

Situational Self-Efficacy and Behavioral Responses to Wearable Use

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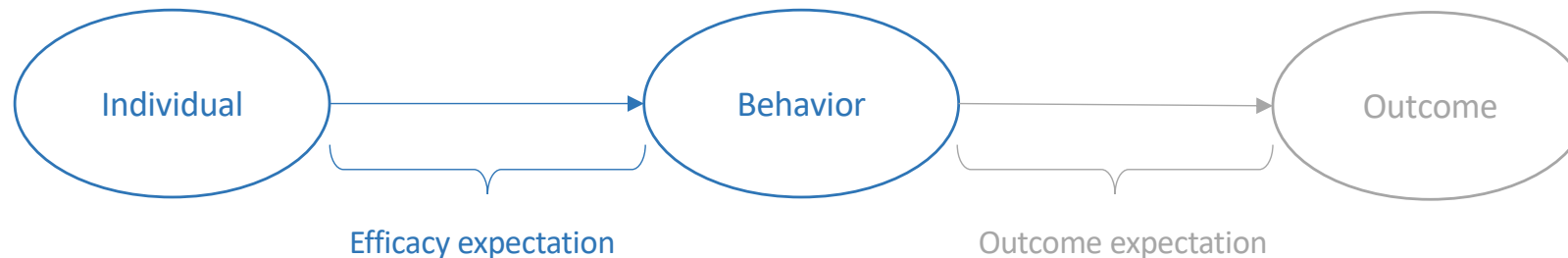


Motivation

- Wearables have the potential to improve health-related outcomes.
- But: High attrition rates and disillusioning results dampen the prospects.
- Little is known about the cognitive and behavioral processes active in wearable use.
- Prior research on wearables based on the self-efficacy theory indicates that individual behavioral responses to wearable use are influenced by not further specified "influencing factors" and a situationally varying perception of self-efficacy.

Self-Efficacy

- ... refers to a person's beliefs about his or her capacity to perform a behavior that is necessary to produce particular outcomes;
- ... determines the confidence, effort, and perseverance with which a behavior will be pursued.



Research Question

Why do the self-efficacy percepts and behavioral responses of wearable users vary over time?

Hypotheses

- Wearable users' behavioral responses are not only influenced by self-efficacy information, but also by (situational) factors that may constrain their self-efficacy.
- Restricting influences may originate from three spheres (Bandura 1977):
 - *Action-related restrictiveness* impairs self-efficacy if the action or task is perceived as too difficult, not affordable, or not enjoyable (cf. Blanchard et al., 2002; Rieder et al. 2019b);
 - *Contextual restrictiveness* hampers self-efficacy if the behavior is requested in a situation in which users feel unable to comply because of work- or family-related duties, stressful life changes, or environmental factors (e.g., the weather) (cf. Adu et al., 2019; Muchiri et al., 2019; Sallis et al., 1988);
 - *Personal restrictiveness* has a limiting effect on self-efficacy when health issues, strong negative emotions (e.g., anxiety), or the inability to resist temptation are present (cf. Blanchard et al., 2002, 2007; Sallis et al., 1988; Stajkovic and Luthans, 1998).

H1: Action-related restrictiveness has a negative effect on situational self-efficacy.

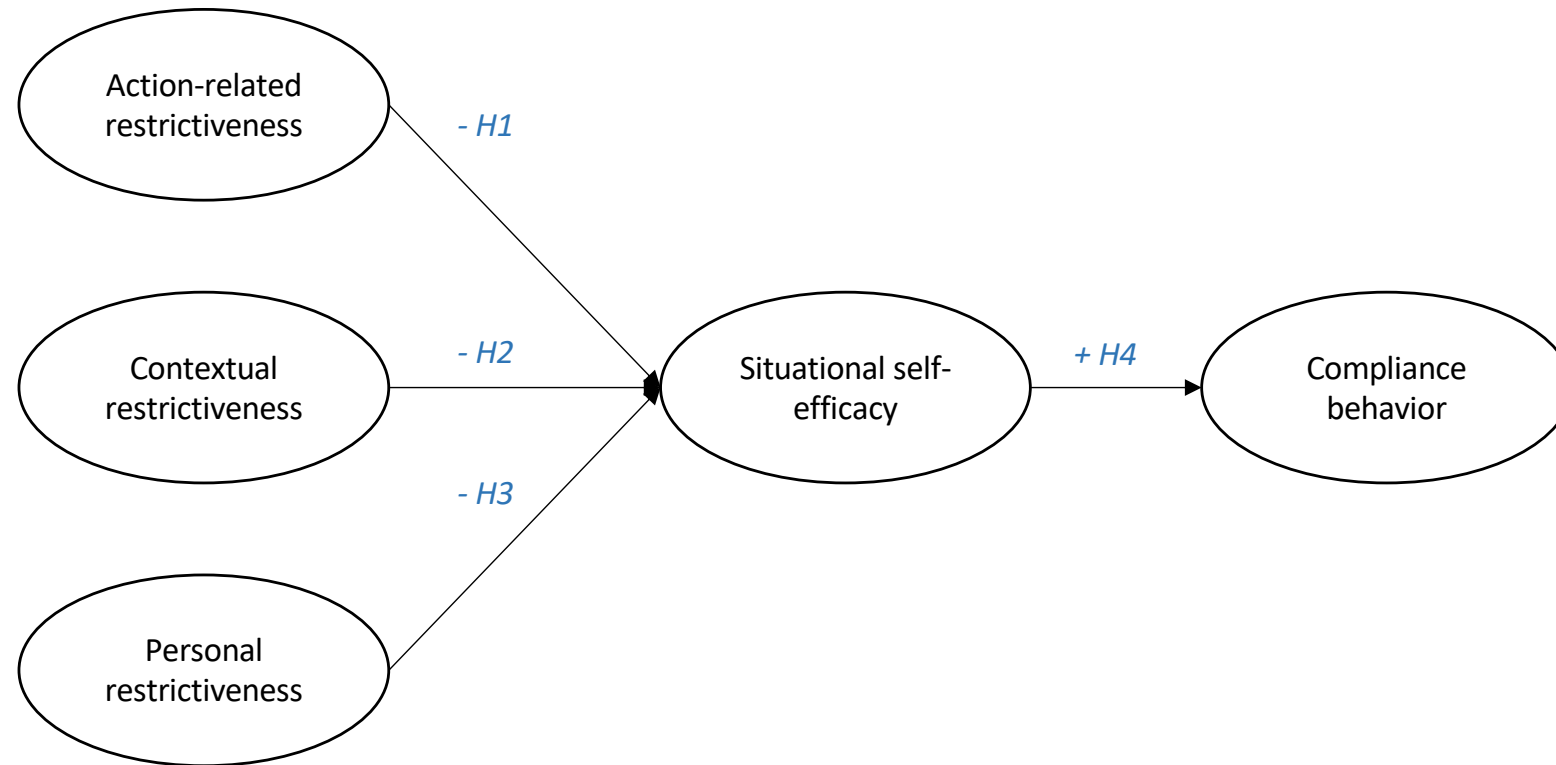
H2: Contextual restrictiveness has a negative effect on situational self-efficacy.

H3: Personal restrictiveness has a negative effect on situational self-efficacy.

- The three restrictiveness-related constructs introduce situational variation to the model, such that self-efficacy and compliance behavior vary depending on the situation (Rieder et al. 2019b).
- Information from attenuating factors is incorporated into an individual's situational (rather than time-invariant) perception of self-efficacy, which then have a direct influence on wearable users' (non-)compliance behavior.
- Compliance behavior refers to the adherence to the wearable's request (cf. Oinas-Kukkonen, 2013). Despite being a momentary reaction to a technology cue, compliance is an important precursor of higher-level behavioral changes in, for example, habits, routines, or attitudes (ibid.).

H4: The higher an individual's situational self-efficacy, the more likely he or she will show compliance behavior.

Research Model



Research Method

Longitudinal quasi-experimental field study:

- *Experimental design* is appropriate to substantiate the proposed causal relationships.
- *Field study* (i.e., natural setting) is required because most hypotheses are bound to specificities of the use context.
- *Longitudinal design* is required to appropriately test the process-related nature of our research model.
- Weekly self-reports on different measures; assignment of participants to experimental groups based on these measures (→ *quasi-experiment*)

Data Collection

- Sampling strategy: Snowball sampling
- Focus on Fitbit devices; exclusive offer of self-tracking devices and considerable market share in Europe.
- Inclusion criteria: long-term users of wearables (>6m) based in Switzerland; maximum variation in demographics and use cases
- Sample size: 150
- Survey tool: Unipark
- Non-deceptive: Participants will receive basic information on the purpose of the study (“studying wearable use”) that does not reveal any of the hypotheses.
- Informed consent
- Base survey (t_0): demographics, wearable use-related information, potential time-invariant variables
- 8x recurring surveys every 6 days (t_0 - t_7)

Measures

- I. Situational self-efficacy
- II. Restrictiveness
- III. Compliance behavior

I. Situational Self-Efficacy Scale

Question	<i>In the above situation, I was confident in my ability to:</i>
Scheduling self-efficacy (Maddison and Prapavessis 2016; Sallis et al. 1988; Scholz et al. 2016)	<i>1) Enable myself to do the behavior (e.g., make time for the behavior)</i>
Task self-efficacy (Sweet et al. 2012, Blanchard et al. 2007)	<i>2) Engage in the behavior as needed for my goals (e.g., do the behavior)</i>
Relapse self-efficacy (Sallis et al. 1988)	<i>3) Stick to my behavior goals when facing difficulties or obstacles (e.g., don't give up on the behavior)</i>
<i>(five-point Likert; strongly disagree to strongly agree)</i>	

II. Restrictiveness Scale

Question	<i>Did you encounter any negative circumstances or obstacles in your situation?</i>
Action-related	<ul style="list-style-type: none"> <i>I do not enjoy the activity (e.g., I do not enjoy running)</i> <i>The activity was too difficult (e.g., I cannot run for 20km)</i> <i>I did not have the funds to do the activity (e.g., I could not afford the green-fee)</i>
Contextual	<ul style="list-style-type: none"> <i>I had other work-related priorities (e.g., I had an important deadline coming up)</i> <i>I had other priorities related to family and friends (e.g., my son was sick)</i> <i>It was impossible for me to do the activity because of the context (e.g., I could not run outside because there was a thunderstorm)</i> <i>I am going through a stressful personal life change (e.g., I recently lost a close family member)</i>
Personal	<ul style="list-style-type: none"> <i>I felt strong negative emotions (e.g., I was afraid of running in the dark)</i> <i>The temptations not to engage in the activity/behavior were too high (e.g., I was invited to dinner and could not resist the unhealthy food served)</i> <i>My health did not allow me to do the activity (e.g., I had 40° fever)</i>
Other options	<ul style="list-style-type: none"> <i>None</i> <i>Other (please specify) [with text field]</i>

III. Compliance Behavior

Question	<i>Following the situation where you used your wearable, how did you react?</i>
Remaining with Status Quo	<i>1) I did not change my behavior</i>
Concept: Compliance change (Oinas-Kukkonen, 2013)	<i>2) I adjusted my behavior to what the wearable intended</i>

Preliminary Results

A) Effect of the Restricting Factors on Situational Self-Efficacy:

	Coefficient	Std. Error	z-Value
Intercept	-5.071	1.496	-3.389 ***
RF	-0.417	0.173	-2.408 *
Control: GSE	2.169	0.346	6.278 ***
Adj. R-Sq.	0.392		
Chi-Sq.	43.11 *** (df = 2)		
N ^a	70		

Note: ^a 10 participants; *** p < 0.001; ** p < 0.01; * p < 0.05; RF = Restricting Factors; GSE = General Self-Efficacy

B) Effect of Situational Self-Efficacy on Compliance Behavior:

	Coefficient	Std. Error	z-Value
Intercept	-3.247	1.931	-1.682
SSE	1.192	0.481	2.476 **
AIC	72.59		
Residual dev.	66.59 (df = 67)		
N ^a	70		

Note: ^a 10 participants; *** p < 0.001; ** p < 0.01; * p < 0.05; SSE = Situational Self-Efficacy

C) Internal Validity of SSE Scale: *Cornbach's Alpha = .91 (→ excellent!)*

Expected Contributions and Implications

Research:

- Self-efficacy: Instability of perceptions in wearable context highlights the need for a situationally variable construct and complements the established understanding of generalized and stable self-efficacy perceptions.
- Wearables: Explanation for conflicting study results on the effectiveness of wearables; clarification of behavioral change processes and determining factors.

Practice:

- Wearable providers may directly address concrete barriers and obstacles to users' self-efficacy and compliance.
- Volatility of self-efficacy percepts calls for repeated persuasion of users of their ability to act/perform.

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