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Mismatch, empowerment, fatigue or balance? Four scenarios of physical activity up to 2030 in Finland

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ABSTRACT

Sedentary lifestyles and the lack of physical activity (PA) are a major concern among all age groups, and current generations tend to be less fit than the previous ones in the Western World. At the same time, there is an urgent need to cut transport-related carbon dioxide (CO_2) emissions. Major gains can be foreseen if current car-centred lifestyles and sedentary behaviour are addressed from an integrated perspective. In this study, we explore future scenarios in the intersections of PA and active lifestyles as well as related environmental and health benefits in Finland. We used a disaggregative Delphi approach to examine the topic. Although frequently used in health-related research, Delphi has rarely been used in exploring alternative futures or non-consensus. The study design was based on a mixed-methods approach where we combined both qualitative and quantitative data analysis. Building on the experts' perceptions on alternative futures, we formulated four scenarios for PA up to 2030, which we named Mismatch, Empowerment, Fatigue and Balance. The scenarios may be utilised as guides in developing future policies and decision-making, and to build better futures. Our scenarios demonstrate that alternatives do exist, and actions can be realigned with the positive scenarios of Empowerment and Balance. The physically inactive scenarios of Mismatch and Fatigue represent avoidable scenarios.

1. Introduction

1.1. From sedentary lives to physically active futures

Sedentary lifestyles and the lack of physical activity (PA) are a major concern among all age groups, and current generations tend to be less fit than the previous ones. According to the World Health Organization (WHO, 2018), the global situation is alarming: one out of four adults and three out of four adolescents do not meet their respective targets of PA recommended by the WHO. Although the global

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situation of physical inactivity has been stable since 2001, people in high-income Western countries are becoming more physically inactive (Guthold et al., 2020, 2018). At the same time, there is an urgent need to cut transport-related carbon dioxide (CO_2) emissions. While this can be partly done by replacing current fleets with less carbon-intensive transport modes, the decarbonising potential of walking and cycling is widely recognised especially in urban areas in Europe (EC, 2016). Thus, major gains can be foreseen if current car-centred lifestyles and sedentary behaviour are addressed from an integrated perspective. For example, Wepner and Giesecke (2018) and Inayatullah (2010) have argued for a more comprehensive approach to health policy, which would encompass aspects such as mobility or urban design. In addition, WHO (2018) has demanded a "whole of society" response and highlighted, for example, the role of motorised transport, technology and urbanisation in sedentary behaviour. The Helsinki statement of Health in All Policies (HiAP) by the WHO (2013) undermines this aspect, as well.

Linking PA with active, sustainable transport has been recognised increasingly. Frank et al. (2005) have suggested that there is a clear link between PA and walking and cycling-friendly environments. However, significant underused potential in combining sustainable mobility with PA still exists (Dora, 1999; Rabl & de Nazelle 2012; Maizlish et al., 2013). Maizlish et al. (2013) and Mizdrak et al. (2019) have shown that a modal shift towards active travel both reduces carbon emissions and has significant health benefits. Still, in practice, transport experts are rarely brought to the same table with public health professionals and this topic is seldom considered from an integrated perspective (Hämäläinen et al., 2016; Salvo et al., 2021). The issue is even more topical, as, recently, the positive health co-benefits of a wide range of climate mitigation efforts have been established (e.g. Hamilton et al., 2021).

While current health trends are worrisome regarding physical activity, academic literature provides an abundance of studies on the futures of health. For example, Ciasullo et al. (2020) and Font and Sato (2012) have envisioned a transition from "cure" to a more holistic notion of "care". Gille and Houy (2014) have projected that we may see a switch from the "right to get treatment" to a "duty to stay healthy". Wepner and Giesecke (2018) have underlined the need to extend future health policies beyond traditional healthcare and include a wider range of issues (such as mobility) under the same umbrella. Similarly, Inayatullah (2010) has envisaged a more preventive turn in healthcare, encompassing city design as one of the means to support healthier lifestyles and prevent non-communicable diseases (NCDs). Although the futures of health, in general, have been explored extensively (see e.g., Lamé, Oualid, & Stal-Le Cardinal, 2019; Piano & Robinson, 2019; Tarkkala et al., 2019), there is little prior research done in the future of PA. Thus, although the health-related co-benefits of PA and active travel have been established, there is a lack of a comprehensive futures perspective, which would tie these two together and address the topic from a future-oriented lifestyle angle.

Koski (2008) has suggested the concept of PA relationship to examine PA as a multidimensional interplay of culture, meaning and the social world. Kauravaara (2013) studied physical inactivity among young men from a lifestyle perspective by linking the concepts of agency, social class, and habitus. In the health lifestyle theory (Cockerham, 2005), lifestyle behaviour is largely seen as a balancing act between lifestyle choices and lifestyle changes. Lifestyles (active or otherwise) cannot be examined only from an individual perspective, but a wider structural frame needs to be used to capture all the facets. Lifestyle changes have been under scrutiny in many studies in terms of an individual's capability, opportunity, and motivation to change one's behaviour (Michie et al., 2011). From the futures studies' perspective, the focus on individuals should be complemented with descriptions of alternative societal futures. Different drivers are strong in different future scenarios and different scenarios require a different set of policy measures.

As Jim Dator (2009) argues: "there is no single future "out there" to be predicted. There are many alternative futures to be anticipated and pre-experienced to some degree." The seminal futurist, Bertrand de Jouvenel (1967) also emphasised that we should not merely distinguish possible and plausible futures from impossible ones. We may even shape the future towards the preferable or desirable, at least partly. Thus, while peoples' perceptions of the futures vary, there is an inner logic behind these variations. Varum and Melo (2010), argue that there are some patterns, which are likely to carry us into the future. Alternative scenarios can be used to recognize, consider, and reflect on these patterns, which may shape the future. Moreover, by identifying and explicating these patterns, certain frailties (such as tunnel vision) often plaguing decision-making may be overcome (Varum & Melo, 2010). By identifying alternative futures, research may inform decision-makers to open their thinking to various strategic options.

In this study, we explore the future scenarios in the intersections of PA and active lifestyles as well as related environmental and health benefits. Building on the experts' perceptions on the alternative futures, we look forward to describing the key patterns in the scenarios that would guide in developing future policies and decision making. We will address the following detailed research questions: RQ1) What kind of scenarios of PA can be derived from Finnish experts' views of the future of PA in Finland up to 2030? RQ2) What barriers and drivers do Finnish experts see in current efforts to promote PA? Section 2 reviews previous research done on the future of PA, Section 3 introduces the research approach of this study and Section 4 presents the scenarios drawn from the analysis. The empirical material was gathered in May 2020 during the first wave of the COVID-19 pandemic, which is also reflected in the results.

1.2. Case Finland

Our research on alternative futures of PA was carried out in Finland, an affluent, Nordic country known for its technology and education. Finland is an interesting example in terms of PA and active travel for several reasons: First, most Finns do not meet the national recommendations for PA (Vähä-Ypyä et al., 2015; Kokko & Mehtälä, 2016; Husu et al., 2016). Second, walking and cycling seem to have decreased slightly between the latest national travel surveys 2010 and 2016 (Traficom, 2017), although many municipalities have implemented policies to increase active travel (Turunen, 2019). Third, certain health promotion activities, such as promoting healthier eating habits have been relatively successful in Finland (see e.g., Puska et al., 1998). Thus, although the link between PA and active travel is clear and much has been done on both fronts, there is a pressing need to find out more about the underlying reasons behind the slow progress to bring about plausible visions of a 'physically active future'. The views of experts and

interest groups are central in understanding the various drivers and barriers.

Currently in Finland, among children and adolescents, one third is sufficiently physically active i.e., at least 60 min of moderate to vigorous physical activity a day (Kokko & Martin, 2019). This situation has remained quite similar over the past decades. Based on population data children and adolescents can be divided into three groups depending on their PA, one third are sufficiently physically active, one third fairly physically active and one third physically inactive, highlighting a clear split in PA. At the same time, there is a strong decrease in PA over age, when 71% of 7-year-olds perform enough PA, 41 % of 11-year-olds and only 10 % of 15-year-olds did the same. This decrease in PA is very deep in Finland when compared to many other developed countries (Inchley et al., 2020).

In a recent population-based study, Finnish adults spent daily on average nearly 10 h of their waking hours either sitting or lying down (Husu et al., 2021). Standing comprised about 2 h, light physical activity nearly 4 h and moderate-to-vigorous PA (MVPA) about 45–50 min daily. On average participants took 7.500 steps per day. When the number of daily MVPA minutes and steps were calculated among the cardiorespiratory fitness tertiles, the low-fit tertile accumulated on average fewer steps (1.750) and less MVPA minutes (15 min) daily than the high-fit tertile (Husu et al., 2021). Further, participants' age and body composition are known to influence the level of daily PA (Vähä-Ypyä et al., 2021).

2. Making scenarios in a delphi study

2.1. Scenarios

Scenarios are depictions of plausible alternative futures (Bishop et al., 2007). They offer a glimpse of what may be, and some may describe the steps that have led to a particular future. Although scenarios do not predict the future, they show what could happen, if certain conditions hold and/or we follow a certain path of actions (see Tuominen et al., 2014). Thus, scenarios can help us prepare for the future by showing us that alternatives do exist and that we have the agency to consciously decide what to do in a specific scenario, or even, which scenario will become reality. They help us thus to be better prepared for what may come (Bishop et al., 2007).

Several methodological approaches are available in making scenarios (van Notten et al., 2003; Börjeson et al., 2006; Amer et al., 2013). Basic alternatives consist of quantitative modelling, qualitative stakeholder workshops or scenarios constructed on expert views. Quantitative modelling works best when the most relevant factors and their relationships are known and are expected to remain stable in the future. They aim at high accuracy in if…then estimates and can take into account a multitude of factors. Stakeholder workshops work best when visions of the desirable future are generated and there is a need to think very creatively out-of-the-box (e.g., Parkkinen et al., 2019). Expert view -based scenarios are useful especially when relationships of the models are expected (or wished) to change, when the operational environment of the topic under study is volatile, but a structured set of scenarios is aimed at. Scenarios are then made for outlining the possible and plausible futures.

This study follows the expert view approach with a non-consensus Delphi study (Tapio, 2003; Steinert, 2009). Delphi study allows for an iterative process for anonymous expert argumentation avoiding biasing group effects of face-to-face workshops. Non-consensual, or disaggregative Delphi studies can be used to build alternative future scenarios.

Scenario approaches have been less explored in health-related research, although these could be useful in policy planning. To put it bluntly, since the future is always uncertain and open for alternative futures, it is simply not a good practice to "bet all your money" and prepare your actions for only one future. We maintain that there is a lack of alternative-futures orientation in PA related research.

2.2. Delphi-method

Delphi is traditionally used when the objective is to seek consensus on complex issues (Helmer, 1967; Hsu & B.A. Sandford, 2007). The method's key characteristics are anonymity, iterative expert rounds and feedback (Kuusi et al., 2006). Contrary to conventional group interactions, which may suffer from group pressure and dominant individuals, Delphi offers more room for free expression of opinions by emphasising anonymity. Confidentiality paired with anonymity may even encourage the diverse expression of opinions and thus decrease the tendency to conform (Tapio, 2003; Kuusi et al., 2006).

The traditional aim of Delphi panels has been to map and generate a consensus of experts' views on various health-related topics, but less so to offer alternatives on how the future of a particular issue could evolve. In non-consensus-oriented Policy Delphi (see Linstone and Turoff, 1975) variants, such as the argument Delphi (Kuusi, 1999), Disaggregative Delphi (Tapio, 2003) and the Dissensus Delphi (Steinert, 2009), expert views are grouped into alternative futures instead of forming a unified view. Although Delphi has been used frequently in health-related research to establish unified views (Flostrand et al., 2020), the focus has rarely been on alternative futures or non-consensus.

There are quite a few relevant examples of consensus-based Delphi in health research. Turner, Ollerhead, and Cook (2017) used Delphi to identify research priorities in public health and Havers et al. (2019) conducted a Delphi to better understand hospital policy development. Consensus Delphi has been also used to identify good practices related to the treatment of specific illnesses (Baldwin, 2020; Stennett et al., 2018; Giangregorio et al., 2015), to identify efficient health policies (Christian et al., 2020; Virgara et al., 2021) or to identify useful factors for PA-related interventions (Huijg et al., 2013; van Stralen, Lechner et al., 2010). van Stralen et al. (2010) underlined several factors related to psychological (e.g. PA as a daily routine), social (e.g. PA as a way to fulfil social needs) and environmental categories (e.g. access to facilities). van Stralen et al. (2010) also underlined Delphi as a useful method for gathering new or promising concepts to be added to established evidence. Similarly, Huijg et al. (2013) conducted a two-round Delphi to examine if factors previously identified as promising in PA interventions also matched experts' views, which they largely did. All of the above have sought to establish unified views on a specific topic, rather than exploring various alternatives from a futures perspective.

Although Delphi has been used in health-related research abundantly, there is a lack of the alternative futures perspective focusing on disagreement rather than agreement with the expert panel. In addition, most health related Delphis seem to be concerned with the present. Gillis et al. (2013) used a more future-orientated study design with their 10-year perspective, but the aim was in finding consensus on research priorities in PA and sedentary behaviour among children and adolescents. Chiang and Lei (2016) used a Delphi variant to outline the determinants between walking and the urban environment.

3. Material and methods

3.1. Data gathering

We used a mixed-methods approach by combining both qualitative and quantitative data analysis. According to Author et al., qualitative analysis tends to be more focused on meanings and interpretations, whereas quantitative methods offer a way to understand relationships between various aspects, making these two methodological schools complementary rather than incompatible.

The composition of the expert panel is an important facet of Delphi (Tapio 2003; Hsu & Sandford, 2007; Varho & Tapio, 2013). Expertise should be diverse and wide enough to ensure that there is potential for multiple viewpoints (Varho & Tapio, 2013; Kuusi, 1999; Linstone & Turoff, 1975). We aimed at a wide range of expertise due to the complex nature of our research topic. Although a lot has been written about the expert panels as such, there is little practical guidance on the selection of the actual experts (Hsu & Sandford, 2007). The expertise matrix developed by Kuusi et al. (2006) is a tool, which can be used in the formation of a Delphi panel. The matrix is a simple grid where panellists are listed based on their competencies, interests, and socio-demographic factors. The tool quickly reveals gaps in terms of targeted attributes and ensures that the panel includes sufficient expertise (Varho & Tapio, 2013). In our study, we targeted experts on PA and health promotion.

The experts of the Delphi panel included city and government officials, representatives of NGOs, research organisations and businesses. A group consisting of health professionals was consulted to identify relevant experts. An expertise matrix consisting of interests, competencies and socio-demographic factors was used to ensure adequate coverage (Fig. 1). The expertise matrix included 169 experts, all of whom were invited, and 40 of them eventually partook in the Delphi. The distribution of the participating experts on a two-axis expertise matrix is described in Table 1. The expertise was asked at the end of the questionnaire and only 31 panellists responded to this part.

The Delphi questionnaire included 27 questions on a wide range of issues ranging from future trends to weak signals (see Appendix 1 for the full questionnaire). The wider research consortium was used to develop the questions, first openly exploring ideas,

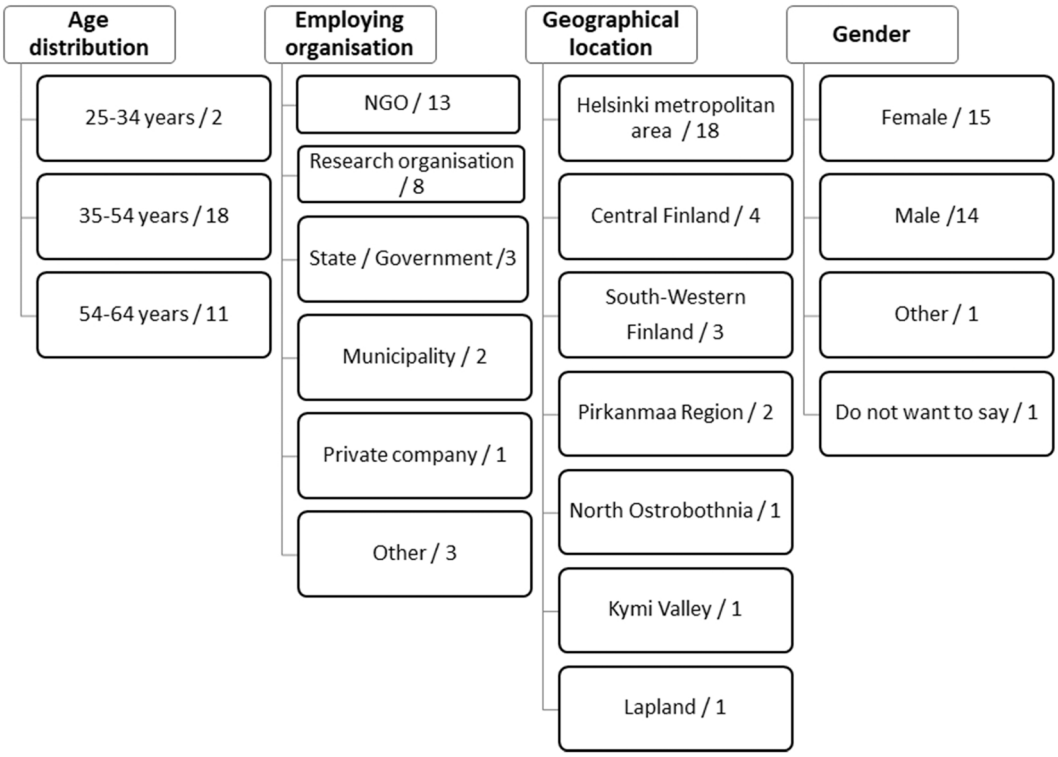

Fig. 1. The number of experts according to their self-reported background possessing specific expertise. The expertise related questions were not compulsory, and they were asked at the end of the questionnaire, which is why only 31 experts responded to this part. The geographic locations are Finnish regions.

Table 1
Experts' expertise distributed into two axes: content of expertise and disciplinary field **of expertise**. The experts could tick the options freely on both axes in the Delphi questionnaire, ie. an expert was free to choose multiple areas or types of expertise.

Content of expertise	Disciplinary field of expertise					
	Human behaviour	Sports clubs and associations	Health promotion	Technology	Business	Administration
Sports	1	8	2	1	0	6
Physical activity	14	8	16	4	3	12
Health	9	2	8	3	1	7
Children and adolescents	5	8	12	3	3	6
Adults	12	6	12	3	2	4

then twice testing drafts of the questionnaire. **Part 1** of the questionnaire included **trend questions** on the future of PA. First, the panellists were asked to estimate what probable changes they foresee and preferable (albeit possible) changes they envision in the average daily minutes of light, moderate and vigorous-intensity PA and sedentary behaviour among the working-age population. The experts were provided with numerical data from 2018 (Husu et al., 2018) depicting the average daily minutes (N.B. for vigorous intensity the Husu et al. (2018) included only an estimation: "few minutes"). Second, the panellists were requested to estimate probable and preferable changes in daily PA, compared to current levels, in the morning, during commuting, during daytime and in the evening. The scale was a 7-point Likert scale (−3 =steep decrease, −2 = moderate decrease, −1 = small decrease, 0 = remains at current level, 1 =small increase, 2 = moderate increase, 3 = steep increase, compared to the current situation). Third, the panellists were asked to anticipate the probable and preferable changes in the average daily steps among children, adolescents and adults, and the experts were provided with numerical data from 2018 (Husu et al., 2018; Kokko & Mehtälä, 2016). Part 1 included also a set of questions on how the respondents estimated probable and preferable changes in supervised exercise, volitional exercise, active travel or incidental activities (percentage increase/decrease from current levels, no previous data for comparison). All Part 1 questions were targeted to the year 2030.

In **part 2** the panellists were asked to estimate **the potential of various measures in increasing PA** among the general population. They were also asked to estimate the potential certain measures have in reducing polarisation among teens and children, and what the future role of active travel could be like. Part 2 also included open-ended questions on how the PA perceptions change among children and adults, and on the perceived impacts of remote presence on PA.

Part 3 included two questions on the future of **PA-related business activities**. The panellists were asked to assess the potential of various business activities, products, and services to increase PA. The panellists' views on how to promote PA related business activities were mapped in an open question. The Likert scale used for parts 2–3 for mapping potential was 1 = no potential, 2 = little potential, 3 = moderate potential, 4 = considerable potential, 5 = great potential.

Part 4 asked open-ended questions of **weak signals and wild cards** related to PA. Weak signals were defined as ".existing signs or phenomena which may be regarded as signs of a bigger change or transformation". Wild cards were defined as ".surprising factors, which have a low probability, but if realised they can have a major impact on the current state of things". **Part 5** included **background questions** mapping expertise and standard socio-demographics (background organisation, age, sex, interests, competencies, and geographical location) (see Fig. 1). Most questions (Part 1- Part 4) included a comment box and the respondents were encouraged to comment on each other's answers. The panel was accessible for 14 days in May 2020 in the eDelphi system (eDelphi.org), an online real time Delphi platform developed specifically for Delphi surveys and their management. In the real time Delphi, iteration of initial answers is possible during a predefined time slot, when the respondents can come back to the questionnaire, comment each other's answers and change one's own answer (see Gordon & Pease, 2006). Final answers are used in data analysis. Ethical pre-evaluation of the questionnaire was not considered necessary, since the platform made the responses completely anonymous, and these types of questions were part of the experts' daily work. According to the Finnish National Board on Research Integrity TENK (2019) ethical review is not necessary if participation of over 15-year old research subjects in the research does deviate from the following aspects: the principle of informed consent, interference with the physical integrity of the research participant, exposure of the participant to exceptionally strong stimuli, or causing mental harm or threat to the safety of the participant, his/her family members or those close to the participant. Our study did not divert from these principles therefore no ethical review was conducted.

3.2. Data analysis

We analysed the final responses with a mixed-method combination of both quantitative and qualitative methods. The numerical data were clustered with SPSS and the resulting four clusters were formed as the core of the scenarios. To get "flesh between the bones", the qualitative data consisting of the comments and answers given in the Delphi panel was then thematically analysed exploratively per each cluster with qualitative content analysis using nVivo software. The scenarios were thus formed with the combination of grouped quantitative data and thematic qualitative data. We were aware of the potential challenges raised by Author et al. in mixing numerical and qualitative data in Delphi, such as either type of data dominating the analysis, problems in framing the questions to discover alternative states or building consistent scenarios. However, these issues were considered in the data analysis as follows.

3.2.1. Cluster analysis

Hierarchical cluster analysis was performed on the responses to Part 1 in the questionnaire. Since the aim of the study was to find

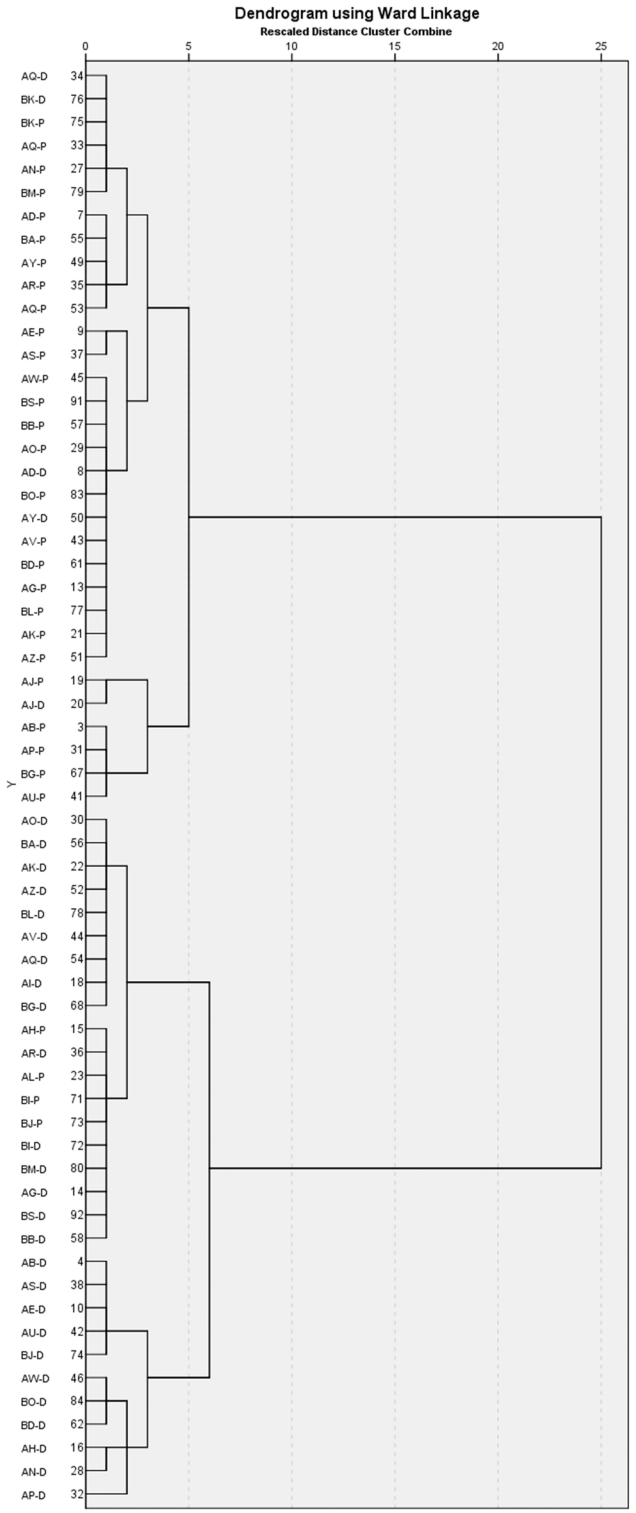

Fig. 2. The clusters for physical activity in the future. SPSS software dendrogram describing the clustering process of the quantitative Delphi data. Read from left to right. Block letters stand for individual responses, where for example AA-P refers to the probable future answer of the respondent AA, and AA-D the desirable future, respectively. Clusters are based on the survey responses of 40 experts (32 respondents produced 62 images of the future grouped in 4 clusters). Two respondents did not indicate their preferred future image.

alternative future scenarios rather than group respondents, the unit of analysis was the future image, not one respondent. Each respondent produced both the probable and the desirable future image.

As the questions for the experts were expressed in various scales (minutes, steps, or percentage changes) the data had to be standardised for the analysis. Standardisation was carried out by giving the maximum response of each question the value of 100 and the minimum response the value of 0. The rest of the responses were given linear values in between the extremes so that their distance remained relatively equal to the original values in the interval scale. The Ward method in SPSS was used as the clustering algorithm, including squared Euclidean distance measure. No weights were used for the variables since there were reasonably balanced sets of 3 or 4 questions on each of the questionnaire themes. Fig. 2.

Cluster analysis does not decide the number of clusters. The number was mainly decided by contemplating the visual output of the hierarchical tree (dendrogram), where four clusters seemed an apparent choice (Fig. 3). After that cluster centres were calculated as arithmetic means of responses within a cluster for each variable. The cluster centres were interpreted by the research team as being far enough from each other to be understood as different scenarios. Analysis of the qualitative material supported this to be the case.

3.2.2. Qualitative content analysis

The qualitative data consisted of both the comments given on the trend and Likert-scale questions and the answers given to the open-ended questions. The data exported from the eDelphi-platform was anonymous, i.e., the program generates a distinctive number code for each respondent and the names are omitted from all material. The automatically generated number code was converted to a short alphabetic code to avoid errors. We exported the data to the nVivo-program for the qualitative content analysis (QCA). First, the data were grouped based on the clusters formed in the cluster analysis, ie. respondents (and their answers) were distributed to a specific cluster as described in 3.2.1. The data was then analysed using QCA, which is a systematic, but a flexible method for analysing textual data (Schreier, 2014). In QCA, the data is coded into various categories based on either preconceived codes (directed QCA), inductively formed codes (conventional QCA) or the exploration of latent meanings (summative QCA) (Hsieh & Shannon, 2005). We used a hybrid approach combining conventional and summative QCA and explored the material inductively, but with a specific focus on the ways the future of PA is described, and which barriers and drivers were emphasised. This approach was compatible with the explorative nature of the hierarchical cluster analysis described above.

Each cluster was thought to represent a separate view of the future with a distinctive futures' image embodied in the qualitative data. Therefore, the respondents were divided according to the clusters and all qualitative data in each cluster was analysed separately to define the innate nature of each cluster. The actual analysis consisted of reading and categorising the data inductively. The data was roughly divided into two main sections based on the questionnaire design, ie. the first part consisted of the data related to the comments and the latter half of the answers to the open-ended questions. The comments emphasised the actual act of being physically active (e.g. intensity, time, place and types of PA in the future), whereas the other half accentuated maybe slightly more the general aspects of PA (e.g. barriers and drivers for PA, contextual factors and weak signals related to the future of PA). The analysis of the rich data was a continuous process, and the main categories were formed after several readings of the data by the first author (see Table 2). The main categories formed the core of the scenario building process, and each scenario includes elements of these categories. The interpretations were assessed, formulated, and reformulated with a wider research team.

The qualitative data with its main categories were then combined with the numerical estimations given by the respondents to the trend questions. Thus, the quantitative data provided a numerical frame with numerical indicators for each scenario, whereas the qualitative data was used to formulate and describe the inner dynamics of each scenario as seen by the respondents. This combination served as the basis of the scenario formation process (see Fig. 3).

4. Results

In this section, we will present the results. The numerical characteristics of the clusters will be discussed first, followed by the four scenarios. The scenarios have been formulated based on both numerical data and the analysis of the qualitative data.

4.1. Physical activity in the future: Clusters in numbers

The trend questions produced numerical data on what changes the experts foresee in sedentary behaviour and intensity of the daily intensity-specific PA (Fig. 4), daily steps among different age groups (Fig. 5), the organisation of daily PA (Fig. 6) and daily schedules of PA (Fig. 7). Apart from the daily steps by age group, all figures refer to the whole population. The experts indicated that sedentary behaviour decreases and vigorous-intensity PA increases in Clusters 2 & 4, whereas the opposite is true for Clusters 1 & 3. Compared to

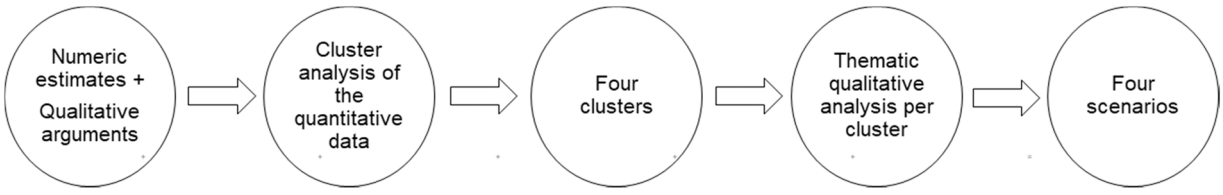

Fig. 3. Scenario-formation process: expert arguments and numerical trends combined.

Table 2
Key elements in creating future scenarios for physical activity. The main categories, related key themes and main attributes based on the QCA of survey responses of 32 experts. All main categories & attributes were used as a basis for the scenario building process.

Themes	Main categories	Attributes defining each scenario
Individual change vs. institutional change, degree of cooperation	Actor/s: Who / what changes?	Key actors: Who / what are they?
Time, place, intensity, organization of PA, the mode choice	PA – what, when and how?	What is the ideal PA? What is the role of active travel?
Attitudes, experiences, values	Individual factors	What motivates the individuals and what changes compared to the current situation?
Role of family, nature, & outdoors, service provision, work-life balance	The understanding of everyday life	What are the defining characteristics in terms of everyday lives?
Polarisation, urbanisation & urban structure, changes in work life, ageing, economic boundaries, crises, technological development, climate change	Contextual characteristics	What are the key challenges? What is the role of technology?
Active vs. passive, individual vs. collective, remote vs. present, thrill-seeking vs. placid, healthy vs. unhealthy	Lifestyles	Which types of lifestyles dominate?

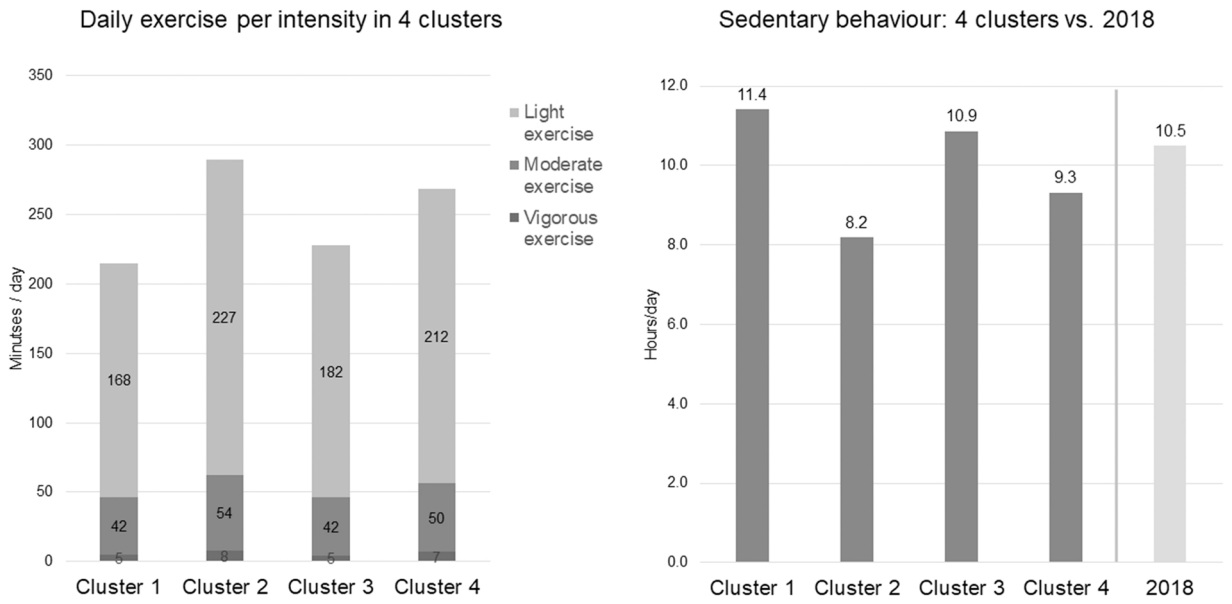

Fig. 4. Light, moderate and vigorous-intensity PA in the four clusters and sedentary behaviour in the four clusters compared to the 2018 values.

the 2018 values, sedentary behaviour is especially high in Cluster 1 and low in Cluster 2. Thus, clusters 1 & 3 are generally less active and more sedentary than clusters 2 & 4.

Fig. 5 depicts the increase or decrease of the daily steps among different age groups. The increase in steps is especially pronounced among adults and adolescents in Cluster 2, while the decrease in steps is most significant among adults in Cluster 1. The experts saw no increase in steps among children if the values are compared to 2018.

The daily scheduling of PA (Fig. 6) describes the time of the day people are active, i.e. are they most likely to be physically active during the morning, day, evening or while commuting. Active commuting is most pronounced in clusters 2 & 4, which signifies active travel. The high share of evening-related PA in Cluster 1 is related to organised exercise, which takes place after work. Clusters 2 & 4 depict an increase in overall PA, whereas Clusters 1 & 3 seem to be less active especially among adults and adolescents.

Fig. 7 describes the organisation of PA and the foreseen changes to the shares of organised, self-organised, active travel and incidental activities. All forms of exercise see an increase in cluster 2, but the shares of non-organised forms (volitional, active travel and incidental activities) are especially pronounced. Clusters 1 & 2 depict a significant decrease in organised exercise from current levels. All forms of exercise are increasing in Cluster 4, but the rise is not as steep as in Cluster 2 (excluding organised PA).

4.2. Scenarios

4.2.1. The mismatch scenario

I would say that technological development will make people even more passive. Work-life becoming ever tougher will decrease our free-time. [BG].

The first scenario, called Mismatch, where people are torn between different demands: work-life balance is a mismatch. Active

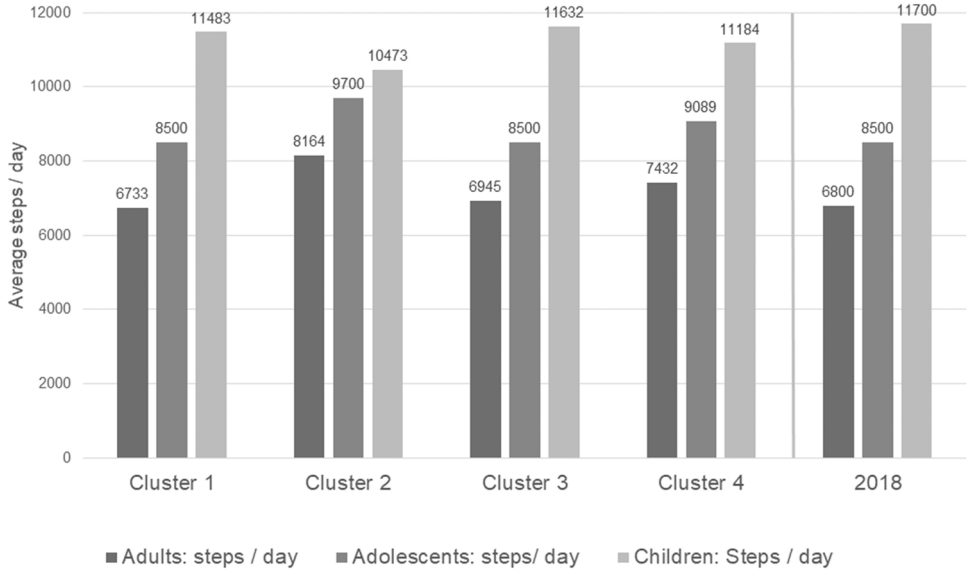

Fig. 5. Daily steps of adults, adolescents, and children in the four clusters compared to 2018 values.

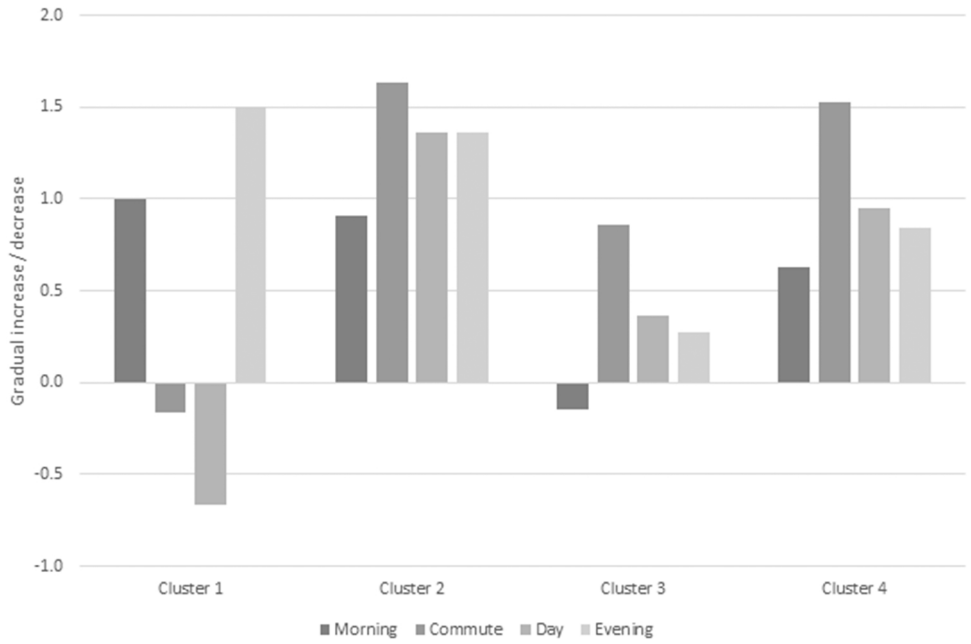

Fig. 6. Daily scheduling of PA in the four clusters compared to current scheduling on a seven-step Likert scale (−3 =steep decrease, −2 = moderate decrease, −1 = small decrease, 0 = remains at the current level, 1 =small increase, 2 = moderate increase, 3 = steep increase).

lifestyles face challenges when online presence has made everything effortless.

With more and more people working from their home offices, remote presence has become normalised and inactive lifestyles are increasingly common. Technological innovations aiming to ease daily lives have been very successful and most things can be handled effortlessly online. However, this has had its downsides: taking a break during the day requires both conscious effort and flexible working conditions. With people less often actively commuting to work (or to schools), daytimes have become sedentary; people tend to be desk-bound most of the working hours. With work and free time becoming more and more mixed, it becomes more difficult to find time for daily exercise.

The chances for inadvertent exercise during the day have become less frequent: PA is seen to require effort, motivation, adequate resources, and (if done during the day) a lenient working culture. Those motivated to remain active, exercise mainly in the evenings (after work) or the morning (before work). The share of daily walking and cycling has grown slightly, but it is still very modest. Instead,

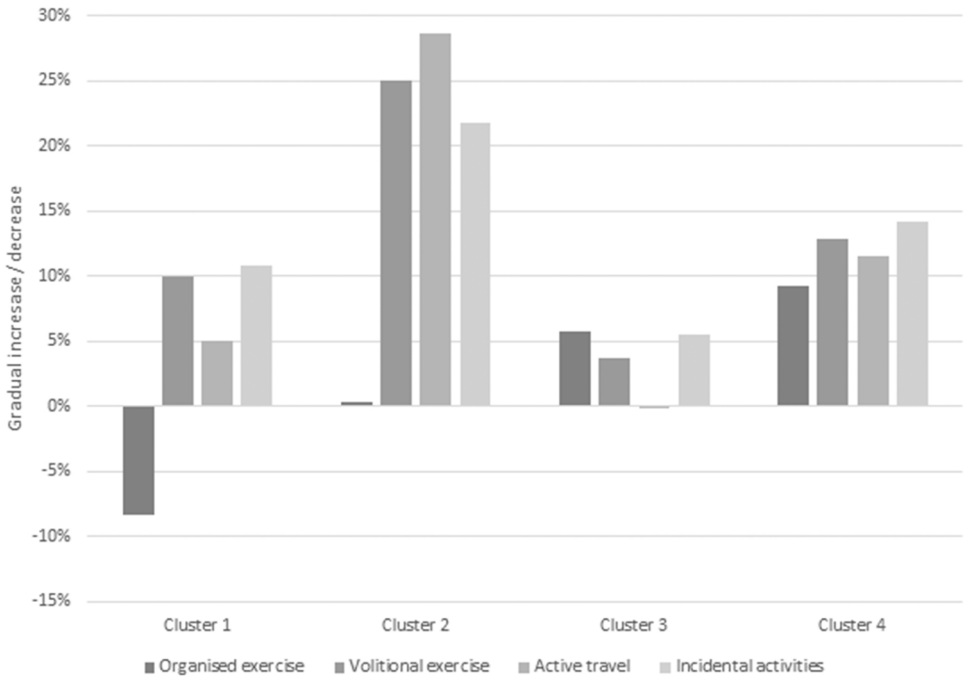

Fig. 7. The organisation of daily PA (organised exercise, volitional exercise, active travel, incidental activities) in the four clusters compared to the current situation (percentage increase/decrease from current levels).

exercising is optimised, efficient and accommodated to busy lives. This has led to a boom in online and on-demand training. The financial burden generated by the massive health and social reform has made politicians reluctant to invest in new schemes. Fragmented governance, limited cooperation and fluctuating political will is seen by many professionals to limit the willingness to address the growing group of those seeking effortless comfort rather than healthy exercise.

4.2.2. The empowerment scenario

I am sincerely hoping that everyday physical activity and the better-understood health benefits [associated with PA] will find their way into the socio-political discourse, along with climate change and modern urban development, and that we will see genuine actions. [AS].

In the Empowerment scenario, people have rediscovered the joys of being physically active and living healthy lives in the aftermath of the global pandemic. Inclusive and sustainable urban planning is challenging traditional car-centred lifestyles.

Healthy lifestyles have boomed after the global health crisis of the early 2020 s. Many have found comfort in the great outdoors and even overgrown nature trails have been rebuilt to meet the demand. Activity parks and local recreation areas are places where people of all ages gather to enjoy outside activities. The change in attitudes in terms of what can be regarded as exercise has changed, and sports culture is not merely about competition and performance, but also strongly associated with well-being, amusement, and inspiration.

A more profound understanding of target groups and their everyday lives together with increased cross-sectoral cooperation has offered new ways to tackle some of the fundamental causes of polarisation. As a result, promising practical tools and opportunities have been created for different fitness levels and socio-economic backgrounds to support the integration of PA into daily lives. For example, semi-professional sports cooperatives offer flexible, low-threshold services via various platforms making it easy and relatively cheap to find targeted activities suiting specific needs or financial situations. With municipalities having adequate resources and willingness to invest in both wellbeing and proactive healthcare, there are enough recreational facilities to serve not only competitive sports but also informal groups looking for low-cost exercising opportunities. The urban structure has been moulded to encourage the use of active travel making it easier to access services without a private car. Well-planned cycling lanes and -routes together with updated infrastructure support the use of bicycles and other active travel modes for all transport purposes.

4.2.3. The fatigue scenario

Each physically inactive person has on the one hand, his or her reasons for not being active and on the other hand specific motivating factors. Nowadays, these [factors and reasons] are not concentrated on and people are offered the same contents. Municipalities tend to think that the municipal sports sector knows what people need to be more physically active and the municipal services remain the same year after year. [AQ].

The third scenario is called Fatigue. People are increasingly tired and feel that they lack adequate support mechanisms, which would help them to be more active. Poor motivation, negative attitudes, lack of skills and increased polarisation have not made things easier.

With more and more time spent online, most people have a strong online presence. This has boosted the online training culture and

there are numerous online communities dedicated to the enhancement of the physical self. Although official guidelines emphasise low threshold PA and positive attitudes in terms of the needed daily physical effort, popular online communities are swamped with perfection seekers, ultra-training tips and "train hard" -rhetoric. These vocal online influencers have also inspired counter online communities, such as the "non-exercisers" and "voluntary couchers", who have found an audience among those, who are finding all the effort simply exhausting and would just rather relax online.

Although both organised and unorganised exercise has increased slightly, the gap between the physically very active and physically inactive has continued to broaden. Some critics say that emphasizing individual responsibility works well for already active people, but for the rest, it just increases polarisation. Lack of skills or financial resources, negative attitudes towards exercise in general, bad experiences, or poor access to services makes daily PA a toil to an increasing number of people despite their socio-economic background.

With more people working online, daily commutes either by foot or by bike have decreased and active travel is on the decline. Meeting the daily target levels has become a question of effort and motivation. Although the general well-being of the employees is naturally strongly encouraged and supported by employers, the promotion of active working habits is still rather new and there are not enough tools or resources available. In addition, financial resources for proactive measures are rather limited and the ethos of the "good worker" is still strong. Still, some well-off companies see these types of support services as worthwhile in boosting job satisfaction or attracting new employees.

4.2.4. The balance scenario

I don't think there's been enough discussion on the potential that the third sector has in promoting physical activity. Especially those [NGO's] that are not organised sports clubs or sports associations. The same applies to the culture sector or your average municipal social and health services or services aimed at youths- or seniors. [AI].

The name of the fourth scenario (Balance) describes the key attributes of the scenario. Wellbeing and urban planning are developed and managed as a joint, cooperative effort. The understanding of everyday life has increased significantly, which has resulted in tailored products and services to support PA.

The first joint meetings within the new urban wellbeing cooperation units were not easy. With different sectors coming together with their practices, jargon and working culture, it was chaotic at first. However, once these joint meetings with core sectors started to flow, there was no way to go back to the old silos. As a result, the cooperation unit has also started to include a rotating board of NGOs to make the unit even more inclusive. The cooperation has to date led to a wide and deep understanding of how health, urban wellbeing and sustainable development are interlinked: our natural environment, urban structure, services, values, lifestyles, and material culture need to be considered from a holistic, phenomenon-based perspective. Innovations tackling new ways to decrease CO_2 emissions in for example everyday mobility have spurred.

As a result of this new type of systemic cooperation, general PA has become not so much a question of the individual getting a specific amount of exercise, but for the individual or "the core unit" (such as a family or a small group of people) getting specific support when needed. For those in need, this can take, for example, the form of a targeted PA recipe with personal or group guidance, skill-boosting or try out sessions topped with financial resources to get you started with a specific focus on keeping the services low-threshold, culturally inclusive and closely located. Support mechanisms for service providers are available.

The targeted services have had a positive effect, and the much-discussed polarisation gap is not as distinctive as before. PA is a by-product of accessible services, good infrastructure, and everyday activities. The urban space encourages spontaneous movement. In addition, walking and cycling have been made easy. Families find themselves more often outside enjoying the urban environment than inside glued to their screens.

Table 3
Four scenarios for PA building on expert Delphi: Mismatch, Empowerment, Fatigue and Balance. Overview of expert perceptions on physical activity in the future including all main attributes of analysis.

Main attributes	Mismatch	Empowerment	Fatigue	Balance
Key actor/s	Fragmented institutions	Community	Individual	Cross-sectoral partnerships
Defining characteristics	Stationary, convenient lives	Inclusion, empowerment	Polarisation	Wide and deep cooperation
Ideal physical activity	Efficient and optimised	Nature-based and locally organised	Online	A by-product of other activities
Distinctive change in motivation	A conscious choice	A source of happiness	Scheduled part of the day	A natural part of daily activities
Key challenge	Fragmented cooperation	Budgetary restrictions	Meeting diverse needs	Meeting the growing demand
Role of technology	Technology makes life easier	Technology is a companion	Technology dominates	Technology is a tool
Lifestyles	Excessive comfort-seeking	Healthy & sustainable	Polarised	Routinised
Role of active travel	Modest	Central	As present	Increased

5. Discussion

5.1. Summary of the results

In this section, we will return to the research questions and summarise the results. We will also discuss some of the key similarities and differences of each scenario. A summarised comparison can be found in Table 2, which captures each scenario in terms of the identified key characteristics and main categories based on the qualitative analysis. Table 3.

We will now return to the two research questions presented at the beginning of this article. We will first discuss RQ1) What kind of scenarios of PA can be derived from the Finnish experts' views of the future for the next 10 years? We set out to examine the future of PA as the experts of PA and sports see it. We formulated four distinct scenarios of PA: the Mismatch scenario, the Empowerment scenario, the Fatigue scenario, and the Balance scenario. All scenarios are plausible; some are maybe more probable while others might be more preferable. The scenarios have different inner logics derived from both the experts' views and the dynamics of the present situation. For example, each scenario has a different key actor (see Table 2) based on two pivotal factors the experts' accentuated the degree of institutional cooperation (the Mismatch and the Balance) and the role of the individual in daily PA (the Empowerment and the Fatigue). Thus, the future of PA may be different depending on the degree (and probability) of cross-sectoral cooperation. Similarly, whether the individuals are seen to have agency in terms of their daily PA may affect how the future turns out. Thus, by emphasising some aspects over others, the inner logic of the scenarios changes and the view of the future becomes different. Similarly, the choices made in the present can be seen to shape the spectrum of potential alternative futures.

The scenarios presented in this article offer a glimpse of what might happen if certain aspects are emphasised. In RQ2, we sought to uncover the barriers and drivers experts identified in current efforts to encourage PA in different age groups in Finland. We claim that different factors accelerate and/or hinder PA (see Fig. 8). Each scenario tangents on various barriers, but the barriers are present especially in the Mismatch and Fatigue scenarios, whereas some of the barriers have been overcome in the Empowerment and Balance scenarios. In the Mismatch scenario, the combination of busy lives, comfort-seeking and passivating technologies seem to work against PA and turning PA into something, which requires a conscious effort instead of it being naturally integrated into daily activities. In the Empowerment scenario, some of the key barriers related to urban structure have been overcome. Instead of having scattered locations, which can be accessed by car, the urban structure encourages active travel simultaneously establishing a strong active link between PA and active travel modes. Similarly, inflexible facilities have been replaced by low-threshold options. In the Fatigue scenario, negative attitudes and experiences, lack of skills and poor motivation form the key barriers hindering PA. In the Balance scenario, the individual barriers present in the Fatigue scenario have been addressed with the systemic cooperation scheme involving various key institutions and a deep understanding of target groups.

In addition to barriers, the professionals clearly emphasised certain factors, which need to be embraced to transform the system (see Fig. 8). Targeted measures and services, and cross-sectoral cooperation are especially pronounced in the Balance scenario. In the Empowerment scenario, the use of technology as a tool is especially accentuated and active travel is encouraged by adequate

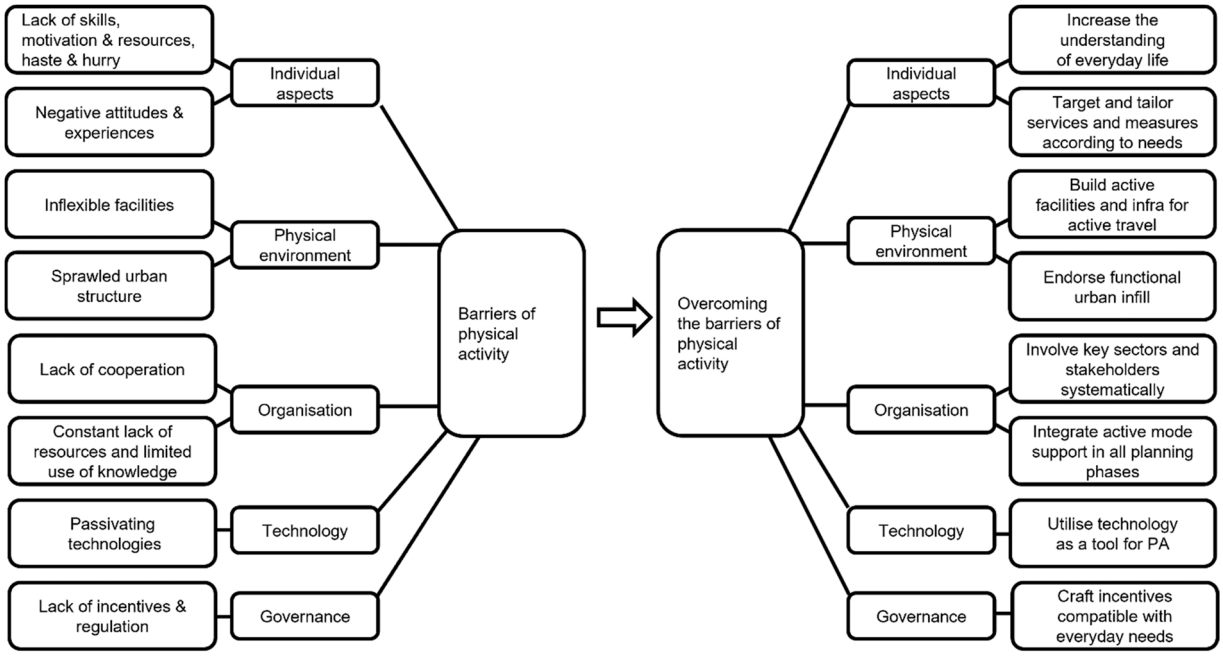

Fig. 8. Thematic barriers of PA and the tools for tackling the barriers identified in the qualitative analysis. The barriers are present especially in the Mismatch and Fatigue scenarios and tackled in the Empowerment and Balance scenarios.

infrastructure. In addition, the rediscovery of the urban green and active facilities form the cores of this scenario. The need to better understand motivations and everyday life, as well as lack of incentives and adequate resources, are common shortcomings in the Mismatch and Fatigue scenarios. Our findings are in line with Wepner and Giesecke (2018) and Inayatullah (2010), who argue for a holistic view of health systems, which would include factors and determinants (such as urban planning, urban design, and mobility) not traditionally present in health-related policymaking. Our experts named siloed thinking and the lack of cross-sectoral cooperation as one of the key issues also.

5.2. Policy relevance

The four scenarios presented in this article can be used as thought experiments in policymaking: they offer and open doors to potential futures, where the emphasis on a particular set of factors instead of others has led to a particular outcome. For example, if individual needs are not met by better-targeted and customised services, we may face more polarisation like in the Fatigue scenario. Similarly, in the Mismatch scenario, the growing demands of work-life narrow the timeframe for daily PA. Then again, in the Balance scenario, a wide and deep cross-sectoral cooperation between e.g., urban planners, schools and the health sector have led to a better understanding of everyday lives and ultimately better-targeted services. In the Empowerment scenario, holistic planning initiatives have led to urban spaces, where walking and cycling are challenging car-centred cultures, while also providing a simple solution to address sedentary behaviour. The scenarios presented in this article can be used to highlight the strengths and weaknesses of the current system and by properly addressing both the flaws and assets, the overall resilience of the system can be enhanced. These scenarios can also be utilized as a what-if -testbed, ie. a safe environment for assessing potential effects of various policymaking options.

Scenarios are alternative holistic descriptions of the futures of a system with a certain focus and context. However, there is a great variation in the PA of each age group as pointed out in the introduction section of this paper. This brings about the question, whether different segments of people could live in different scenarios simultaneously, that is the scenarios would rather describe subsystems than alternative states of a system. If we understand scenarios as subsystems containing specific lifestyles of specific segments of individuals, we should not only discuss what decision-makers should do to attain the "good" scenarios, Empowerment and Balance and avoid the "bad" scenarios Mismatch and Fatigue. Rather, we should consider *where* and *for whom* each scenario would best describe the current and immediately foreseen reality. This could also be a more generic feature of scenarios that requires further research.

We carried out our research during the first wave of the COVID-19 pandemic during the first lockdown in Finland, six weeks after the start of the lockdown. Although COVID-19 was not included in the original research setting, the pandemic was naturally reflected in the results. For example, various forms of remote presence (e.g., remote work, online training) and their influence on e.g., commuting, work practices and daily PA were highlighted in the qualitative data echoing the findings of Buehler and John Pucher (2021). Worries on how people would replace daily exercise previously linked with commuting were highlighted. According to the results of objective measurements of PA, these fears had a solid ground as the PA of children and adolescents considerably decreased in the mornings and afternoons during school lockdowns (Vasankari et al., 2020). Still, more flexible working hours were seen to offer more opportunities for PA during the workweek. Similarly, some experts emphasised the pandemic's positive effects on bringing less obvious alternatives to PA promotion. For example, the integration of nature (ie. local parks, forests and nature trails) into PA promotion was seen as having unprecedented potential: with restricted or no access to most indoor activities, local parks, forests and nature trails were rediscovered as PA locations. Many experts even saw this as a weak signal of a more permanent change in values and lifestyles.

5.3. Methodological considerations and suggestions for further research

We conclude this article by examining the methodology we used, the implications of this research as well as suggestions for further research. We acknowledge that the expert panel was limited to health and PA promotion professionals and experts in the age groups of children, adolescents and work life-aged adults. The experts presented mainly the Helsinki Metropolitan area with only a limited number of experts from other parts of Finland, mainly because most expert organisations are in the capital area.

We would like to promote the use of Delphi primarily as a method for mapping alternative futures. Health-related Delphis have traditionally sought consensus among experts on a specific topic, but we feel that the traditional approach is a rather limited way of using the Delphi. We agree with Tapio (2003), Steinert (2009) and Melander (2018) that dissensus Delphi is a useful tool in discovering alternative and innovative views about the future of complex issues. We also agree with Soria-Lara and Banister (2017) that consensus-seeking may even hinder the generation of futures visions. Not only is this examination of alternative futures or scenarios valuable as such, but it can also reveal underlying aspects, which would otherwise remain hidden from plain view. By striving for unified views, we may lose valuable information, which could be used to increase resilience, or as Bishop et al. (2007) argue to be better prepared for the future. Understanding that there are intricacies in alternative presentations of the future may also be useful in avoiding the caveats of policymaking, which have been mentioned by e.g., Varum and Melo (2010).

We used a mixed-methods approach and were aware of the potential problems raised by Tapio (2003) in mixing numerical and qualitative data in Delphi. Our findings stemming from the numerical cluster analysis and the qualitative data analysis were complementary and the formation of the scenarios was relatively seamless. The caveats raised by Tapio (2003) were avoided by carefully formulating the questionnaire and by treating both numerical and qualitative datasets equally. Analysing qualitative data cluster-specifically made the analysis less prone to imbalance. Each cluster was perceived as having a distinctive view of the future armed with a coherent inner logic. An apparent exception is the Mismatch scenario, where active commuting would decrease a little,

while overall active travel would increase a little. This mismatch (*sic*!) might be explained with an increase in active travel on leisure time. However, internal inconsistency can also emerge if panellists do not consider their answer as a holistic image of the future but answer the questions one by one.

'Almost roundless' real-time Delphi has its pros and cons. A benefit relative to traditional multiple rounds inquiry is the opportunity for instant communication, as each panellist can always see the cumulative set of responses and arguments and may come back to change own answers and provide more in-depth counterarguments. However, the Delphi manager cannot analyse the material as one can in the multiple-round approach. Although it is beyond the resources for this study, it would be interesting to include another Delphi round, where each scenario would be transformed into numerical arguments to be re-evaluated by the experts. The results combined with cross-impact analysis (Gordon & Hayward, 1968) and fuzzy cognitive modelling (Panula-Ontto, 2019), might potentially be used to model the impacts of scenarios, which could be valuable in policymaking. This kind of cumulative approach of multiple rounds of 'roundless' real-time Delphis might be a relevant future option for in-depth studies.

As explained in the methodology section, an individual respondent's answer always contained estimates of the probable future and views about a realistic desirable future. In the cluster analysis, we treated these as separate units of analysis. Cluster 2 representing the Empowerment scenario included only answers on the desirable future, whereas the other clusters contained answers for both probable and desirable futures. The obvious question rises whether probable and desirable futures can or should be mixed this way and can they be in the same scenarios? We would answer they can, since the numeric responses contain exactly same variables and different values for the variables represent different states of the variable in the future. Whether this estimate is from a probable future image or desirable future image, is irrelevant from the point of view of building the scenario. However, from the perspective of interpreting the results it is very relevant to keep in mind, how many answers of the probable and desirable future were grouped in each cluster.

In terms of the content, our experts deliberated also on the increasing potential of green urban areas, local forests or nature trails as locations for PA. Further analysis could be done; for example, in examining how PA and nature-based locations are intertwined with the notions of experiences, sensations or thrill seeking. The concept of experiencescape (O'Dell & Biling, 2005), which examines experiences as an interplay between place, culture, identity, politics, and power could be one way of deepening our knowledge on the role nature-based locations could have in PA promotion. We would also recommend further exploration of the relationship between PA, active travel and car-centred planning and underline the need for deeper collaboration in governance. Our findings indicate that these are interconnected, and a more profound understanding of the interlinkages could benefit the promotion of both PA and walking and cycling in urban areas. The new mobilities paradigm (Sheller & Urry, 2006), often utilised in transport sociology, could offer a fruitful lens through which the complexities of PA and car-centred urban structure could be examined.

This research tackles PA mainly among adults in general, although some parts of this research mapped PA promotion among children and teenagers. Therefore, this article may be of interest to those involved in PA promotion among adults, children, and adolescents. Senior citizens were left out of the scope of this research.

6. Conclusions

We now return to the premise set out at the beginning of this article, where we argued that although PA and active travel have received a lot of attention per se, there is a lack of an integrated perspective. Bringing these two distinct topics together has been in our view an invaluable exercise and the experts seem to agree that active travel certainly has the potential as a means to integrate PA into everyday lives. Even if we need changes in individuals' lifestyles, this does require changes to the institutions of urban transport planning and funding schemes, and a less car-centred focus, where active travel is treated as an equally valuable and normal means of transport.

All in all, there seems to be a clear need to increase cross-sectoral cooperation and to bring different sectors and experts together. The lack of cooperation was rather strongly emphasized by the experts as being one of the main structural issues in current decision-making. In our scenarios, siloed thinking was especially pronounced in the Fatigue and Mismatch scenarios, whereas especially the Balance scenario with its wellbeing cooperation units, is an example of what could happen if collaboration would be wide and deep across sectors and different levels of governance. Also, the Empowerment scenario introduces us to a future where the cooperation between urban planners and the health sector has resulted in urban areas, which focus first and foremost on making walking and cycling a normalised mode of accessing various services while simultaneously supporting physically active everyday lives.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.futures.2022.103036.

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