Psychological Topics, 33 (2024), 1, 91-114
Original Scientific Paper UDC: 159.922.8.072(485):796.035
https://doi.org/10.31820/pt.33.1.5 004.738.5:796.035-053.6

An Exploration of Swedish Adolescents' Experiences of Mobile Apps for Physical Activity

Angelica Olander[1], Jenny Wilhelmsson[1], Paul A. Davis[1], Lúcia Gomes[2,3], Hugo V. Pereira[2,3], Diogo S. Teixeira[2,3], and Markus B. T. Nyström[4]

[1] Department of Psychology, Umeå University, Umeå, Sweden
[2] Faculty of Physical Education and Sport, Lusófona University, Lisbon, Portugal
[3] Research Center in Sport, Physical Education, and Exercise and Health (CIDEFES), Lisbon, Portugal
[4] Psychology, Department of Health, Learning and Technology, Luleå University of Technology, Luleå, Sweden

Abstract

Recent reports on children and adolescents' physical activity indicate that approximately 80% do not meet the World Health Organisation's recommended levels of physical activity. Childhood is a critical period of development; as such, it is important to prioritize health promotion in this phase of one's life. Use of gamification in mobile apps has been shown to positively influence physical activity levels in children and adolescents. Inclusion of behaviour change techniques (BCTs) has been noted to increase the effect of health promoting interventions. Previous research highlights that children and adolescents find the BCTs of goal setting/planning, feedback, reward, self-monitoring, social comparison, and social support to be of interest. The aim of this study was to explore Swedish adolescents' experience with physical activity and apps with a focus on the influence of BCTs. Three focus group interviews were undertaken with a total of 18 participants (11-15 years of age). The data were explored using reflective thematic analysis. In addition to the BCTs identified in previous research, participants in the present study indicated they were positive about mobile apps providing instruction on how to perform a behaviour, demonstration of the behaviour, and the influence of removal of reward. Other attractive features of physical activities apps included developing a streak, competition, and provision of an adequate level of challenge. The present study contributes to a deeper understanding of how BCTs and other features can be implemented in physical activity apps, where individualization and renewal appear to be more important than the actual content features. These findings are important for future work to create interventions that increase the level of physical activity among adolescents both in Sweden and other countries.

Keywords: children, youth, health promotion, behaviour change techniques, exercise

Paul A. Davis https://orcid.org/0000-0002-1807-7837
Lúcia Gomes https://orcid.org/0000-0002-3281-2877
Hugo V. Pereira https://orcid.org/0000-0001-5710-524X
Diogo S. Teixeira https://orcid.org/0000-0003-4587-5903
Markus B. T. Nyström https://orcid.org/0000-0002-0536-2890

✉ Markus B. T. Nyström, Department of Health, Education and Technology, Luleå University of Technology, Laboratorievägen 14, SE-971 87, Luleå, Sweden. E-mail: *markus.nystrom@ltu.se*

Introduction

Regular physical activity (PA) offers many notable positive benefits for health and well-being (World Health Organization [WHO], 2020). PA during childhood and adolescence affects PA levels in adulthood (OECD & European Union, 2020); as such children and adolescents are a particularly important target group for health promotion (Kumar et al., 2015). Moreover, adolescents undergo a critical period of rapid physical, emotional, cognitive, and social development with implications across the subsequent lifespan (Steinberg & Morris, 2001). Adolescents can also be exposed to behavioural risk factors that can establish habits that carry over into adulthood (Stice & Whitenton, 2002). Research indicates that half of mental health problems in adulthood emerge in early adolescence, therefore, it is important to engage in health promotion with this target group (Inchley et al., 2020).

WHO (2020) recommendations outline that children and adolescents (5-17 years of age) should engage in at least 60 minutes of moderate to vigorous intensity PA per day. In addition, high-intensity PA and musculoskeletal strengthening activities are recommended at least three days a week. Despite recommendations and knowledge of the health benefits of PA, global figures show that 81% of children and adolescents aged 11-17 do not reach the recommended levels (Guthold et al., 2020). In most European Union (EU) countries, PA levels have decreased drastically in the 11-15 age group (Van Hecke et al., 2016), and there is a downward trend with a decrease in PA between 2006 and 2018 (OECD & European Union, 2020). As such, the development and improvement of interventions to promote motivation for behaviour change in PA in children and adolescents is warranted.

One of the most researched approaches to motivation is self-determination theory (SDT; Ryan & Deci, 2000). SDT suggests that people have three basic psychological needs: Autonomy, Competence, and Relatedness, that influence their motivation. Satisfaction of basic psychological needs in the context of PA has been found to promote autonomous motivation and well-being (Teixeira et al., 2018). SDT describes adolescents' motivation for PA across a spectrum with varying degrees of self-determination categorized into either controlled (i.e., external and introjected regulation) or autonomous (i.e., intrinsic, integrated and identified; Owen et al., 2014). Research indicates that adolescents' psychological need satisfaction and intrinsic motivation are positively associated with objectively measured PA (Kalajas-Tilga et al., 2020).

Studies examining levels of adolescent PA in Sweden indicate that most Swedish adolescents do not reach PA recommendations (Nyberg et al., 2020) and innovative approaches to increase physical activity are urgently needed. Figures show that 76-93% of Swedish children and adolescents between 11 and 16 years of age play games on their mobile phones (Davidsson & Thoresson, 2017); as such, game-based apps offer a modality for reaching this target group. Gamified apps

have been shown to have a positive effect on PA for both young people and adults, including increased number of steps and time spent exercising (Daryabeygi Khotbehsara et al., 2021; He et al., 2021; Mazeas et al., 2022). A meta-analysis by Baumann et al. (2022) showed that apps can reduce the degree of insufficient PA in children and adolescents, especially apps that have a high degree of individualization (i.e., adaptation to the individual needs and developmental level). Pokémon Go is a popular gamified app that, in addition to positive effects on PA, has been shown to reach a wider population compared to other apps focusing on health promotion (Lee et al., 2021).

In addition to an increase in PA, gamified apps have been shown to have a positive impact on motivation as well as wider psychological and social well-being (Joronen et al., 2017; Lee et al., 2021; Mazeas et al., 2022). Despite these positive results, there are also studies that highlight varying results where no significant effects, or negative effects, have been observed; long-term effects of mobile apps for health promotion are noted to be limited (Böhm et al., 2019; Wang et al., 2022; Winand et al., 2022; Xu et al., 2022).

The varying findings may be a result of difficulties in evaluating effective mechanisms of interventions and their impact; specifically, Michie et al. (2015) argue that interventions are often complex with many constituent interacting components. In addition, there is often heterogeneity in studies in terms of type of intervention, outcome measures, and effect size; collectively this makes it difficult to compare and draw conclusions across the research (Michie et al., 2015). To facilitate the evaluation of interventions, Abraham and Michie (2008) developed a taxonomy of different behaviour change techniques (BCT). A BCT can be defined as an "observable and replicable component designed to change behaviour" (Michie, 2015, p. 2). The taxonomy forwarded by Abraham and Michie includes a total of 93 BCTs; comprehension of the underlying mechanisms of these BCTs can be increased by linking them to existing theories of behaviour change (e.g., SDT). In doing so, the understanding of the behaviour and factors that influence behaviours is deepened; in turn this can contribute to the development of more effective interventions that are tailored to the application of those that are relevant for the target population.

BCTs can be applied in multiple contexts, such as integration into apps to promote PA (Brannon & Cushing, 2015). Goal setting, planning, feedback, reward, self-observation, social comparison, and social support are BCTs that children and adolescents have identified as interesting, attractive, and motivating (Baumann et al., 2022; Daryabeygi-Khotbehsara et al., 2021; Domin et al., 2022; Schoeppe et al., 2017). Schoeppe et al. (2017) examined the effect of BCT on app quality and observed that the number of BCTs correlates positively with app quality. This highlights that the integration of BCTs into PA apps targeting children and adolescents is warranted. There are also indications that a range of BCTs can have varying effects across age groups, as such strategic use of specific BCTs should be

based on the characteristics of the target group (Brannon & Cushing, 2015).

Taken collectively, the research on BCTs and PA in adolescence indicates that further examination of individual and cultural characteristics in the design of PA apps is warranted. Therefore, the aim of the present study was to explore Swedish adolescents' (11-15 years of age) experiences and preferences in the use of mobile apps promoting PA. In particular, using focus groups, adolescents' perceptions of BCTs including goal setting/planning, feedback, reward, self-observation, social comparison and social support were examined. Additionally, this study explored adolescents' interest and evaluation of other features in PA apps and how/if they were perceived to influence motivation to engage in PA.

Methods

Participants

The target population for this study was adolescents between 11 and 15 years of age. No exclusion criteria were used regarding mobile phone use or level of physical activity. The participants were recruited during November and December 2022. Initially, advertisements were published on Facebook to reach as many potential participants as possible. The ad was published in two general Facebook groups related to Umeå (*Händer i Umeå* and *Tips mm Umeå*) with a total of 17 000 members. No people responded to these ads, so a convenience sample was used where participants were sought through friends and acquaintances. Parents were primarily contacted as their consent was needed for participation in the study. A total of 18 participants were recruited (see Table 1 for descriptives of participants).

Table 1

Demographic Information About the Participants

Focus Group	1	2	3	Total
Gender: male/female (*n*)	3/6	2/3	0/4	5/13
Age: *M* (min/max)	13.0 (11/14)	13.8 (13/15)	11.3 (11/12)	12.8 (11/15)
Estimated app usage: hours per day *M* (*SD*)	2.5 (0.7)	2.6 (1.6)	1.0 (0.6)	2.2 (1.3)
Use PA-apps at least once per week: yes/no (*n*)	5/4	3/2	3/1	11/7
Physically active at least 60 minutes per day: yes/no (*n*)[a]	6/3	4/1	4/0	14/4[b]

Note. [a] WHO recommended amount. [b] the four people who answered "no" were partially physically active.

Procedure

A total of three focus groups, lasting 60-75 minutes, were conducted in Swedish between November and December 2022. Each focus group was video, and audio recorded as well as moderated by the first two authors of this study. Using Krueger and Casey's (2015) structure of questions and format for focus groups, each data collection began with an introduction of the moderators, as well as an outline of the aim of the study and the rules of the discussion. Upon clarification of any questions, the discussion began with an opening round where participants introduced themselves by name, age, favourite sport/PA, and whether they think PA is important. The discussion then proceeded with questions aimed at introducing the topic of interest and eliciting the participants' thoughts about it. Moderators guided the discussion to consider which apps are popular in their age group prior to transitioning to an in-depth discussion about participants' experiences and preferences regarding PA, apps in general, and PA apps. To support and encourage further discussion, prompt material (e.g., screenshots of app) was presented with graphical examples of different features and appearance of apps (e.g., Pokémon GO, my personal workout). The central questions comprising the interview guide were based on previous research that identified BCTs in PA apps for children and adolescents. Participants discussed their experiences, attitudes, and preferences regarding these BCTs (see Appendix). Finally, in closing, the discussion was summarized, and participants were asked to offer their final reflections.

Ethical Considerations

The study's protocol was reviewed and approved by the institution's internal review process and undertaken in consideration of the Swedish Research Council's guidelines for good research practice (Swedish Research Council, 2017). The participants and guardians received written information about the study, the purpose of the focus groups and the anonymous treatment of individual data. They were also informed that participation was voluntary and that they could withdraw at any time without consequences. Guardians as well as participants provided written consent prior to participating in the focus groups.

Data Analysis

Audio recordings of the focus groups were transcribed verbatim, and the video was referred to when specific speakers needed to be identified, to make sure that the transcribers were considering the same observations when they were coding the material. In this study, reflexive thematic analysis was used by the first two authors undertaking the data analysis. Data were coded and interpreted latently to create a deeper understanding. The analysis had an inductive approach, and the

method was mainly based on the six steps described by Braun and Clarke (2022), to be rigorous and systematic to identify recurring patterns. The first step in the analysis process was to create an overview and familiarity with the data. The transcribed material was independently read three times and initial observations were noted. When similar observations were noted, initial codes were created. Based on these codes and the study's aims, sub-questions were created in accordance with Magnusson and Marecek's analysis method (2015) to facilitate further analysis.

In the next step, the transcribed material was read through jointly based on one sub-question at a time and quotes were cut out and saved in a master document. A commentary was then made to the excerpts to condense the data into more manageable units. Upon completion of this step, the master document contained 268 excerpts divided into 14 sub-questions. The next step of analysis consisted of creating potential themes to create a broader pattern of meaning and increase the level of abstraction. This step was inspired by the classical analysis method described by Krueger and Casey (2015) where all excerpts were printed and sorted into piles based on shared meanings or conceptual cohesion. In the next step, each theme was reviewed and refined through a back-and-forth process. Themes were split, combined, or discarded based on discussions between the two authors. The purpose of this phase was to ensure that the themes were data-driven, relevant to the research question, and contained sufficient meaningful data. At the end of this process, when the authors had ensured that each theme had clear boundaries, a common thread that captured unique concepts were named. Finally, a reflexive description was created under each theme that weaves together the analysis with evidence from the data and the context of the data, reinforced by quotes. This process aims to pull together the analysis of data as well as have it validated and confirmed. In writing up the study, the themes, subthemes, and quotes were translated into English by two of the authors and two additional authors reviewed the translations to ensure clarity and preserve their original meaning.

Reflexivity

In reflexive thematic analysis, subjectivity is not considered an obstacle or something that should be discouraged, but rather an asset in research and essential for good quality analysis (Braun & Clarke, 2022). The authors have a background in sport and exercise psychology and have experience in reflecting and investigating the latent meaning of individuals' experiences in this context. They have continuously reflected on how their previous experiences and the context may have influenced the results of the study.

Results and Discussion

The aim of the study was to explore Swedish adolescents' experiences and preferences in the use of mobile apps promoting PA. This provided an understanding of which BCTs, and other features are perceived as motivating and how they can be implemented in a PA app. Four themes were identified in the study, a summary is presented in Table 2.

Table 2

Summary of Themes and Sub-Themes

Theme	Sub-Themes
Engagement Promotion	Renewal Competition Streak
Individualization	Self-selected goals Feedback Reminders Rewards Social Interaction
Social aspects	Social support Social Comparison
App-individual alignment	Cheating Barriers to physical activity Planning, reminders, and punishment Appropriate challenge Education

Theme 1: Engagement Promotion

1. A. Renewal

A recurring theme across focus groups (FG) was a desire for variety and renewal. Participants talked about renewal being necessary for them to be interested and continue with an activity or an app, "If the app never changes, you will get tired and then you will delete it." – FG 1. It emerged that renewal in apps can take the form of new updates, game worlds and levels. It can also involve varying rewards and reminders and different forms of training exercises. "It shouldn't be too boring and the same thing all the time, so it's good to have different worlds, be able to change your avatar and stuff like that" – FG 3. When there is a lack of variety, participants described that they get bored and immediately look for a new activity.

1. B. Competition

Competition was noted to increase motivation for PA and app use among participants. It also strengthens and promotes social interaction, "There is more pep in a competition, like in the family and so on. Then you create a connection." – FG 1. A specific attractive feature was a list of results to be able to compare and beat own or others' records. Despite the predominantly positive image of competition, there was a risk that the comparison could lead to negative outcomes, "But you can also spit on each other, 'damn, you're moving too little' " – FG 2. Competition engaged participants and was mostly perceived positively, yet when related to social comparison (theme 3.B) it could turn negative.

1. C. "Streak"

A *streak* is an uninterrupted recurrence of daily activity that strengthens the motivation to repeat and maintain activity. This feature was appreciated by participants in all focus groups, "I tend to use apps more if it has a log-in streak [feature] because then I am enticed to go in and do my log-in and then I play more." – FG 3. Participants talked about how streaks can provide rewards in the form of money and in-game items or maintaining social contact. They also said that streaks in themselves are rewarding. On the other hand, this can lead to an addiction that contributes to increased stress and feelings of hopelessness and lack of motivation if the streak is broken, "So I get kind of stressed! Every day I snap in the morning and then I get stressed the next morning because I have to like... I can't lose my 300 days or whatever I have." – FG 2. Streaks are thus a strong motivating factor, but only on condition that it is maintained, otherwise it has the opposite effect.

Collectively, renewal, competition, and streaks were central features that participants described as desirable. These features are perceived as rewarding in apps and thus can induce increased levels of engagement (Mouchabac et al., 2021), which is an important part of motivation and has been linked with PA behaviour (Ruiz-Tejada et al., 2022). However, somewhat concerning were participants' descriptions of uncontrolled "addiction" to engage with the apps and maintain a streak, for example. The "dark side" of gamification has been noted in recent reviews of health and fitness tracking devices extending into PA apps (Arora & Razavian, 2021). The strong drive for app use noted with the participants in this study may relate with satisfaction of basic psychological needs (Ryan & Deci, 2017). Specifically, research has shown psychological needs can be satisfied more often, easier, and faster in apps than in real life (Jeno et al., 2022). Engagement promotion through the satisfaction of psychological needs in a PA app can increase attractiveness and may promote PA; however, using gamification to tap these mechanisms requires careful consideration (Kim & Werbach, 2016).

Theme 2: Individualization

2. A. Self-Selected Goals

When discussing goal setting, participants noted dramatic differences in preferences. For example, one goal that motivates a person can be a trigger for another, "You can also do something like, 'if you burn so many calories you get so many points in a week'. That's what I think can be triggering, like 'you lost so many [calories]', then you might be like 'now I have to lose more calories to get points' and you just think about that." – focus group (FG) 1. Therefore, participants suggested options for the type of goal such as weight/calories, minutes of activity or number of steps. Furthermore, it was discussed that goals should be individualized to adapt the level of challenge, "Everyone is different. So, I may not like what someone else likes and then it becomes very limited for me. Then I might choose not to download the app." – FG 2. Individual goal setting contributes to individuals' perceptions that the goal was relevant and was highlighted as a prerequisite for other functions to be appreciated.

2. B. Feedback

When discussing what type of feedback is perceived as motivating and helpful for self-monitoring, it emerged that the most important thing is that it feels relevant to one's goal. There were requests for individualized feedback, where some suggestions were number of steps, number of calories, minutes of activity and sleep:

> [When discussing self-monitoring] You can choose the same with weight and height. The school nurse has one of those [graphs] between the years how much you have gained in weight and height. For some people, weight is a trigger, so you can opt out, so not everyone has to have it. – You can choose a little, what you like and what you don't. – FG 1.

Other forms of feedback suggested were "likes" and comments from friends, or notifications from apps. Participants wanted a statistical overview to check how they were doing against their goals or recommended activity level to evaluate and adjust their activity:

> I think it's really good to see the difference [in the app] if I've walked this much per day and then I can see how it has increased. On Sunday I did this much and then it increased on Monday and then again on Thursday and then it decreased on Wednesday. Such things are easy to see and understand. – FG 1.

2. C. Reminders

Participants talked about how they appreciate receiving reminders regarding PA, recovery, diet, and if they are losing a streak. For the reminders to be relevant,

they need to be related to the individual's goals. Based on previous experiences, participants talked about the stress and irritation that arises when reminders and notifications come too often. "[When discussing reminders] But not too much because there is an app that gives me notifications. Every day I get 20 notifications and it's quite annoying, eventually you delete the app if you get too many notifications." – FG 3. For the reminder to arrive at appropriate times and allow for preparation, participants suggested a setting for timing, frequency, and content. Through this customization they believed that the reminders would be more relevant, and the risk of dismissal would be reduced.

2. D. Rewards

Participants felt that motivation to reach a goal and to be physically active increases if it leads to a reward. They expressed that the reward should be proportionate to the challenge. The type of reward appreciated varied according to interests, "[When discussing rewards in apps]. I'm not interested in rewards in games but rather discount codes in different places, clothing stores and things that you buy. (...)" – FG 1. As well as gender and age:

> I think it would have motivated older people as well because Roblox is a bit more like… no one I know at my age plays it, only at younger ages. Then you might not feel any motivation. But there may be different rewards for different ages. You enter your age in the app. In our age we might appreciate a discount code more. – FG 1.

It was noted that there were two types of rewards that were appreciated, these were related either to 'the real world' or game play: physical rewards in the form of gift cards/discount codes, sweets, or scratch cards; and rewards in apps such as encouraging notes, points, or new features/game worlds. Finally, it was also highlighted that reaching your goals can be rewarding and self-reinforcing.

2. E. Social Interaction

The social drive was central in all discussions and is described in more detail in theme 3. Individual preferences also emerged regarding social interaction; for example, consideration of how and with whom one interacts in a PA app is important. Some wanted private accounts while others wanted to be able to be friends, communicate, and interact with other people's content.

> You should be able to choose. Because some people may want to inspire others, or get tips, and don't really care about what people think of them. Some may want it to be more private and look at other people's tips and stuff like that. – FG 1.

Different opinions also emerged regarding with whom one would prefer to compete or play with or against friends/family, strangers, or an internet bot:

> You can choose: I only want to meet friends, I only want to meet people from my country or the whole world. Then, if it's a Spanish person, you can try to speak English or say "hey, I don't understand your language, here you get a sandwich, high-five let's go" (...) You can have a setting where you can choose to be a little more anonymous or a little less anonymous. – FG 3.

Analysis of participants' reports indicate the BCT of individualization is a necessity for user engagement. This is in line with previous research that has shown that individualized design can be a moderating factor that enhances the effect of BCTs (Michie et al., 2015), and a lack of individualization is one of the biggest barriers to changing health behaviour (Baumann et al., 2022). This desire to make choices can be interpreted as a need for autonomy, which can lead to increased motivation that promotes adolescents' engagement and persistence in sport (Ryan & Deci, 2017).

Age-specific preferences were noted across the focus groups and can underpin the desire for individualization. Younger participants reported individualization should not be 'adult-like', whilst older participants wanted more reality-based BCTs and did not want apps to be 'childish'. This is in line with previous research highlighting the importance of adapting apps to the developmental level (Baumann et al., 2022; Brannon & Cushing, 2015; Schoeppe et al., 2017). In addition, features in apps can have different functional meanings depending on the individual's experience. They can either be interpreted as controlling, leading to a reduced sense of autonomy, or seen as informative, confirming, and enhancing of autonomy and competence (Ryan & Deci, 2017). This may be an explanation for the study's results with a wide range of content preferences.

Theme 3: Social Aspects

3. A. Social Support

Participants described that an important driver for PA and app use is having a context where they can socialize, meet new friends, and share their everyday life. It emerged that they are highly influenced by their friends' choices and participation. Social cohesion was considered more important than performance and interest in an activity, "It's often the social cohesion you have within the team and your friends and that's what's most important. Then it doesn't matter if I score the most goals or if I run the most, it's more about the cohesion." – FG 1. Participants appreciated receiving support in the form of 'likes' and encouraging comments and described the importance of a supportive social climate to thrive and not feel lonely, "I used to play volleyball and football, but I started to find it quite boring because I didn't really have any friends. I only had one." – FG 1. Social support, or lack of it, appears to be a crucial factor in starting or quitting an activity or app.

3. B. Social Comparison

Participants talked about how motivation and inspiration for PA can increase when they see what and how others perform activities and by comparing themselves to others. One form of social comparison that participants mentioned is competition (see theme 1.B). They also talked about comparisons via social media,

> You can find inspiration from others if you see how they do it. On social media, like TikTok, you can get motivation from them. For example, if they post their workout or something. Then if you don't have motivation to go it can give you motivation. – FG 1.

However, a contradictory picture of social comparison emerged, as it can also lead to feelings of inadequacy, stress, negative behavioural patterns such as overtraining and unhealthy eating habits:

> In society, it's very much that you may not go to the gym just for yourself. You care very much about what others think and feel about your body or what you do in your spare time or things like that. For example, that you go to this workout even though you really don't feel like it, just because you think that "oh then maybe no one will comment on me tomorrow". It can lead to huge problems with food and that you can exert yourself too much at the gym (...) it can be good that you are encouraged to go there, but it can also lead to bad things. – FG 1.

The participants in this study talked about the social driver as one of the most important factors in motivating PA and app use. Social comparison and social support were seen as a source of inspiration and were considered more important than both performance and interest in an activity. In addition to these positive consequences, negative consequences of social comparison emerged that have the potential to affect the level of PA. Social comparison was described as contributing to an experience of evaluation where the individual is guided by the opinions of others, which, according to Ryan and Deci (2017), can lead to controlled motivation. This study shows that adolescents experience controlled motivation in the form of pressure to exercise to achieve an ideal of thinness and avoid negative evaluation. Individuals can also experience a form of internal evaluation that leads to pressure to perform to prove their value to themselves and others. A negative self-evaluation can promote PA behaviours, however, negative cognitions can diminish well-being and impair perceptions of exercise (Thøgersen-Ntoumani & Ntoumanis, 2006).

The psychological need of relatedness can be satisfied through interactions with other people in apps as well as internet bots (Luo et al., 2021). A lack of relatedness in real life can lead to adolescents dropping out of a sport or not even starting (Ryan & Deci, 2017). Satisfying the need for relatedness in a PA app may

increase the likelihood of more adolescents becoming physically active (Holt et al., 2019). There are clear benefits of interacting with other people, as it can increase the sense of relatedness, but it should also be considered that it can result in an undesirable comparison which can create an opposite effect, (i.e., a diminished sense of relatedness).

Theme 4: App-Individual Alignment

4. A. Cheating

The participants problematized PA apps as they saw a potential risk of cheating to gain an advantage within the app. The risk was perceived to be greater if there was a motivating reward. They discussed various ways to prevent the risk of cheating through, among other things, movement registration, but at the same time saw opportunities to cheat despite this, "Because there may be people who, well I don't know, travel in cars or as you say, maybe stomp like 100 times and then they get a reward. It feels like… then you have cheated." – FG 2. It was also discussed that there is a risk that app users report an activity that has not been performed or dismiss reminders without performing the planned activity, "It will also be strange if I have to tick 'I have walked 10,000 steps', because I can just as well sit in bed and tick and get a lot of rewards." – FG 2. To counteract this, participants suggested evidence such as pictures or videos of their exercise, diet, and rest:

> If someone has difficulty with food and exercises a lot, it can be good to take a picture when you do certain things before the notification can be removed, that it sticks (...) then it will be all over the screen that you have to take a picture, "here is the food" or when you exercise, as proof. Like Ryde [rental e-scooter] when you return it, that you haven't broken it. – FG 1.

The participants were aware that cheating can never be completely prevented but considered it important to minimize the risk so as not to negatively affect the relationship with the app and thus reduce motivation to use it.

4. B. Barriers to Physical Activity

Based on their previous experiences, participants talked about possible barriers that could affect their use of a PA app. They mentioned technical barriers such as lack of internet connection, "It's such a shame that you need an internet connection. Like Pokémon Go, I want to do it but at the same time I don't want to waste my internet [quota]" – FG 2, or a breakage of accessories such as fitness trackers or lack of exercise equipment, "You have a wristband linked to the app and mine broke so it was really hard to wear it on your arm because it would always sort of come off and so on, so I gave up." – FG 2.

They also mentioned that it is inconvenient to have to bring their mobile phone to register their activity and that the mobile phone's other functions and apps

can interfere and take attention away from PA:

> I don't know if this is possible but if the app had automatically turned on "do not disturb" or a reminder to turn on "do not disturb". If you get a notification that someone has posted this or someone snaps you, you want to open it immediately, if it's someone special. But you don't want to open it, you want to stay in your bubble, it can be very disturbing. – FG 1.

The above-mentioned barriers can limit the use of a PA app. Designing apps with features that do not require internet connection, accessories or specific exercise equipment will allow for increased use by a wider population.

4. C. Planning, Reminders, and Punishment

It emerged that planning plays an important role by increasing motivation, minimizing practical obstacles, and ensuring rest days. Planning should be specific and include day, time and activity but also allow for spontaneous exercise:

> I had difficulties with my friend, we were going to start working out together, but she has a boyfriend so she might be with him when I ask, so it's better to plan and set goals. Monday, Wednesday, and Friday are the three days we go, so you can plan in advance with a ride or something. – FG 1.

For the planned activities to take place, reminders were an appreciated feature and a good memory aid. However, the participants mentioned that there is a risk that they dismiss the reminder without performing the activity if there is no consequence. As previously mentioned, reward was considered a motivating factor, but it was also found that punishment can be motivating to maintain a desirable behaviour. Different types of punishment were discussed, such as reduction of points, ending a streak, or not being able to use the phone until the activity is completed:

> Usually when a notification comes up, it doesn't bother you, you can just dismiss it, even if it comes up again and again, it's just in the top corner. But if you make the notification all over the screen, you can't do anything. Either you have to stop using your mobile phone, and I don't think anyone wants to do that, or you have to start doing it [the workout]. Then you can set a time that "at seven o'clock I'm usually free", then I can schedule the work out sessions. – FG 1.

Planning and reminders are important components for increasing the likelihood of completion of exercise; participants said that habits become more persistent if lack of activity leads to negative consequences.

4. D. Appropriate Challenge

A topic that was repeatedly raised in discussion, although not a focus of the interview guides, was that the degree of difficulty in physical education, leisure

activity, and games in apps must be proportional to one's sense of competence to create motivation. The participants discussed that they want a balance wherein they must engage effort to achieve a goal yet perceive that it was achievable, "If I take dance classes and then we have dance at school, it feels a bit more boring because you might be doing something really easy from YouTube that they have found." – FG 2. In apps, the level of difficulty can be adjusted based on skill level through individualized goals. Another way to ensure an appropriate level of challenge is for the app to evolve in unison with the user; for example, through more difficult challenges and new game worlds in 'levelling up'. This maintains motivation and creates conditions for long-term use.

4. E. Education

Participants in all focus groups suggested that useful information and instructions can help them reach their goals by creating and maintaining motivation for PA. For example, they wanted information on PA recommendations and the effect of a particular exercise, "If you do the exercise, the app can say 'now when you do this exercise, you build up this muscle, if you train this period of time', 'if you do it this way, it will be like this'" – FG 1. They also wanted instructions in the form of short video clips or pictures on how to perform an exercise and which equipment is required. They appreciated getting inspiration for new exercises, "Some may not know how to do push-ups, then there can be a tutorial on how to do them. An old man, like an internet bot, who shows you. Like two to three pictures, you do this, then this, then this." – FG 3. In addition to this, it also emerged that guidance in the form of tips, advice, and comments from other people or from apps was appreciated by participants.

The fact that the participants talked about features such as planning, reminders, information, and instructions as being important can be interpreted as a need for support and help to promote perceptions of competence (Holt et al., 2019). In terms of maturation and development, adolescents do not have fully developed executive functions (Blakemore & Choudhury, 2006) and can thus have difficulty setting reasonable goals, planning, and performing actions.

Other features that emerged as important in PA apps, and can be interpreted as tools for impulse control, are external rewards and punishments. Punishment, in the form of removing rewards, is a BCT that has not played a central role in previous research on PA apps for adolescents. The results of this study clearly show that adolescents are motivated by external rewards and punishments, which can be understood based on Skinner's (1938) theory of operant conditioning. However, Ryan and Deci (2017) argue that there is a problem with this type of controlled motivation. By rewarding a result, or punishing the lack of it, the individual will learn to take the quickest and easiest route to the result. This can lead the individual to choose easy challenges, which reduces perceived competence. It can also lead to a choice of immoral strategies, such as cheating, to reach the goal quickly (Ntoumanis & Standage, 2009). This type of motivation can work well in the short

term but if the goal is long-term physical activity, more autonomous motivation should be promoted (Teixeira et al., 2018).

The participants in this study mentioned a desire for knowledge in the form of instructions and information in a PA app. These are features found in the BCT taxonomy (e.g., Michie et al., 2015) but not identified in previous research as being important for adolescents in PA apps. They also mentioned that the appropriate level of challenge is important to increase motivation. The emergence of these features in the study can be understood as contributing to satisfaction of psychological needs (i.e., competence).

By promoting the experience of competence and autonomy with the help of BCTs (e.g., planning, reminders, instructions, information, reward, and punishment) and the appropriate level of challenge, PA apps can serve as a supportive tool that helps the user to develop over time. In addition, minimizing obstacles and cheating contributes to the app interacting with the individual's unique conditions and increases attractiveness as well as long-term use.

Strengths and Limitations

There are some notable strengths and limitations that should be considered when it comes to the findings of the present study. First, this is a qualitative study with an exploratory approach, one should therefore be cautious about the generalizability of the study's results. Second, the use of convenience sampling in the recruitment of participants could also have had an impact on the findings. The use of this method of recruitment can increase the risk that the sample is not being representative or induce a sampling bias that leads to certain groups being over- or under-represented. However, the narrow objectives and focused aim of the study suggests the recruitment strategy used in the present study can be considered appropriate. Moreover, in exploratory research wherein the population is a difficult-to-recruit population (i.e., young people, where guardians must approve participation) this sampling strategy can promote recruitment. As this study has an explorative approach, focusing on a particular population (i.e., adolescents), a conscious choice was made to use this recruitment method due to the potential advantages outweighing the disadvantages.

Conclusion

The result of this study indicates new knowledge about attractive features in PA apps including streaks, competitions, and appropriate challenge. Participants noted that renewal and individualization were more important than the features themselves. Satisfaction of psychological needs was identified as being important for well-being and long-term PA in adolescents. These findings are important in the creation of interventions to increase the PA level of adolescents. Future research is warranted to explore whether the findings from a Swedish sample can

be replicated across other countries with more diverse socio-economic conditions that can contribute to levels of PA in adolescents.

References

Abraham, C., & Michie, S. (2008). A taxonomy of behavior change techniques used in interventions. *Health Psychology*, *27*(3), 379–387. https://doi.org/10.1037/0278-6133.27.3.379

Arora, C., & Razavian, M. (2021). Ethics of gamification in health and fitness-tracking. *International Journal of Environmental Research and Public Health, 18*(21), Article 11052. https://doi.org/10.3390/ijerph182111052

Baumann, H., Fiedler, J., Wunsch, K., Woll, A., & Wollesen, B. (2022). mHealth interventions to reduce physical inactivity and sedentary behavior in children and adolescents: Systematic review and meta-analysis of randomized controlled trials. *JMIR Mhealth and Uhealth*, *10*(5), Article e35920. https://doi.org/10.2196/35920

Blakemore, S.-J., & Choudhury, S. (2006). Development of the adolescent brain: Implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry*, *47*, 296–312. https://doi.org/10.1111/j.1469-7610.2006.01611.x

Böhm, B., Karwiese, S. D., Böhm, H., & Oberhoffer, R. (2019). Effects of mobile health including wearable activity trackers to increase physical activity outcomes among healthy children and adolescents: Systematic review. *JMIR Mhealth and Uhealth*, *7*(4), Article e8298. https://doi.org/10.2196/mhealth.8298

Brannon, E. E., & Cushing, C. C. (2015). A systematic review: Is there an app for that? Translational science of pediatric behavior change for physical activity and dietary interventions. *Journal of Pediatric Psychology*, *40*(4), 373–384. https://doi.org/10.1093/jpepsy/jsu108

Braun, V., & Clarke, V. (2022). Conceptual and design thinking for thematic analysis. *Qualitative Psychology*, *9*(1), 3–26. https://doi.org/10.1037/qup0000196

Daryabeygi-Khotbehsara, R., Shariful Islam, S. M., Dunstan, D., McVicar, J., Abdelrazek, M., & Maddison, R. (2021). Smartphone-based interventions to reduce sedentary behavior and promote physical activity using integrated dynamic models: Systematic review. *Journal of Medical Internet Research*, *23*(9), Article e26315. https://doi.org/10.2196/26315

Davidsson, P., & Thoresson, A. (2017). *Svenskarna och internet 2017: Undersökning om svenskarnas internetvanor* [Swedes and the internet 2017: Survey on Swedes' internet habits]. IIS, Internetstiftelsen i Sverige. https://internetstiftelsen.se/docs/Svenskarna_och_internet_2017

Domin, A., Ouzzahra, Y., & Vögele, C. (2022). Features and components preferred by adolescents in smartphone apps for the promotion of physical activity: Focus group study. *JMIR Human Factors*, *9*(2), Article e33972. https://doi.org/10.2196/33972

Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2020). Global trends in insufficient physical activity among adolescents: A pooled analysis of 298 population-based surveys with 1·6 million participants. *The Lancet Child & Adolescent Health*, *4*(1), 23–35. https://doi.org/10.1016/S2352-4642(19)30323-2

He, Z., Wu, H., Yu, F., Fu, J., Sun, S., Huang, T., Wang, R., Chen, D., Zhao, G., & Quan, M. (2021). Effects of smartphone-based interventions on physical activity in children and adolescents: Systematic review and meta-analysis. *JMIR Mhealth and Uhealth*, *9*(2), Article e22601. https://doi.org/10.2196/22601

Holt, A. D., Smedegaard, S., Pawlowski, C. S., Skovgaard, T., & Christiansen, L. B. (2019). Pupils' experiences of autonomy, competence and relatedness in 'Move for Well-being in Schools': A physical activity intervention. *European Physical Education Review*, *25*(3), 640–658. https://doi.org/10.1177/1356336X18758353

Inchley, J. C., Stevens, G. W. J. M., Samdal, O., & Currie, D. B. (2020). Enhancing understanding of adolescent health and well-being: The health behaviour in school-aged children study. *Journal of Adolescent Health*, *66*(6), S3–S5. https://doi.org/10.1016/j.jadohealth.2020.03.014

Jeno, L. M., Egelandsdal, K., & Grytnes, J. A. (2022). A qualitative investigation of psychological need-satisfying experiences of a mobile learning application: A Self-Determination Theory approach. *Computers and Education Open*, *3*, Article 100108. https://doi.org/10.1016/j.caeo.2022.100108

Joronen, K., Aikasalo, A., & Suvitie, A. (2017). Nonphysical effects of exergames on child and adolescent well-being: A comprehensive systematic review. *Scandinavian Journal of Caring Sciences*, *31*(3), 449–461. https://doi.org/10.1111/scs.12393

Kalajas-Tilga, H., Koka, A., Hein, V., Tilga, H., & Raudsepp, L. (2020). Motivational processes in physical education and objectively measured physical activity among adolescents. *Journal of Sport and Health Science*, *9*(5), 462–471. https://doi.org/10.1016/j.jshs.2019.06.001

Kim, T. W., & Werbach, K. (2016). More than just a game: Ethical issues in gamification. *Ethics and Information Technology*, *18*(2), 157–173. https://doi.org/10.1007/s10676-016-9401-5

Krueger, R. A., & Casey, M. A. (2015.). *Focus groups: A practical guide for applied research*. (5th edition). Sage Publications.

Kumar, B., Robinson, R., & Till, S. (2015). Physical activity and health in adolescence. *Clinical Medicine*, *15*(3), 267–272. https://doi.org/10.7861%2Fclinmedicine.15-3-267

Lee, J. E., Zeng, N., Oh, Y., Lee, D., & Gao, Z. (2021). Effects of Pokémon GO on physical activity and psychological and social outcomes: A systematic review. *Journal of Clinical Medicine*, *10*(9), Article 1860. https://doi.org/10.3390/jcm10091860

Luo, T. C., Aguilera, A., Lyles, C. R., & Figueroa, C. A. (2021). Promoting physical activity through conversational agents: Mixed methods systematic review. *Journal of Medical Internet Research*, *23*(9), Article e25486. https://doi.org/10.2196/25486

Magnusson, E., & Marecek, J. (2015). *Doing interview-based qualitative research: A learner's guide*. Cambridge University Press. https://doi.org/10.1017/CBO9781107449893

Mazeas, A., Duclos, M., Pereira, B., & Chalabaev, A. (2022). Evaluating the effectiveness of gamification on physical activity: Systematic review and meta-analysis of randomized controlled trials. *Journal of Medical Internet Research*, *24*(1), Article e26779. https://doi.org/10.2196/26779

Michie, S., Wood, C. E., Johnston, M., Abraham, C., Francis, J., & Hardeman, W. (2015). Behaviour change techniques: The development and evaluation of a taxonomic method for reporting and describing behaviour change interventions (a suite of five studies involving consensus methods, randomised controlled trials and analysis of qualitative data). *Health Technology Assessment*, *19*(99). https://www.ncbi.nlm.nih.gov/books/NBK327617/

Mouchabac, S., Maatoug, R., Conejero, I., Adrien, V., Bonnot, O., Millet, B., Ferreri, F., & Bourla, A. (2021). In search of digital dopamine: How apps can motivate depressed patients, a review and conceptual analysis. *Brain Sciences*, *11*(11), Article 1454. https://doi.org/10.3390/brainsci11111454

Ntoumanis, N., & Standage, M. (2009). Morality in sport: A self-determination theory perspective. *Journal of Applied Sport Psychology*, *21*(4), 365–380. https://doi.org/10.1080/10413200903036040

Nyberg, G., Kjellenberg, K., Fröberg, A., & Lindroos, A. K. (2020). A national survey showed low levels of physical activity in a representative sample of Swedish adolescents. *Acta Pædiatrica*, *109*(11), 2342–2353. https://doi.org/10.1111/apa.1525

OECD & European Union. (2020). *Health at a glance: Europe 2020: State of health in the EU cycle*. OECD. https://doi.org/10.1787/82129230-en

Owen, K. B., Smith, J., Lubans, D. R., Ng, J. Y., & Lonsdale, C. (2014). Self-determined motivation and physical activity in children and adolescents: A systematic review and meta-analysis. *Preventive Medicine*, *67*, 270–279. https://doi.org/10.1016/j.ypmed.2014.07.033

Ruiz-Tejada, A., Neisewander, J., & Katsanos, C. S. (2022). Regulation of voluntary physical activity behavior: A review of evidence involving dopaminergic pathways in the brain. *Brain Sciences*, *12*(3), Article 333. https://doi.org/10.3390/brainsci12030333

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Schoeppe, S., Alley, S., Rebar, A. L., Hayman, M., Bray, N. A., Van Lippevelde, W., Gnam, J.-P., Bachert, P., Direito, A, & Vandelanotte, C. (2017). Apps to improve diet, physical activity and sedentary behaviour in children and adolescents: A review of quality, features and behaviour change techniques. *International Journal of Behavioral Nutrition and Physical Activity*, *14*, 1–10. https://doi.org/10.1186/s12966-017-0538-3

Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. Appleton-Century.

Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology*, *52*(1), 83–110. https://doi.org/10.1146/annurev.psych.52.1.83

Stice, E., & Whitenton, K. (2002). Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. *Developmental Psychology*, *38*(5), 669–678. https://doi.org/10.1037//0012-1649.38.5.669

Swedish Research Council. (2017). *Good research practice*. Swedish Research Council. https://www.vr.se/english/analysis/reports/our-reports/2017-08-31-good-research-practice.html

Teixeira, D. S., Marques, M., & Palmeira, A. L. (2018). Associations between affect, basic psychological needs and motivation in physical activity contexts: Systematic review and meta-analysis. *Revista Iberoamericana de Psicología del Ejercicio y el Deporte*, *13*(2), 225–233.

Thøgersen-Ntoumani, C., & Ntoumanis, N. (2006). The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations. *Journal of Sports Sciences*, *24*(4), 393–404. https://doi.org/10.1080/02640410500131670

Van Hecke, L., Loyen, A., Verloigne, M., Van der Ploeg, H. P., Lakerveld, J., Brug, J., De Bourdeaudhuij, I., Ekelund, U., Donnelly, A., Hendriksen, I., & Deforche, B. (2016). Variation in population levels of physical activity in European children and adolescents according to cross-European studies: A systematic literature review within DEDIPAC. *International Journal of Behavioral Nutrition and Physical Activity*, *13*(1), 1–22. https://doi.org/10.1186/s12966-016-0396-4

Wang, S. D., Dzubur, E., Naya, C. H., Mason, T. B., & Dunton, G. F. (2022). Dyadic effects of Pokémon GO on physical activity and sedentary behavior in mothers and children. *International Journal of Exercise Science*, *15*(5), 142–151. https://pubmed.ncbi.nlm.nih.gov/36896453

Winand, M., Ng, A., & Byers, T. (2022). Pokémon "Go" but for how long?: A qualitative analysis of motivation to play and sustainability of physical activity behaviour in young adults using mobile augmented reality. *Managing Sport & Leisure*, *27*(5), 421–438. https://doi.org/10.1080/23750472.2020.1810107

World Health Organization (2020). *WHO guidelines on physical activity and sedentary behaviour*. World Health Organization. https://www.who.int/publications/i/item/9789240015128

Xu, L., Shi, H., Shen, M., Ni, Y., Zhang, X., Pang, Y., Yu, T., Lian, X., Yu, T., Yang, X., & Li, F. (2022). The effects of mHealth-based gamification interventions on participation in physical activity: Systematic review. *JMIR MHealth and UHealth*, *10*(2), Article e27794. https://doi.org/10.2196/27794

Received: June 12, 2023

Appendix

Interview Guide

Opening

Introduction and purpose of the group

Hello!!! Our names are XX and XX and we would like to start by thanking you for taking the time to join us. The focus-group will last about one hour.

This interview is part of a large international project to create an app to increase physical activity among children and young people.

The purpose of our meeting today is to explore your experiences, attitudes and preferences regarding different features and content of a physical activity app. Specifically: (1) what makes apps attractive to you; and (2) what might increase the chances of you using a physical activity app.

We will lead the group discussion by asking you some questions.

In addition, we want you to know that this meeting will be filmed for research purposes. The data collected will be de-identified, so you will be completely anonymous when we analyze the results of the discussion. What is said in this room stays here. You can tell us about what we have talked about but not what individuals have said.

Ground rules

To facilitate our conversation, we want to go through some rules:

- Speak one at a time.
- We would like to hear from each of you, taking turns to share your honest opinions.
- There are no right or wrong answers. Feel free to comment on each other's comments. Don't let the group influence your opinion.
- Avoid side conversations (This means talking to each other, but not to everyone in the group or about the group or about the topic we are discussing).
- Let us know if you need a break, it's okay to walk away to go to the bathroom.
- Do not use your cell phones.
- Do you have any questions?

Introduction

Introduction of participants - Lifestyle - 5 minutes

Before we start, we would like to know a bit about each of you. Please tell us:

- Your name / age
- What is your favorite physical activity or sport?
- Do you think physical activity is important?
  - Why do you think it is important?
  - (Also explore the level of physical activity/exercise - general; specific sports)

Discussion questions (15-20 minutes)

Transition

Experience and expectations

- What are some popular apps that you know people of your age use?
- What kind of physical activity apps are you familiar with?
- Which one(s) do you use? Or have used in the past?
- Why did you start and/or stop using xxxx apps? (According to their answers)
- Which one do you like more and why? (Explore also use/regular use)
- What would be the ideal app to promote physical activity (visual/ functionality/content)?
- What would make you appreciate the app more?
  - What interesting/fun aspects have you seen among the existing apps?
  - What would you expect from a future app?

Main Question

Appreciation and enjoyment (physical activity and app)

- What do you find enjoyable when you think about physical activity?
- What do you like to do most when it comes to physical activity? (School and out of school context)
- What do you find fun when you use an app? (Physical activity app and "regular" app)
- What aspect of an app is important to you? (i.e., design/content/character)
- Which aspect of an app do you like the most? (i.e., design/content/ character)
- What would make you use the app more often? (i.e., content, graphics, character, etc.)

Exploring BCT with the support of trigger materials

Some examples (trigger materials) were selected and will be shown to participants (e.g., Pokémon Go, Desafio de 4 semanas, my personal workout, becoming a champion). Afterwards, participants can share their thoughts and feelings about the presented features of physical activity apps. Considering their usefulness, relevance and likes. Make sure to ask questions related to self-monitoring, feedback, reminders and the best time for reminders, social support, comparison, rewards, other more specific ones like app colors, interface, and fonts (these materials should be presented in a plain and understandable language/way).

Questions for use after showing the materials 30/40 min.

- What do you think and feel about these apps?
- What do you like about these apps?
  - And dislike?
- Is there anything about this that you think would be useful for you?

Goal setting and planning

- In terms of physical activity, what would you like to achieve?
- What kind of goals would you be interested in setting for yourself?
- Do you like the possibility to choose pre-selected activities?
  - Or do you prefer to be able to include your own activities?
  - What would they be?
- Would you like to see a calendar in the app to help you plan your physical activities, a kind of weekly plan?
  - When?
  - What?
  - Where?
  - With whom?
  - Why?
  - How?

Feedback

- What kind of feedback would you like to receive via the app?
- What do you appreciate most?

Social support and comparison

- Social profile and in-app challenges.
- Explore which type of social support, or social comparison is preferred.
- Social profile and in-app challenges.

- With whom do you want to play a physical activity app?
- Do you want a team to play with?

Rewards

- Explore the preferred type of rewards when you reach your goals?
  - How do you feel about getting more qualities/powers?
  - Badges?
  - Personalization?
  - Making characters?
  - Skins?
  - Ranking?

Self-control (plan, control and follow up)

- How do you feel about challenging yourself and mapping your physical activity during a day?

Reminders

- What kind of reminders would work best for you?

Conclusion

Summarize what has emerged and check that the picture is correct.

- Ask if any information has been missed?
- If there is anything to add?