

Advances in Social Thermoregulation

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Goals of the talk

- Identify basic principles in the Social Thermoregulation (ST) literature
- Discuss evidence in the ST literature
- Identify gaps in the ST literature
- How to do ST Registered Reports
- Chart Individual Differences
- Sensor Validation + Standard Data Formats
- Observing social thermoregulatory mechanisms to identify mechanisms for causal predictions

Basic principles

- Social thermoregulation is co-regulation of body temperature
- How that extends to interpersonal relationships - ?
- In social psychology, we can identify some basic principles, but have no theories
- Because of publication bias, our understanding of many mechanisms is too messy

ST Basic Principles 1

ST amongst humans: Modern social relations pleisomorphically organized around processes of body temperature regulation.

ST Basic Principles 2

Or: Modern social relations built on top of more ancient processes of body temperature regulation...

ST Basic Principles 3

Or: Modern social relations built on top of more ancient processes of body temperature regulation and temperature regulation is a main motivation for interpersonal attachments.

ST Basic Principles 4

Thermoregulation and attachment (cf. Bowlby, 1969)...

ST Basic Principles 5

Thermoregulation and attachment and co-regulation of temperature (e.g., Gottman & Levenson, 1992)

ST Basic Principles 6

Thermoregulation and attachment and co-regulation of temperature and environmental demands (Beckes & Coan, 2011).

ST Basic Principles 7

Homeothermic endotherms: Internal (but costly) regulation.

ST Basic Principles 8

Other homeothermic endotherms: Personal heaters.

ST Basic Principles 9

Case in point: Energy consumption of Octodon Degus (Nunez-Villega et al., 2014).

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Empirical Work - Humans

- Link between thermoregulation and interpersonal attachments
- Temperature manipulated or assessed

Reproducibility Crisis: Predictions

- P-hacking/analytic flexibility (Simmons et al., 2011)
- "Why most published research findings are false" (Ioannidis, 2005)
- Low statistical power (Button et al., 2013)

Reproducibility Crisis: Confirmations

- 27/51 findings replicate in ManyLabs 1-3 (Klein et al., 2014; 2018; Ebersole et al., 2016)
- ~40/100 in Reproducibility Project
- 13/21 findings from Science/Nature replicate (Cameron et al., 2018)

ST Literature - Insufficient

- Link between thermoregulation and interpersonal attachments
- Temperature manipulated or assessed
- Sometimes effect replicate, sometimes they don't

Meta-Analysis

- Take stock of the available evidence
- Identify potential gaps



Rhonda Hadi



Elisa Sarda



Rick Klein



Nick Coles



Ivan Ropovik

Meta-Analysis Take Home Message

- Enough evidential value in the Social Thermoregulation (ST) literature
- Considerable heterogeneity in ST
- No evidence that effects are moderated by climate, but moderated by gender
- Strength of evidence differs across subfields/methodologies
- Literature messy (principles vs. theories)

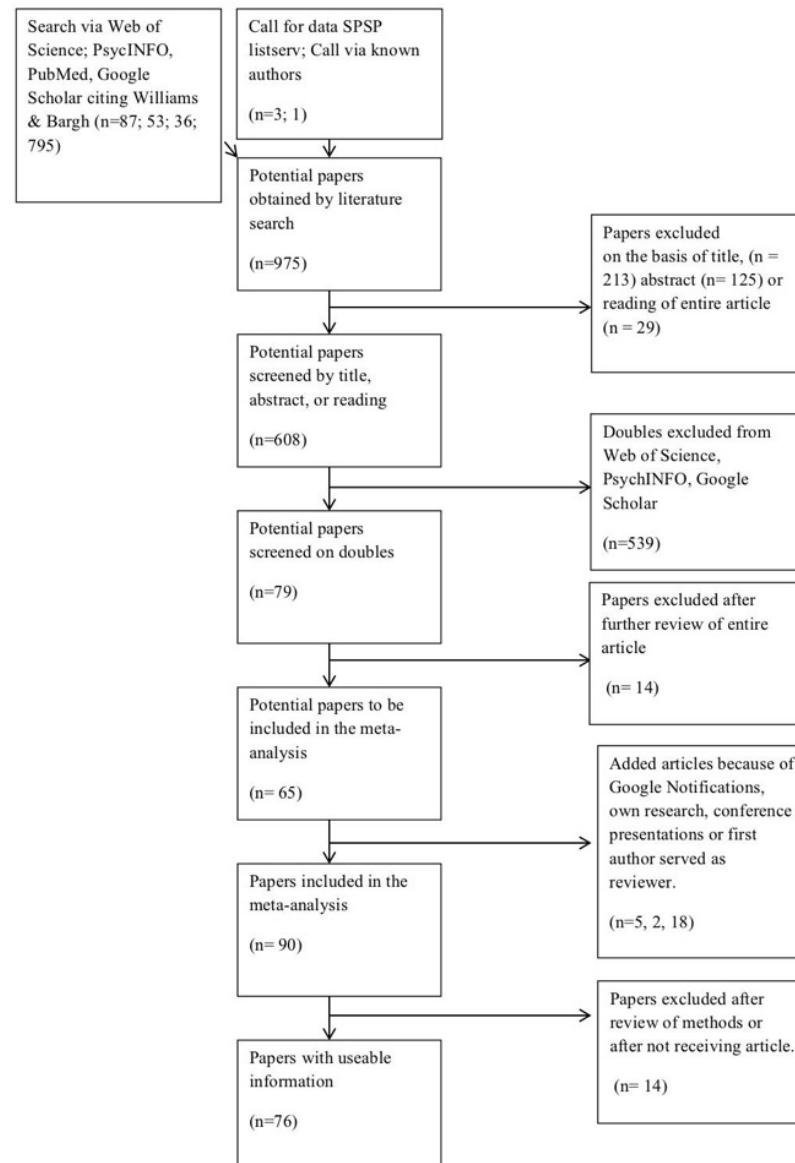
Quality Control

- Limited to studies on humans
- Data and code online: <https://osf.io/wdk3e/>
- Coding by two experts on ST
- Independent code review

Literature Search (2009 - 2017)

- "temperature" AND "social" AND "representation"
- "temperature" AND "embodiment" AND "social"
- "warmth" AND "embodiment" AND "interpersonal"
- "grounded cognition" AND "temperature"
- "embodied cognition" AND "warmth"
- "interpersonal" AND "physical warmth"

Flowchart



Reports on Social Thermoregulation

Between 2008-2017, 90 published and unpublished reports on ST appeared. Used 76 of those reports; total of 346 effect sizes. Out of these 202 met selection criteria.

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Extracted Variables

- Publication Year
- Journal H5 Index
- Location of Study
- Effect Size, dfs, total N, p-value
- Publication Status
- Proportion of Men/Women in study

Coding Methods/Categories

- Compensatory vs priming
- Manipulation / type of measure
- Sub-category of ST

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- Influence diagnostics via Cook's distance, standardized residuals, and other leave-one-out statistics.

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- Excluded 3 outliers (ES odds of 1 in 1,137 and 1 in 564,971, and 1 in 1,000,000,000)

Outlier Exclusion

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- Excluded 3 outliers (improbably large odds)
- Left one outlier in (with $N = 6,346,239$)

Outlier Exclusion

- Influence diagnostics via Cook's distance, standardized residuals, and other leave-one-out statistics.
- Excluded 3 outliers (improbably large odds)
- Left one outlier in (with $N = 6,346,239$; ES: $g = .05$)

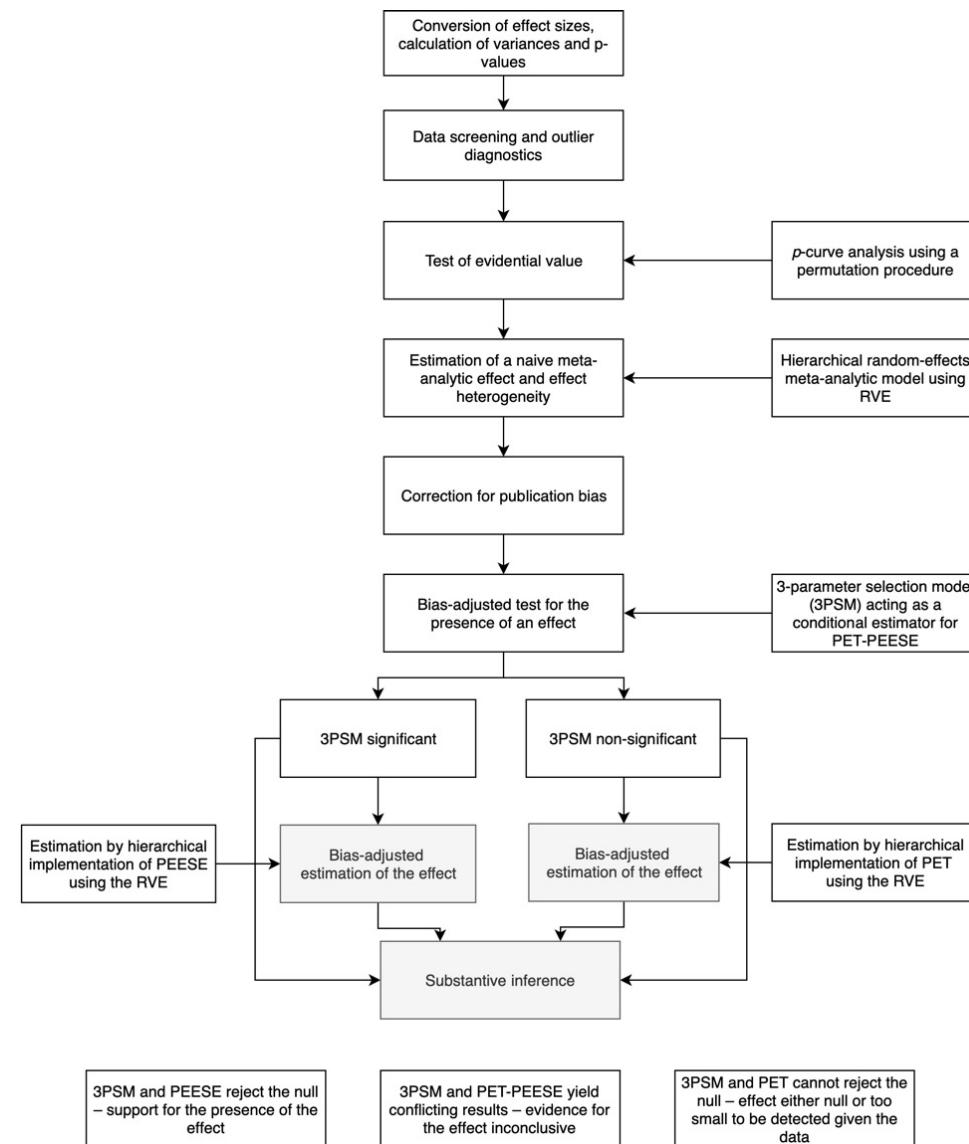
Analysis Strategy

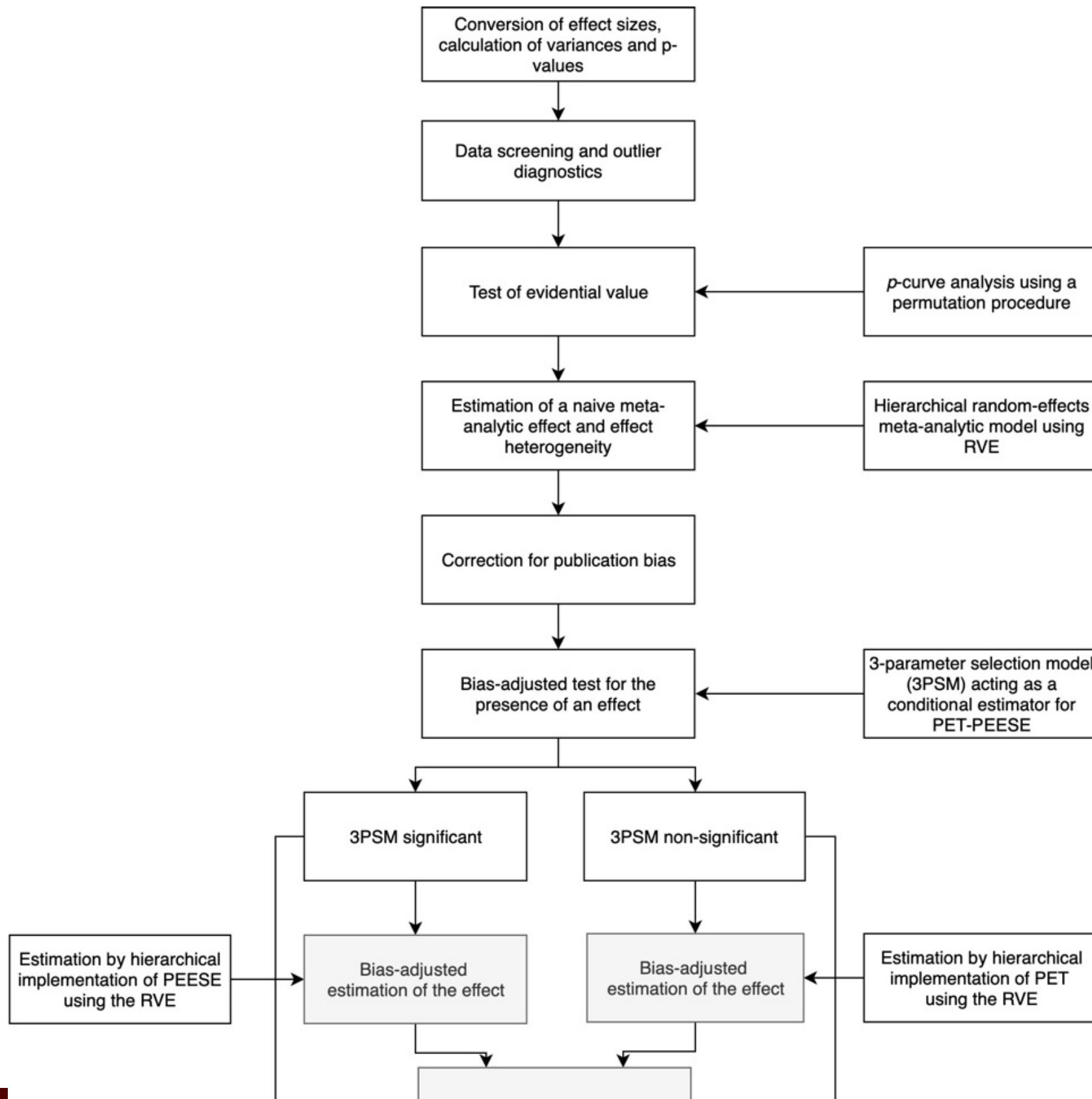
- Multilevel random-effects meta-analysis model
- Restricted maximum-likelihood estimation via Metafor (Viechtbauer, 2010)
- Model accounts for nested model with multiple effects within studies (allowing for correlated true effects)
- Dependencies accounted for by robust sandwich-type variance estimation (RVE), applied to estimated variance-covariance matrix of within-study ES.

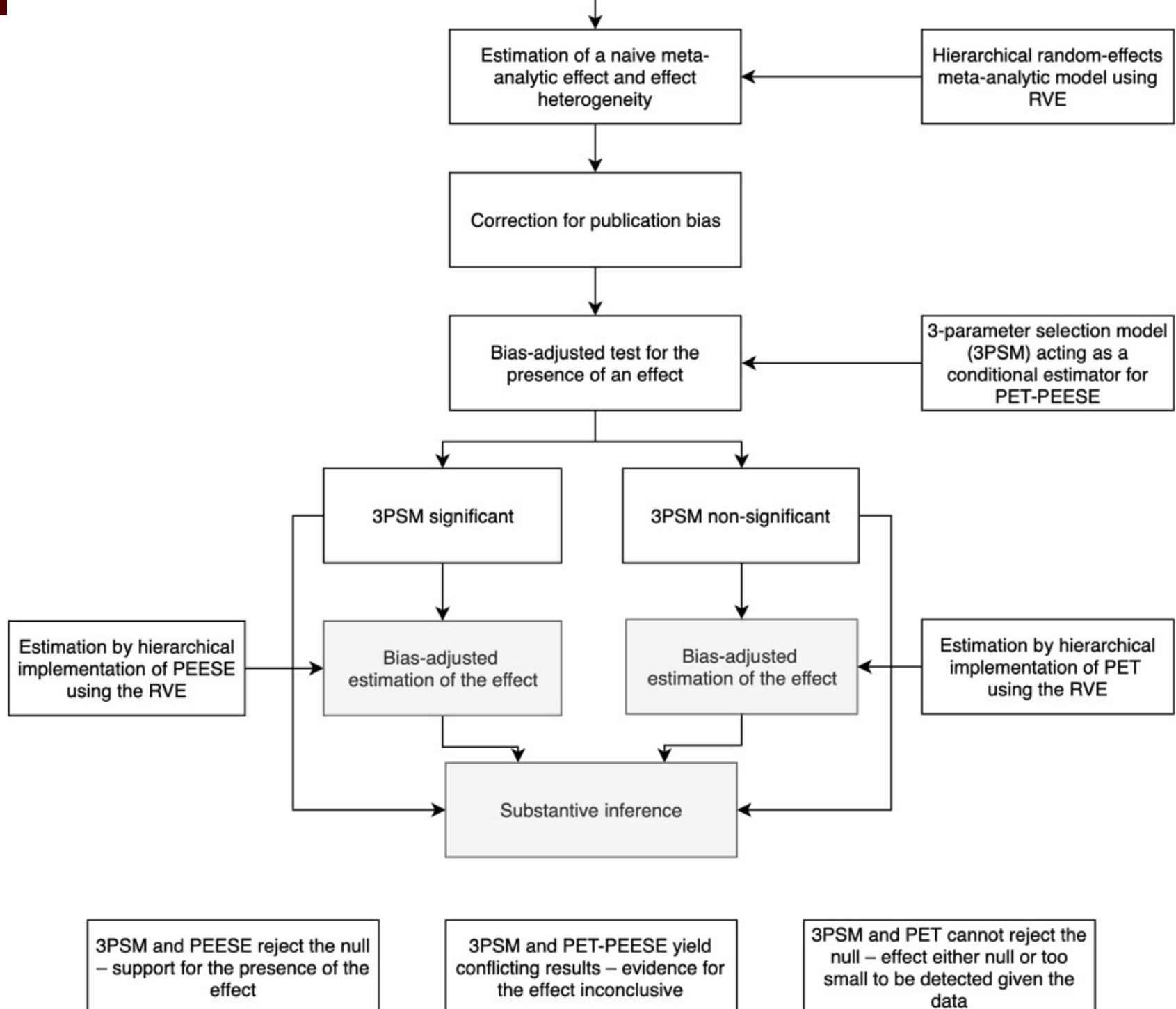
Analysis Strategy

- We did not investigate whether publication bias existed, but assumed it
- Employed several methods to mitigate bias

Analysis Workflow



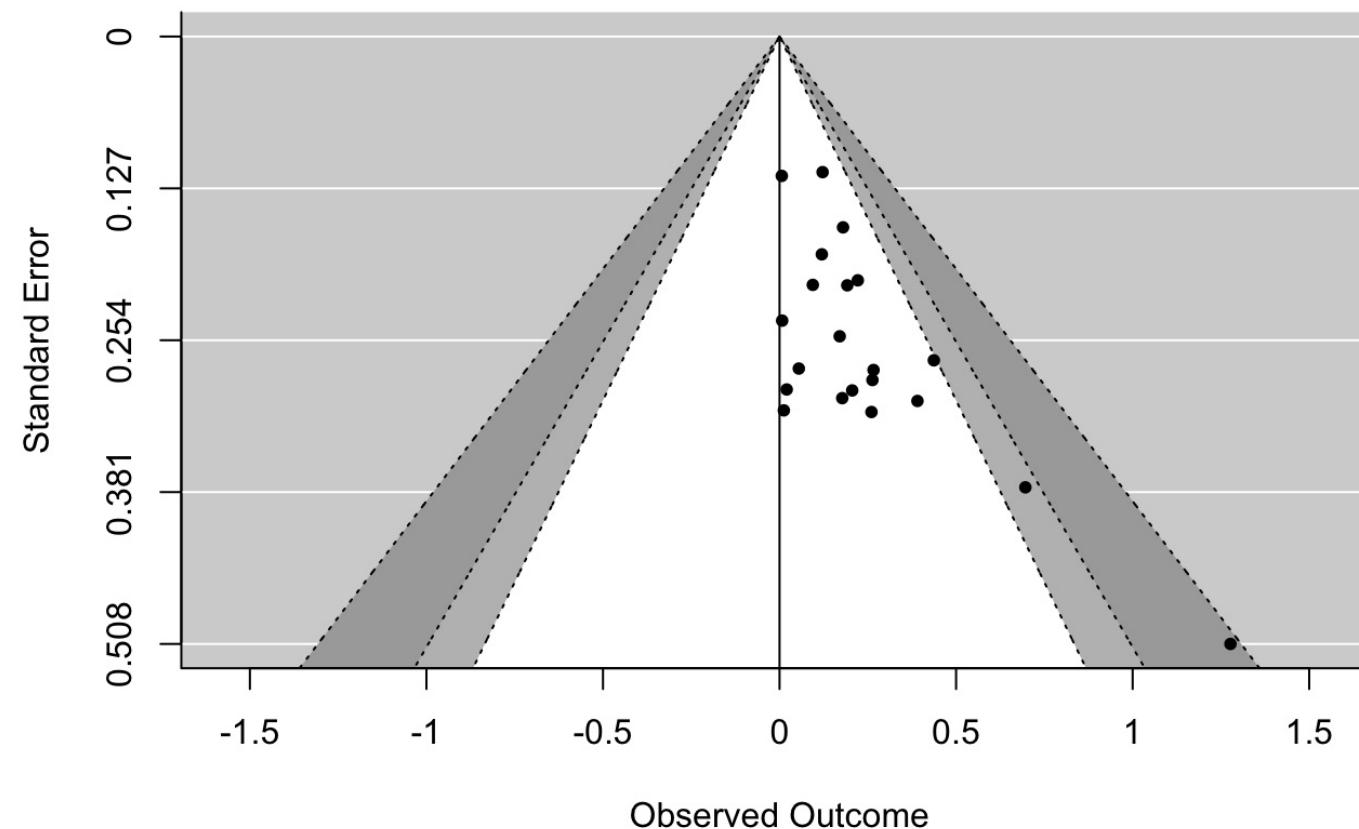




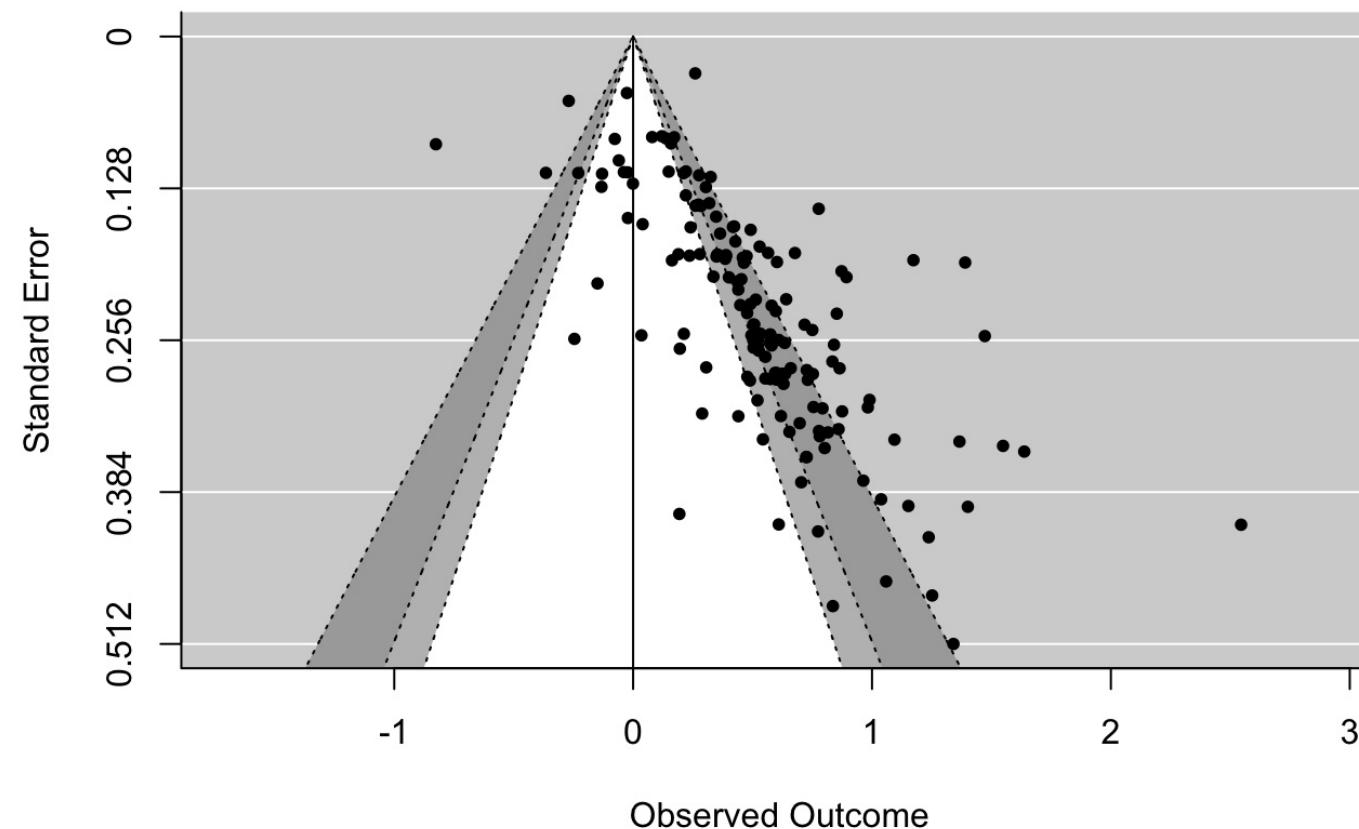
Mitigate Bias

- Estimate evidential value: P-curve for evidential value (1PSM). Disclosure table:
<https://osf.io/2kz5q/files>.
- Estimate bias-corrected average ES: 3PSM
- Estimate bias-corrected average ES: PET-PEESE

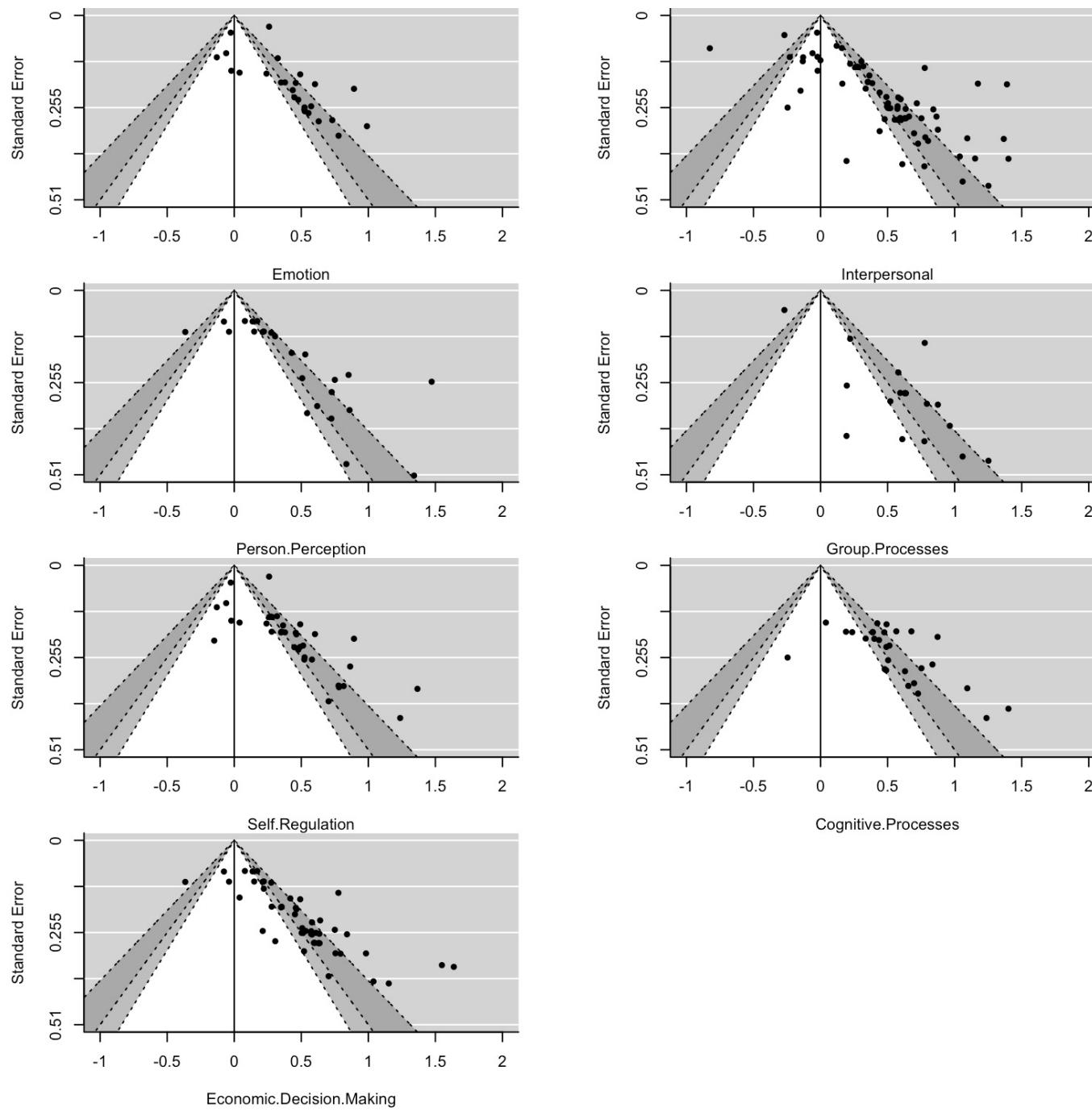
Temperature-Mood



Global Funnel Plot (No Mood)



Global Funnel Plot (No Mood)



Global Funnel Plot (no mood)

- Globally: Publication Bias
- 69% of effects were significant
- Overall naive Hedges $g = .45 (.38 - .51)$

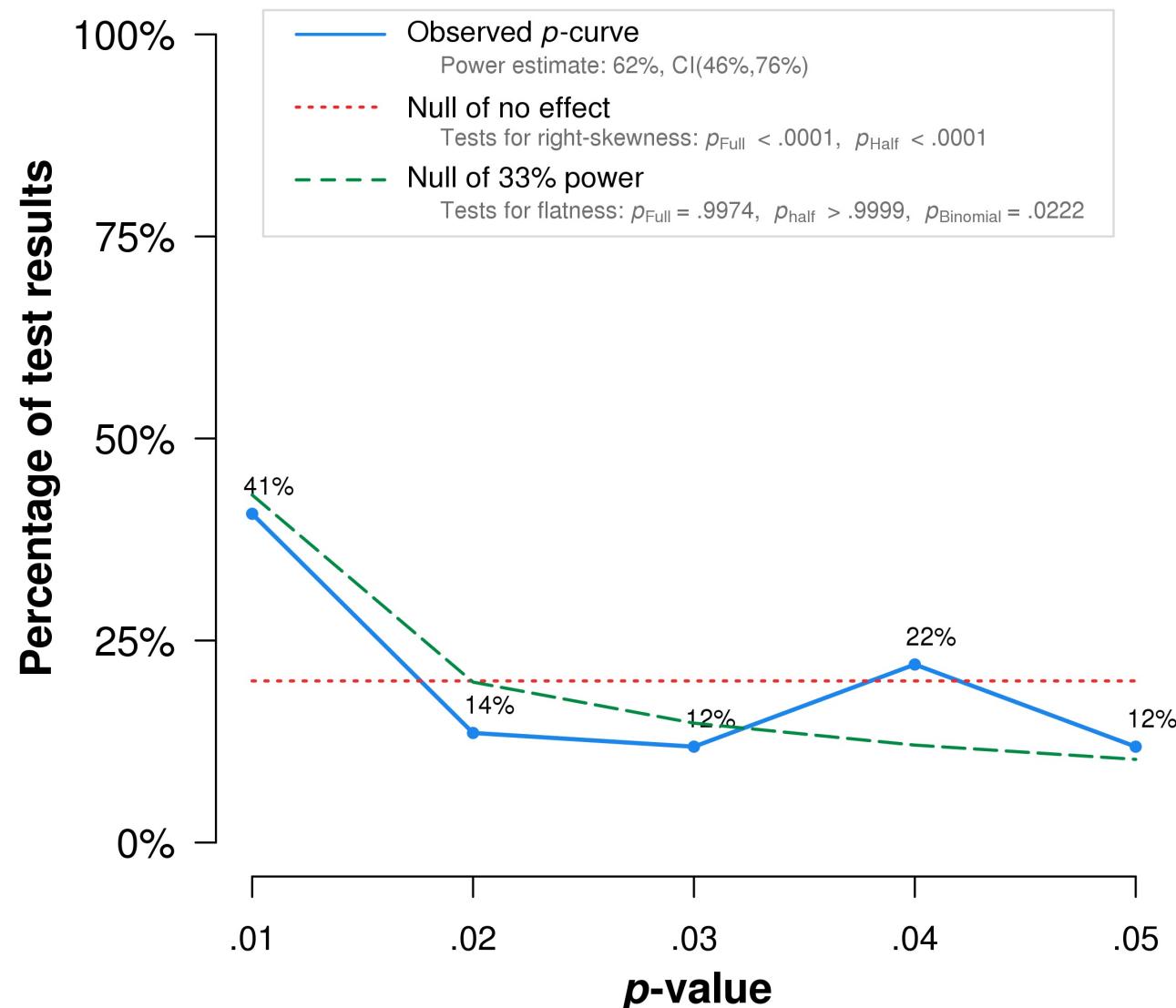
Global Funnel Plot (no mood)

- 3PSM: indicated effect ($g = .22$; 95CI (.13 .30))
- 3PSM: 17.9% of ns effect to enter literature
- PEESE: indicated effect ($g = .13$; 95CI (.06 .20))
- Median power is only 11.6%/24.1% (severely underpowered)

P-curve - Categories

- P-curve can reject evidential value (not support evidential value)
- What it can also do is show if "p-hacking" is present

P-Curve Example 1

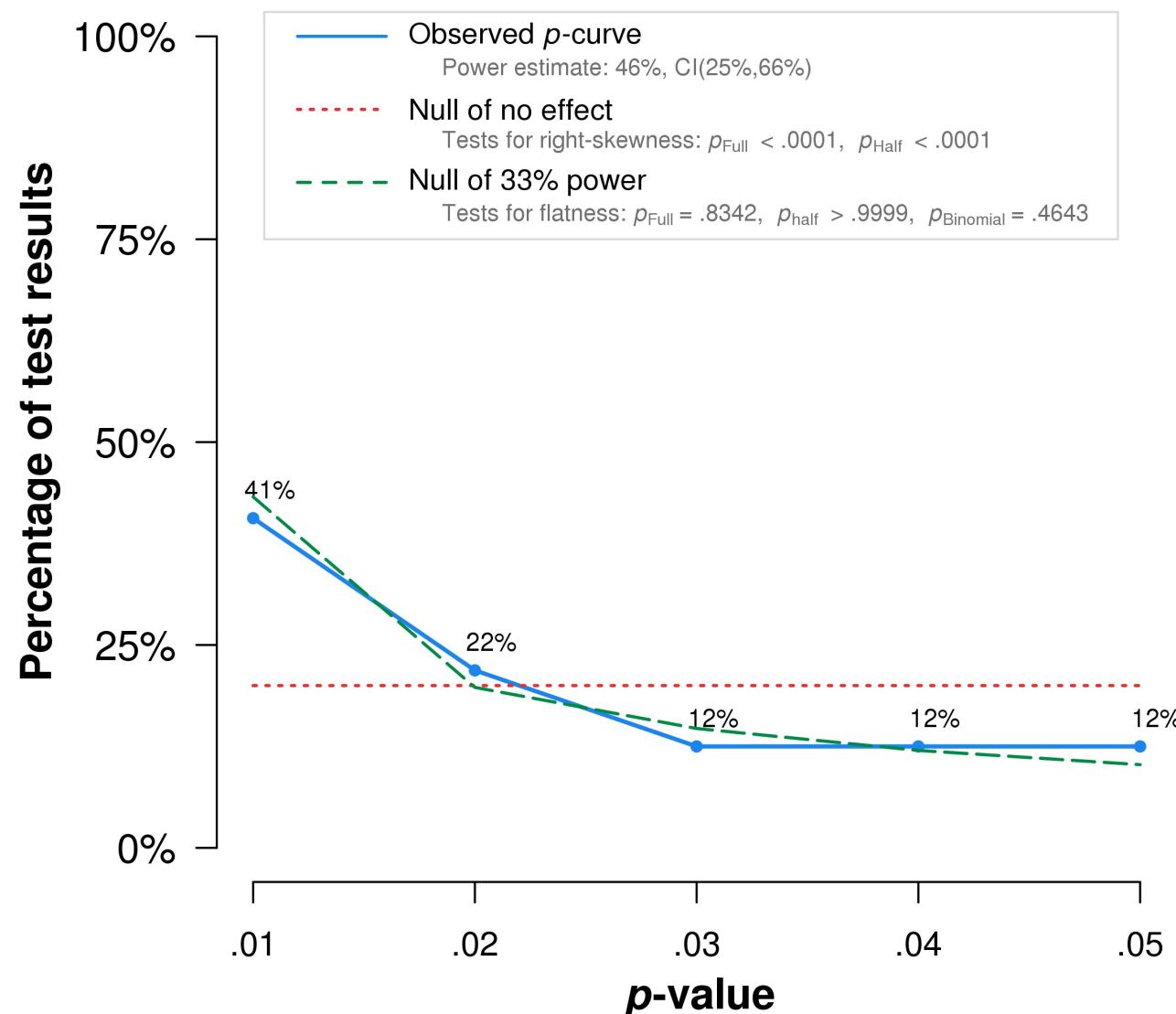


Note: The observed p-curve includes 59 statistically significant ($p < .05$) results, of which 34 are $p < .025$. There were 26 additional results entered but excluded from p-curve because they were $p > .05$.

P-Curve Example 1

- Interpersonal Processes
- ($N = 11405$; $k = 71$; Clusters = 57)

P-Curve Example 2



Note: The observed p-curve includes 32 statistically significant ($p < .05$) results, of which 22 are $p < .025$. There were 11 additional results entered but excluded from p-curve because they were $p > .05$.

P-Curve Example 2

- Judgment and Decision Making
- N = 7454; k = 53; Clusters = 27

Comparison Priming vs. Compensatory

| Category | k (effect sizes) | Effect Size | Standard Error | tau | I ² (heterogeneity) | 3PSM Estimate | 3PSM p-value | PEESE estimate | PEESE P-value |
|--------------|------------------|-------------|----------------|-------|--------------------------------|----------------|--------------|-----------------|---------------|
| Compensatory | 41 | 0.319 | 0.049 | 0.207 | 73.06% | .14 [.04, .25] | .007 | .06 [-.04, .17] | .24 |
| Priming | 127 | 0.484 | 0.04 | 0.322 | 85.92% | .23 [.13, .34] | < .001 | .16 [.07, .25] | .001] |

Physical vs. Non-Physical

| Category | k (effect sizes) | Effect Size | Standard Error | tau | I ² (heterogeneity) | 3PSM Estimate | 3PSM p-value | PEESE estimate | PEESE P-value |
|--------------|------------------|-------------|----------------|-------|--------------------------------|----------------|--------------|-----------------|---------------|
| Non-Physical | 90 | 0.381 | 0.038 | 0.268 | 89.23% | .22 [.12, .32] | <.001 | .15 [.08, .23] | <.001 |
| Physical | 81 | 0.509 | 0.057 | 0.347 | 70.39% | .21 [.06, .35] | .005 | .03 [-.13, .19] | .75] |

Methods

| Category | k (effect sizes) | Effect Size | Standard Error | tau | I2 (heterogeneity) | 3PSM Estimate | 3PSM p-value | PEESE estimate | PEESE P-value |
|---------------|------------------|-------------|----------------|-------|--------------------|----------------|--------------|---------------------|---------------|
| Visual/Verbal | 17 | 0.407 | 0.034 | 0 | 0 | .24 [.19, .30] | <.001 | .27 [.11, .42] | .001 |
| Outside | 14 | 0.443 | 0.123 | 0.392 | 95.51% | .44 [.11 .77] | .009 | .12 [-.17, .41] | .424 |
| Temp Estimate | 23 | 0.465 | 0.072 | 0.265 | 71.95% | .12 [-.09 .34] | .269 | -.15 [-.33, .03] | .105 |
| Subj Warmth | 8 | 0.111 | 0.083 | 0.209 | 86.39% | .23 [-.10 .56] | .166 | .02 [-.64, .69] | .934 |

Subfield

| Category | k (effect sizes) | Effect Size | Standard Error | tau | I2 (heterogeneity) | 3PSM Estimate | 3PSM p-value | PEESE estimate | PEESE P-value |
|---------------------|------------------|-------------|----------------|-------|-----------------------|--------------------|-----------------|------------------------|------------------|
| Emotion | 26 | 0.315 | 0.051 | 0.2 | 74.18 | .05 [-.10, .19] | .528 | -.06 [-.32, .19] | .621 |
| Interpersonal | 75 | 0.423 | 0.053 | 0.362 | 82.88% | .21 [.06 .36] | .005 | .08 [-.05, .20] | .225] |
| Person Perception | 31 | 0.471 | 0.088 | 0.342 | 83.23% | .35 [.14 .56] | .001 | .15 [.00, .30] | .046] |
| Group Processes | 18 | 0.554 | 0.07 | 0.186 | 43.9% | .39 [.21 .58] | <.001 | .34 [.16, .53] | 0] |
| Self Regulation | 41 | 0.346 | 0.055 | 0.242 | 76.1% | .18 [.05 .30] | .006 | .06 [-.04, .16] | .249] |
| Cognitive Processes | 29 | 0.499 | 0.054 | 0.154 | 32.76% | .29 [.13 .46] | <.001 | .22 [.05, .38] | .011] |
| JDM | 60 | 0.439 | 0.058 | 0.287 | 85.05% | .20 [.08 .33] | .002 | .04 [-.04, .12] | .367] |

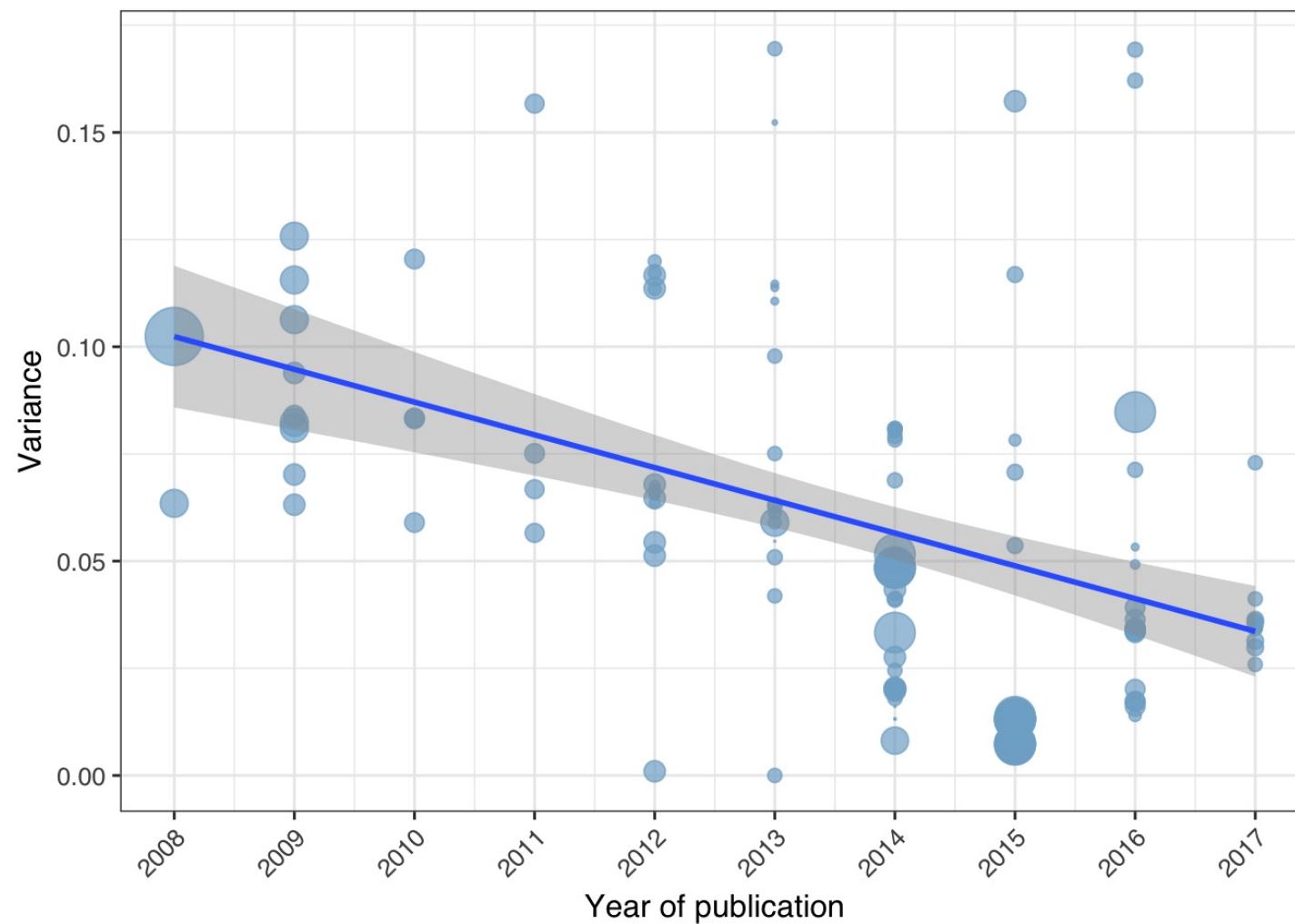
General Observations 1

- No effect of latitude ($\beta = .02$, $t = 0.55$, $p = .58$).
- Greater ES when greater proportion of females in sample ($\beta = .11$, $t = 3.10$, $p = .003$).

General Observations 2

- H5 Index not associated with sampling error ($\beta = -.13$, $t(89.9) = 1.27$, $p = .209$)
- SE is associated with citations ($\beta = .36$, $t(88.0) = 3.19$, $p = .002$)
- Higher number of citations; larger effects ($\beta = .09$, $t = 2.88$, $p = .005$)
- H5 index inversely related to the ES ($\beta = -.10$, $t = -2.70$, $p = .008$)

Improving Research Practices?



Conclusions

- Overall ST literature has evidential value
- Very unlikely to be explained by selective reporting alone
- Strength of evidence differs by subfield/method

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- Very unlikely to be explained by selective reporting alone
- Strength of evidence differs by subfield/method
- Why differs by subfield?

Selective Reporting

- Likely moderations exist (e.g., IJzerman et al., 2016, 2018)
- We pay insufficient attention to conditions under which effects emerge
- Focus on generating formal theories (e.g., via mathematical/AB models)
- No effects mood/emotions
- Other moderations mostly inconclusive

Recommendations

- Even when research practices are improving, still a lot of imprecision.
- Confirmatory Reports (precision)

ST: Mechanisms

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ST: Co-Regulatory Mechanisms

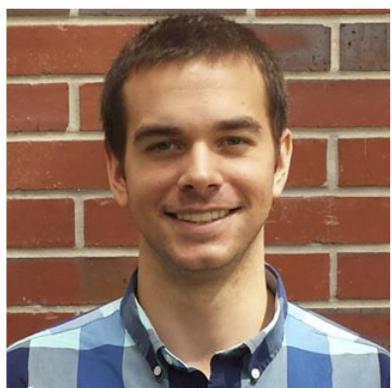
- Social cognition is about understanding mechanisms
- Obviously, we don't understand them well enough yet for ST
- No mood/emotion main effects
- We presume some form of co-regulation

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Rick Klein



Ivan Ropovik



Elisa Sarda



Fieke Wagemans



Emily Butler

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- Pleisomorphically organized around processes of body temperature regulation
- Presumes that evolutionarily modern interpersonal relations rely on earlier mechanisms
- Anderson (2010)/Satinoff (1978): Neural reuse

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- Solid evidence exists that diverse social networks protect against the cold (IJzerman et al., 2018)
- Body as shell to protect CBT
- Logical first step is thus peripheral temperature

Skin temperature and emotions

- Lower skin temperature when people are sad or anxious (Ekman et al., 1983; McFarland, 1985)
- Romantic partners co-regulate each other's emotions (and these are linked to physiological changes, Butler & Randall, 2002)

Skin temperature and (social) emotions

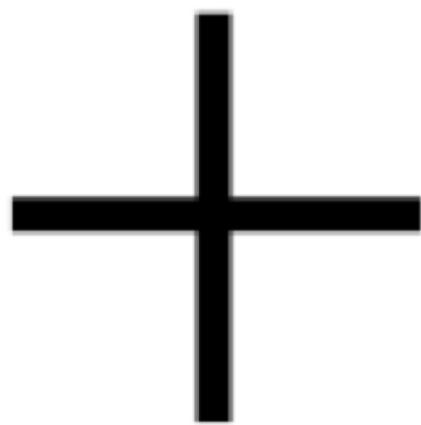
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- Social exclusion decreases peripheral temperature (IJzerman et al., 2012)
- Infant stress cries increase mother peripheral temperature (Vuorenkoski et al., 1969)
- Eight-week old infant temperature drops when mother leaves room (Mizukami et al., 1990)

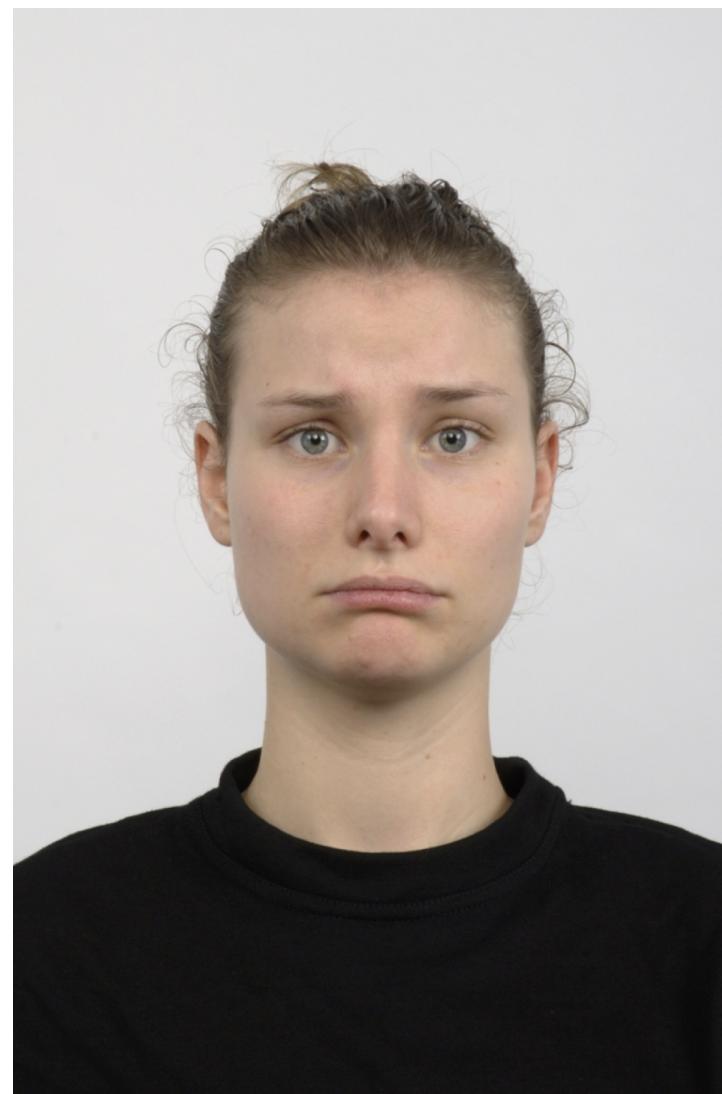
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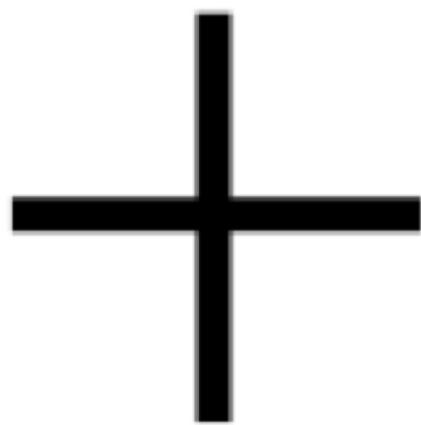
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- Eight-week old infant temperature drops when mother leaves room (Mizukami et al., 1990)
- Obviously, (potential) first step in causal chain

Procedure

- Couples in lab.
- Photograph each partner mimicking sad/neutral faces.
- Measure peripheral skin temperature continuously (fingertip).
- Display each partner's photos to the other partner (mixed with sad/neutral stranger photos) and measure temperature response



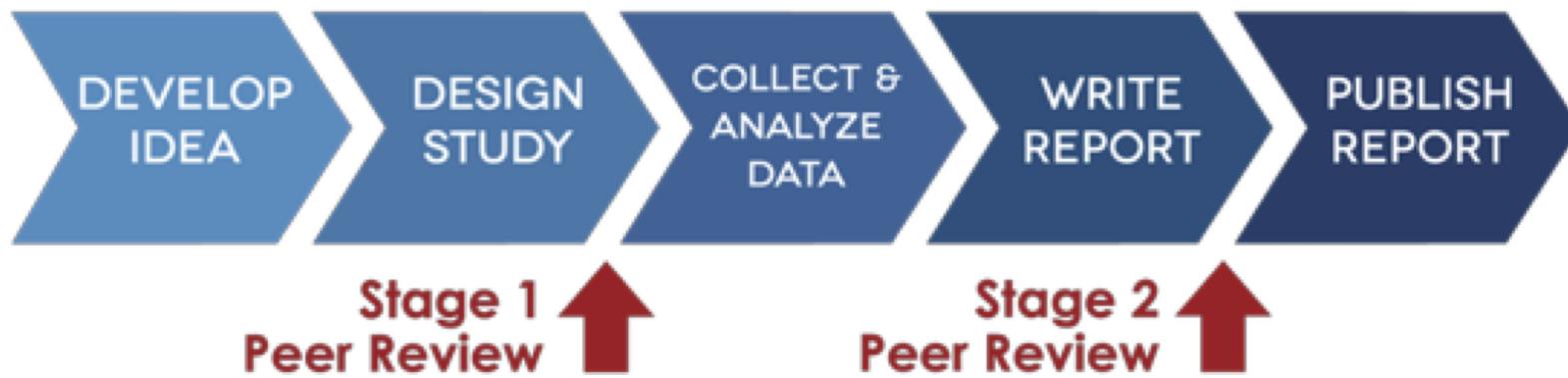






Confirmatory Report

- Suitable method, solid theory (peer review?)
- Prediction + analysis plan in advance (preregistration)
- Present all evidence (open data/OSF)
- Reduce luck factor (high power/precision)
- Results are informative, no matter what



Results Pilot

- Viewing sad (vs. neutral) partner face results in increase $t(6,622.17) = 2.656, p = .0079$
- Reanalysis showed ES to be (much) smaller: Beta = 0.047 vs. Beta = 0.359

Confirmatory Report: Improvements

- Greater precision (measurement)
- Greater statistical power (original 77%, new 95% to detect 1/20 degree Celsius (vs. 0.5 in original))
- Superior exploratory analyses

Power analysis

- Smallest effect size of interest (1/20 degree)
- Back-fitted mixed effects model in 1000 iterations (via simr)
- Requires 118 participants for 95% power
- Script: <https://osf.io/6zxj9/>

Results

?

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Understanding of Mechanisms

- Interpersonal regulation should vary as a function of social context, relationship quality, individual differences



Rodrigo Vergara



Cristobal Hernández



Francisco Jaume-Guazzini



Siegwart Lindenberg



Rick Klein

Individual differences in ST

Individual differences in ST

Developing an individual difference measure for Social Thermoregulation (Desires):

- Cross-National Sample (12 countries/1523 participants)
- Created 57 questions
- Iterative factor analysis: Naïve bootstrapping & cross-validation

Social Thermoregulation Subscale:

| Item | Factor Loading |
|--|----------------|
| I usually have more physical contact with others than most people | .52 |
| When people are close to me, I like to be really close to them | .54 |
| When I feel cold I seek someone to cuddle with | .61 |
| I like to warm up my hands or feet by touching someone who I am close to | .73 |
| I prefer to warm up with someone rather than with something | .76 |
| M Omega (SD) | .83 (0.04) |
| M Alpha (SD) | .77 (0.08) |
| Range Omega | .77-.89 |
| Range Alpha | .55-.81 |

Social Thermoregulation Subscale:

Correlates - through split-half validation - with:

- Attachment Avoidance ($r = -.33$)
- Alexithymia Subscale ($r = -.16$)
- Health ($r = .10$)
- Nostalgia Proneness ($r = .13$)

Solitary Thermoregulation Subscale:

| Item | Factor Loading |
|--|----------------|
| When I feel cold I don't turn on the heater | -.50 |
| I am not sensitive to coldness | -.45 |
| I can't focus when it is too cold | .38 |
| When it is cold, I wear more clothing than others | .64 |
| When it is cold, I more quickly turn up the heater than others | .77 |
| When I am troubled I like to take a long warm shower to clear up | .24 |
| If am feeling distressed I seek a warm place to calm down | .26 |

| Item | Factor Loading |
|-------------|----------------|
| M Omega | .77 |
| M Alpha | .68 |
| Range Omega | .50 - .78 |
| Range Alpha | .52 - .67 |

Solitary Thermoregulation Subscale:

Correlates - through split-half validation - with:

- Age ($r = .07$)
- Attachment to smartphone ($r = .17$) and online identity ($r = .20$)
- Height ($r = -.22$)
- Nostalgia proneness ($r = .16$)
- Core body temperature ($r = .08$)
- Attachment anxiety ($r = .08$)

Out-of-Sample Testing

In French (UGA) sample:

- Social Thermoregulation - Omega = .83; Solitary T = Omega = .79
- Social Thermoregulation correlates with Openness to Experience ($r = .17$), Agreeableness ($r = .16$), Avoidance ($r = -.43$)
- Solitary Thermoregulation correlates with Neuroticism ($r = .25$), Anxiety ($r = .25$)

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Understanding Interpersonal Regulation

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Understanding Interpersonal Regulation

- Typically focus on hypothesis-driven research
- What do our hypotheses often rely on?
- Instead, collect observations and generate data patterns from there
- Across studies, we need to start observing same variables (e.g., STRAQ-1)

Challenges

- Temperature measurement in daily life
- Recruitment of samples outside student populations
- Generation of models from data

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- Recruitment of samples outside student populations
- Generation of models from data
- Example: HPP (complex social networks protects core body temperature from cold)

Challenges

- Temperature measurement in daily life
- Recruitment of samples outside student populations
- Generation of models from data
- Developing standard data formats

Temperature Measurement in Daily Life

Temperature measurement: Sensors

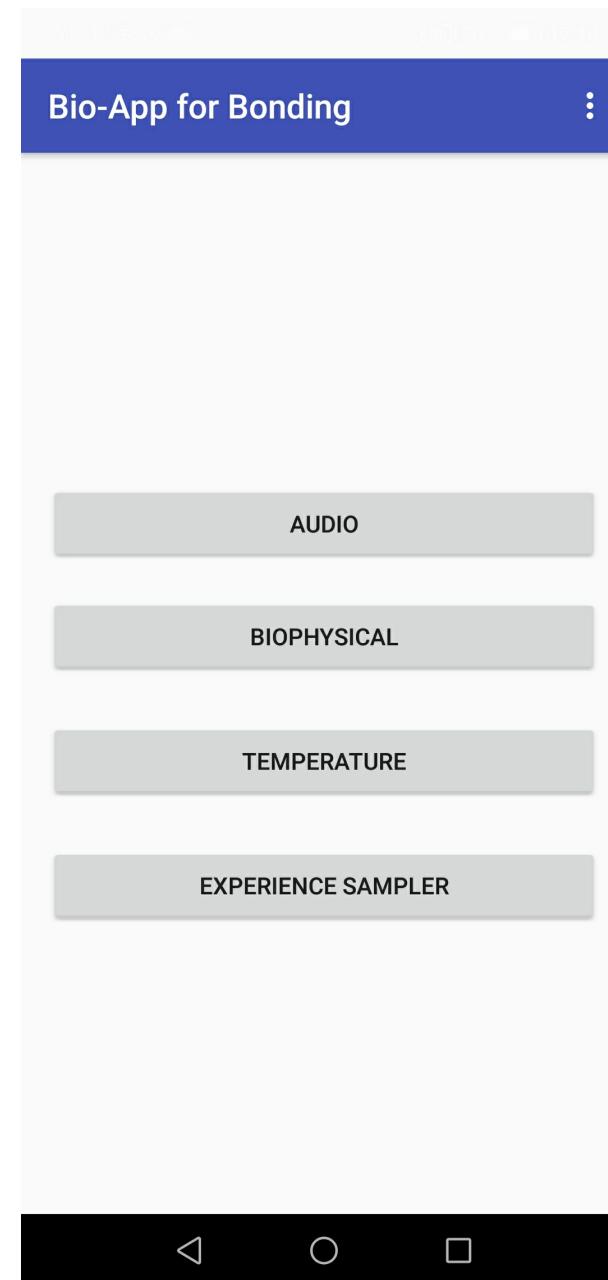
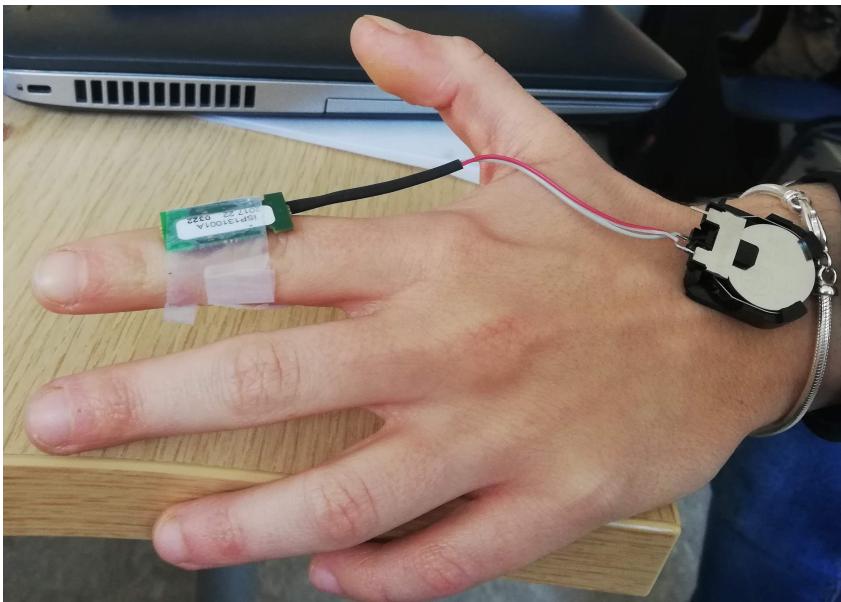
- Angelsensor
- Bluemaestro Tempodisc
- MyTemp sensor
- InsightSIP

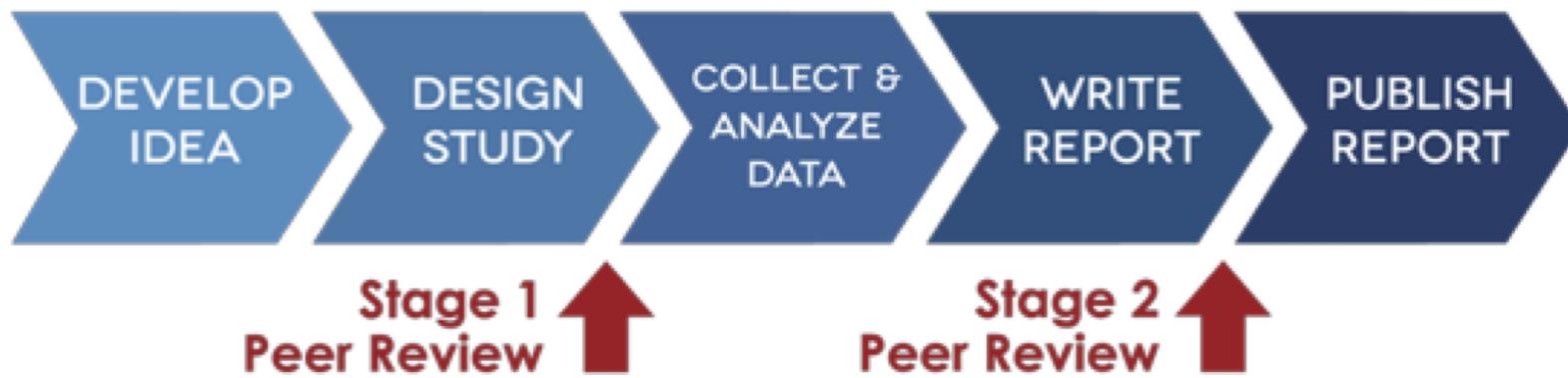
Temperature measurement: Sensors

- Angelsensor - crowdfunding (often failure)
- Bluemaestro Tempodisc - no more access to firmware
- MyTemp sensor - core temperature sensor, not intended for peripheral temperature
- ISP131001 Sensor

Experience Sampling Challenges

- Development of software to communicate temperature
- Software needs to integrate other information (is partner close?)
- Integration of self-report of experiences
- No recording on participants' phones





Sensor and Software Validation Study

- Validate sensor against other, known reliable sensor (AdInstruments MLT442/A Instruments)
- Develop standard data format that includes measurements of social networks and attachment

Procedure

- Participants are in three conditions: Control, cold, warm
- Temperature is measured with three sensors: AdInstruments MLT442/A Instruments and 2 ISP131001 sensors
- Placement: Wrist, finger, finger

Sensors

- AdInstruments MLT442/A Instruments: measures every ms
- 2 ISP131001 sensor: measures every 100 ms

Participants: Sample

- Community sample from larger Grenoble region (700+ couples)

Participants: Power

- PANGEA: Participants crossed with random stimuli-in-treatment design
- 3 conditions (control, cold, warm)
- 30 measurements per block
- Considered two effect sizes ($r = .40$, $r = .60$)
- $N = 12/r = .40/\text{Power} = .86$
- $N = 12/r = .60/\text{Power} = 1$
- To accommodate exploration, doubled to $N = 24$

ST Standard Measurements

- STRAQ-1
- Experiences in Close Relationships Scale
- Social Network Index
- Height, weight, native language, sex, age, romantic relationship?
- Study location (longitude/latitude)
- Minimum/maximum temperature of day of study
- For women: forward counting question to predict next menstrual onset

Results

- Correlation between sensors $r = \sim .70 - .80$
- Exact results for body placement - unanalyzed

Discussion

- Validation of sensor successful
- Standard data format - if merged, allows for exploration

Theory Generation

- Often: "simple" observation that is tested
- Can we make observations more accurate?

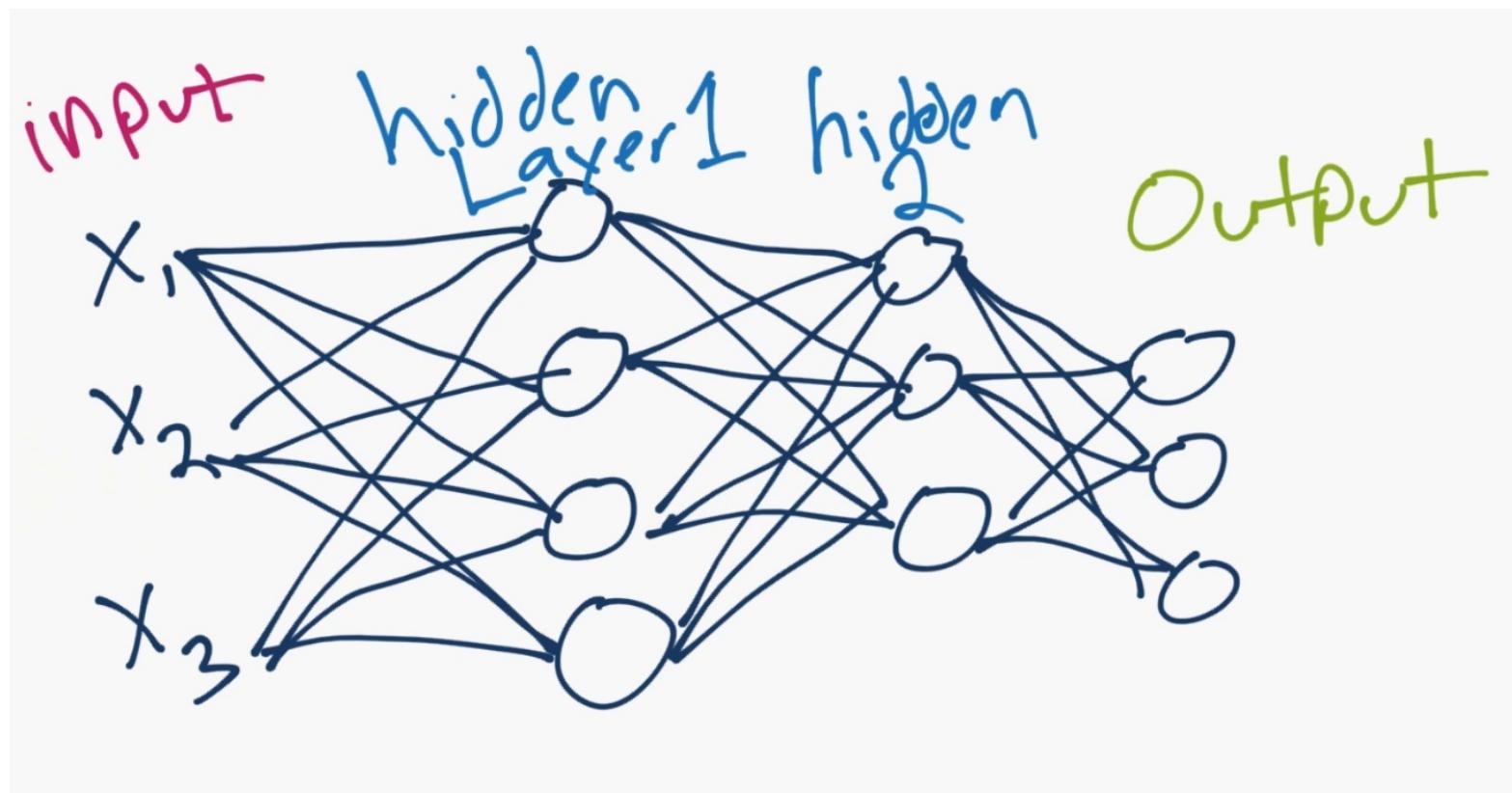
Experience Sampling

- Measure peripheral temperature every second
- Record when partners are within 5 meters from each other
- Ask 4 times a day about 1) partner responsiveness, 2) mood/emotions, 3) whether participants feel warm/cold
- Before and after we ask about STRAQ-1, Social Network Index, ECR, Menstruation onset (women), height, weight, native language, sex, and will record outside temperature

Sample Size

- Rely on same back-fitted model as CR (118 participants at minimum)

Analysis Plan



Conclusions

- Social thermoregulation literature contains sufficient evidental value to build program of research on
- But not all evidence is as strong
- Theories on social thermoregulation are insufficiently precise

Conclusions

- Social thermoregulation literature contains sufficient evidental value to build program of research on
- But not all evidence is as strong
- Theories on social thermoregulation are insufficiently precise
- Remedies: Confirmatory Report, Standard Data Format, Experience Sampling/Registered Report

Measurement Protocol

- STRAQ-1
- Experiences in Close Relationships Scale
- Social Network Index
- Height, weight, native language, sex, age, romantic relationship?
- Study location (longitude/latitude)
- Minimum/maximum temperature of day of study
- For women: forward counting question to predict next menstrual onset

General Approach for (Social) Psychology

- CRs are necessary to combat publication bias
- ERs are necessary to generate predictions

Confirmatory Reports



Confirmatory Reports at IRSP: Guidelines for Authors

Confirmatory Reports (CRs; previously and elsewhere Registered Reports; see <https://cos.io/rr/>) is a form of empirical article in which the methods and proposed analyses are reviewed and pre-registered prior to the research being conducted. This format is designed to minimise bias in deductive science, while also allowing flexibility to conduct and report exploratory (unregistered) analyses.

The philosophy of the editorial team with respect to CRs rests on continuous exchanges and discussions with the authors. We are aware that not all social psychologists are familiar with this publication format and we are certainly happy to help in this process. One of the ways we plan to reduce the workload for authors, editors, and reviewers, is by letting our editors create a project on the Open Science Framework (OSF) after a first-page overview submitted to the journal. This project will include the hypotheses, data, and scripts to analyze the data. This will allow authors and reviewers to work more efficiently by adopting a transparent “research workflow”. All reviews and editorial letters will be stored and will be open to our readers.



Exploratory Reports



Exploratory Reports at IRSP: Guidelines for Authors

Exploratory Reports (ERs) is a format for empirical submissions that tend to address relatively open research questions, without strong *a priori* predictions of hypotheses.

These studies are abductive (=often starting with an observation) and inductive/hypothesis-generating (=going from data to hypothesis). This means that authors can do as many analyses as they would like on a dataset, as long as they openly report it. These analyses should however generate predictions, and in some cases, these predictions can and should already be tested. At this stage, we are limiting the ER to two types: Machine learning and cross-validation (We include machine learning as a separate ER type, even though it often includes cross-validation (but not always, as in the case of conditional random forests or autoencoding)).

Cross-validation can be done using more traditional, inferential statistics, machine learning, or another analysis approach. For research using cross-validation, we expect authors to submit a results-blind submission for the validation part of their manuscript. At least one validation set is required, a second validation set highly encouraged. The analyses for the validation sets will be blinded to reduce publication bias. Authors are also asked not to analyze data in their validation sets prior to submission. For those unfamiliar with exploratory research, we recommend reading Yarkoni and Westfall, viewing Rick Klein's

How to Apply?

Our Solution 1

CO-RE Lab Workspace

Contributors: Hans IJzerman, Richard A. Klein, Lison Neyroud
Date created: 2017-11-17 09:26 AM | Last Updated: 2018-10-02 01:53 PM
[Create DOI](#)
Category: Project
Description: Add a brief description to your project
License: Add a license

Wiki

This OSF page is the homepage for researchers working in the CO-RE lab. You can find the necessary tools to build up your project in this page. The place to start is with the [Research Milestones Sheet](#) (RMS). Once you have started the RMS, please start a new OSF project by using the Research Template for [Exploratory](#) or [Confirmatory](#) Studies.

Files

Click on a storage provider or drag and drop to upload

Name Modified

| Name | Modified |
|---------------------|----------|
| CO-RE Lab Workspace | |

Make Private Public 9

Citation

Components [Add Component](#) [Link Projects](#)

[Research Template to Start New Project \(Exploratory\)](#)
IJzerman, Klein & Neyroud
This template is intended to guide researchers in the CO-RE lab to run exploratory studies. Please use this template alongside the Research Milestone ...

[Research Template to Start New Project \(Confirmatory\)](#)
IJzerman, Klein & Neyroud
This template is intended to guide researchers in the CO-RE lab to run confirmatory studies. Please use this template alongside the Research Miles she...



Our Solution 2

| A | B | C | D | E | F | G | H | I | J |
|--|-----------------|------------------|---|---------------------------|---|---|---|---|---------------------|
| Research Milestones Form | | | | | | | | | |
| Completed Prior to Registration of Project | | | | | | | | | |
| In case a study is exploratory, indicate this on the page where usually hypotheses are included. | | | | | | | | | |
| Project Name | PI | Order of authors | OSF Project Page | OSF Page Public? (Yes/No) | OSF - Study Rationale + Hypotheses | Power Calculation | OSF - Methods, Procedures, Scales | OSF Data Analytic Plan | Ethics Application? |
| Student Projects 2017-2018 | | | | | | | | | |
| Social Thermoregulation and Energy Usage | SUBATLI Tiffany | | https://osf.io/anr6j/ | NO | https://osf.io/7ydnw/ | https://osf.io/d4qfb/ | https://osf.io/qnc5k/ | | N/A |
| Conformity and Thermoregulation | LACKNER Zoé | | https://osf.io/e4aby/ | NO | https://osf.io/gwm4a/ | | https://osf.io/rcuk5/ | | N/A |
| Social Thermoregulation and Attraction | BARBOSA Vivian | | https://osf.io/vamd8/ | NO | https://osf.io/pws2y/ | https://osf.io/6wne8/ | https://osf.io/tkag8/ | | N/A |
| 2018-2019 | | | | | | | | | |
| Stress Regulation in Modern Times: Technologically Mediated Reduction of Coldness and Stress | KAFAEE Nazanin | | https://osf.io/cp6k2/ | NO | https://osf.io/49rhu/ | | https://osf.io/kxuq7/ | | YES |
| Ongoing Projects | | | | | | | | | |
| Social Thermoregulation in Romantic Relationships | KLEIN Rick | | https://osf.io/s3yev/ | NO | https://osf.io/rsb3a/ | https://osf.io/6zxj9/ | https://osf.io/vcu7b/ | https://osf.io/yr62f/ | N/A |
| EMBR Wave | Justin Mah | | https://osf.io/mtdwi/ | NO | https://osf.io/ae8bs/wiki/home/ | | https://osf.io/svbtm/wiki/home/ | | N/A |
| Social Thermoregulation and Personality (Explorato) | WITTMANN Adrien | | https://osf.io/z8w3e/ | NO | | | | | |

Co-Regulation (CORE) Lab.

We study co-regulation in romantic relationships. We study social thermoregulation. We rely on open science ideals. We collaborate with researchers around the world, but are located at the Université Grenoble Alpes.



<http://www.corelab.io>



@hansijzerman



Papers

Check out publications and/or preprints from the lab. We ensure all our work is available to the public, so if you can't find a paper let us know!

[ACCESS PAPERS](#)



Open Data/Materials

To the extent possible we make materials, data, and analysis scripts publicly available on the Open Science Framework. These may be used for re-analysis or for novel hypotheses.

[FIND OUR DATASETS](#)



Lab Philosophy

Doing science is really hard. Here, we document the workflow of the lab and expectations for lab members. Includes templates for OSF projects to make open science easier.

[DOWNLOAD](#)

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