

The Self-Control Strategy of If-Then Planning

Presentation at the University of Tuebingen

May 12, 2022 | 12.00 pm

Introduction

Intention-behavior gap

People often struggle with attaining their goals WEBB & SHEERAN (2006), SHEERAN & WEBB (2016)

**„I want to achieve outcome O/
perform behavior B!“**

Failure to...

...initiate goal-directed behaviors

...stay on track

...bring goal pursuit to a successful close

...but they can deal effectively with the difficulties of goal striving! GOLLWITZER (1999, 2014)

**„If I encounter opportunity/obstacle O,
then I perform goal-directed behavior B!“**

Facilitates goal attainment by...

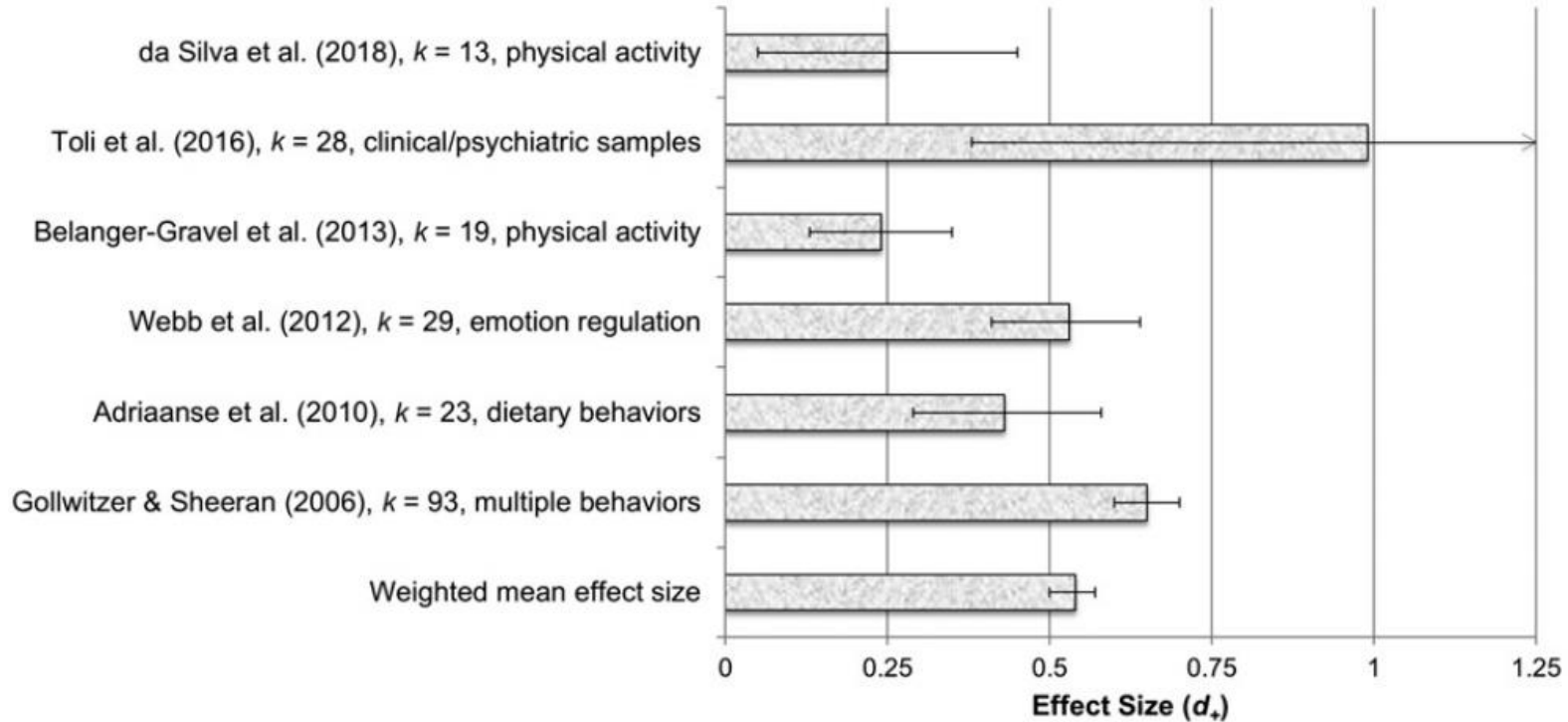
...automated recognition of critical situations

...habit-like, goal-directed responses

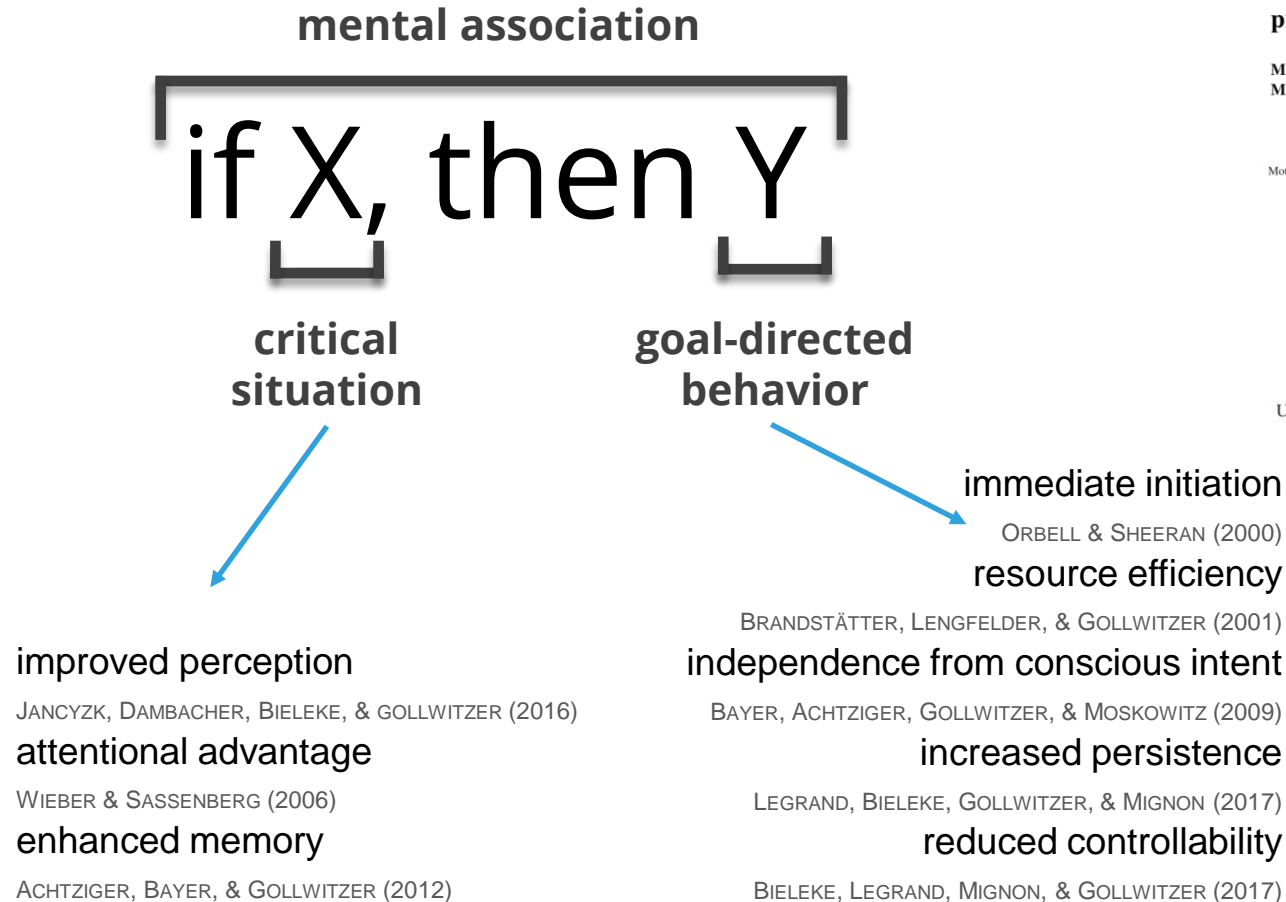
...reduced effort for successful task performance



Effects



Processes



The benefit of no choice: goal-directed plans enhance perceptual processing

Markus Janczyk · Michael Dambacher ·
Maik Bieleke · Peter M. Gollwitzer

Motivation Science

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Nothing Will Stop Me? Flexibly Tenacious Goal Striving With Implementation Intentions

Eve Legrand
University of Lille

Maik Bieleke
University of Konstanz

Peter M. Gollwitzer
University of Konstanz and New York University

Astrid Mignon
University of Lille

Current directions and open questions

- **Characterizing the effects of if-then planning**
 - flexibility versus tenacity
 - spill-over effects
 - cerebral correlates
- **Novel applications and questions**
 - athletic performance and effort
 - strategic information processing
 - individual differences

EUROPEAN REVIEW OF SOCIAL PSYCHOLOGY
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<https://doi.org/10.1080/10463283.2020.1808936>

 **Routledge**
Taylor & Francis Group

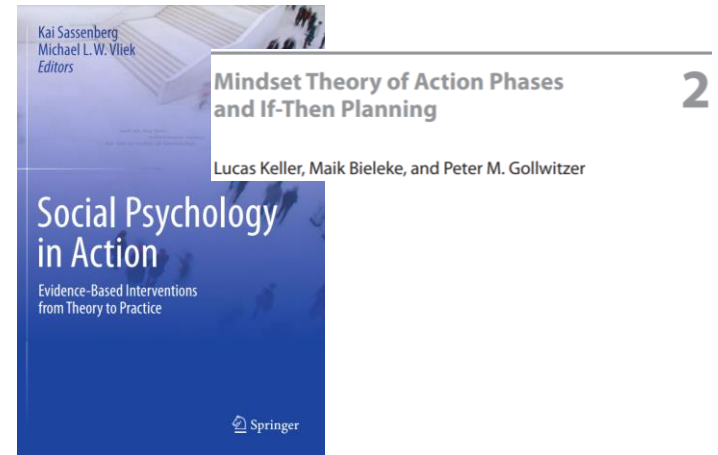
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If-then planning

Maik Bieleke ^a, Lucas Keller ^b and Peter M. Gollwitzer ^{b,c}

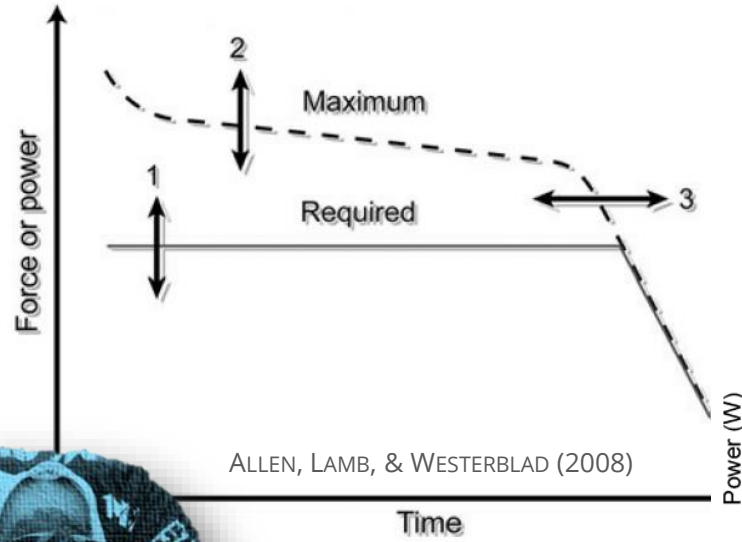
^aDepartment of Developmental and Educational Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria; ^bDepartment of Psychology, University of Konstanz, Konstanz, Germany; ^cDepartment of Psychology, New York University, New York, NY, USA



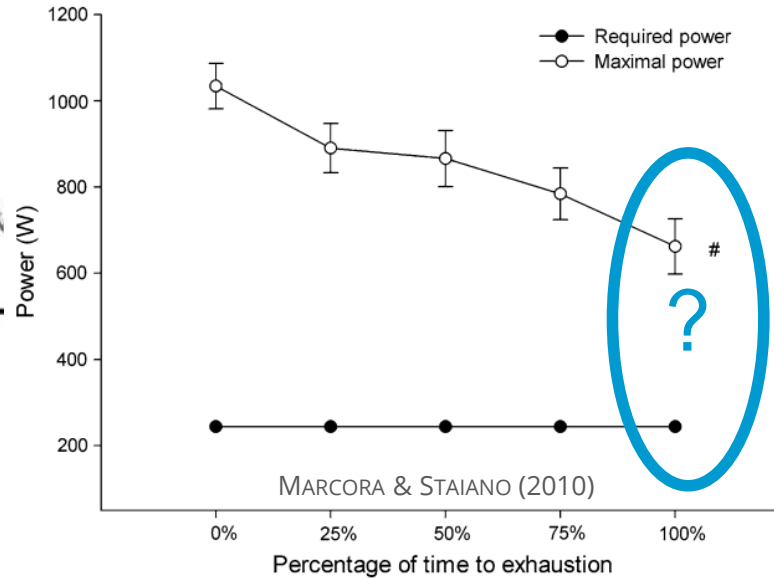
BIELEKE, KELLER, & GOLLWITZER (2021), KELLER, BIELEKE, & GOLLWITZER (2019)

If-Then Planning in Sports

What limits endurance performance?



ALLEN, LAMB, & WESTERBLAD (2008)



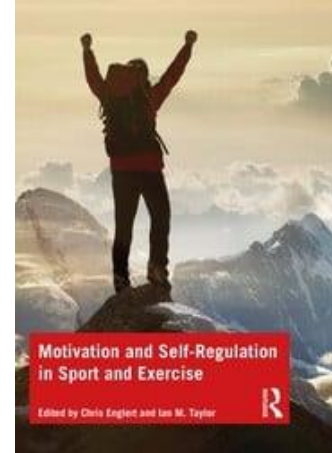
MARCORA & STAIANO (2010)



**ENDURANCE
PERFORMANCE IN SPORT**
Psychological Theory and Interventions

Edited by Carla Meijen

R



**Motivation and Self-Regulation
in Sport and Exercise**

Edited by Chris Engelt and Ian M. Taylor

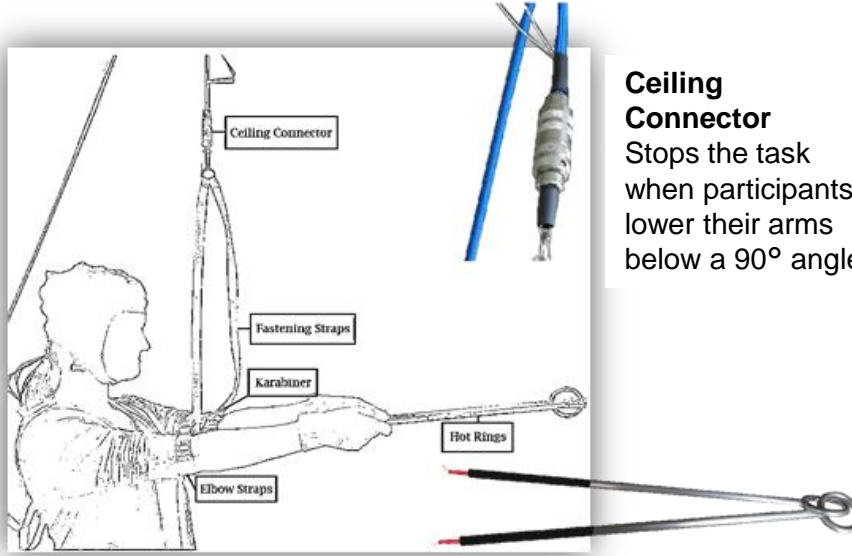
R

WOLFF, BIELEKE, & SCHÜLER (2019), WOLFF, HIRSCH, BIELEKE, & SHENHAV (2021)

fNIRS study in custom endurance performance task



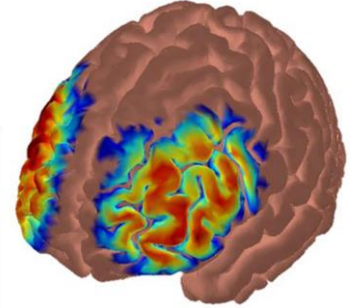
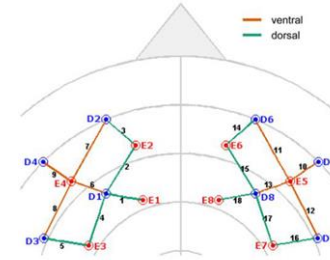
fNIRS Cap
bilateral DLPFC
layout with
8 sensors and detectors



Ceiling Connector
Stops the task
when participants
lower their arms
below a 90° angle

Recording Box
Records ring contacts
with 50 Hz (1/20 ms)

“Hot Rings”
Conductive aluminium rods
connected together by rings



- PFC activity** is linked to
- strenuous cardiovascular endurance performance (ROOKS ET AL., 2010)
 - different facets of self-regulation (e.g., attention control, response inhibition) (MILLER ET AL., 2001; DUBIN ET AL., 2019)

Examining differences between conditions

Control condition

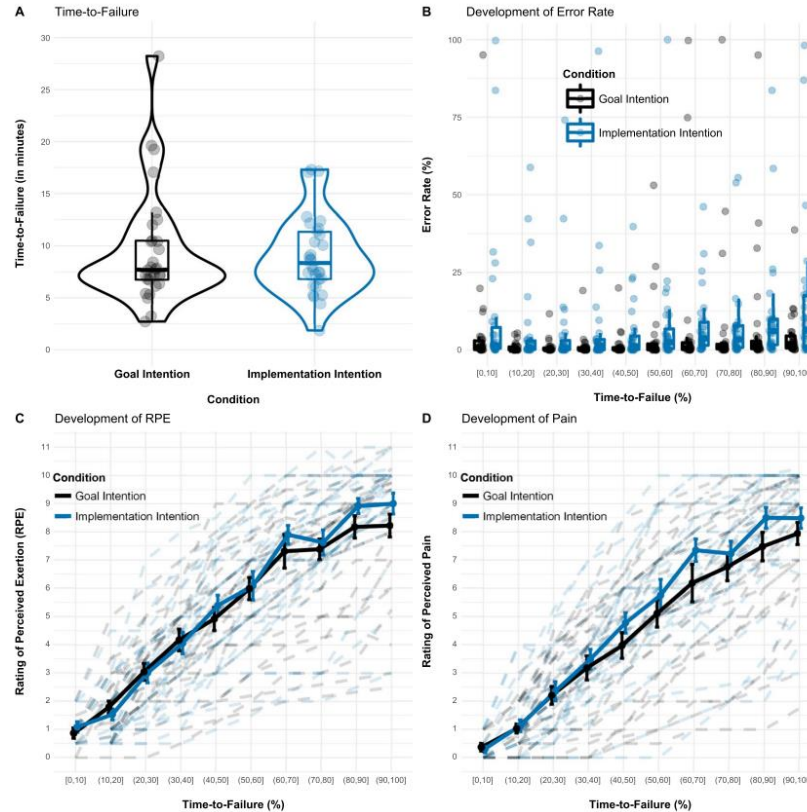
“The task is to persist for as long as possible while maintaining highest precision!”

Implementation intention

“I want to persist for as long as possible while maintaining highest precision!”

Pain: “If my arms start to hurt, then I ignore the pain and tell myself: Keep going!”

Effort: “If the task becomes too strenuous for me, then I ignore the strain and tell myself: Keep going!”



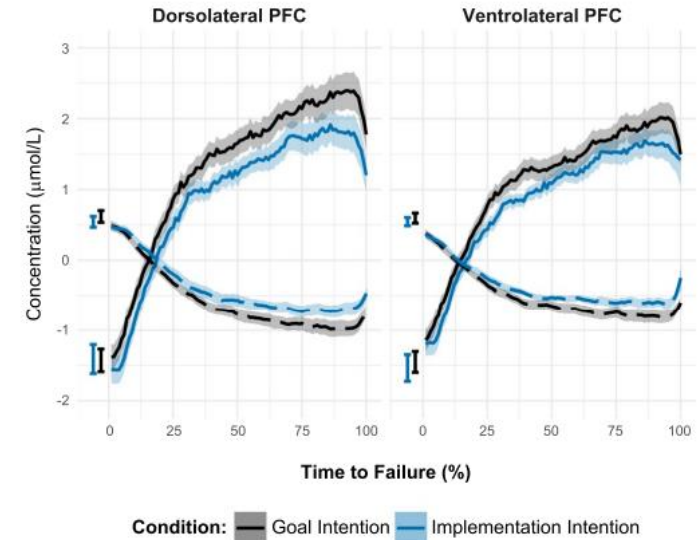
SCIENTIFIC REPORTS

OPEN

Increase in prefrontal cortex oxygenation during static muscular endurance performance is modulated by self-regulation strategies

Wanja Wolff¹, Maik Bieleke^{1,2}, Anna Hirsch³, Christian Wienbruch³, Peter M. Gollwitzer^{1,4} & Julia Schuler¹

Received: 30 May 2018
Accepted: 9 October 2018
Published online: 25 October 2018




If-then planning in other athletic tasks



International Journal of
*Environmental Research
and Public Health*

Article

Implicit Theories about Athletic Ability Modulate the Effects of If-Then Planning on Performance in a Standardized Endurance Task


Anna Hirsch ^{1,*}, Maik Bieleke ², Julia Schüler ¹ and Wanja Wolff ^{1,3} 



*behavioral
sciences*

Article

Served Well? A Pilot Field Study on the Effects of Conveying Self-Control Strategies on Volleyball Service Performance

Maik Bieleke ^{1,2,*}, Claudio Kriech ³ and Wanja Wolff ^{3,4} 

Inner Obstacles and Goal-Directed Behaviors of Elite and Youth Level Cyclists:


A Qualitative Analysis From the Perspective of Athletes and Coaches

Anna Hirsch¹, Maik Bieleke¹, Julia Schüler¹, & Wanja Wolff^{1,2}

PLOS ONE

RESEARCH ARTICLE

Struggles and strategies in anaerobic and aerobic cycling tests: A mixed-method approach with a focus on tailored self-regulation strategies

Anna Hirsch ^{1,*}, Maik Bieleke¹, Raphael Bertschinger¹, Julia Schüler¹, Wanja Wolff^{1,2}

Scoping review

Original Article

If-Then Planning in Sports

A Scoping Review

Maik Bieleke¹, Wanja Wolff^{1,2}, Chris Englert³, and Peter M. Gollwitzer^{4,5,6}

¹Department of Sport Science, Sport Psychology, University of Konstanz, Germany

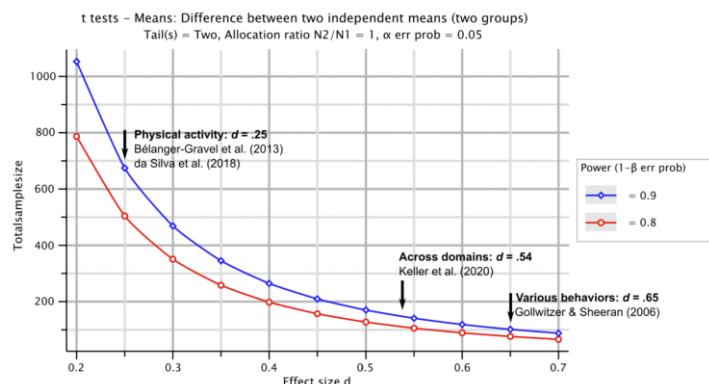
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⁶Institute of Psychology, Leuphana University Lüneburg, Germany



BIELEKE ET AL. (2021)

12.05.2022

Table 1. Overview of studies on if-then planning effects in sports

Study	Topic	Sample size (condition)	Sample characteristics	Intervention	Task (measures)	If-then planning main effects
Endurance performance						
Bieleke and Wolff (2017)	Weight-holding	62 (plan: 29, goal: 33)	University students, M = 24 years, all female	Plan to continue despite exertion	Hold rings while avoiding contacts between them (time-to-failure, errors, RPE)	No effect on performance, faster increase of RPE
Thürmer et al. (2017, Study 1)	Weight-holding	47 triads (plan: 21, goal: 26)	University students, M = 23 years, 75 % female	Plan to deal with pain by self-affirmation	Hold ball simultaneously as a triad (time-to-failure)	Increased time-to-failure
Latinjak et al. (2018)	Cycling	27 (plan: 15, control: 12)	Sport students, M = 22 years, 41 % female	Self-generated plans	Cycle endurance test (time-to-failure, RPE)	No effect on performance, increased RPE
Wolff et al. (2018)	Weight-holding	60 (plan: 30, control: 30)	University students, M = 22 years, all female	Plan to continue despite exertion	Hold rings avoiding contacts (time-to-failure, errors, DLPFC activity)	No effect on performance and RPE, reduced DLPFC activity
Wang et al. (2019)	Yoga	90 (plan: 30, goal: 30, control: 30)	High-school students, M = 16 years, 53 % female	Plan to continue despite pain	Holding a yoga posture (time-to-failure)	Increased time-to-failure
Hirsch et al. (2020)	Weight-holding	66 (plan: 33, goal: 33)	University students, M = 26 years, all male	Plan to continue despite either exertion or pain	Hold rings avoiding contacts (time-to-failure, errors, RPE)	No effects on performance and RPE
Beyond Endurance Performance						
Achtziger et al. (2008, Study 2)	Tennis	107 (plan: 37, goal: 38, control: 32)	Tennis players, M = 34 years, 29 % female	Self-generated plans focusing on negative inner states	Tennis match (rating of performance and fitness)	Higher fitness and performance ratings
Stern et al. (2013, Study 1)	Golf	48 (plan: 24, control: 24)	University students and community members, M = 23 years, 77 % female	Self-generated plans focusing on anxiety-related states	Putting shots into golf hole (success)	Higher success rate
Stern et al. (2013, Study 2)	Darts	93 (plan: 31, goal: 30, control: 32)	University students, M = 20 years, 66 % female	Self-generated plans focusing on anxiety-related states	throwing darts at center circle (success)	Higher success rate
Wilczynska et al. (2014)	Basketball	76 (plan: 38, control: 38)	Basketball players, M = 15 years, 42 % female	Self-generated plans	Throw effectiveness test (throwing success, heart rate)	No effect on success, reduced heart rate
Bieleke et al. (2019)	Volleyball	62 (plan: 33, goal: 29)	Volleyball players, M = 14 years, 44 % female	self-generated plans based on coach feedback	Serve ball to target position (error, velocity, precision)	No effects on performance indicators

Note. RPE = rating of perceived exertion, DLPFC = dorsolateral prefrontal cortex.

Dr. Maik Bieleke

University of Konstanz

Individual Differences in If-Then Planning

Focus on experimental research

TABLE II
IMPACT OF METHODOLOGICAL FACTORS ON EFFECT SIZES FOR IMPLEMENTATION INTENTIONS

Factor	<i>N</i>	<i>k</i>	<i>d</i>	95% <i>CI</i>	<i>Q</i>
<i>Sample</i>					
General public	1076	8	.58	[.45, .70]	14.09*
Children/young adults	144	2	.47	[.14, .85]	2.38
People with physical illness	291	4	.52	[.28, .77]	3.66
People with psychological problems					
Schizophrenic patients	20	1	1.01		
Brain-injured patients	34	1	.87		
Heroin addicts	41	1	1.32		
University students	6855	79	.65	[.61, .70]	147.93***
<i>Design</i>					
Correlational	1688	11	.70	[.61, .82]	20.23*
Experimental	6773	83	.65	[.61, .70]	151.59***
<i>Measurement</i>					
Self-report	4488	36	.63	[.58, .70]	80.96***
Objective	3973	58	.67	[.61, .74]	92.32**
<i>Publication status</i>					
Unpublished	3759	46	.67	[.61, .72]	75.13***
Published	4702	48	.65	[.59, .70]	98.23***

GOLLWITZER & SHEERAN (2006)

1. What is your goal?
Pick a goal that is **desirable** („I really want it“) and **feasible** („I can do it“).

Goal: _____!

Example: I want to run a sub 3:00 hours marathon!

2. What might be a situation that is critical for attaining your goal?
Think of an **opportunity to act** or an **obstacle to overcome**.

Situation: _____

Example: getting dropped by my pacemaker

3. How could you best respond in the critical situation to attain your goal?
Think of a specific **action** or **thought** that might be helpful.

Response: _____

Example: calm down and stick to own pacing strategy

4. Make your if-then plan!

If _____

If I get dropped by my pacemaker,

then _____!

then I will keep cool and stick to my pacing strategy!

WOLFF, BIELEKE, & SCHÜLER (2019)

If-then planning scale (ITPS)



Individual differences in if-then planning: Insights from the development and application of the If-Then Planning Scale (ITPS)

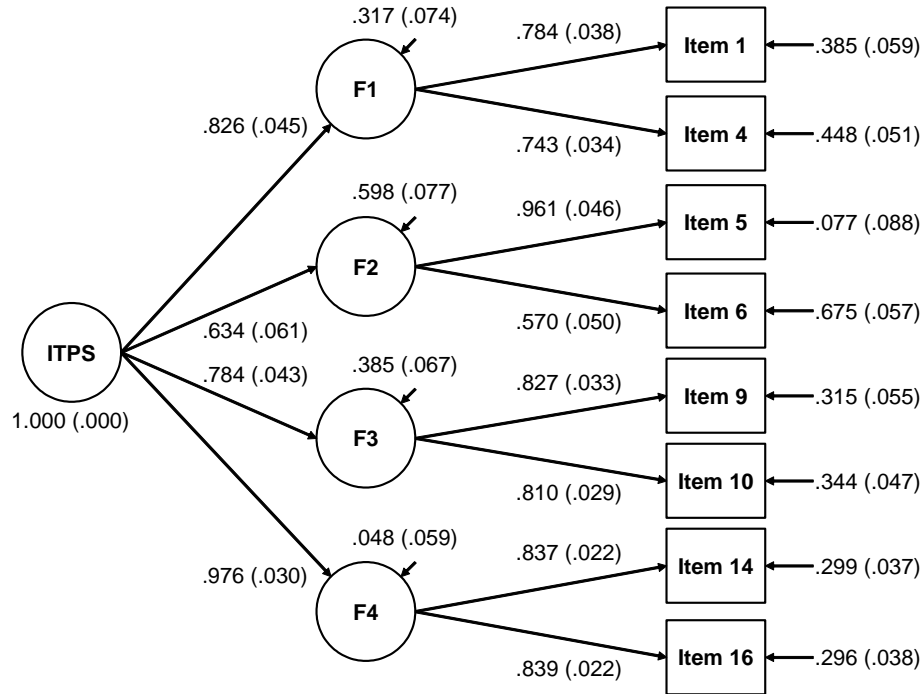
Maik Bieleke^{a,*}, Lucas Keller^b



- **Structure of the plan:** if-part (# 1-4) and then-part (# 5-8)
- **Fokus of the plan:** seizing opportunities (#1, 2, 5, 6) vs. overcoming obstacles (# 3, 4, 7, 8)

#	Item
1	I think about when and where decisive moments for the achievement of my goals could occur.
2	I think about chances and possibilities that I could use.
3	I envisage what obstacles could arise.
4	I am concerned with what setbacks to expect.
5	I plan how best to achieve my goals.
6	I plan the concrete actions I will take toward my goal.
7	I plan how to protect myself from distractions.
8	I plan ways in which I can deal with difficulties.

The ITPS is psychometrically sound



Model fit:

RMSEA 0.058

SRMR 0.038

CFI 0.970

TLI 0.047

Reliability:

Cronbach's α 0.85

Descriptive Statistics:

Mean 5.27 (1-7 Likert)

Standard Dev. 0.95

The ITPS has a meaningful nomological network

Table S6

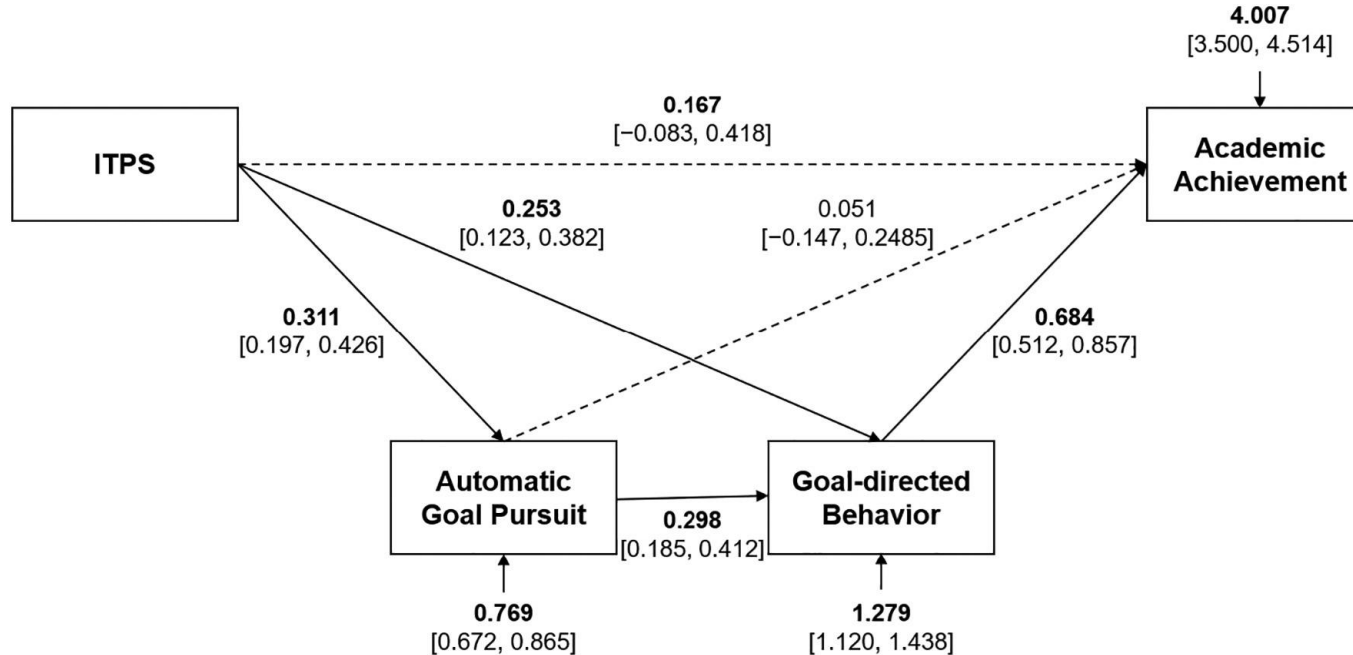
Correlations between the ITPS and External Measures in Study 2

External Variable	Reference	Items	Possible range	Observed range	M	SD	α	r	p
(1) Self-regulatory styles									
Rosenbaum Self-Control Schedule	Rosenbaum (1980)	36	1.0 – 6.0	1.9 – 6.0	4.0	0.6	.87	.61	<.001
Brief Self-Control Scale	Tangney, Baumeister, & Boone (2004)	13	1.0 – 5.0	1.7 – 5.0	3.5	0.8	.89	.23	<.001
Capacity for Self-Control Scale	Hoyle & Davison (2016)	20	1.0 – 5.0	1.4 – 5.0	3.5	0.7	.92	.44	<.001
inhibition		7		2.0 – 5.0	3.9	0.6	.82	.57	<.001
initiation									
continuation									
Short Self-Regulation Questionnaire	Carey, Neal, & Collins (2008)								
Habitual Self-Control Questionnaire	Schroder, Ollis, & Duckworth (2016)								
Short Grit Scale	Duckworth & Quinn (2009)								
consistency of interest									
perseverance of effort									
Emotion Regulation Questionnaire	Gross & John (2003)								
reappraisal									
suppression									
(2a) Manifestations of vigorous self-regulation									
Almost Perfect Scale Revised	Slaney, Rice, Moble, & Stiles (2001)								
discrepancy									
high standards									
order									
Obsessive-Compulsive Inventory	Foa et al. (2002)								
washing									
obsessing									
hoarding									
ordering									
checking									
neutralizing									
Creature of Habit Scale	Ersche, Lim, Ward, & Clark (2015)								
preference for routines									
(2b) Manifestations of poor self-regulation									
Procrastination Scale	Tuckman (1991)	16	1.0 – 4.0	1.0 – 3.7	2.2	0.7	.95	-.35	<.001
Barratt Impulsiveness Scale	Patton, Stanford, & Barratt (1995)	30	1.0 – 4.0	1.0 – 3.1	2.0	0.4	.87	-.22	<.001
attentional impulsivity		8		1.0 – 3.5	2.0	0.6	.78	-.10	.080
- attention				1.0 – 3.5	2.0	0.6	.78	-.10	.080
- cognitive instability									
non-planning impulsiveness									
- cognitive complexity									
- self-control									
motor impulsiveness									
- motor impulsiveness									
- perseverance									
Creature of Habit Scale	Ersche, Lim, Ward, & Clark (2015)								
eating-related automaticity									
(3) Motivational styles									
Behavioral Inhibition and Activation	Carver & White (1994)								
BIS									
BAS - reward responsiveness									
BAS - drive									
BAS - fun seeking									
Action Control Scale	Kuhl (1994)								
preoccupation (AOF)									
hesitation (AOD)									
volatility (AOP)									
(4) Cognitive styles									
Consideration of Future Consequences	Strathman, Gleicher, & Cacioppo (1992)								
Need for Cognition	Cacioppo, Petty, & Kruglanski (1996)								
Need for Cognitive Closure	Kruglanski, Webster, & Eckstein (1994)								
(5) Facets of personality									
Big Five Inventory-2 Short	Soto & John (2017)	30	1.0 – 5.0	—	—	—	—	—	—
open-mindedness		6		1.0 – 5.0	3.9	0.9	.76	.22	<.001
- aesthetic sensitivity		2		1.0 – 5.0	3.5	1.1	—	.19	<.001
- intellectual curiosity		2		1.0 – 5.0	3.7	1.0	—	.17	.003
- creative imagination		2		1.0 – 5.0	3.7	1.0	—	.19	.001
conscientiousness		6		1.7 – 3.5	3.8	0.8	.77	.36	<.001
- organization		2		1.0 – 5.0	3.7	1.0	—	.28	<.001
- productiveness		2		1.5 – 5.0	3.7	1.0	—	.36	<.001
- responsibility		2		1.5 – 5.0	3.9	0.9	—	.27	<.001
extraversion		6		1.0 – 5.0	3.0	0.9	.79	.27	<.001
- sociability		2		1.0 – 5.0	2.8	1.2	—	.18	.002
- assertiveness		2		1.0 – 5.0	3.0	1.1	—	.18	.002
- energy level		2		1.0 – 5.0	3.2	1.1	—	.27	<.001
agreeableness		6		1.7 – 5.0	3.8	0.8	.84	.24	<.001
- compassion		2		1.5 – 5.0	3.9	0.9	—	.24	<.001
- respectfulness		2		1.0 – 5.0	4.1	0.8	—	.24	<.001
- trust		2		1.0 – 5.0	3.5	1.0	—	.16	.006
negative emotionality		6		1.0 – 5.0	2.5	1.0	.79	-.16	.006
- anxiety		2		1.0 – 5.0	2.7	1.1	—	-.09	.138
- depression		2		1.0 – 5.0	2.4	1.1	—	-.25	<.001
- emotional volatility		2		1.0 – 5.0	2.4	1.1	—	-.09	.118
Rosenberg Self-Esteem Scale	Rosenberg (1965)	10	1.0 – 4.0	1.1 – 4.0	3.0	0.7	.92	.34	<.001
Dirty Dozen	Jonason & Webster (2010)	12	1.0 – 5.0	1.0 – 4.7	2.2	1.0	.93	.06	.284
Machiavellianism		4		1.0 – 5.0	2.2	1.1	.89	.06	.298
narcissism		4		1.0 – 5.0	2.2	1.1	.82	.14	.016
psychopathy		4		1.0 – 5.0	2.4	1.1	.86	-.04	.518

Note. Pairwise correlations between each external scale and the ITPS (i.e., r) are based on 289 to 298 observations.

The ITPS is consistent with theoretical predictions

$N = 576$ students, 79.2% female, $M = 17.2$ years old



$\chi^2(58) = 176.76, p < .001, RMSEA = .060, CFI = .907, TLI = .874, SRMR = .047$

Generating new insights with the ITPS

If-then planning is linked to worse goal disengagement but better goal reengagement

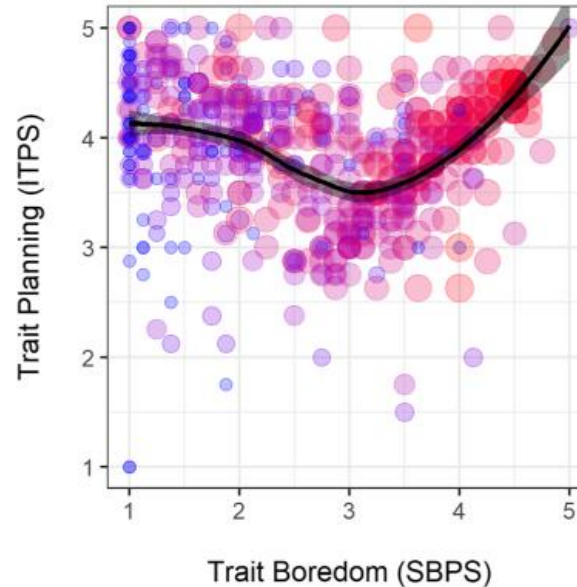
<https://doi.org/10.31234/osf.io/db7u3>

Table 2
Regressing Goal Adjustment on Self-Control and Boredom

	Goal Disengagement			Goal reengagement		
	M1	M2	M3	M1	M2	M3
<i>N</i> = 323						
Intercept	4.63*** (0.48)	3.95*** (0.21)	4.67*** (0.68)	2.24*** (0.40)	5.50*** (0.17)	3.45*** (0.55)
Domain-General Self-Control	0.15* (0.07)		0.15 (0.08)	0.17** (0.05)		0.04 (0.07)
If-Then Planning	-0.31*** (0.09)		-0.30** (0.09)	0.40*** (0.07)		0.33*** (0.07)
Boredom Proneness		-0.02 (0.06)	0.00 (0.07)		-0.32*** (0.05)	-0.22*** (0.06)
Boredom Avoidance and Escape		-0.04 (0.05)	-0.02 (0.05)		0.13*** (0.04)	0.10** (0.04)
R ²	.04	.00	.04	.15	.14	.19

BIELEKE, WOLFF, & KELLER (IN PRESS)

BIELEKE, MARTARELLI, & WOLFF (2021)

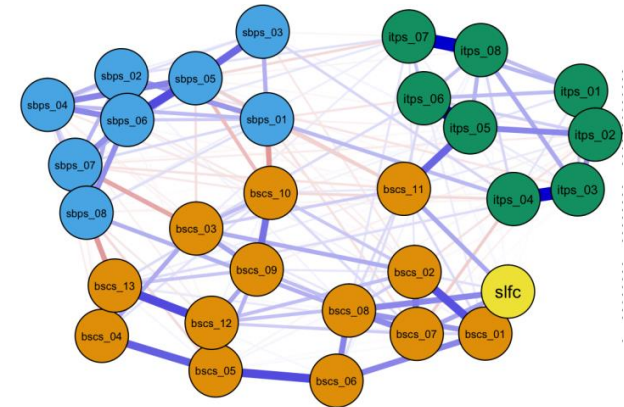


If-then planning linked to adherence to COVID-19 social distancing guidelines

<https://doi.org/10.1007/s12144-021-02106-7>

If-then planning is a distinct self-control strategy and negatively linked to self-control costs

<https://doi.org/10.32872/spb.7453>



WOLFF, BIELEKE, ET AL. (2022)

Summary

Current directions and open questions

- **Characterizing the effects of if-then planning**
 - flexibility versus tenacity
 - spill-over effects
 - cerebral correlates
- **Novel applications and questions**
 - athletic performance and effort
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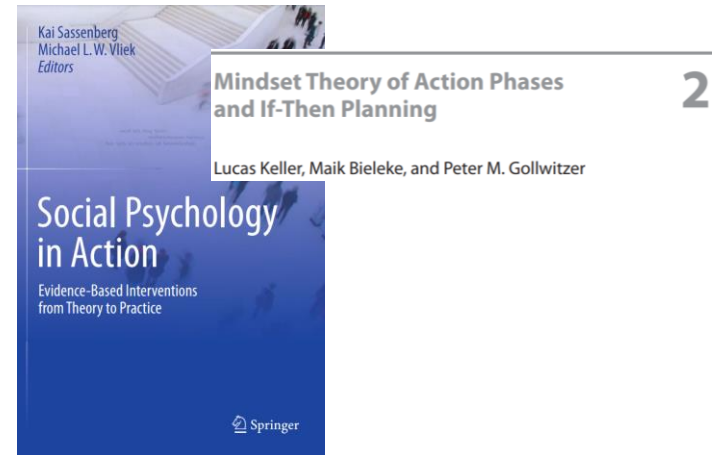
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If-then planning

Maik Bieleke ^a, Lucas Keller ^b and Peter M. Gollwitzer ^{b,c}

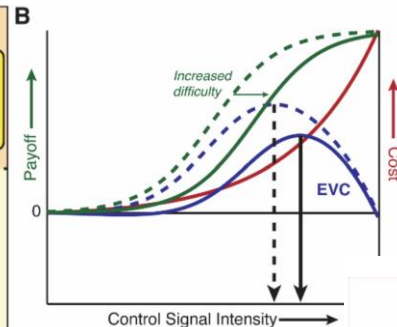
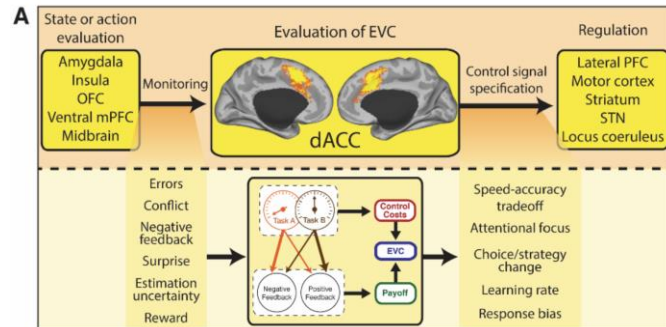
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BIELEKE, KELLER, & GOLLWITZER (2021), KELLER, BIELEKE, & GOLLWITZER (2019)

Guiding sensations for regulating effort

$$EVC(signal, state) = [\sum_i \Pr(outcome_i | signal, state) \cdot Value(outcome_i)] - Cost(signal)$$



Emotions /
Boredom

Self-control /
If-Then Planning

It's not a bug, it's boredom: Effortful willpower balances exploitation and exploration

Published online by Cambridge University Press: 26 April 2021

Maik Bieleke and Wanja Wolff

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Too bored for sports?



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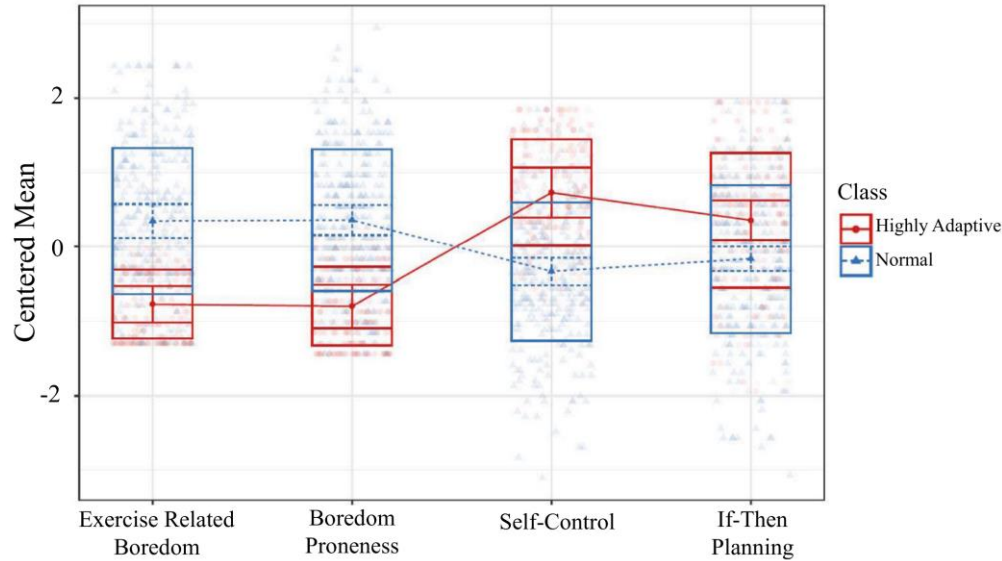
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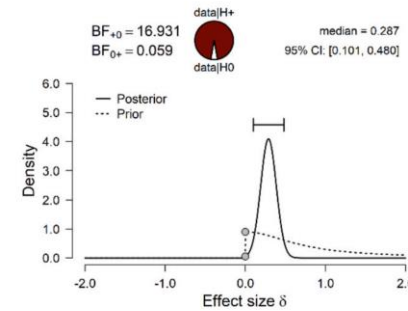


Too bored for sports? Adaptive and less-adaptive latent personality profiles for exercise behavior

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A



B

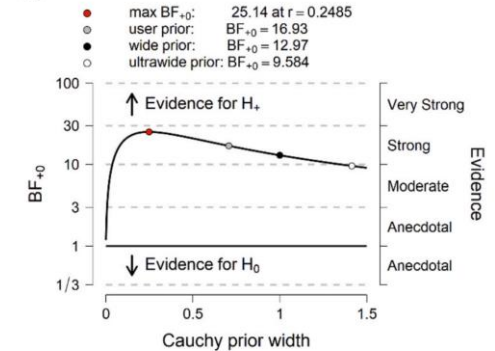


Fig. 2. Effect size of the Bayes Factor (Panel A) and Bayes Factor Robustness as a function of prior width (Panel B).

**Thank you
for your attention!**

Maik Bieleke

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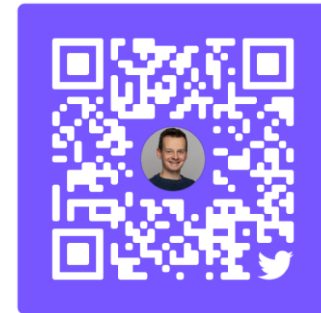
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