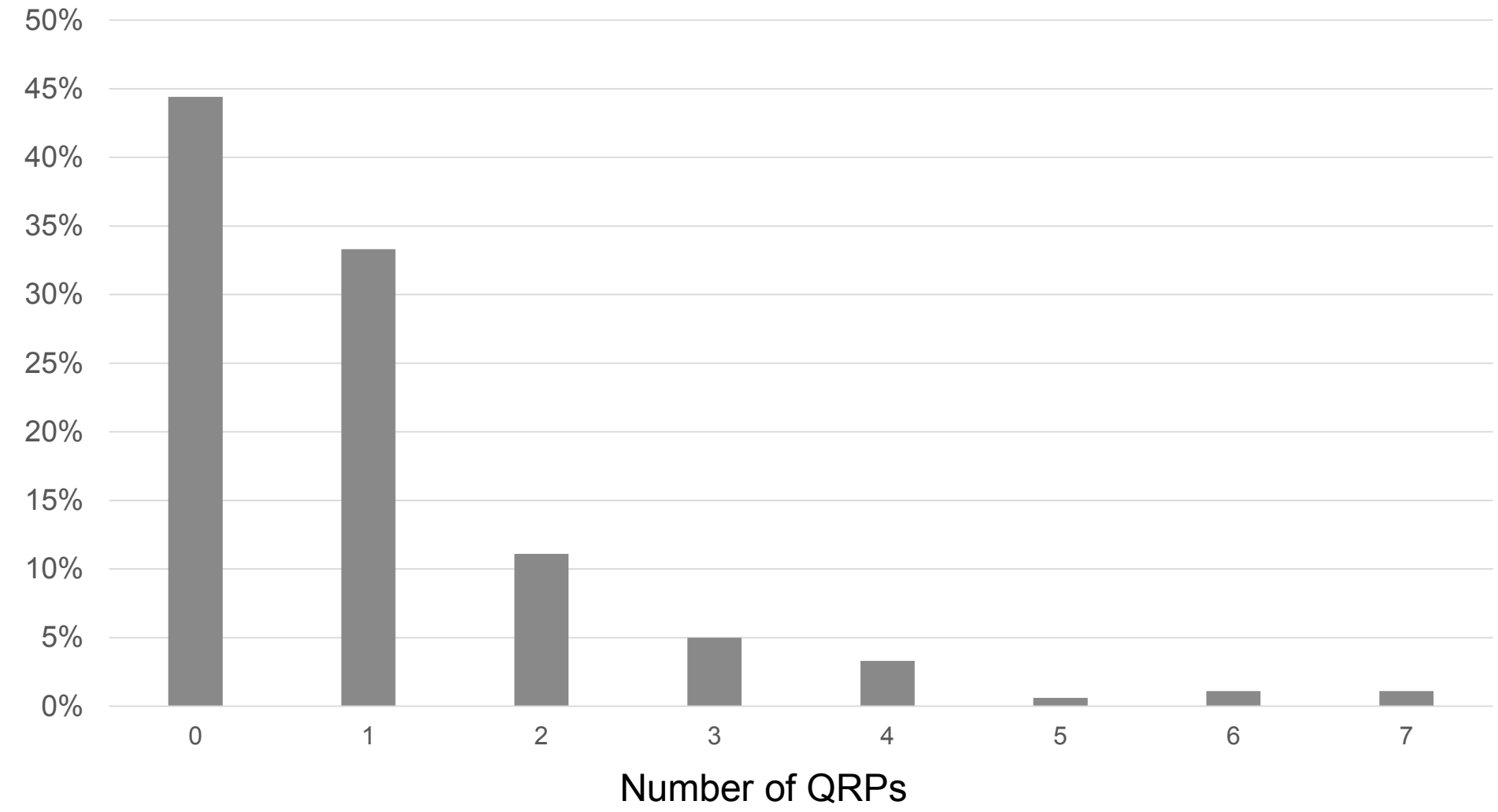
Survey contents

- Lists of QRPs taken from Fiedler & Schwarz (2016), augmented with an item on HARKing and four distracter items (e.g. “performing a power analysis”)
  - Ich habe im Rahmen meiner Abschlussarbeit mindestens einmal… (ja/nein/weiß nicht)
  - [QRP] finde ich… (1 „problematisch“ – 5 „sinnvoll“ oder „weiß nicht“)
  - [QRP] findet mein Betreuer… (1 „problematisch“ – 5 „sinnvoll“ oder „weiß nicht“)

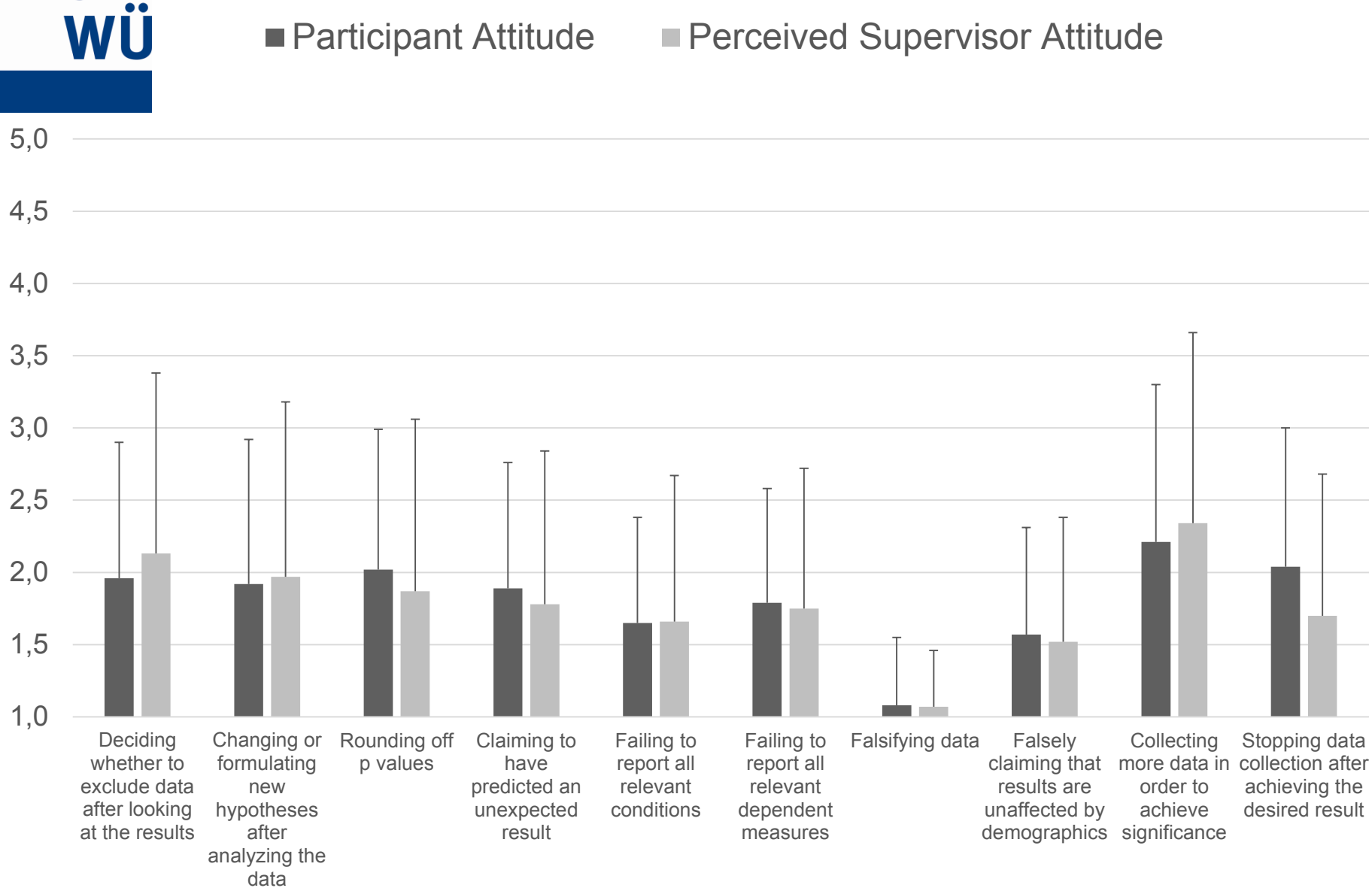
Self-reported prevalence



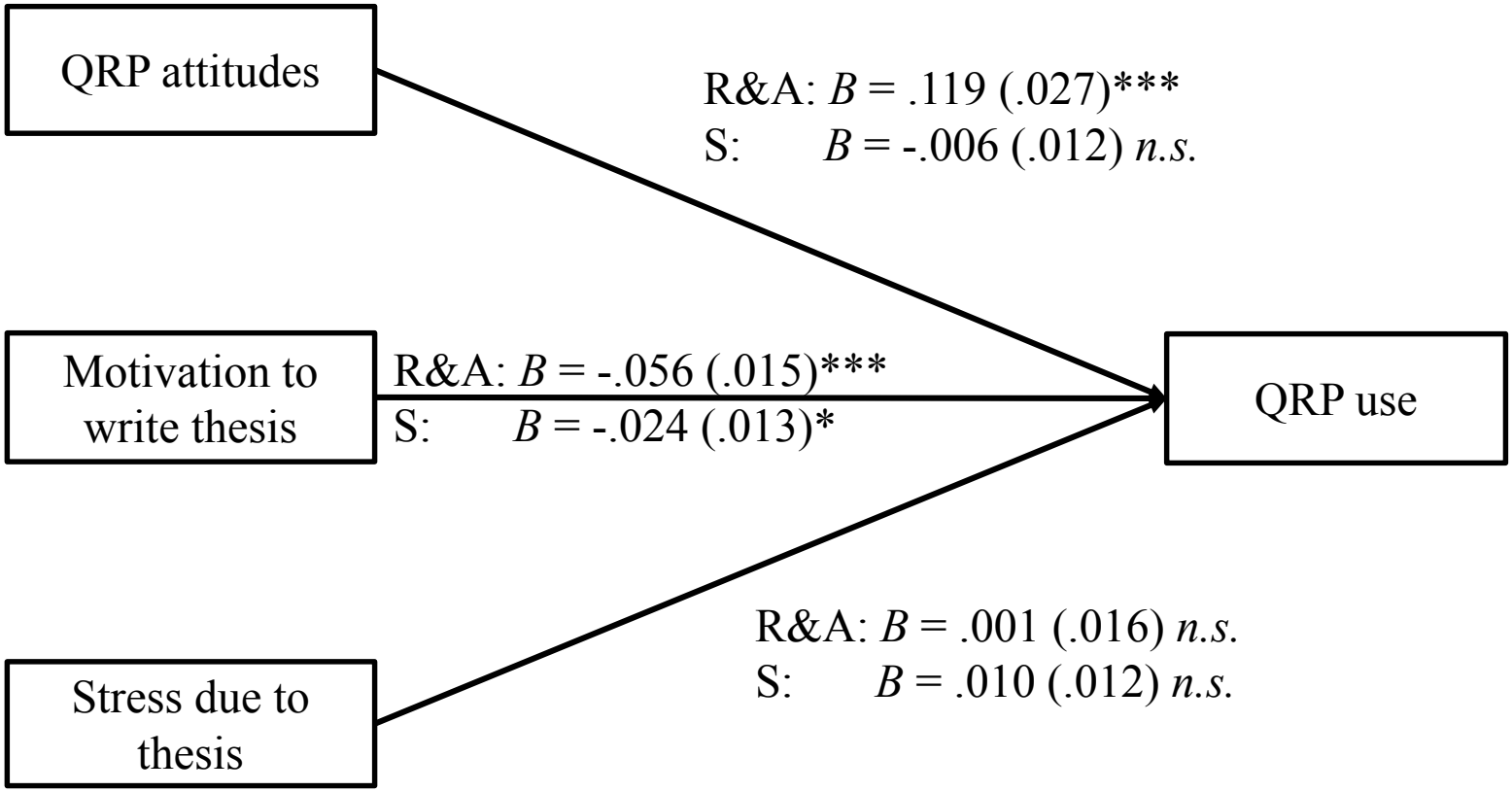
Percentage of students reporting engaging in multiple QRPs



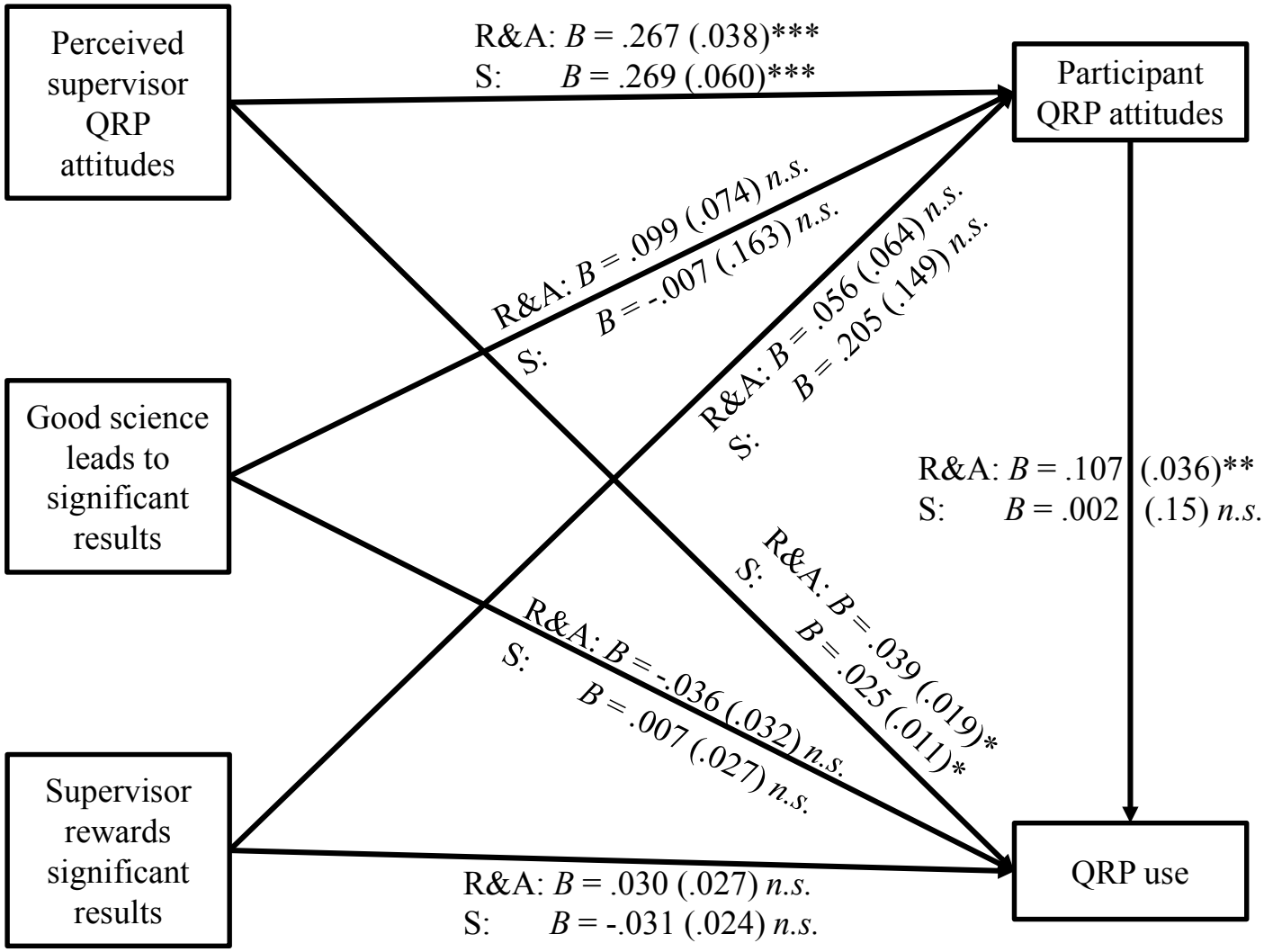
Attitudes towards QRPs



Results


QRP attitudes
R&A: B = .119 (.027)***
S: B = -.006 (.012) n.s.
Motivation to write thesis
R&A: B = -.056 (.015)***
S: B = -.024 (.013)*
QRP use
R&A: B = .001 (.016) n.s.
S: B = .010 (.012) n.s.
Stress due to thesis

Results


Perceived supervisor QRP attitudes
Good science leads to significant results
Supervisor rewards significant results
Participant QRP attitudes
QRP use
R&A: B = .267 (.038)***
S: B = .269 (.060)***
R&A: B = .099 (.074) n.s.
S: B = -.007 (.163) n.s.
R&A: B = .056 (.064) n.s.
S: B = .205 (.149) n.s.
R&A: B = .107 (.036)**
S: B = .002 (.15) n.s.
R&A: B = .039 (.019)*
S: B = .025 (.011)*
R&A: B = -.036 (.032) n.s.
S: B = .007 (.027) n.s.
R&A: B = .030 (.027) n.s.
S: B = -.031 (.024) n.s.

Limitations

- Self-report study
  - Social desirability?
  - Fear of repercussions?
  - Participants competent to judge QRP use?
- Cross-sectional design
  - Causality issues: do attitudes predict QRP use or does QRP use bias attitudes? Do students infer supervisor attitudes from their own?
  - Participants able to judge supervisor attitudes accurately?

Conclusion

- Motivation appears to be a protective factor in student QRP use
- Student attitudes towards QRPs predict their use
  - Only when they have influence, i.e. in reporting and analysis!
- Student's perception of their supervisor attitudes shapes their own attitudes and affects their reported QRP use directly
- Beliefs about significance may affect student QRP use, but if so, their influence is small

Implications

- Teaching
  - Supervisors must be careful what attitudes they project to students!
  - Motivating students might encourage them to avoid QRPs
- QRP use in academia
  - Students' reported QRP use is comparable to that of career academics
  - Students do not endorse QRP use at the start of their career
  - Academic collaborators' role (as data analysts, authors, etc.) can dictate in which QRPs they engage

THANKS FOR THE ATTENTION!!!

Survey contents

- General motivation (3 items, α = .62)

  „Ich finde das Arbeiten an meiner Abschlussarbeit spannend und interessant“

- Stress (3 items, α = .82)

  „Die Arbeit an meiner Abschlussarbeit ist für mich belastend“

Survey contents

- Significant results important for grade (3 items, α = .81)

  „Meine Note hängt davon ab, ob meine Ergebnisse signifikant sind“

- Good science produces significant results (3 items, α = .65)

  „Ein Nulleffekt heißt für mich, dass ich keine gute Arbeit geleistet habe“