Why so rational?
Expanding theoretical horizons in exercise motivation research

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Debate: Does behavioral theory work in the real world?

Yes

“I contend that theories derived from behavioral science (...) can be, and are, effective in informing population-level interventions to promote greater participation in physical activity and eating behavior.”

No

“I summarize data that shows that despite 30+ years of interventional research applying or developing behavior change theories, progress towards shifting population behaviors has been glacial.”
What is our track record? Behavioral theory

Ekkekakis & Zenko (2016)

Pooled effect sizes from 18 recent meta-analyses from physical activity promotion trials.

$\rightarrow d$: 95% CI 0.21–0.31
Motivation
A theoretical construct used to explain behavior; with the idea of a circular process at its core.

Mental states and processes

Behavior
Action by which an organism adjusts to its environment.

Performance
Result of the behavior.
The Cognitive Approach to Psychology

Study of the mind as an information processor
Transforming information → storing information → retrieving it from memory

Cognitive Theory of Motivation

Goal Setting Theory.
People have a drive to reach a defined end state, while reaching this end state can be a reward in itself.

Expectancy Theory. Which goals shall be pursued?
Expectation × instrumentality × valence.
Theoretical approaches to intervention
e.g. Biddle, Hagger et al. (2007)

1. Belief-attitude theories
e.g. Theory of planned behavior

2. Competence-based theories
e.g. Social-cognitive theory

3. Control-based theories
e.g. Self-determination theory

4. Stage models
e.g. Transtheoretical model
Concomitant line of thinking

Unbounded rationality. Rationality in decision-making as optimization by using and combining all available information appropriately.

But: Decision-makers act as satisficers (Simon, 1953), and often seek for a satisfactory solution rather than the optimal one.
Bounded rationality

1. Circumstances under which people behave irrationally?
2. Circumstances under which people behave rationally?

Controlled reasoning
Dual-system/dual-process theory


• **Type-1.** Fast and automatic in a sense that it requires little or no cognitive resources and effort. Primacy of affect.

• **Type-2.** Slower and reflective in a way that it comprises controlled reasoning.
First interim conclusion

• Exercise interventions are rather ineffective
• Meta-theoretical mainstream in exercise psychology: Cognitive theory of motivation
• People do not always behave rationally
Basic/core affect

- Neuro-physiological state, consciously accessible as a simple, primitive, **nonreflective feeling** most evident in mood and emotion. Generic term.

- **Core affective valence** refers to all states in which a person feels good or bad, including examples like pleasure and displeasure.
Exercising makes you feel good?

Dual Mode Theory

Ekkekakis (2009)
VT/LT 1  VT/LT 2  post performance
below the VT/LT  proximal the VT/LT  above the VT/LT

Heart rate (% max)  Lactate (mMol)
0  0  10  20

0  50  100

below the VT/LT  proximal the VT/LT  above the VT/LT

Intensity

Heart rate  Lactate
Affective response is interindividually homogenous in the low cognitive influence below the VT/LT. It becomes heterogeneous with a strong cognitive influence proximal to the VT/LT. Above the VT/LT, interoceptive influence is strong and leads to a homogenous affective response. This is reflected in the heart rate and lactate levels on the graph.
Systematic reviews and meta-analyses

1. Positive/negative change of affect during moderate intensity exercise linked to future PA
2. Null relationship for postexercise affect
3. Reliable correlation of change during exercise with affective judgments about future physical activity (affective forecasting)

Parfitt & Hughes (2009).
*Exercise intensity-affect relationship*

*Prediction of future exercise*
Exercise attempt → Unpleasant affective experiences

Physical and psychological barriers → Diminution of intrinsic motivation

Changes in the body and self-perceptions → Phys. Inactivity Reduced fitness

“Exercise” registers in memory as unpleasant → Exercise avoidance

Ekkekakis (2016; modified)
Second interim conclusion

- Exercise will not automatically make you feel good
- Cognitive „post-processing“ of affective state during and after exercise can make you feel good
- Positive/negative change of affect during exercise linked to future PA
- With inexperienced exercisers there will be decrease in affective valence already at moderate exercise intensity
Affective-Reflective Theory (ART) of Physical Inactivity and Exercise

Brand & Ekkekakis (2018)

- Dual-process model
- Affect and automaticity (i.e. on „irrational“ sources of influence)
- Exercise-psychological account
- Novel account to the explanation of physical inactivity
ART: Driving and restraining forces

Lewin (1951), Brand & Ekkekakis (2018)
ART: Affective valuation, plans and impulses

Brand & Ekkekakis (2018)
Affective Misattribution Procedure (AMP)
Murphy & Zajonc (1993), Payne et al. (2005), Antoniewicz & Brand (2014)

40 Trials

<table>
<thead>
<tr>
<th>prime</th>
<th>ideograph</th>
<th>mask</th>
<th>reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ms</td>
<td>1000 ms</td>
<td>125 ms</td>
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Visually more or less pleasing than the average Chinese ideograph?
Automatic affective misattribution after fitness center primes  Antoniewicz & Brand (2014)

Difference in automatic evaluation
\( F(1,70) = 6.35, p < .05, \eta^2_{\text{part.}} = .08 \)

AMP differs from 1 in frequent fitness center exercisers
\( t(33) = 2.26, p < .05, d = 0.79 \)
ART: Affective valuation, plans and impulses

Brand & Ekkekakis (2018)
Measuring mental associations: The ST-IAT


• Timed sorting task with two concepts (target & evaluative) mapped on the same response key.
• The task is easier (less time) when the two concepts sharing the same response key are closely associated (co-activation!) in the participant’s memory.

→ Concept allocation to keys is systematically varied within participants
   [here: sequenced blocks A + B]
Measuring mental associations: The ST-IAT

Greenwald et al., (1998)

Block A

Block B

IAT-effect

msec
ART: Affective valuation, plans and impulses

Brand & Ekkekakis (2018)
Dropping Out or Keeping Up?

Early-dropouts, late-dropouts, and maintainers differ in their automatic evaluations of exercise already before a 14-week exercise course

Antoniewicz & Brand (2016)

→ 88 participants (24.98 years ± 6.88; 51.1% female)

→ Positive associations with exercise discriminated ‘Maintainers’ from other non-/adherence groups

\[ V = 0.15, F(4,170) = 3.35, p < 0.01, \eta^2_p = .07 \]
ART: Affective valuation, plans and impulses

Brand & Ekkekakis (2018)
Experimental procedure

Brand & Utesch (🔥, May 2018)

- **Experimentally lowered (ego-depletion)**
  
  24.8 ±4.1 y/age
  
  n = 61 (36 female)

- **Control**
  
  25.3 ±5.4 y/age
  
  n = 63 (30 female)

**Manipulation**

Self-control

[e-letter task]

**Dependent variable**

Toning exercise

[bogus instruction]

Automatic associations & reflective evaluation

Randomized
Data and statistical design

→ Response surface analysis (polynomial regression; ML estimator)

\[ weight = b_0 + b_1 \text{reflective} + b_2 \text{automatic} + b_3 \text{reflective}^2 + b_4 \text{reflective} \times \text{automatic} + b_5 \text{automatic}^2 + \varepsilon \]
ART: Affective valuation, plans and impulses

Brand & Ekkekakis (2018)
I can see it in your face!

Affect, amygdalo-motor paths, facial expression

Feldman Barrett et al. (2007), Gothard (2014)

→ Expression-feeling congruence hypothesis
e.g. Izard & Abe (2004)
Summary

Line of argument

40 years of research in exercise psych
Undisputed paradigmatic mainstream
Cognitive-behavioral theories of motivation
Exercise interventions hardly effective

Motivation: Driving and restraining forces
Bounded rationality
Dual-process theory: automaticity

Characteristics of exercise behavior
Inadvertency of affect and feelings during exercise
Affective-Reflective Theory of Physical Inactivity and Exercise
Summary

Key suggestions

Start investigating the **conditions under which**...
...behavior is likely to be governed by controlled reasoning
...automatic processes (e.g. affect, predisposition, habit) become important

**Note:** Cognitive behavioral theory
is valuable, useful and necessary for understanding
exercise behavior change

Begin being **curious** about...
...non self-report measures!
Summary

The bottom line

Start challenging theory instead of asking questions like whether theory X can be applied to exercise.

Why? Disregard of the specificities of exercise in general psychology

One last question...

Why so rational?

Publish or perish...
  → don’t risk too much...
  → do „little“ empirical studies...
  → ...

Theory

Hypothesis

Operationalization

Challenge with data