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Teleworking Lifestyles:
Differences in Commuting Carbon Footprints and Subjective Well-Being?

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Original research article

Sceptical, pragmatic, and innovative teleworkers: Exploring commuting carbon footprints and subjective well-being

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ABSTRACT

Teleworking – be it at home, in a coworking space or on the move – is assumed to be an incubator for both more sustainable practices and enhanced subjective well-being. Yet, existing research, firstly, has treated teleworkers as a homogeneous group and has, secondly, analysed environmental and well-being effects stemming from teleworking only separately. This study addresses both limitations by analysing a teleworker sample from French- and German-speaking Switzerland (n = 1230). Using a sustainable lifestyle segmentation approach, we identify three teleworker types – sceptical individualistic (1), pragmatic (2), and eco-conscious innovative (3). Their different sustainability orientations are associated with different commuting-related CO_2 emissions and well-being outcomes. However, no holistic relationship between emissions and well-being is observed; instead, negative well-being emerges only among high-emission teleworkers (sceptical individualistic teleworkers). By linking environmental and well-being outcomes within a segmentation approach, this study provides initial starting points for targeted – rather than one-size-fits-all – policy interventions.

1. Telework, well-being, and resource efficiency

Advances in information and communication technologies (ICTs) have facilitated flexibility in work arrangements, a trend that has been accelerated by the coronavirus (COVID-19) pandemic [1]. In the last decade, these circumstances have contributed to a substantial increase in teleworking, which is understood as work performed outside an employer's usual office by means of ICTs [2,3].

In European countries, the percentage of employees working from home nearly doubled from 14% in 2019 to 22% in 2023 [4]. In Switzerland, the percentage of employees teleworking regularly or occasionally rose from 25 in 2019 to 37 in 2023 [2]. Accordingly, it is hardly surprising that return-to-office mandates have faced resistance from employees [5,6]. Teleworking has become a global phenomenon which employees greatly value because it is an effective means of improving well-being and the work–life balance [7,8].

Amid the telework trend and debates on well-being, a second research stream is focusing on the environmental impacts of teleworking in the context of resource efficiency [e.g., [9–12]]. Although studies have mixed findings, a majority of them show that telework has an impact on energy savings and the reduction of carbon dioxide (CO_2) emissions [9,10,13]. However, the results depend on the studies' system boundaries, particularly regarding the incorporation of rebound (e.g., induced mobility) or spillover effects (e.g., relocation choices) [10].

These two strands of teleworking research – one focusing on well-being, and the other on resource efficiency – are rarely examined together in academia. We argue that resource efficiency and well-being are mutually interdependent. Teleworking saves commuting time, which can then be used for personal matters to improve well-being, since long commutes are related to stress and strain [14]. This is why policy interventions should take both into account to achieve long-lasting effects: Improving resource efficiency is most effective and impactful when well-being is also enhanced.

A further drawback of recent studies is that teleworkers have been treated as a homogenous group which ignores within-group differences [15]. From our perspective, the lifestyle approach is an appropriate way to detect variations among teleworkers [16].

Teleworkers may share similar structural conditions. However, they may respond in different ways depending on their lifestyles, resource efficiency and/or well-being. A lifestyle-based segmentation can capture the interconnected patterns between climate impact and well-being outcomes by identifying coherent configurations of behaviours,

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Agenda

Methodological framework, conceptualization & definitions

Research rationale

Data & methods

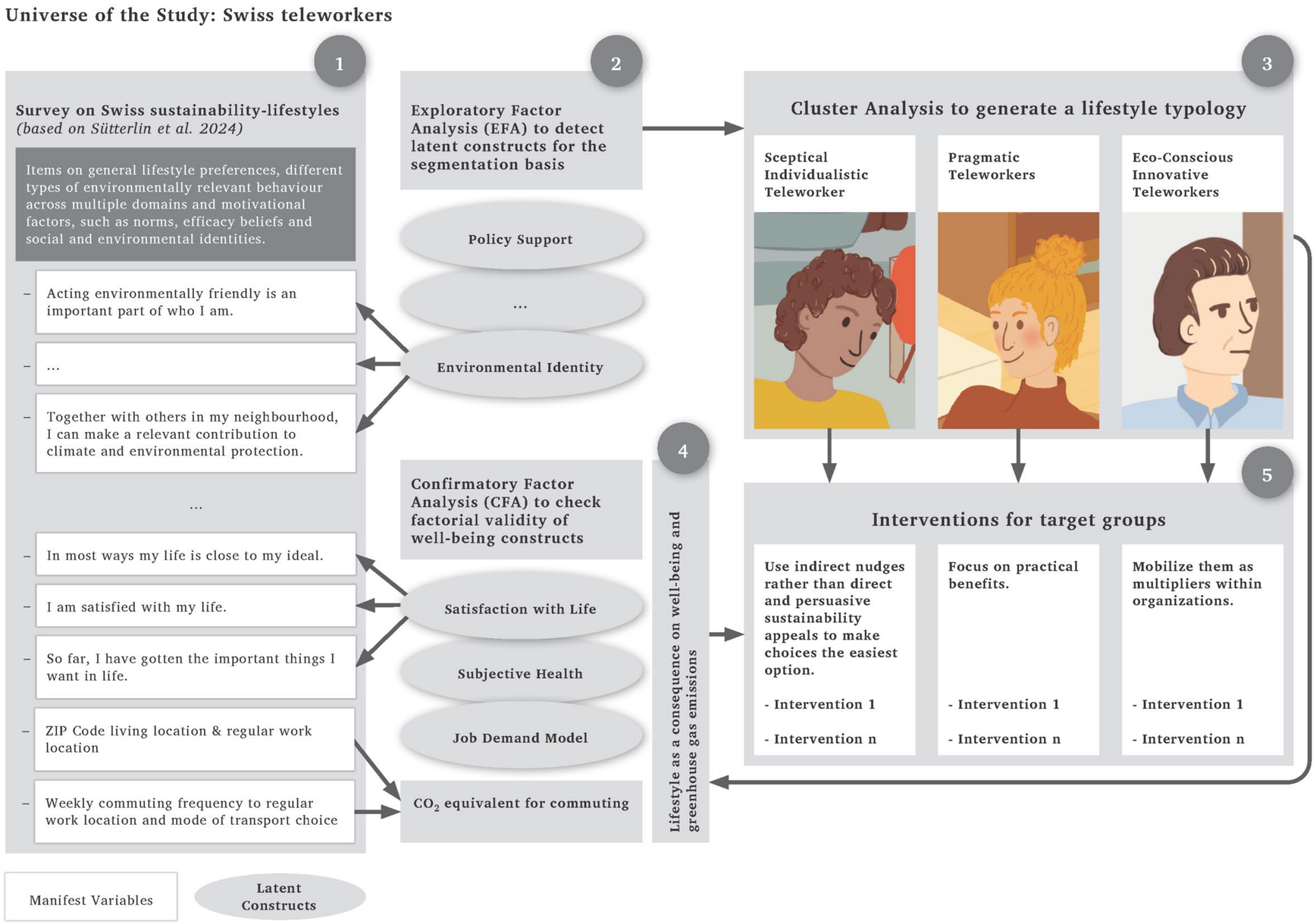
Findings

Policy recommendations

Key takeaways

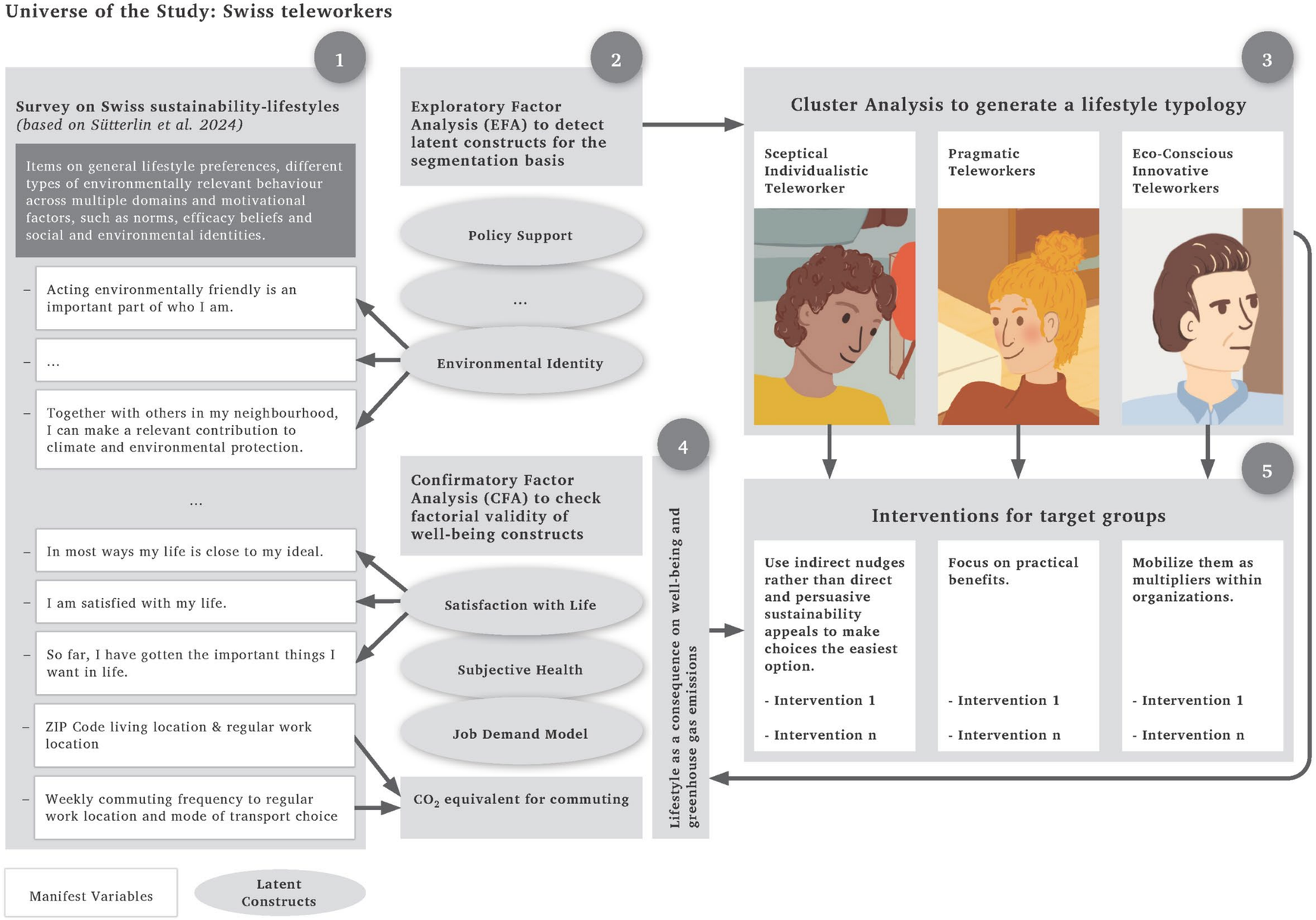
Methodological and conceptual framework

Telework is defined as paid work carried out outside the employer's usual workplace on an occasional or regular basis.
(FSO, 2025)



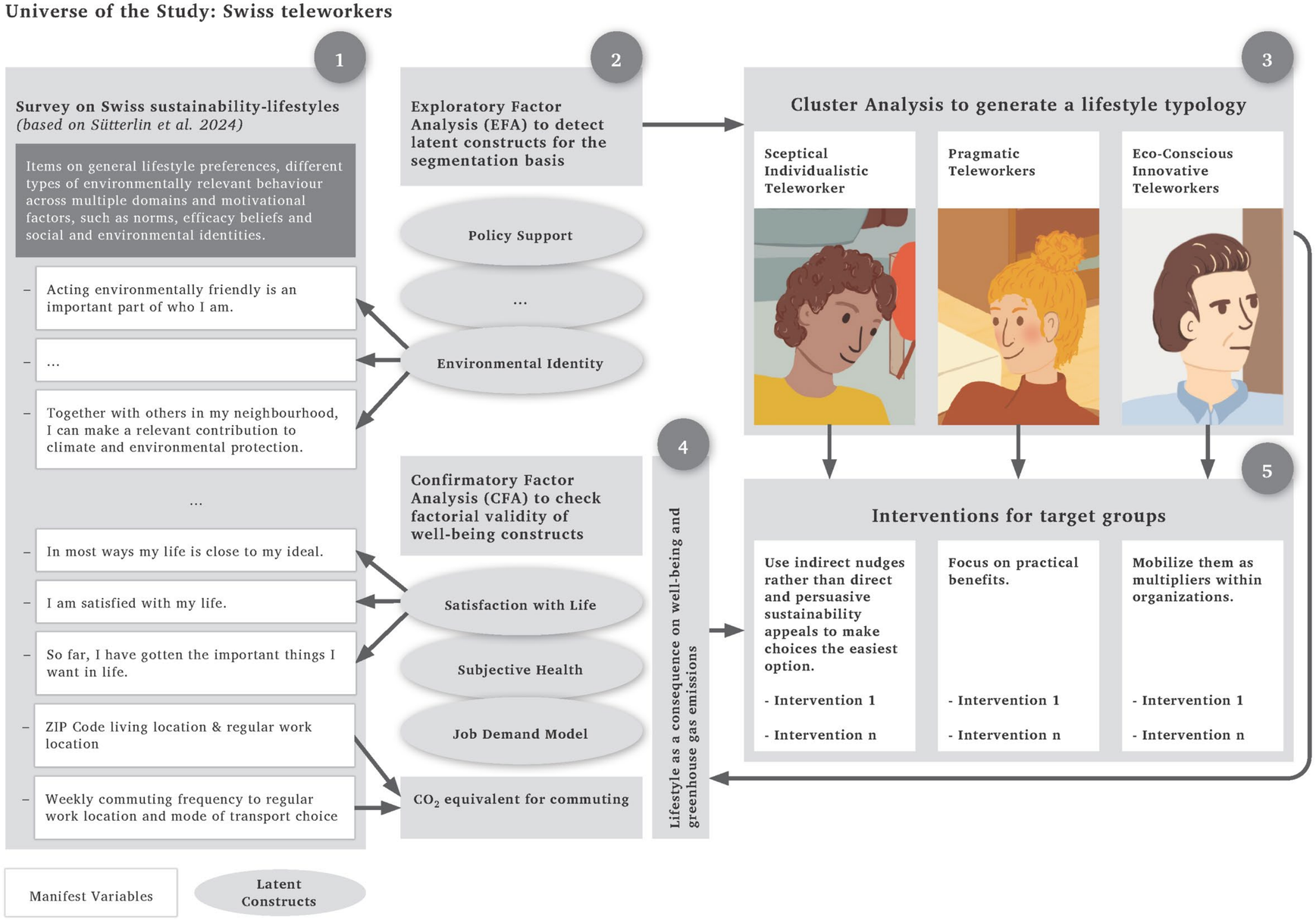
Methodological and conceptual framework

Well-Being is a state of thriving in which all human needs are satisfied. It manifests itself in life satisfaction and a healthy life.
(O'Neill et al., 2018)



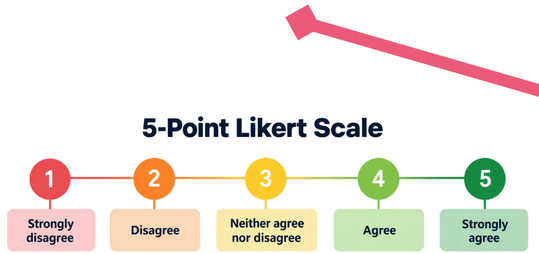
Methodological and conceptual framework

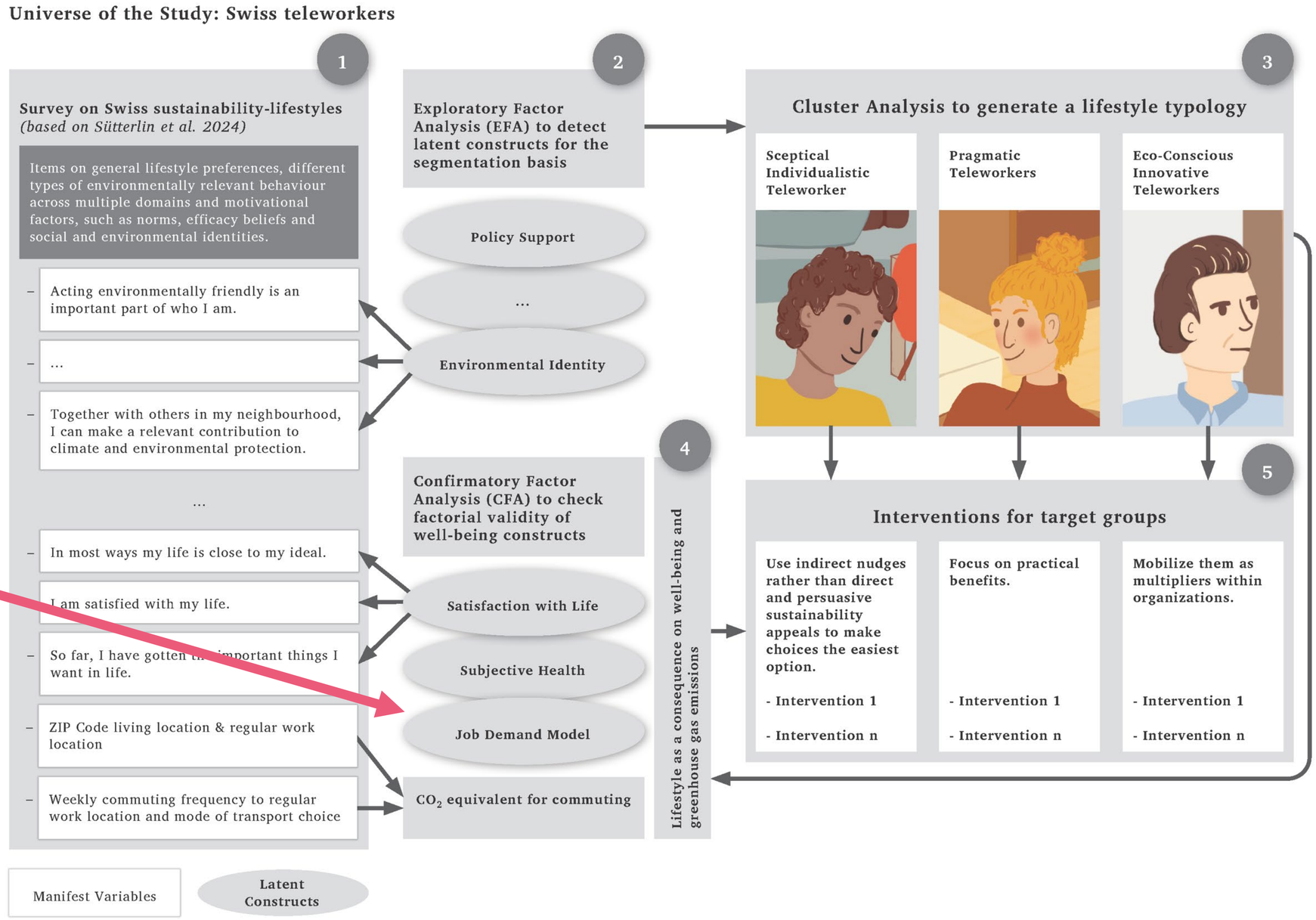
The **cognitive dimension** involves personal evaluations about satisfaction with life as a whole and specific domains such as family, job, and health.
(Diener et al., 2018)



Methodological and conceptual framework

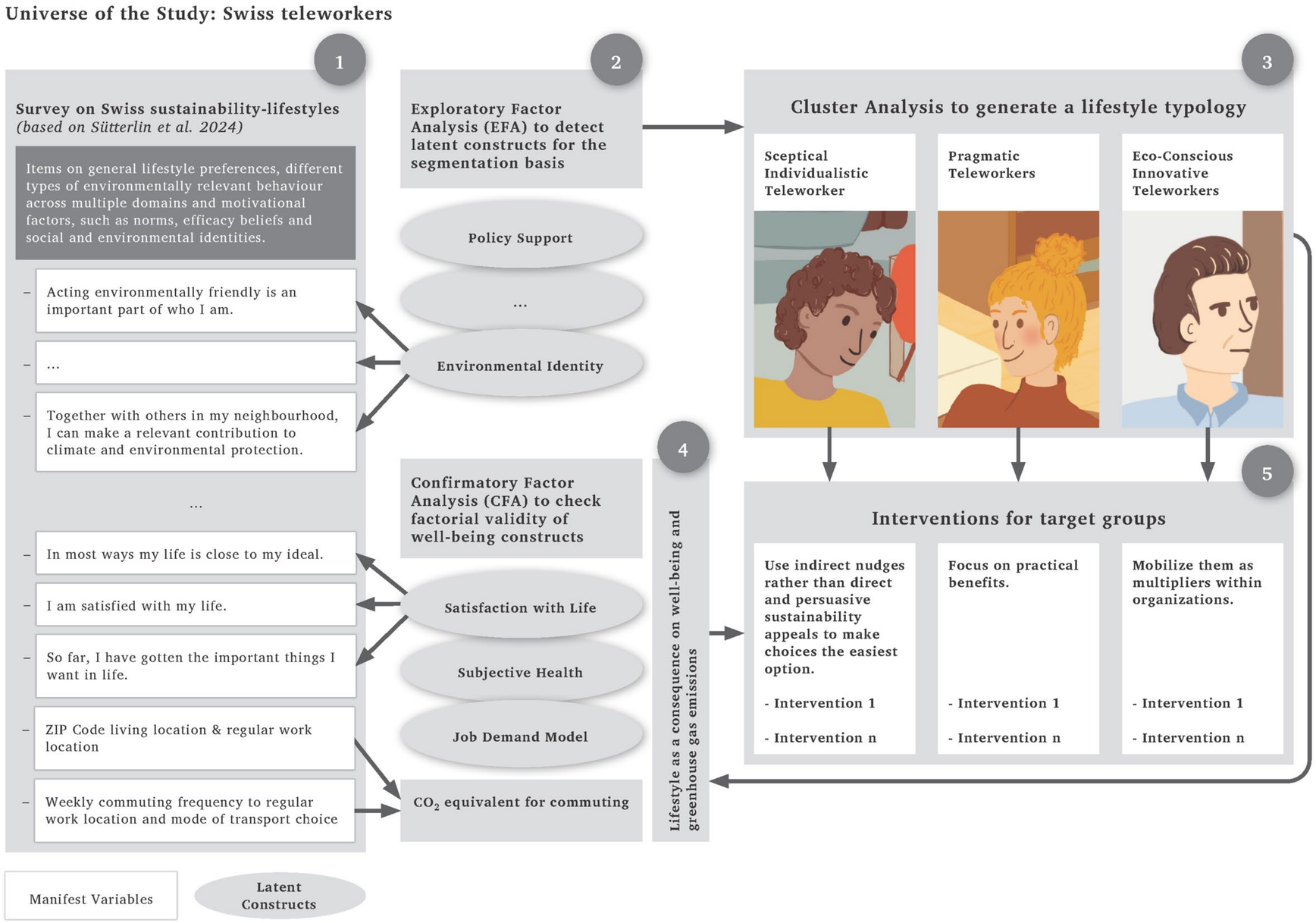
Job-demand model: How do job charecteristics influecne well-being?
(Demerouti et al. 2001)





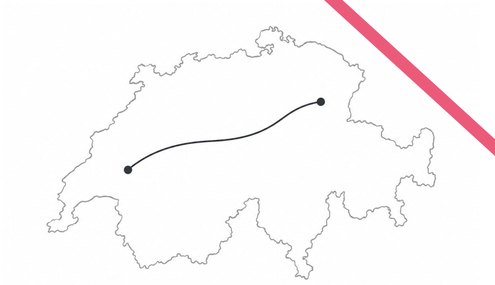
Methodological and conceptual framework

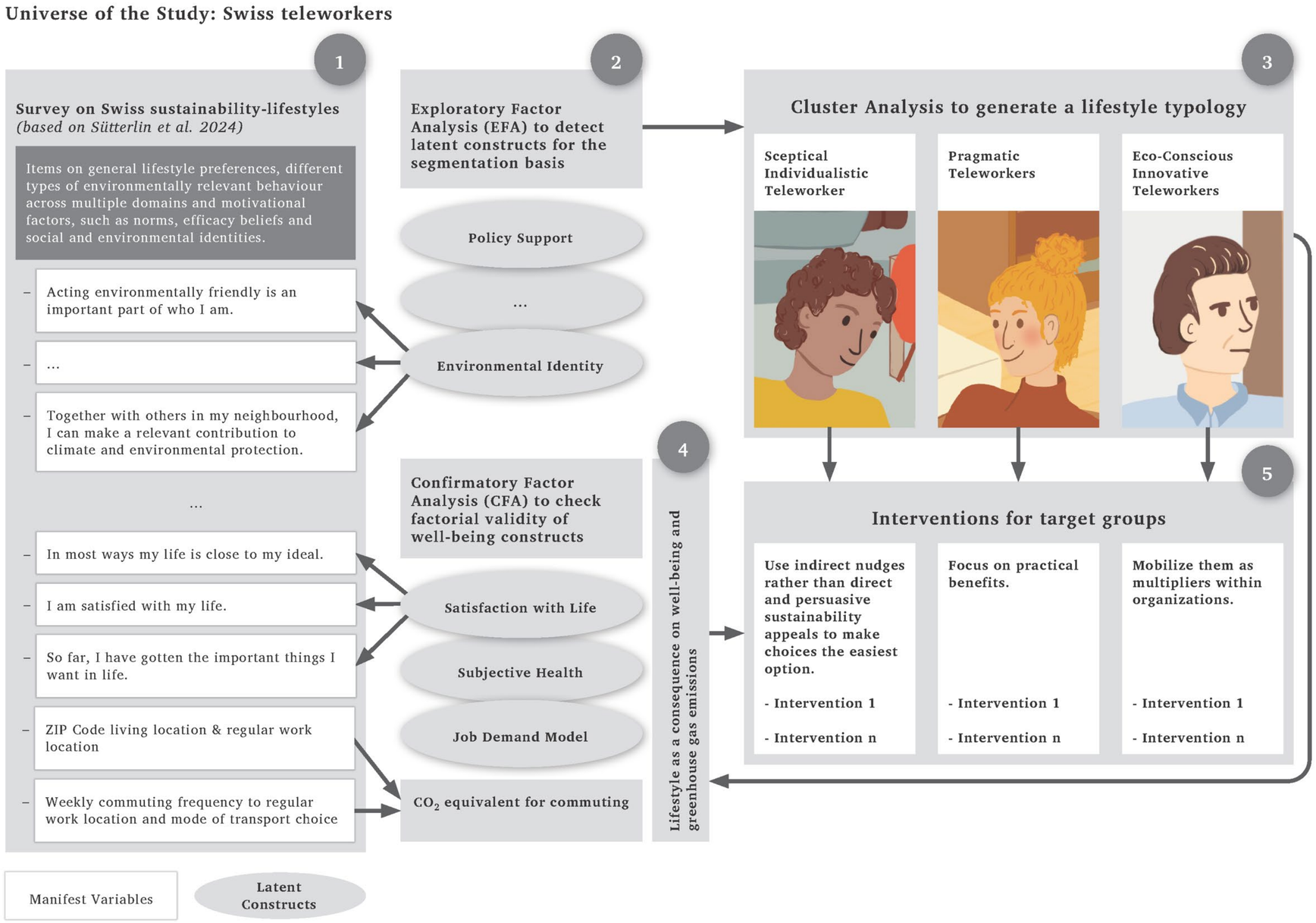
Lifestyles? Pierre Bourdieu's theory on habitus shows how tastes and **preferences** differ according to different social groups ('milieus').



Methodological and conceptual framework

The **carbon footprint** is measured in CO_2 equivalents, reflecting the total greenhouse gas emissions associated with consumption (here commuting).





Research rationale

Telework & lifestyles ?

- **Research** has treated teleworks as a homogenous group (0/1). Some segmenting studies based on manifest observable data (frequency, teleworking arrangements)

Telework & resource efficiency ?

- **decreases** commuting trips and respective CO_2 emissions, but creates additional opportunities for leisure travel (Balthasar et al., 2024)
- **increases** living space demand for the home office (Z'Rotz et al., 2026) and distances between place of living and regular workplaces (Ravalet & Rérat, 2019)

Telework & well-being ?

- teleworking saves commuting time, long commutes are related to stress (Chatterjee et al. 2020).
- organisation of private and work life (work-life-balance)

Research rationale

So what ?

- Lifestyle research and tailored interventions: More wellbeing, less carbon footprint?
- Target groups for interventions (Corporate Mobility Management)
- The low-cost hypothesis proposes that environmental attitudes and norms have a stronger influence on behaviour when the costs of acting pro-environmentally are low.
  (Diekmann & Preisendörfer, 2003)
  - Behaviour change is more likely, if well-being is enhanced.

Max Neef et al. (1991) framework:

- First-order satisfiers - directly satisfy a fundamental human need – work, holiday
- Second-order satisfiers - satisfy a need indirectly, often by enabling another satisfier – mobility -> short-distance tourism, 15-minute city

Short Detour: Sustainability?

Decouple well-being from consumption

The objective of sustainable tourism …

The objective of sustainable mobility …

… should not simply be to reduce the environmental impact of consumption, but to identify ways of satisfying human needs and enhancing well-being with lower resource use.

Data

- Online survey of 1 230 teleworkers in Switzerland
- Oct 2024 – Jan 2025
- French/German language regions
- aged 18+
- sample validated against Swiss national labour statistics
- Items and constructs are derived from Sütterlin et al. (2024)

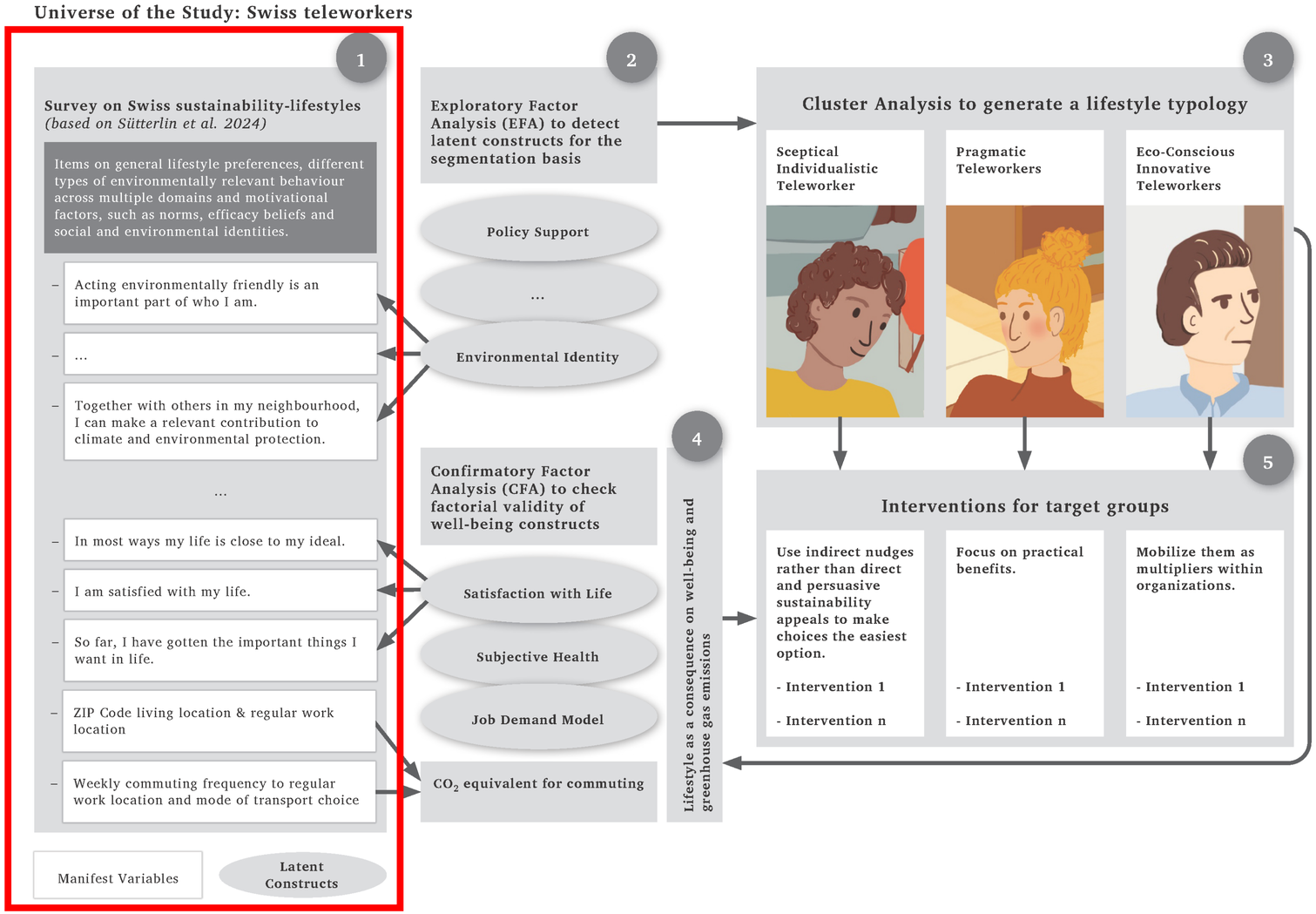


Fig.1. Conceptual and methodological framework.

Latent Constructs

- Exploratory Factor Analysis
- 45 items into 10 factors

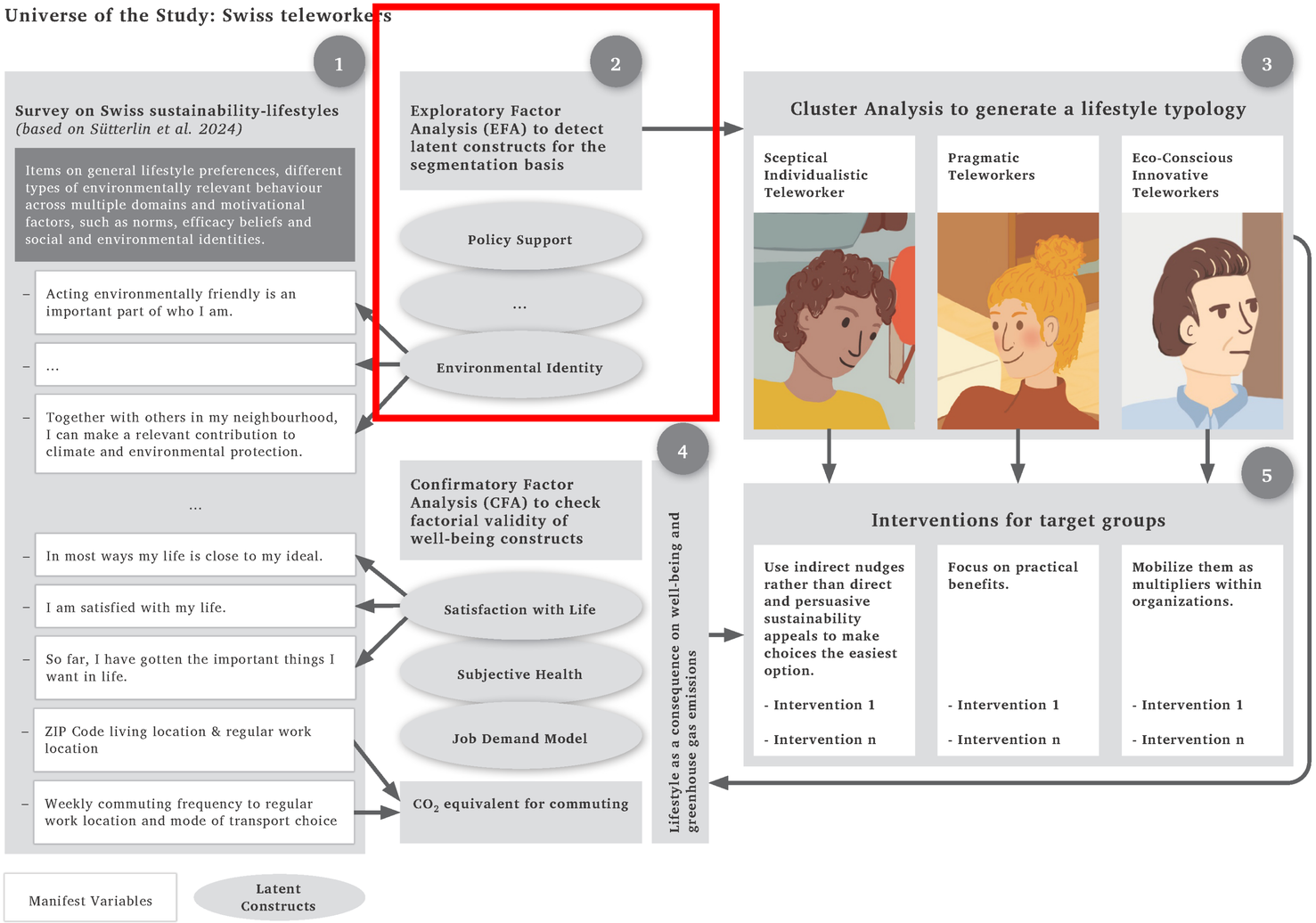


Fig.1. Conceptual and methodological framework.

EFA to check factorial validity of the latent constructs representing the segmentation basis **(Ex 1)**

Factor	Scale Item	Loading	Eigen-value	% of var.	α	Mean	SD	n
1	**Environmental Identity and Conscious Consumption**							
	Acting environmentally friendly is an important part of who I am [76].	**.917**	**6.76**	**21.11**	**.843**	**3.46**	**.86**	**1173**
	I am the type of person who acts in an environmentally friendly fashion [76].	**.851**						
	My purchasing decisions are based on considerations of how big an impact they have on the environment. If something is harmful to the environment, I do without it (adapted Sütterlin et al. [58], originally from Choi and Feinberg [77]).	**.685**						
	I don't mind sacrificing a little money to live in an environmentally friendlier fashion (adapted by Sütterlin et al. [58], originally from Thøgersen [57]).	**.580**						

EFA to check factorial validity of the latent constructs representing the segmentation basis **(Ex 2)**

2	**Collective Efficacy and Outcome Efficacy**							
	I believe that we in our neighbourhood can advance environmental protection together. (adapted by Sütterlin et al. [58], originally from Hamann and Reese [78])	**.867**	**3.18**	**9.94**	**.862**	**3.43**	**.96**	**1229**
	Together with others in my neighbourhood, I can make a relevant contribution to climate and environmental protection. (adapted by Sütterlin et al. [58], originally from Wallis and Loy [79]).	**.842**						
	Acting in an environmentally friendly fashion is effective in protecting our planet and nature [80].	**.624**						
3	**Policy Support**							
	Using public money to subsidize (financially support) renewable energy such as wind or solar power [81].	**.879**	**2.31**	**7.25**	**.862**	**4.04**	**.97**	**1229**
	Government funding of research on innovative technologies and processes in the field of renewable energies [58].	**.814**						

Cluster Analysis

- 10 factors are used for exploratory segmentation

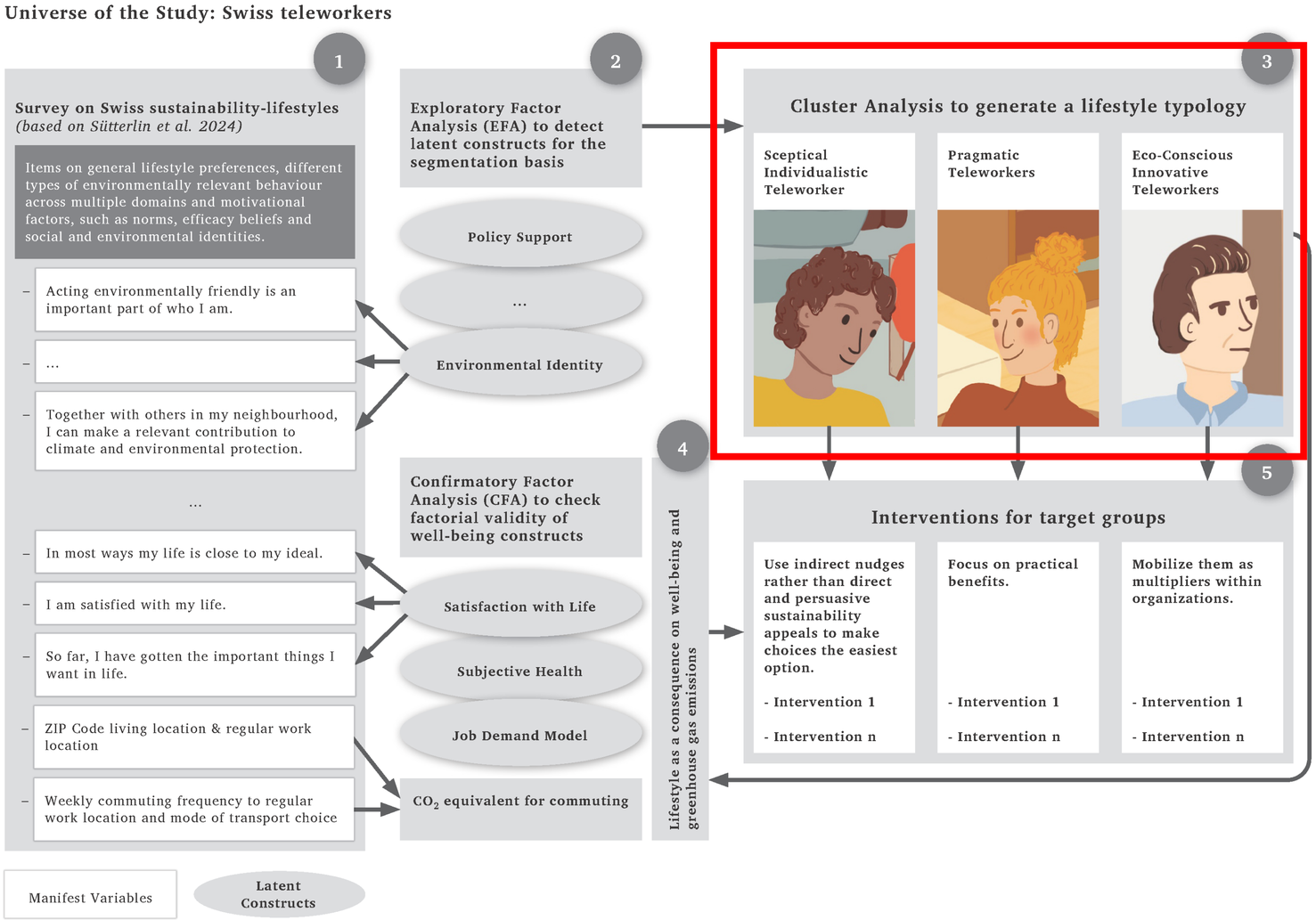
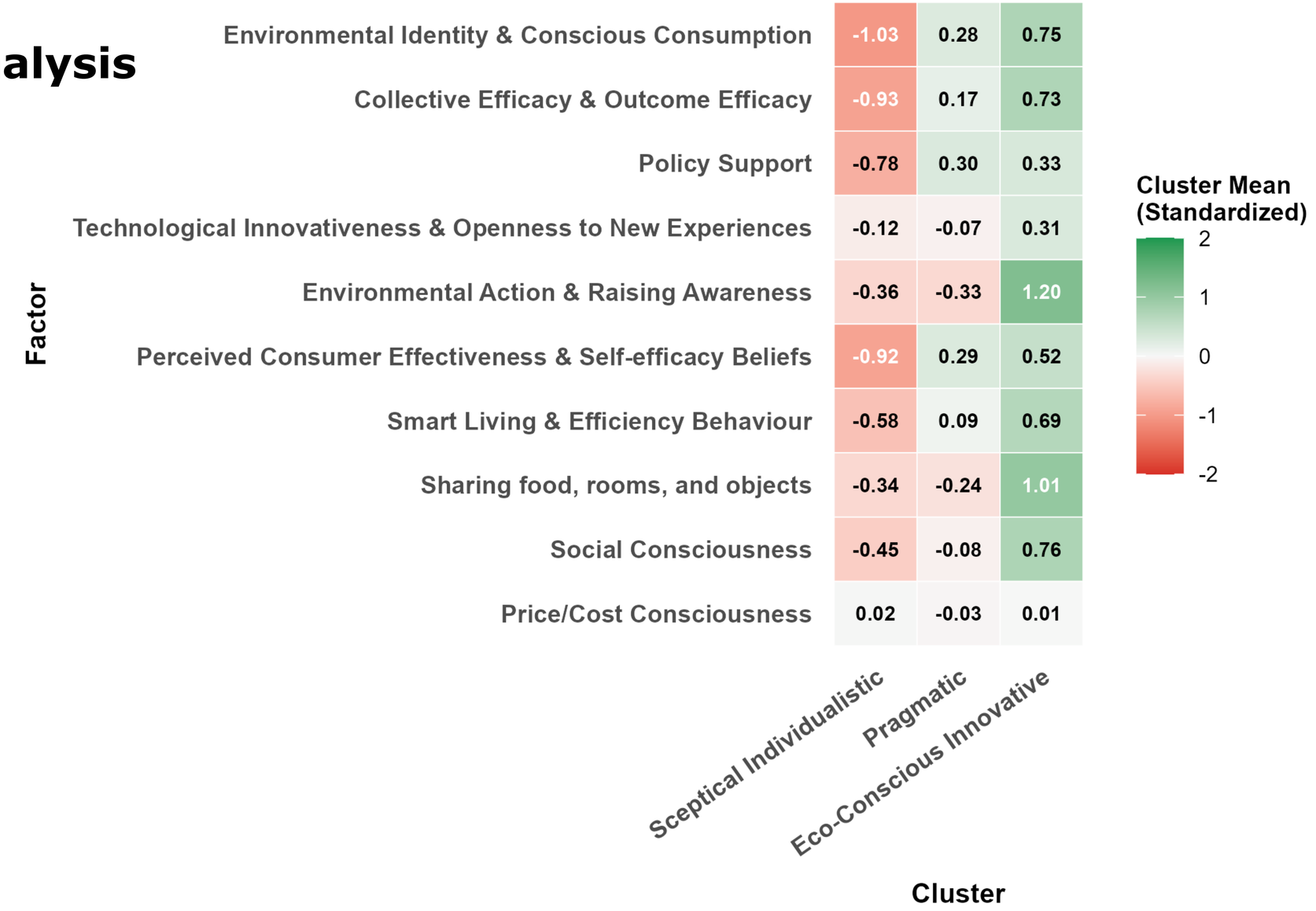


Fig.1. Conceptual and methodological framework.

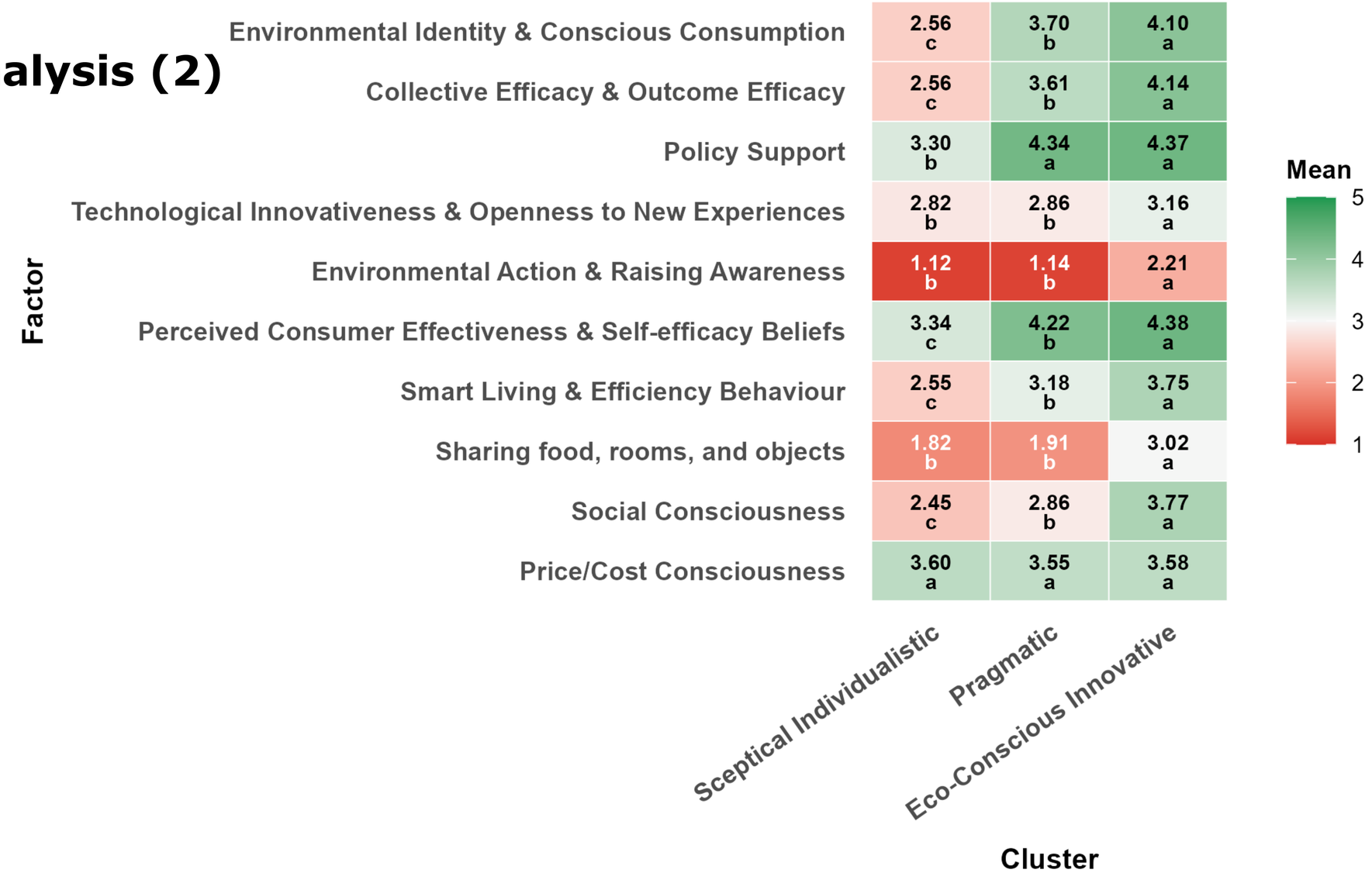
Cluster Analysis



Note: Values indicate standardized cluster means.

Fig. 2. Cluster profiles by factor used for segmentation (z-scores).

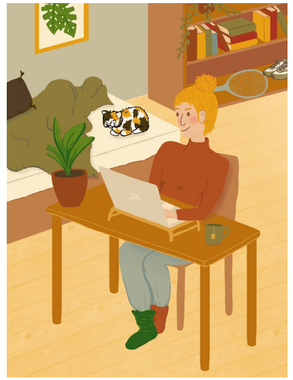
Cluster Analysis (2)



Note: Letters (a–c) show significance groups per factor.
Clusters with the same letter do not differ significantly ($p < .05$, Bonferroni).
Different letters indicate significant differences. “a” = highest mean group, “c” = lowest.

Fig. 3. Cluster profiles across factors representing the segmentation basis (Means + Significance Letters).

Teleworker Typology



Pragmatic
47.1%

- Non-pronounced stand toward sustainability
- Balanced gender distribution
- Highest income
- Average educational level

Sceptical Individualistic
29.1%

- Lowest sustainability engagement
- More male
- Lower income
- Lowest educational level

Eco-Conscious Innovative
23.8 %

- Strongest sustainability engagement
- More women
- Middle income
- Highest educational level

Dependent Variables

- Confirmatory Factor Analysis CFA
- Commuting-related CO_2eq emissions followed Balthasar et al.'s (2024) method
- Wellbeing = f(
  - Satisfaction with life
  - Subjective health
  - Job demand model)
- One-way ANOVA tests show significant effects of teleworker profile on those dependent variables

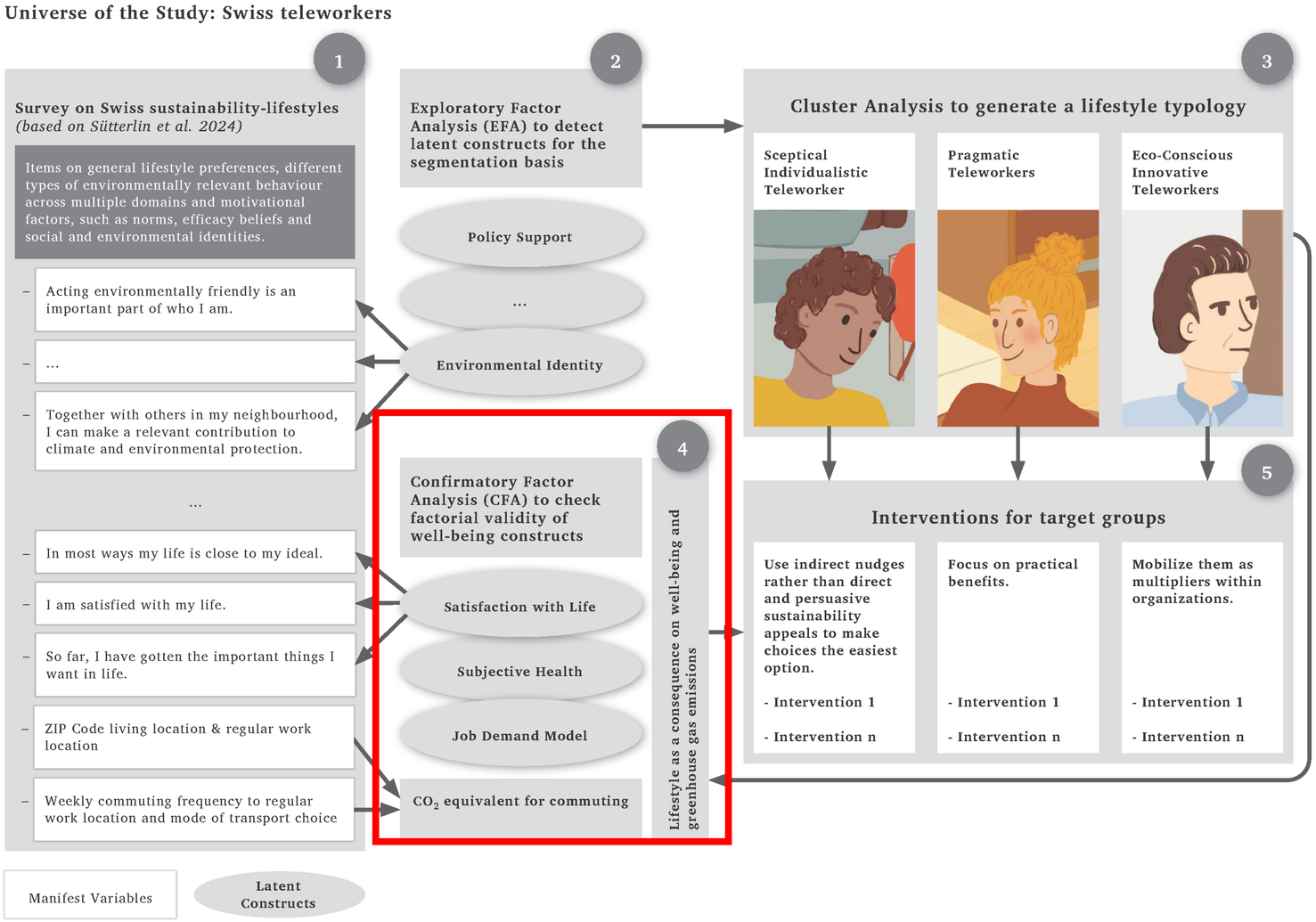


Fig.1. Conceptual and methodological framework.

CFA to check factorial validity of constructs reflecting **well-being**.

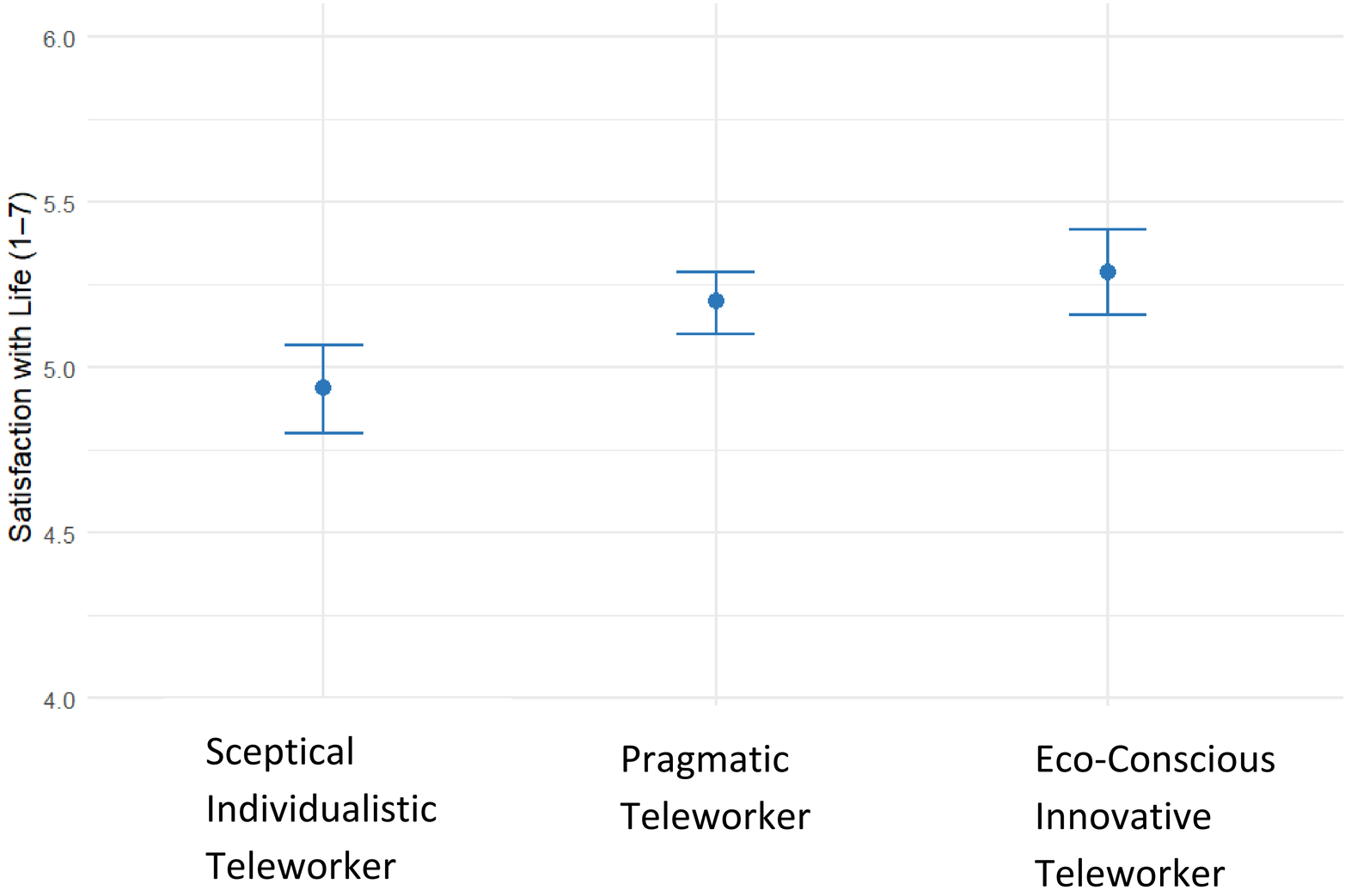
CFA to check factorial validity of constructs reflecting well-being.

Constructs		Standardized Loading	α	Composite Reliability	AVE	Mean	SD	n
1	**Satisfaction with Life in General (scale 1-7)** [70]							
	In most ways my life is close to my ideal.	**0.89**	**.898**	**.898**	**0.75**	**5.15**	**1.16**	**1229**
	I am satisfied with my life.	**0.91**						
	So far, I have gotten the important things I want in life.	**0.80**						
2	**Subjective health (scale 1-7)** [58,87]							
	How do you rate your overall health?	**0.96**	**.868**	**.869**	**0.66**	**5.60**	**1.01**	**1229**
	How do you rate your mental health?	**0.77**						
	How do you rate your physical health?	**0.84**						
3	**Job Demand Model,** *In your job, how often do you...* **(scale 1-5)** [73]							
	have to work very quickly?	**0.71**	**.809**	**.862**	**0.59**	**3.23**	**0.78**	**1229**
	have too much work to do everything?	**0.71**						
	have to work to very tight deadlines or under a lot of pressure?	**0.87**						

Note: χ^2(scaled) = 322.71, df = 24, p = .000. Overall fit of the measurement model: Comparative Fit Index (CFI) = 0.948, NNFI = 0.961, Root Mean Square Error of Approximation. (RMSEA) = 0.068, Standardized Root Mean Square Residual (SRMR) = 0.062, Listwise case exclusion, SD standard deviation, α Cronbach's Alpha.

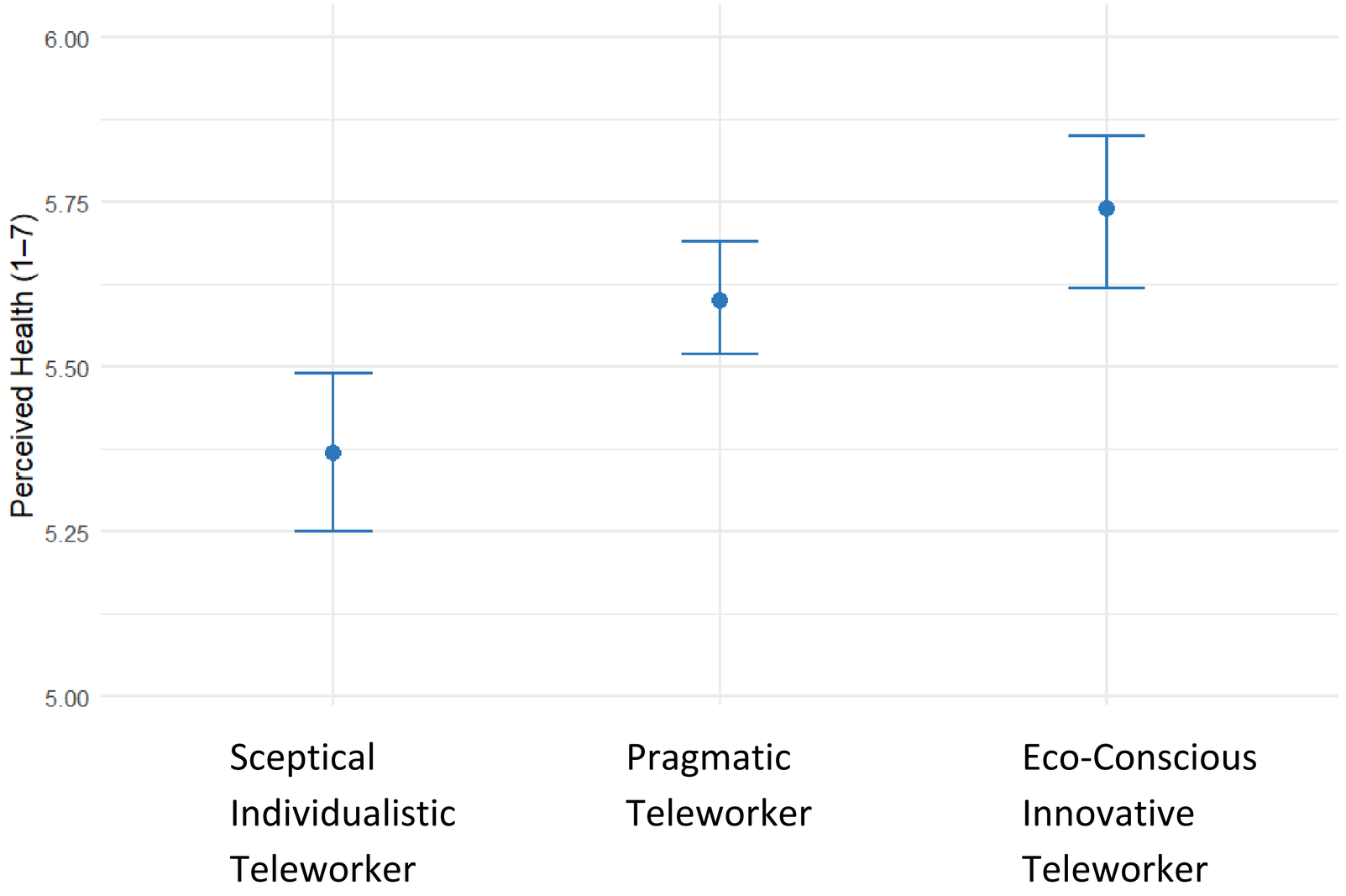
Sceptical Individualistic Teleworkers

Lower satisfied with life

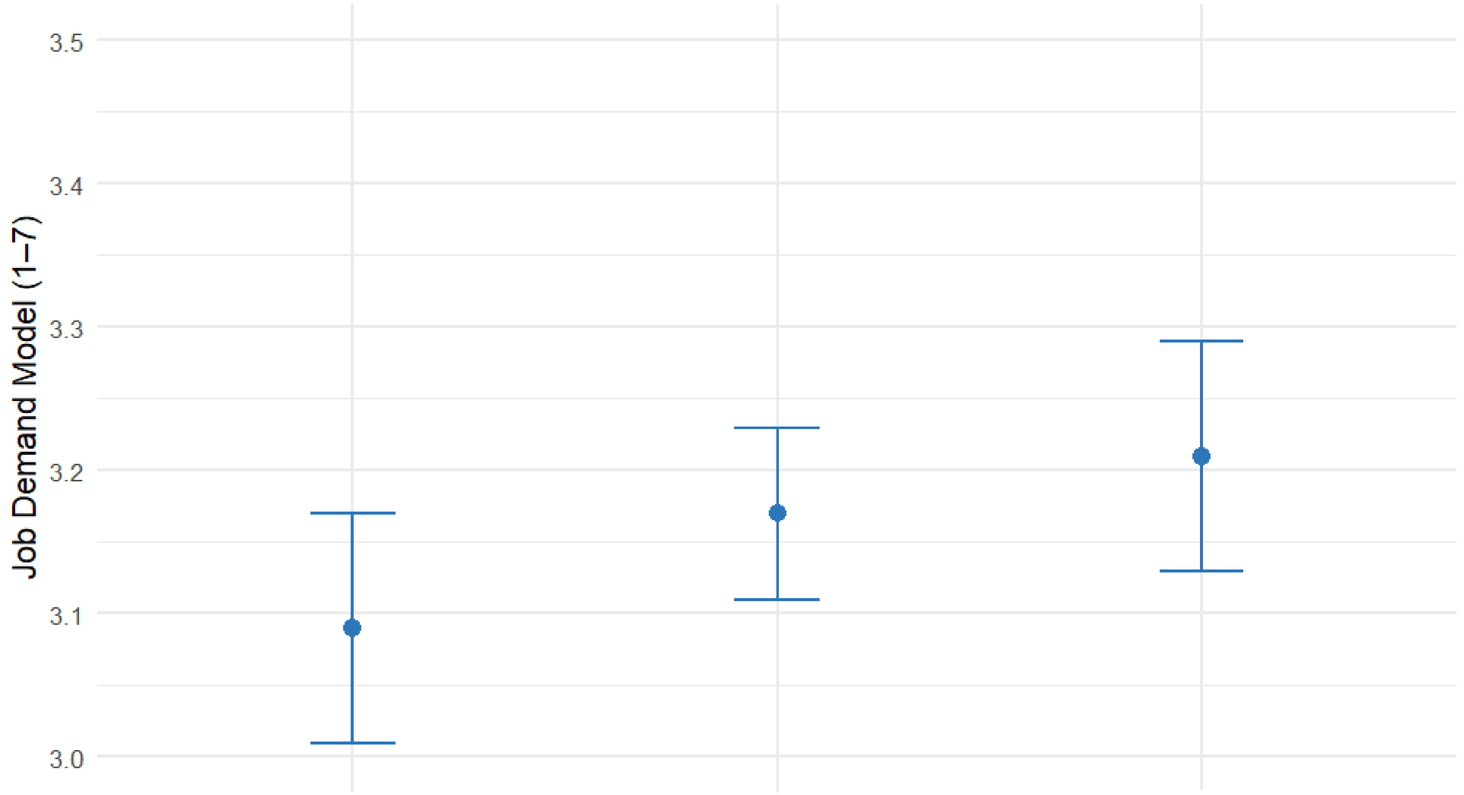


Sceptical Individualistic Teleworkers

Lower perceived health



No Differences in Job Demand Model



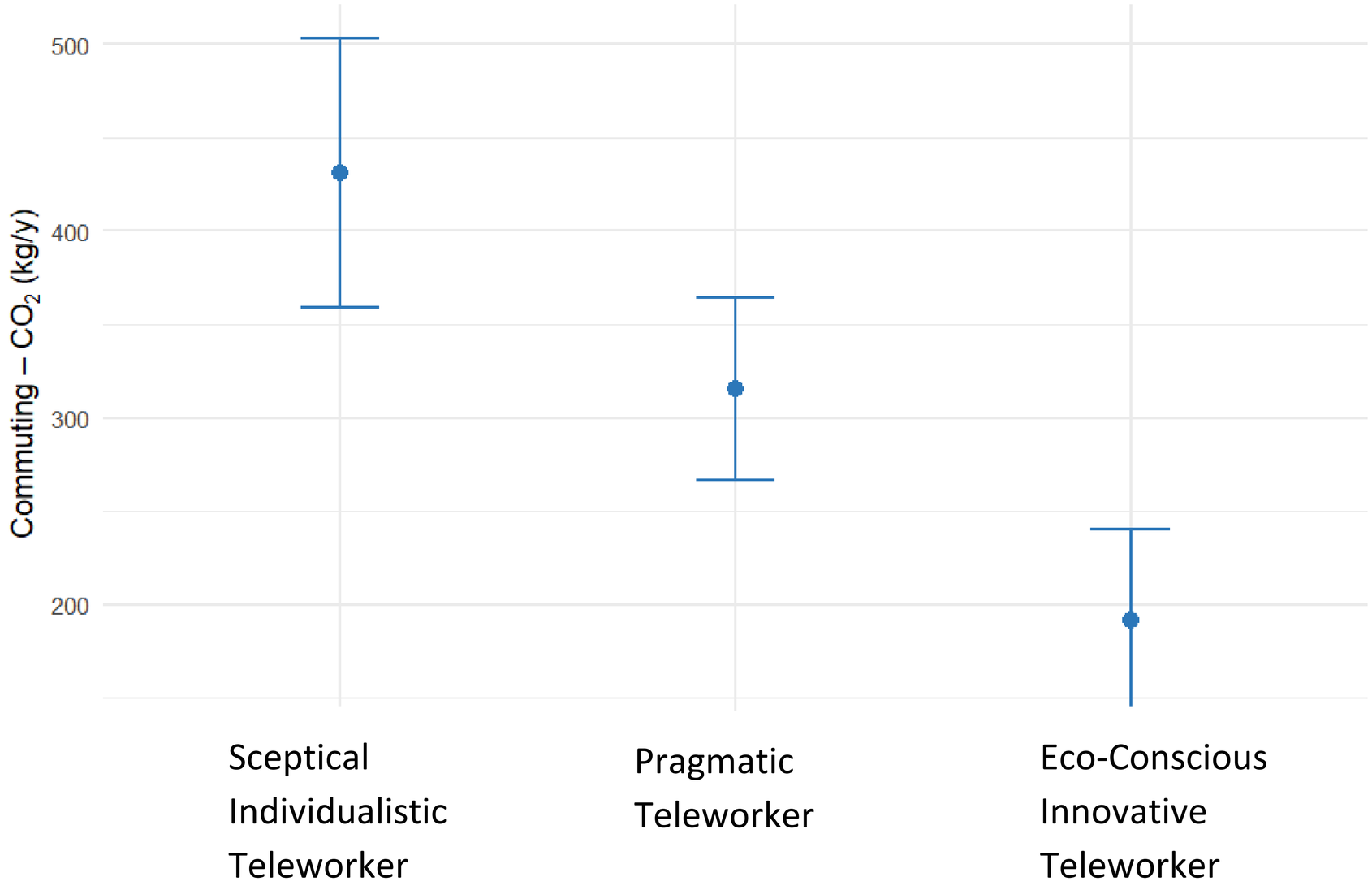
Sceptical Individualistic Teleworker

Pragmatic Teleworker

Eco-Conscious Innovative Teleworker

Eco-Conscious Innovative Teleworkers

Lower commuting-related CO_2eq emissions



Mutual Interrelations Between Well-Being and CO_2 Emissions?

Only for sceptical individualistic teleworkers

	Well-being indicators		
Predictor	**Satisfaction (β)**	**Job Demand Model (β)**	**Health (β)**
CO_2 emissions	.024	-.016	.157
SI (vs. ECI)	-.104**	-.096**	-.093*
PR (vs. ECI)	-.015	-.049	.017
CO_2 × SI	-.030	.069	-.135*
CO_2 × PR	.013	.043	-.100
Adj. R^2	.09	.01	.14
F	3.03**	1.34	4.30***
n	1186	1182	1187

Intervention Design

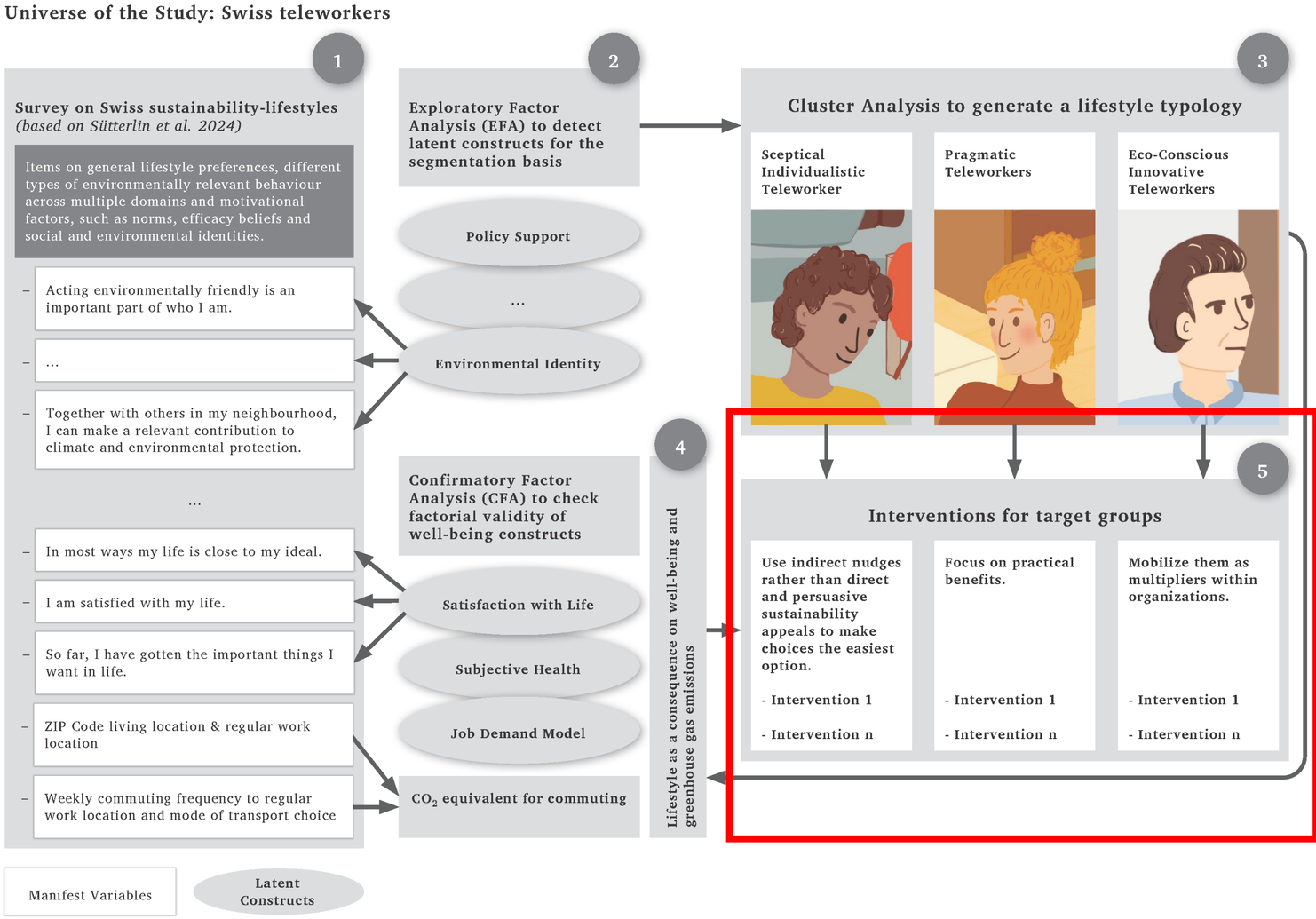


Fig.1. Conceptual and methodological framework.

Policy Recommendations

	Pragmatic Teleworker	Sceptical Individualistic Teleworker	Eco-Conscious Innovative Teleworker
Knowledge Effectiveness			
Dos	• Personal convenience • Time savings	• Efficiency (higher well-being) • Autonomy • Convenience	• Environmental goals • Social engagement
Don'ts	• Abstract communicating of environmental goals	• Moral appeals	
Normative Persuasion	• Promote productive travel time in train • Financial advantages of shared mobility services	• Use indirect nudges rather than direct sustainability appeals	• Promote existing sustainability to expand to other areas • Supportive communication
Role Models			• Mobilize them as multipliers within organizations or neighbourhoods

Key Takeaways

- Teleworker heterogeneity matters
  - CO_2 emission outcomes vary among teleworker types
  - Well-Being (health, satisfaction) vary among teleworker types
- Stronger ecological orientations within teleworker types are associated with lower commuting-related CO_2 emissions
- For one type (sceptical individualist) more CO_2 is related with less perceived health
- Effective energy reduction policy requires group-specific measures tailored to each teleworker type
- Starting point for interventions for less $CO_{2,}$ with more well-being (trend of home-to-office mandates)

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