**Motivation: Theory- and Evidence-Based Interventions to Increase Physical Activity**

**FiDiPro - the Finland Distinguished Professor Programme 1.2.2016 - 30.9.2021**

**Final report**

This report provides a final summary of the Finland Distinguished Professor Programme awarded to Professor Martin S. Hagger and under the administration of Professor Taru Lintunen and the Faculty of Sport and Health Sciences, University of Jyväskylä (JYU). Professor Hagger has worked as FiDiPro - the Finland Distinguished Professor between 1.2.2016 and 30.9.2021 at JYU. The overall mission of the project was to develop a leading motivational theory of health behaviour, and to promote physical activity through behavioral interventions based on the theory in multiple applied settings. The aims of the project were:

1. Develop and test a psychological model of motivation, known as the Integrated Behaviour Change Model (IBCM);
2. Conduct empirical research that will test the key propositions of the IBCM;
3. Develop and evaluate intervention materials to increase physical activity and to promote sustainable long-term changes in physical activity in multiple contexts based on existing evidence and research on the ICBM;
4. Develop an objective measure of physical activity behaviour using computer assisted Video Analysis of Physical Activity (CAVAPA);
5. Develop theory- and evidence-based training and educational materials and self-training manuals to be used in schools, workplaces, health care and elderly care;
6. Develop research proposals for funding research on evidence-based behavioural interventions to promote physical activity.

We have achieved all of the above aims through progressing each project according to the FiDiPro plan in each of these aims between 1.2.2016 and 30.9.2021 and, consequently, successfully met the proposed goals of the FiDiPro project. Professor Martin Hagger and the FiDiPro team have published 176 scientific articles and numerous conference presentations and book chapters during the project. Publications and presentations are listed on the current web site (<https://www.fidiproimpact.com/>). Outputs and achievements of each aim:

**Aim 1 -** **Development of the Integrated Behaviour Change Model (IBCM)**

The FiDiPro Professor Martin Hagger has led the development of the Integrated Behaviour Change Model. The model was first proposed by Hagger and Chatzisarantis (2014) and summarized in Figure 1.



Figure 1. Integrated behavior-change model for physical activity (Hagger & Chatzisarantis, 2014).

**Aim 2 – Development and implementation of empirical research that will test the key propositions of IBCM**

*Research project 1.* This project serviced a principal goal of the FiDiPro project to develop and implement a theory-based intervention to promote physical activity. This particular project provided teachers of physical education with skills to support autonomy of school students The main objective was to develop and test a teacher-delivered theory-based intervention that promotes school students’ motivation toward physical activity in school and out-of-school contexts, known as the PETALS project. The project was implemented by training PE teachers to be more autonomy supportive and examining the effect of this training on students’ leisure-time physical activity.

First, a pilot study was organized in four communities close to Jyväskylä and Kouvola. Next, we developed content of the theory-based intervention to promote autonomy-supportive behaviours in PE teachers allocated to the intervention. The intervention was implemented in 10 schools with the help of city of Jyväskylä. Data was collected from PE teachers, their students, and parents. The PETALS project is described in detail in the protocol article (Polet et al., 2019). In addition, a description of the study and the developed training materials in Finnish and in English are available on the project web site: <https://www.fidiproimpact.com/petals>.

The main results of the project have been reported in four scientific outputs published in high ranked peer-reviewed journals, and the PhD student funded by the project, Juho Polet, has submitted his doctoral dissertation to preliminary examination. Results of the project have also been presented in several scientific congresses, for example, in the FEPSAC invited symposium in the 15th European Congress of Sport and Exercise Psychology 15-20.7.2019 in Münster, Germany and in the ISSP International Society of Sport Psychology 14th World Congress 10.-14.7.2017 in Sevilla, Spain. In addition, researchers organised a *Motivation and Behaviour Change - IMPAct/PETALS Webinar 14.8.2020.* A link to the recording of the webinar is here:

<https://m3.jyu.fi/jyumv/ohjelmat/sport/liikunta/liikuntapsykologia/motivation-and-behaviour-change-impact-petals-seminar-14-8.2020>

Access code = motivation

*Research project 2:* Promoting physical activity to the school community. The aim of this project was to change the school environment to be more conducive to physical activity using participatory planning emanating from the students themselves. The doctoral student working on this project, Heidi Pasi, has had an article accepted for publication in *PLOS ONE* and she is currently working on the projects outlined in research aim 3 (CAVAPA).

*Research project 3:* Teaching personal and social responsibility (TPSR) through physical activity. This project is moving into its final dissemination stages. A protocol article has been published in *International Journal of Sport and Exercise Psychology* and a second article based on the thesis of the doctoral student working on this project, Hanna-Mari Toivonen, was also published in *Frontiers in Psychology.*

*Research project 4*: Let’s Move it. Dr. Nelli Hankonen’s ‘Let's Move It’ intervention aimed at increasing physical activity among vocational college youth. The FiDiPro research was complemented with research ongoing by Dr. Hankonen’s study on young people (letsmoveit.fi).

*Research project 5*: Physical Over-Smoking -Mobile Phone Application. In this project, Dr. Mary Chasandra tested the effects of the PoS app to support adults attempting to quit smoking to manage their cigarette cravings on behavioral and psychological motivational variables in an RCT intervention program. Results have been published in the *Journal of Medical Internet Research*.

*Research project 6:* Promotion of physical activity in older people recovering from lower extremity medical event or condition. Prof. Nikander’s and Prof. Sipilä’s study generated novel knowledge on the level of physical activity among older people recovering from acute illness, injury, or surgery. The intervention designed for this study includes goal-directed multicomponent physical activity promotion supported by a volunteer and will be implemented in the real-world conditions. Master student Sanna Turakka interviewed elderly participants on this project for her thesis.

**Aim 3:** **Develop an objective measure of physical activity behaviour using computer vision technology (CAVAPA)**

Development of an objective measure of group-level physical activity behaviour using computer vision technology (CAVAPA) has been in progress during the project. Several pilot versions of CAVAPA were developed first and introduced in congress presentations. Next, CAVAPA was accepted as an applied practicum project of the Department of Mathematical Information Technology and five students developed the user interface of CAVAPA. In the current, final phase, postdoctoral researcher Greg Ruthenbeck has worked on the technical development of CAVAPA. Ruthenbeck, together with postdoctoral researcher Jekaterina Schneider and doctoral student Heidi Pasi, are currently writing it up for publication.

**Aim 4: Develop training and educational materials**

The Handbook of Behavior Change was published by Cambridge University Press in Autumn 2020. The book fulfils a primary goal of FiDiPro to deliver and publish theory and evidence-based guidelines to change behavior applicable in multiple contexts. Supplemental materials which outline the materials developed to change behavior are available online under “General Resources”:

https://www.cambridge.org/us/academic/subjects/psychology/health-and-clinical-psychology/handbook-behavior-change?format=HB#resources

**Aim 5: Research proposals**

The FiDiPro team has submitted research proposals to the Finnish Ministry of Education and Culture for funding research on behavior change interventions. The PETALS study received funding for three years. A new proposal of intervention in families was submitted in the Autumn 2021 as an extension of the PETALS project. In addition, a research proposal was submitted to the European Commission for ERC Advanced Grant funding but was, unfortunately, not successful, although there are plans for this to be resubmitted in future.

**Resources and cooperation**

The core FiDiPro research team members: The research team was assembled with the specific expertise demanded by the FiDiPro project. The FiDiPro professor Professor Martin Hagger from Curtin University in Australia (from 2019 with the University of California, Merced) joined JYU as the FiDiPro and provided the overall leadership of the project and took the lead role in developing the theoretical basis of the intervention, co-ordinating the studies including the initial test of the model in Finland, analysing the data, writing the research up for dissemination, and leading the translation of the research into practice. He also contributed to supervision of the Ph.D. students and postdoctoral researchers on the project.

Professor Taru Lintunen (Faculty of Sport and Health Sciences, University of Jyväskylä) contributed expertise in exercise psychology and the promotion of health in young people through PE and physical activity. She provided leadership and support for the project in terms of developing the interventions, leading the implementation and administration of the project, supervision of the Ph.D. students and postdoctoral researchers on the project, and writing findings up for publication.

The research team also comprised researchers, academics, and stakeholders who each brought key expertise required to fulfil the overall goals of the project. They are listed on the current web site (https://www.fidiproimpact.com/people).

The project was governed and guided by a Steering Group of experts, which took an executive advisory role over the project. The Steering Group included a representative from Business Finland, external experts, and representatives from the companies that co-funded the project. The expert members of the Steering Group were selected on the basis of the specific expertise or translational aspect that they brought to the project’s development, implementation, and translation. In addition, the contributing companies participated throughout the project in the implementation of the project.

The project was funded by Business Finland (formerly TEKES) and three business partners *Kisakalliosäätiö*, *Firstbeat Technologies Oy*, and *Vertical* startup accelerator. Support from *TEKES/Business Finland* was excellent both in the application phase and during the project. Their supportive and constructive way of interacting helped us both to work effectively and to foresee and solve potential challenges.

Collaboration with the business partners increased our understanding of the needs of companies in the field of well-being, promotion of physical activity, and behaviour change. We offered business partners tailor-made measures of motivation, information on how to motivate clients, and provided expertise on change techniques such as goal setting. The FiDiPro team has also provided mentoring consultancy and lectures on key topics to the start-ups.

The Faculty of Sport and Health Sciences had to pay obligatory service costs to the KPMG and Earnst & Young -companies for dealing with the Australian and US administrative tax, social security, and pension regulations of the FiDiPro professor. These costs were not originally budgeted in the FiDiPro project but we managed to include them in it.

**Changes in project activities to the original plan**

Mobility: Prof. Hagger has spent four months on the programme per year (two months in the final, shorter pandemic year 2021) in Jyväskylä and three months in Hong Kong in 2017, altogether his mobility has been one year and nine months. In 2019 Prof. Hagger was moving to California and there were no visits to Jyväskylä, and Business Finland was extremely supportive by extending the programme to the year 2021. Martin Hagger’s mobility fulfils the requirements of Business Finland. In addition, Jekaterina Schneider spent 12 months in Jyväskylä in 2020. Total mobility in the FiDiPro programme was two years and nine months, which also fulfils the requirements of Business Finland.

Planned mobility of Juho Polet and Jekaterina Schneider to the University of California were cancelled because of the Covid-19 pandemic. The funding allocated to the mobility was used to cover two additional surveys, a family survey and a general population survey, both of which were extensions of the PETALS study and further contributed to the goals of the FiDiPro project.

**Summary of project outcomes**

FiDiPro Martin Hagger, a highly cited researcher designated by Clarivate Analytics/Web of Science, is a world class scholar whose work has increased research capability of the University of Jyväskylä. He has introduced novel research areas, methods, and new perspectives and created a new active working culture. Having had the opportunity to work Martin Hagger, and with other well-known top-level researchers and experienced visiting scholars as part of the FiDiPro project has had a great motivational impact for the Faculty members and, particularly, students and early career scientists. The FiDiPro project has also increased publication activity of the Faculty of Sport and Health Sciences. The project has also led to the development of new materials and technologies that have practical application for scientists aiming to promote motivation and physical activity participation going forward. These include the materials developed as part of the PETALS and TPSR projects, the materials produced in the development of the Handbook of Behavior Change, and the CAVAPA tool to assess group-level physical activity.

The University of Jyväskylä Board recently nominated four new university profiling areas, i.e. research areas that the university seeks to strengthen in order to implement its strategy. One of them is Behaviour Change, Physical Activity, and Well-Being across the Lifespan (BC-Well). The Director of the BC-Well profiling area is Professor Taru Lintunen with co-directors FiDiPro Hagger, Professor Juha Holma (Faculty of Education and Psychology), and Dr. Tiina Parviainen (Jyväskylä Centre for Interdisciplinary Brain Research). Further collaboration on profiling area will take place between these collaborators and also with the Faculty of Information Technology. University is committed to these profiling areas and received 5.68 million euros for the profiling period 2021– 2026 from the Academy of Finland (tenure track positions, visiting professors). Out of the total funding our BC-Well profiling area received 1.68 million euros. The funding has been used to hire three tenure track professors, one in Fundamental Processes of Behaviour Change (Virpi-Liisa Kykyri), a second in Neural Mechanisms of Behaviour Change (Miriam Nokia), and the third in Exercise Psychology (Keegan Knittle). The BC-Well profiling area is an effective extension of the FiDiPro project and it has goals to develop a step-change in the volume and quality of research and dissemination work in the field.

References

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