Quality of Life Technologies Lab
University of Geneva & University of Copenhagen
qol.unige.ch

QoLife

European
Network of
Living Labs

Co-calibrating Short Term, Mixed-Methods Based Momentary Assessments for Physical and Psychological Outcomes with Long Term Quality of Life Outcomes in Older Adults: The coQoL Method

Vlad Manea, Igor Matias, Katarzyna Wac

manea@di.ku.dk, igor.matias@unige.ch, katarzyna.wac@unige.ch

UNIVERSITÉ DE GENÈVE   UNIVERSITY OF COPENHAGEN   STANFORD SCHOOL OF MEDICINE   Stanford University Medical Center   EUROPEAN SCIENCE FOUNDATION   cost European Cooperation in Science and Technology   EUROPEAN COMMISSION   HORIZON 2020   AAL Ambient Assisted Living   Schweizerische Eidgenossenschaft Confédération suisse Confederazione Svizzera Confederaziun svizra   FNSNF Fonds National Suisse Schweizerischer Nationalfonds Fondo Nazionale Svizzero Swiss National Science Foundation   Research at Google

Motivation

Research Problem: Co-Calibration

PROs

Gold Standard

TechROs

Emerging

?

Manea V., Wac K. Co-Calibrating Physical and Psychological Outcomes and Consumer Wearable Activity Outcomes in Older Adults: An Evaluation of the coQoL Method, MDPI Journal of Personalized Medicine, 2020

Method

Measured Outcomes (PROs)

Self-Reported Measures (PROs)

- Filled during subsequent group visits (3 *waves*)
- N = 39 (age 70.0 ± 7.2), up to 2,5 years

Measures (Validated Scale)

- Physical Activity (**IPAQ**)
- Social Support (**MSPSS**)
- Anxiety/Depression (**GADS**)
- Mediterranean Diet (**PREDIMED**)
- Nutrition (**SelfMNA**)
- Memory (**MFE**)
- Sleep Quality (**PSQI**)
- Health-Related Quality of Life (**EQ5D3L**)

Igor Matias, M.Sc., Ph.D. Student T.A. @ Université de Genève | igor.matias@unige.ch | igormatias.com
qol.unige.ch | © QoL Lab 2021

Manea V., Wac K. Co-Calibrating Physical and Psychological Outcomes and Consumer Wearable Activity
Outcomes in Older Adults: An Evaluation of the coQoL Method, MDPI Journal of Personalized Medicine, 2020

5

Measured Outcomes (TechROs)

Devices (TechROs)

- Fitbit Charge 2

Measures (Daily)

- Energy expenditure
- Steps
- Distance
- Sedentary duration
- Physical activity durations (light, moderate, vigorous)
- Sleep duration
- Heart rate

Igor Matias, M.Sc., Ph.D. Student T.A. @ Université de Genève | igor.matias@unige.ch | igormatias.com
qol.unige.ch | © QoL Lab 2021

Manea V., Wac K. Co-Calibrating Physical and Psychological Outcomes and Consumer Wearable Activity
Outcomes in Older Adults: An Evaluation of the coQoL Method, MDPI Journal of Personalized Medicine, 2020

6

Results

Anxiety / Depression (GADS): Co-Calibrations

Notable PROs (contours of correlations 0.8+)

- **All participants**
  - Q5A Sleeping poorly

- **Healthy participants**
  - Q7A Trembling

Health	PRO Outcome	Variable	TechRO Amount	Family	Variable	Correlation/Contour Lower	r_S	Higher	
All	Anxiety	Q3A: irritable	Relative	CLR PA	Vigorous	×	+0.8		
All	Anxiety	Q5A: sleeping poorly	Relative	CLR PA+S	Light	+0.5	+0.8	+0.5	+0.3
All	Anxiety	Q7A: trembling	Absolute	Processed	Active		−0.8		
All	Depression	Q1D: lacking energy	Relative	CLR PA+S	Vigorous	×	−0.8		
All	Depression	Q6D: lost weight due to poor appetite	Relative	CLR PA+S	Light	×	+0.8	×	
All	Both	Numeric score	Relative	CLR PA+S	Sleep		+0.8		
Healthy	Anxiety	Q3A: irritable	Absolute	Processed	Active		−0.8		
Healthy	Anxiety	Q7A: trembling	Absolute	Processed	Light+fair	−0.5	−0.8	−0.5	
Healthy	Anxiety	Q7A: trembling	Absolute	Processed	Vigorous		+0.8		
Healthy	Anxiety	Q7A: trembling	Absolute	Processed	Active		−0.8		
Healthy	Anxiety	Q7A: trembling	Relative	CLR PA	Light	×	−0.8	×	
Healthy	Anxiety	Q7A: trembling	Relative	CLR PA+S	Vigorous	×	−0.8		
Healthy	Depression	Q2D: lost interest in things	Relative	CLR PA	Light	×	−0.8	×	
Healthy	Depression	Q6D: lost weight due to poor appetite	Relative	CLR PA+S	Sleep		+0.8		
Healthy	Depression	Q9D: worse in the morning	Relative	CLR PA+S	Sedentary		+0.8	×	

Color coding: from orange (weak correlation) to green (strong correlation). × depicts an absent significant correlation of the same sign next to the strong correlation.

Memory (MFE): Co-Calibrations

Notable PROs (contours of correlations 0.8+)

- ## All participants
  - Q24 Forgetting where things are kept

- ## Healthy participants
  - Q14 Forgetting to do planned things

- ## Participants with mild disease
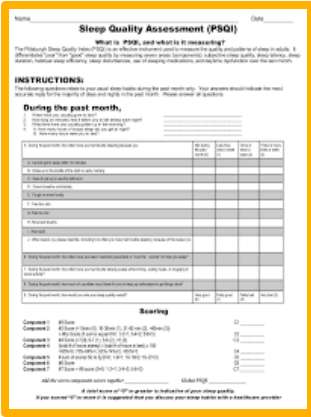 - Q18 Forgetting to tell somebody something important

Health	PRO Variable	TechRO Amount	Family	Variable	Correlation/Contour Lower	r_S	Higher
All	Q7: completely forgetting to take things	Relative	CLR PA+S	Sleep		+0.8	
All	Q12: having difficulty picking up a new skill	Relative	CLR PA+S	Light	×	−0.8	×
All	Q13: finding a word on the tip of the tongue	Relative	CLR PA+S	Sleep		+0.8	
All	Q24: forgetting where things are normally kept	Relative	CLR PA	Fair	×	+0.8	×
All	Q24: forgetting where things are normally kept	Relative	CLR PA+S	Fair	×	−0.8	−0.3
All	Numeric score	Absolute	Processed	Active		−0.8	
Healthy	Q7: completely forgetting to take things	Relative	CLR PA+S	Sleep		+0.8	
Healthy	Q10: letting ramble about unimportant things	Absolute	Processed	Light+fair	×	−0.8	×
Healthy	Q14: forgetting to do planned things	Absolute	Processed	Fair+vigorous	×	+0.8	+0.8
Healthy	Q14: forgetting to do planned things	Absolute	Processed	Vigorous	+0.8	+0.8	
Healthy	Q16: forgetting the topic of an ongoing conversation	Absolute	Processed	Fair	×	−0.8	−0.4
Healthy	Q24: forgetting where things are normally kept	Relative	CLR PA+S	Fair	×	−0.8	×
Healthy	Numeric score	Relative	CLR PA	Fair	×	−0.8	×
Diseased	Q1: forgetting objects put	Relative	CLR PA+S	Vigorous	−0.7	−0.8	
Diseased	Q6: forgetting the time of events	Absolute	Raw	Heart rate		+0.8	
Diseased	Q6: forgetting the time of events	Absolute	Processed	Light	+0.7	+0.8	×
Diseased	Q6: forgetting the time of events	Absolute	Processed	Sleep		−0.8	
Diseased	Q8: being reminded about things	Absolute	Processed	Light+fair	+0.6	+0.8	×
Diseased	Q9: reading anew something already read	Absolute	Processed	Sleep		−0.8	
Diseased	Q13: finding a word on the tip of the tongue	Absolute	Processed	Active		−0.8	
Diseased	Q13: finding a word on the tip of the tongue	Relative	CLR PA+S	Sedentary	+0.8	+0.7	
Diseased	Q18: forgetting to tell somebody something important	Absolute	Processed	Fair	×	−0.8	−0.8 −0.8
Diseased	Q18: forgetting to tell somebody something important	Absolute	Processed	Fair+vigorous	−0.8	−0.8	−0.8
Diseased	Q18: forgetting to tell somebody something important	Absolute	Processed	Vigorous	−0.8	−0.8	−0.8
Diseased	Numeric score	Absolute	Processed	Active		−0.8	

Color coding: from orange (weak correlation) to green (strong correlation). × depicts an absent significant correlation of the same sign next to the strong correlation.

Igor Matias, M.Sc., Ph.D. Student T.A. @ Université de Genève | igor.matias@unige.ch | igormatias.com
qol.unige.ch | © QoL Lab 2021

Manea V., Wac K. Co-Calibrating Physical and Psychological Outcomes and Consumer Wearable Activity Outcomes in Older Adults: An Evaluation of the coQoL Method, MDPI Journal of Personalized Medicine, 2020

9

Applicability

Applicability: Behavior Changes for Dementia screening

PROs

Gold Standard

TechROs

Emerging

?

Quality of Life Technologies Lab
University of Geneva & University of Copenhagen
qol.unige.ch

European Network of Living Labs

Co-calibrating Physical and Psychological Outcomes and Consumer Wearable Activity Outcomes in Older Adults: An Evaluation of the coQoL Method

Vlad Manea, Katarzyna Wac

manea@di.ku.dk, katarzyna.wac@unige.ch

UNIVERSITÉ DE GENÈVE   UNIVERSITY OF COPENHAGEN   STANFORD SCHOOL OF MEDICINE *Stanford University Medical Center*   EUROPEAN SCIENCE FOUNDATION *SETTING SCIENCE AGENDAS FOR EUROPE*   COST EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY   EUROPEAN COMMISSION   HORIZON 2020 AAL *AMBIENT ASSISTED LIVING*   Schweizerische Eidgenossenschaft Confédération suisse Confederazione Svizzera Confederaziun svizra   FNSNF FONDS NATIONAL SUISSE SCHWEIZERISCHER NATIONALFONDS FONDO NAZIONALE SVIZZERO SWISS NATIONAL SCIENCE FOUNDATION   Research at Google

Quality of Life Technologies Lab
University of Geneva & University of Copenhagen
qol.unige.ch

Thank You

Igor Matias and the QoL Team
Quality of Life, Center for Informatics, University of Geneva, Switzerland
igormatias.com | igor.matias@unige.ch