

## University of Groningen

### Health Self-Management Applications in the Workplace

Bonvanie - Lenferink, Anne

DOI:

[10.33612/diss.151661102](https://doi.org/10.33612/diss.151661102)

**IMPORTANT NOTE:** You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*  
2021

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Bonvanie - Lenferink, A. (2021). *Health Self-Management Applications in the Workplace: Multidisciplinary studies on worker behaviour and autonomy*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen, SOM research school. <https://doi.org/10.33612/diss.151661102>

#### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

#### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*

# **Health Self-Management Applications in the Workplace**

Multidisciplinary studies on worker behaviour and autonomy

**Anne Bonvanie-Lenferink**

“Would you tell me, please, which way I ought to go from here?”  
“That depends a good deal on where you want to get to,” said the Cat.

“I don’t much care where—” said Alice.

“Then it doesn’t matter which way you go,” said the Cat.  
“—so long as I get somewhere,” Alice added as an explanation.  
“Oh, you’re sure to do that,” said the Cat, “if you only walk long enough.”

(Alice’s Adventures in Wonderland – Lewis Caroll)

|                                |   |
|--------------------------------|---|
| Publisher:                     | University of Groningen, Groningen, the Netherlands           |
| Printer:                       | Ipskamp Printing, Enschede, the Netherlands                   |
| Cover & chapter illustrations: | Simon Dam ( <a href="http://simondam.com">simondam.com</a> )  |
| Backside photo:                | Wieger Dam ( <a href="http://wiegerdam.nl">wiegerdam.nl</a> ) |
| Paranimphs:                    | Sabine Waschull & Reinder Broekstra                           |

© 2020, Anne Maria Bonvanie-Lenferink

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system of any nature, or transmitted in any form or by any means, electronic, mechanical, now known or hereafter invented, including photocopying or recording, without prior written permission from the copyright owner.



rijksuniversiteit  
groningen

# **Health Self-Management Applications in the Workplace**

Multidisciplinary studies on worker behaviour and  
autonomy

## **Proefschrift**

ter verkrijging van de graad van doctor  
aan de Rijksuniversiteit Groningen  
op gezag van de  
rector magnificus prof. dr. C. Wijmenga  
en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op

dinsdag 2 maart 2021 om 11.00 uur

door

**Anne Maria Lenferink**  
geboren op 17 januari 1990  
te Tubbergen

**Promotores**

Prof. dr. ir. J.C. Wortmann  
Prof. dr. O. Janssen  
Prof. dr. H. Broekhuis

**Copromotor**

Dr. E.L.M. Maeckelberghe

**Beoordelingscommissie**

Prof. dr. E. Buskens  
Prof. dr. U. Bultmann  
Prof. dr. S. Kuhlmann

# Contents

|   |           |
|---|-----------|
| <b>Chapter 1: General Introduction .....</b>  | <b>9</b>  |
| <i>Health Self-Management Applications: a description .....</i>   | 15        |
| Theoretical background .....  | 16        |
| Feedback.....   | 17        |
| Autonomy .....  | 19        |
| Scientific contributions.....   | 21        |
| Research questions and outline of this thesis.....  | 22        |
| <b>Chapter 2: Real-time, actionable feedback and office workers' sitting behaviour and mental fatigue .....</b> | <b>27</b> |
| <i>Abstract .....</i>   | 28        |
| <i>Introduction.....</i>  | 29        |
| <i>Theoretical Background.....</i>  | 32        |
| Real-time actionable feedback.....  | 32        |
| Sitting behaviour .....   | 34        |
| Mental fatigue.....   | 36        |
| The moderating effect of Feedback frequency.....  | 39        |
| <i>Methods .....</i>  | 40        |
| Experimental field study and procedure .....  | 40        |
| Setting.....  | 40        |
| Participants.....   | 41        |
| Sensor tools and feedback .....   | 41        |
| Measures.....   | 44        |
| Statistical analyses.....   | 45        |
| <i>Results.....</i>   | 48        |
| Data overview .....   | 48        |
| Hypothesis testing .....  | 49        |
| <i>Discussion.....</i>  | 53        |
| Recap of the results .....  | 53        |
| Implications for theory .....   | 54        |
| Practical implications .....  | 56        |
| Limitations .....   | 57        |
| Areas for future research .....   | 58        |

|  |            |
|--|------------|
| <b>Chapter 3: Health Self-Management Applications in the Work Environment: the effects on Employee Autonomy .....</b>        | <b>61</b>  |
| <i>Abstract</i> .....  | 62         |
| <i>Introduction</i> .....  | 63         |
| <i>Theoretical Framework</i> .....   | 66         |
| HSMAs and perceived autonomy in the self-regulation of health-related behaviour .....  | 66         |
| The moderating role of focus of feedback .....   | 69         |
| The moderating role of health .....  | 70         |
| Health autonomy at work and at home .....  | 72         |
| <i>Methods</i> .....   | 73         |
| Design, sample, and procedure.....   | 73         |
| HSMA intervention and manipulation of feedback focus.....  | 76         |
| Measures.....  | 77         |
| Statistical analyses.....  | 78         |
| Second stage of the study: interviews .....  | 79         |
| <i>Results</i> .....   | 80         |
| Exploratory factor Analyses.....   | 80         |
| Equivalence of experimental feedback groups .....  | 80         |
| Descriptive statistics .....   | 82         |
| Hypothesis Testing .....   | 82         |
| BMI, performance feedback, and Work Health Autonomy .....  | 88         |
| BMI, developmental feedback, and Home Health Autonomy .....  | 91         |
| <i>Discussion</i> .....  | 94         |
| Discussion of the results .....  | 94         |
| Practical implications .....   | 97         |
| Limitations.....   | 98         |
| Areas for future research .....  | 101        |
| <i>Conclusions</i> .....   | 101        |
| <b>Chapter 4: Ethics in design and implementation of sensor technology applications for workplace health promotion .....</b> | <b>105</b> |
| <i>Abstract</i> .....  | 106        |
| <i>Introduction</i> .....  | 107        |
| <i>Theoretical background</i> .....  | 108        |
| Responsible research and innovation .....  | 108        |
| Privacy of workers.....  | 111        |
| Employee Autonomy and Sensor Technology .....  | 113        |

|  |            |
|--|------------|
| Responsibility in the work environment .....   | 115        |
| <i>Method</i> .....  | 116        |
| Focus of this research .....   | 116        |
| Setting.....   | 117        |
| <i>Results</i> .....   | 119        |
| Privacy in SPRINT@Work.....  | 119        |
| Autonomy of workers in SPRINT@Work.....  | 122        |
| <i>Discussion and conclusion</i> .....   | 125        |
| Compartmentalization of focus .....  | 126        |
| Prevention of out-of-context generalization.....   | 126        |
| Making implied responsibilities explicit.....  | 127        |
| Final remarks.....   | 128        |
| <b>Chapter 5: General discussion and conclusions .....</b>   | <b>131</b> |
| <i>Main Findings</i> .....   | 133        |
| Effects of real-time feedback on office workers' sitting behaviour and mental fatigue .....                              | 134        |
| HSMAs in the work environment: the effects on employee autonomy .....  | 135        |
| Ethics in design and implementation of sensor technology applications for workplace health promotion: a case study ..... | 137        |
| <i>Scientific contributions and implications</i> .....   | 138        |
| Contributions to the Field of Workplace Health Promotion .....   | 138        |
| Contributions to the field of Responsible Research and Innovation .....  | 143        |
| Practical implications .....   | 144        |
| Limitations and future research directions .....   | 145        |
| Final remarks.....   | 152        |
| <b>Appendix .....</b>  | <b>156</b> |
| <b>References .....</b>  | <b>159</b> |
| <b>Summary .....</b>   | <b>181</b> |
| <b>Samenvatting.....</b>   | <b>191</b> |
| <b>Dankwoord .....</b>   | <b>201</b> |
| <b>Curriculum Vitae .....</b>  | <b>207</b> |
| <b>SPRINT@Work .....</b>   | <b>211</b> |

