


# Adolescents With Overweight or Obesity: A Qualitative Study of Participation in an Internet-Based Program to Increase Physical Activity

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## Abstract

Adolescents who are overweight or obese are reported to be less active than their peers. Motivation is a critical factor in sustaining physical activity and thereby positive health outcomes. This qualitative study explores how participation in a 12-week Internet-based intervention study, Young & Active, influenced the participants' short-term and long-term motivation to increase and sustain physical activity. The overall purpose of Young & Active was to design, test, and evaluate a health-promoting Internet-based program for use in the school health services in Norway. The program was informed by self-determination theory and motivational interviewing. Two postintervention qualitative research interviews were conducted with 21 adolescents, aged 13 to 14 years, with a 9- to 12-month interval. The adolescents were recruited from a total of 84 participants from the Young & Active study intervention group. Data were analyzed using qualitative content analysis. Self-determination theory was used as a theoretical and explanatory framework. Following the motivational continuum from self-determination theory, all adolescents showed changes in motivation, from extrinsic toward more intrinsic motivation, and for some, a reversal after completing the program. Analysis of the adolescents' utterances formed patterns that could be divided into four main categories: (a) reinforcement of a habit, (b) promotion of competence and enjoyment, (c) boost of temporary change, and (d) reinforcement of adverse habits. An Internet-based intervention may help adolescents increase and sustain physical activity if participation is based on self-choice and if they have sufficient support in their social environments. The intervention alone is not enough to support adolescents who are less motivated or have other challenges in life and may even provoke resistance and reinforce negative health behavior. Such a program may be used together with face-to-face counseling in school health services, provided that it is further refined on a larger scale and that the counseling is performed by qualified health service professionals.

## Keywords

adolescents, overweight, physical activity, health behavior, self-determination theory, motivation, school health

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## Background

The prevalence of overweight and obesity in pediatric population is rising worldwide (World Health Organization, 2016). In Norway, 13% to 17% of children are currently considered to be overweight or obese (Norwegian Institute of Public Health, 2016). Adolescence is a critical period for the onset of

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overweight, obesity, and obesity-associated morbidity later in life (Arteburn, 2007). Research shows a reduction in physical activity (PA) from childhood to adolescence and that youth who are overweight or obese are less active than their peers of normal weight (Olds, Ferrar, Schranz, & Maher, 2011). The potential positive health outcomes of lifestyle changes among adolescents who are overweight are well established (Oude Luttikhuis et al., 2009). The prevailing social discourse regarding how this may be achieved centers upon diet and PA (Rodgers, Wertheim, Damiano, Gregg, & Paxton, 2015). The latter is regarded as a key component for both physical and psychological well-being (Anokye, Trueman, Green, Pavey, & Taylor, 2012; Ortega, Ruiz, Castillo, & Sjörström, 2007). Traditional approaches to health behavior change have focused on providing information and advice, with limited effect. Newer approaches utilizing behavioral change techniques appear to give more positive results. However, the long-term effectiveness of PA interventions targeting adolescents who are overweight or obese remains uncertain (Chaplais, Naughton, Thivel, Courteix, & Greene, 2015).

The theoretical framework for this study is self-determination theory (SDT) and motivational interviewing (MI). SDT is an empirically based macrotheory of human motivation, development, and well-being, which has proven to be particularly useful in understanding and promoting PA behavior (Friederichs, Oenema, Bolman, & Lechner, 2015; Teixeira, Carraca, Markland, Silva, & Ryan, 2012). SDT suggests that all individuals have three basic psychological needs that affect motivation, autonomy, competence, and relatedness. Supporting these needs may promote relatively self-determined types of motivation, greater commitment, and maintenance of behavior (Fortier, Duda, Guerin, & Teixeira, 2012; Kinnafick, Thogersen-Ntoumani, & Duda, 2014; Teixeira et al., 2012).

SDT proposes that motivation is multidimensional. On a continuum, motivation is subdivided into three types, with amotivation and intrinsic motivation at opposite ends, and extrinsic motivation in the middle. Amotivation implies lack of intentionality to engage in an activity. Intrinsic motivation, the most autonomous type of motivation, is characterized by conducting an activity because of its inherent satisfaction. When intrinsically motivated, a person experiences feelings of enjoyment, excitement, and personal accomplishment. Extrinsic motivation reflects motivation to act to achieve outcomes that are separable from the behavior (Ryan & Deci, 2012).

Extrinsic motivation is divided into four subtypes according to degree of internalization and autonomy of motives; from external and introjected regulation of reward contingencies, to identified and integrated

regulation, reflecting internally influenced values and psychological needs. External regulation refers to behavior performed to avoid punishment or to gain reward. Introjected regulation concerns behavior motivated by a sense of obligation or to avoid guilt or disapproval. Identified regulation relates to actions that are based on the value of their consequences or that are coherent with a person's core values, for example, exercising to learn new skills or to attain better health. Integrated regulation refers to actions fully incorporated into the person's repertoire of behaviors that satisfy psychological needs (Ryan & Deci, 2012).

According to SDT, goals and their underlying motives contribute to determine an individual's motivational orientation. Different kinds of motives for participation in exercise relate to different types of intrinsic or extrinsic motivation and may carry different functional significances for exercise behavior (Markland & Ingledew, 2007a).

MI is a form of collaborative conversation, with the aim of strengthening a person's own motivation for change by expressing empathy, supporting self-efficacy, and increasing awareness of discrepancies between goals and actions (Miller & Rollnick, 2013). SDT offers a theoretical rationale for understanding how a supportive counseling style such as MI can promote health behavior change (Markland, Ryan, Tobin, & Rollnick, 2005; Patrick & Williams, 2012; Riiser et al., 2014).

## Aim

Little research has been carried out on the mechanisms behind loss or lack of motivation among some participants in different lifestyle programs (Teixeira et al., 2012). The present research was part of an Internet-based intervention study, *Young & Active*, with the aim of promoting and sustaining self-determined PA among adolescents who were overweight or obese. Our main objective was to explore the adolescents' experiences through participation in *Young & Active*. The purpose was to gain an in-depth understanding of how an Internet-based approach like *Young & Active* influenced their short-term and long-term motivation to increase and sustain PA.

## Methods

This study is based on a descriptive, qualitative approach. We conducted two postintervention semi-structured interviews, with an interval of 9 to 12 months. Content analysis was used to explore the interview-based texts, following recommendations from Graneheim and Lundman (2004) dealing with the manifest, visible, and latent content in the texts. The latter involves relationship aspects and interpretation of

underlying meanings, based on the assumption that all texts have multiple meanings created between the researcher, the participant, and the text (Graneheim, Lindgren, & Lundman, 2017).

### *The Young & Active Intervention Study*

Young & Active, a 12-week Internet-based intervention study, was developed and tested in a controlled trial within the school health service in Norway (Riiser, Londal, Ommundsen, Sundar, & Helseth, 2013). The aim of the intervention was to promote self-determined PA, based on principles from SDT and MI. The target group was adolescents aged 13 to 14 years, with gender and age-adjusted body mass index over 25. A total of 120 adolescents from schools in southeastern Norway were recruited by the school nurse, 84 to the intervention group and 36 to the control group. They were recruited in connection with the recommended screening of height and weight measurements in the eighth grade (The Norwegian Directorate of Health, 2010). The Young & Active intervention included a comprehensive set of strategic elements; establishing self-determined plans and goals for PA, daily registration of PA with graphic feedback of the results, a PA diary, social support in a forum, updated information on PA and nutrition, and weekly, individualized counseling, informed by SDT and MI, on their registrations and their questions related to PA or other health issues. The counseling was provided by one of the researchers, a physical therapist competent in MI (K. R.). Autonomy support was given by exploring the adolescents' own reasons for change, through supporting their goal setting and showing interest in their well-being. Self-report instruments and measurements of cardiorespiratory fitness, height, and weight were completed individually during school hours at three intervals: at baseline, shortly after completion of the intervention, and 12 months after baseline. To our knowledge, this was the first study to investigate the effects of this kind of individually tailored Internet-based intervention. The study is more thoroughly described elsewhere (Riiser, 2015; Riiser et al., 2015).

### *Participants*

A sample of 21 interviewees was selected among the 84 adolescents who were enrolled in the Young & Active intervention group. They were recruited during the testing after completion of the intervention. Recruitment was done either by some of the researchers responsible for the intervention (K. R., K. L.) together with a research assistant (N. Misvær), or by the first author (T. K. B. S.), who took part in some of the testing. We used a strategy of convenience sampling and accepted those who were available in the different districts and

municipalities (Malterud, Siersma, & Guassora, 2016). Seven boys and 14 girls, aged 13 to 14 years, agreed to participate in the interviews. Distribution of gender, weight, and cardiorespiratory fitness among the interviewees followed the main study (Riiser et al., 2015). After the initial round of 21 interviews, we did a review of the data to consider if more informants were needed to obtain sufficient information. (Malterud et al., 2016). We concluded that additional informants were not needed, that new data would only yield redundancy, and that saturation was attained (Polit & Beck, 2017).

### *Ethical Considerations*

Written consent was obtained from all the adolescents and their parents following written and oral information about the study. Anonymity and confidentiality of the audio recordings and the transcripts were secured by using subject identifier codes instead of names. School nurses were notified about the study and were prepared to help those who acknowledged the need for support in cases of personal difficulties.

### *Interview Guide and Data Collection*

The interview questions were based on a semistructured interview guide, seeing interviews as conversations, using main themes as starting points, and following up with open-ended questions, clarifications, and probing (Brinkmann & Kvale, 2018). This allowed us to explore themes, which emerged during data collection. The main questions were developed by the first author (T. K. B. S.) and discussed with the research group (K. L., K. R., P. L., K. G., S. H.) until final approval. Participants in the research group were experienced researchers in qualitative research and analysis and collaborators in the development and completion of the Young & Active study. The first author of this article, who was responsible for conducting the interviews, is an experienced school nurse. She had no relation to the adolescents prior to this study.

The interview guide contained questions about the adolescents' experiences from participation in Young & Active, their thoughts about the Internet-based counseling from the supervisor, and their views on the program as such. There were also questions about participation and involvement in activities and views on health and PA (see online Appendix). The interview guide was pilot tested to ensure that the questions were customized to the age-group. No changes were found necessary. Due to topical focus, some of the themes and data from the interviews are not treated in this article.

The adolescents were interviewed face to face by the first author. The first set of interviews was carried out immediately following the completion of the Young &

Active intervention, between March and June 2013. The second set of interviews was conducted between March and August 2014. Both interviews took place following the postintervention measurements. Interviews were conducted during school hours at the adolescents' schools. Each interview lasted an average of 20 minutes. During the first interview, an agreement for the next interview was made. The first interview was reviewed prior to the second interview and questions were slightly altered to follow up the adolescents' answers from the first interview. There were no dropouts between the first and second interviews.

### Data Analysis

The interviews were audio-recorded and transcribed verbatim by the first author. We analyzed texts relevant to the aim, that is, the adolescents' statements about the program, motivation, goal setting, and change. All statements of similar content were grouped together. Thereafter, the text was condensed through a process of abstraction on a higher logical level with emphasis on descriptions and interpretations and creation of codes, categories, and themes. The units were coded and summarized into generalized descriptions (Graneheim & Lundman, 2004). Transcripts from the first interview were kept separate from the second interview, analyzed independently, and compared. To remain close to the text by assuming an active, reflective role in the interpretation of the participants' accounts, the first author (T. K. B. S.) listened to the audio recordings and read through the texts several times. The coauthors (K. L., K. R., P. L., K. G., S. H.) listened to and independently read four interviews each. During the inductive content analysis, we discovered that the adolescents' statements on motivation and their experiences of the program differed consistently. We then decided to look at the condensed data in light of SDT. Preliminary results on the units of meaning, codes, categories, and main themes were discussed in the group, with all authors present, until consensus was reached.

### Results

Analysis of the interviews showed that the adolescents' experiences with participation in Young & Active reflected movements between different forms of motivation along the motivational continuum as described in SDT and illustrated in Figure 1 (Ryan, Deci, Fowler, Seligman, & Csikszentmihalyi, 2000). Based on their responses, adolescents were classified as fitting into one of four categories: (a) reinforcement of a habit, (b) promotion of competence and enjoyment, (c) boost of temporary change, and (d) reinforcement of adverse habits.

Categories were linked to movements between forms of motivation and regulation. A total of 13 adolescents were distributed between the first two groups and the rest between the last two groups. Quotations from the interviews used in this article are translated into English.

#### *Reinforcement of a Habit*

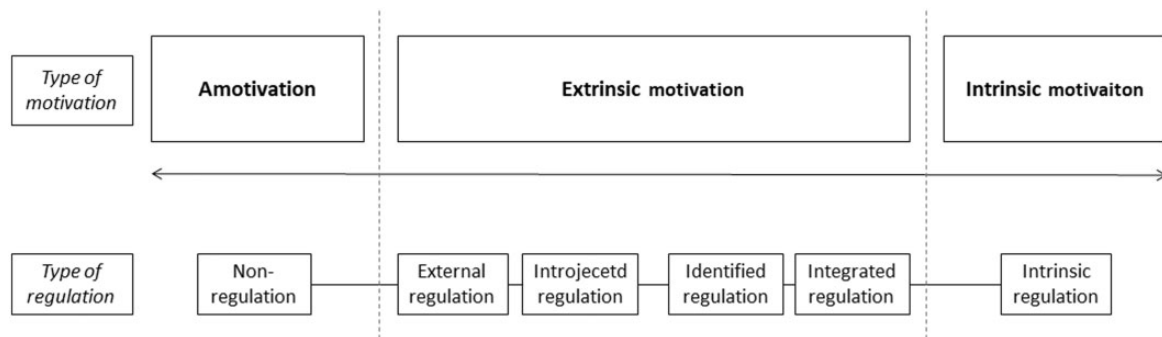
Adolescents in this category seemed initially to be quite autonomously motivated. The reasons they gave for participation in Young & Active differed from the others. They had participated in organized sports for several years and described PA as a natural part of their lives. Mastering an activity, having fun while doing it, and exercising together with friends were highlighted as important. All adolescents spoke about having sufficient support from their families and friends. Setting goals as part of the intervention was experienced as easy, since they already knew what they wanted to achieve. Their main goals were a wish to increase PA levels further and to test their fitness. The interviews revealed that participation created a move from intrinsic motivation toward more extrinsic motivation and back to intrinsic motivation. Participation seemed to have reinforced what was already a habit, as described by one girl:

I enjoy handball, I started with it seven years ago, I exercise three times a week . . . It is fun, and it is something that I feel that I can master . . . I participate because I like it, and I meet with friends there . . . Young & Active got me to exercise even more. (inf. 8)

All adolescents expressed that exercise was something they did for its own sake because they enjoyed it and wanted to do it and not because they had to. They appreciated the opportunity to monitor PA results on the graphs and to get positive feedback from the counselor. Feedback was seen as nice but not necessary, as expressed by this boy:

I'm sure feedback is ok for some, but I didn't need it because I was already motivated . . . She tried to help me, but in a way it was to try to get me to do what I already was doing. (inf. 19)

The same boy said that the result of participation was for him an increased awareness of PA: "It was like an alarm that said I had to take football a bit more seriously, so I started to participate more often, and, well, exercise a bit more (inf. 19)." Others expressed similar experiences. During the second interview, all of them said that they had continued with or increased participation in sports. Some claimed that they had made dietary changes, with more vegetables, water instead of soft



**Figure 1.** The self-determination continuum (adapted from Ryan et al., 2000).

drinks, and sweets only once a week. The majority had stopped increasing weight, and some had reduced to normal weight. They also said that they experienced that their fitness had improved.

### *Promotion of Competence and Enjoyment*

Adolescents in this category were not physically active prior to participation in Young & Active. As with those in Category 1, they expressed quite autonomous motivation initially but were still in need of some extra support to increase PA level or start with new sports, as described by this girl:

It's my body, and when I see that it's time to do something, then I do it... Young & Active "opened doors" to understanding what I can manage with physical activity, and where my limits are... Before Young & Active, I used to give up on exercise a lot earlier. (inf. 2)

Participation in Young & Active apparently supported a movement from more controlled forms of extrinsic motivation toward more autonomous forms of extrinsic motivation, and perhaps intrinsic motivation. The opportunity to receive advice, counseling, and learn more about PA was emphasized as nice, supportive, and informative. To see progress in PA levels on the graphs was highlighted as important, as this boy said:

It was very okay to participate in Young & Active because I saw progress in my training, and it has been fun... Registrations of all physical activities made me feel that I had to exercise, and after a while it became a habit. So now I exercise all the time. (inf. 3)

The experience of creating own goals was mentioned as something that strengthened their motivation, as remarked by this girl:

It was fun to decide my own expectations and goals... Before it was my mother, but now it's me... After participation in Young & Active, it has

become natural to be more physically active, and my self-confidence has increased. (inf. 14)

As with the adolescents in the first category, they said that goals were easy to set because they already knew what they wanted. Goals were about achieving personal challenges, one step at the time, and without interference from others. During the second interview, these adolescents asserted that they were still physically active in sports or other informal physical activities. Like those in Category 1, they expressed having sufficient support from their parents and friends. Some of them also talked about having made healthy changes in their diets. Most of the adolescents in this category stopped increasing in weight and some reduced to normal weight. As with Category 1, they said that they thought their fitness had improved.

### *Boost of Temporary Change*

During the first interview, the adolescents in this category spoke of significant changes in PA level and diet as a result of participation in Young & Active. Several had started with new sports. The second interview revealed that their changes had not been maintained. Participation seemed to have supported a temporary movement from controlled forms of extrinsic motivation toward more intrinsic motivation. After termination of the intervention, their statements reflected a return to controlled forms of extrinsic motivation. Their goals were about reducing weight or getting more attractive bodies. The decision to participate in Young & Active was mainly based on encouragement from their parents or the school nurse and not just their own. Parental support was described as either too controlling, with some parents constantly asking them if they had been physically active during the day, or other parents showing too little support and interest. In general, these adolescents appeared to be less autonomous and more influenced by other people's opinions, as expressed by this girl:

I think I was very comfortable with participating in Young & Active because I received good advice and the feedback was encouraging... Getting feedback from the counselor was what I probably liked best. It helped me believe that I might actually be able to fulfil my plans. Besides, I didn't want the people behind Young & Active to think that I was lazy. (inf. 7)

Changes in PA level and health behavior were described as something they had learned that they should do and had tried to do, but found difficult to accomplish, as this girl explained: "Exercise is something that I know that I should do, but I lose motivation because of my bad fitness and that others are so much better than me" (inf. 4). In addition to having dropped out of organized sports, several admitted to have given up on their diets, some had gained weight, and all described their fitness as not being good.

### *Reinforcement of Adverse Habits*

Similar to those in the previous categories, these adolescents had tried out new sports or attempted to increase PA during participation in Young & Active. Participation seemed to have supported a temporary movement from amotivation to more controlled forms of extrinsic motivation. Adolescents in this category appeared to face greater challenges in their social environments, with less support or stricter control from their parents. Their statements reflected a larger degree of externally controlled motivation, as expressed by this girl:

Physical activity is not fun, I don't like it, and I would never have started if not for my mother who said that I had to. The only reason why I'm exercising is because others says that I should, otherwise I would never have done so. (inf. 13)

None of the adolescents in this category said that they had decided to participate by themselves. In the course of the intervention program, most of them had stopped using the program regularly after 2 weeks. The adolescents' goals were about reducing weight or achieving nicer bodies, and their statements showed a preoccupation with PA, health, and weight, combined with low self-esteem, as these girls put it:

I've heard that people who exercise live longer and I want to have a healthy life... Working towards achieving my goals didn't go so well, but now I've decided on some new goals, and that is to be more physically active and lose 5 to 10 kilos in a month. (inf. 21)

I'm not happy about anything with myself, especially not my body and appearance, I feel that I'm too fat, and I want to change that by eating less. (inf. 12)

During the second interview, some of the adolescents in this category spoke about exercising too much, while others had stopped completely with sports. A few had made unhealthy dietary changes, eating too much or too little, with no food during daytime at school, and sometimes huge meals at night or in the weekends. A few had attained normal weight, but some were still overweight. Some described improved levels of fitness, whereas others said that their fitness had worsened.

### **Discussion**

This study explores the experiences of participants in Young & Active, focusing on how participation in the intervention influenced their regulation of motivation toward PA. Analyses of the two postintervention sets of interview data revealed important nuances in the adolescents' statements, which could be classified into four main categories based on the themes that emerged. The different categories reflected differences in movements along the SDT continuum (see Figure 1).

According to SDT, different forms of regulation are not mutually exclusive. People engage in PA for several reasons, both controlled and autonomous (Markland & Ingledew, 2007a). However, a systematic review of research on exercise found consistent support for a positive association between more autonomous forms of motivation and exercise (Teixeira et al., 2012). Our qualitative findings show similar results. Adolescents who expressed autonomous motivation initially increased and maintained their PA behavior. Statements from adolescents in Category 1 suggest fulfillment of basic psychological needs of autonomy, competence, and relatedness (Ryan & Deci, 2012). Autonomy was also expressed in the way the adolescents conceived their goals, as being volitional and based on intrinsic motivation. According to SDT, when this type of goal predominates, it is more likely that people experience positive cognitions and a sense of freedom from pressure, which in turn can contribute to long-term commitment (Markland & Ingledew, 2007a). Other studies confirm the importance of autonomous motivation for regular PA (Gourlan, Trouilloud, & Sarrazin, 2013; Verloigne et al., 2011). Based on the statements from adolescents in Category 1, they may not have needed participation in Young & Active to maintain or increase PA. However, some of them admitted to be less committed to their sports prior till the intervention. Dropping out of organized sports is a common risk among adolescents in this age-group and even more so for those who are overweight or obese (Corder et al., 2013; Corder, van

Sluijs, Ekelund, Jones, & Griffin, 2010). Participation may have prevented such dropout.

The adolescents in Category 2 did not participate in any sports prior to Young & Active. Their way of expressing goals reflected not only autonomy but also some ambivalence. They described a lack of competence in PA initially, which gradually changed toward an increase in competence and enjoyment. Ryan and Deci (2012) point out that if behaviors are to be successfully enacted and maintained, people must come to value the behaviors and endorse their importance. The MI-inspired Internet-based counseling, supporting choice, acknowledgment of feelings, and opportunities for self-direction in combination with sufficient support outside the Young & Active program, may have contributed to strengthening their motivation and permitting an even greater feeling of autonomy. Research shows that pediatric obesity treatment programs built on SDT and MI have a significant effect on an increase in PA and decrease in body mass index (Gourlan et al., 2013). Similar results were confirmed in another study with adolescent participants in obesity treatment programs using MI as a teaching method (Engström, Abildsnes, & Mildestvedt, 2016). Experiencing positive changes, both physically and on the graphs, was emphasized as inspiring among the adolescents in Category 2. A recent review supports the use of goal setting and self-monitoring of behavior, in combination with autonomy-supportive counseling, as an effective way of initiating and sustaining health behavior change over time (Samdal et al., 2017).

Adolescents in the remaining two categories also expressed motivation and willingness to change, but their remarks and ways of describing goals and motives reflected less autonomy and more controlled forms of motivation governed by external factors such as other people's opinions or behavior change primarily performed to improve appearance or please others (Teixeira et al., 2012). There is evidence of a focus within Western societies on ideal body size and media that promote exercise as means of getting the ideal physique (Dakanalis et al., 2015). Adolescents, especially those who are overweight or obese, are particularly vulnerable to such pressures (Markland & Ingledew, 2007b; Voelker, Reel, & Greenleaf, 2015). Being overweight, or having a perception of being overweight, even if you are not, may in itself engender extrinsic motivation and undermine intrinsic motivation (Pearl, Puhl, & Dovidio, 2015; Voelker et al. 2015). If so, this would likely have an adverse effect on long-term exercise maintenance, because people may perceive this as being an imposed pressure to engage in PA (Markland & Ingledew, 2007b).

Young & Active seemed to have inspired the adolescents in Category 3 to initiate and increase PA during the intervention. Statements from the adolescents show that

they did not succeed in sustaining the changes. Personal and social-environmental factors outside the intervention, related to self-image, relationships to family and friends, and other life circumstances, seem to have been of greater significance. Participation may even for some have reinforced controlled motivation and a feeling of having to make changes rather than wanting to do so. According to cognitive evaluation theory, a subtheory within SDT, contexts using rewards, deadlines, demands, or external evaluations may negatively influence intrinsic motivation. This happens because individuals come to see themselves as performing the behavior for the reward, that is, due to forces external to themselves, instead of fun, enjoyment, and satisfaction (Ryan & Deci, 2017). A study on the motivational impact on PA of wearable healthy lifestyle technologies showed similar results, indicating that the external pressures the participants experienced using Fitbits promoted a temporary increase in motivation but had a negative long-term effect on their motivation (Kerner & Goodyear, 2017).

The adolescents in Category 4 expressed even less initial and volitional motivation for participation. The intervention did not seem to promote healthy lifestyle changes but rather to reinforce negative behavior. Another study with adolescents taking part in different obesity programs showed results similar to our study. While the majority expressed an increase in motivation, the programs seemed to have enhanced extrinsic motivation further among those who expressed lower motivation (Engström et al., 2016). The adolescents in Category 4, in our study, expressed greater challenges in their social environments, with more pressure and less support from their parents. Extensive evidence within developmental psychology shows that parenting styles impact on the development of children's autonomy and well-being (Karabanova & Poskrebysheva, 2013; Koepke & Denissen, 2012). Parental promotion of self-endorsed functioning is more likely to yield decision-making enacted with a sense of freedom, choice and volition, and higher internalization of values or regulations, while those who lack this kind of support are in greater risk of developing rebellious reactions or oppositional behavior (Van Petegem, Beyers, Vansteenkiste, & Soenens, 2012).

From an SDT perspective, behavior change depends on regulation of behavior as one's own choice (Deci & Ryan, 2008). This requires internalizing the behaviors and integrating them with one's sense of self, values, and goals (Teixeira et al., 2012). Most health-related behaviors fall into categories of what people do not necessarily find interesting and will spontaneously engage in (Vansteenkiste, Williams, & Resnicow, 2012). To fully endorse these kinds of behaviors, the development of satisfying relationships is critical, in addition to strengthening autonomy and competence (Ryan et al., 2000). The importance of relatedness for the internalization

process is confirmed in other studies (Sebire, Jago, Fox, Edwards, & Thompson, 2013; Van den Berghe, Vansteenkiste, Cardon, Kirk, & Haerens, 2014). Our results indicate that when individuals are mainly driven by controlled motivation, or have other challenges in their lives, support of relatedness through an Internet-based solution is not sufficient to sustain long-term changes.

### Strengths and Limitations

Much of the literature on motivation focuses mainly on quantitative dimensions of interventions (Teixeira et al., 2012). This study provides valuable insights into different underlying motivational mechanisms among participants in an Internet-based intervention inspired by SDT and MI. The study has some limitations that should be acknowledged. Our interviewees were a selected group from already selected participants in an intervention. Initial motivation and type of support outside the intervention varied, as did the participants' use of the intervention (Riiser et al., 2015). The intervention lasted only 12 weeks and the adolescents received Internet-based counseling limited to once a week. Important differences exist between Internet-based interventions and face-to-face meetings. Internet-based counseling does not provide the same opportunities to respond, and one may miss out on important nuances.

Trustworthiness of the data was evaluated through the use of the concepts of credibility, dependability, transferability, and authenticity (Graneheim et al., 2017). In our opinion, the interviews revealed sufficient richness of data to answer the study's aim, rendering the study both credible and dependable. Gender distribution followed the Young & Active study, and the adolescents came from different backgrounds, schools, and municipalities. A weakness might be that the way the adolescents answered may have been influenced by what they thought the interviewer (T. S.) wanted them to say or by the way questions were asked. However, it is our judgment that the adolescents shared willingly and openly from their experiences, which affirms the authenticity of our data. The second interview confirmed the adolescents' main perspectives, giving further support to dependability, authenticity, and credibility. To secure dependability, all the researchers were included in the interpretation process and tried to stay close to the adolescents' narratives. Preunderstandings and interpretations were discussed among the researchers. Concerning transferability, we think that the data present insights into motivation for behavioral change that are essential to be aware of when designing and conducting similar interventions.

### Conclusion and Implications for Practice

Internet-based interventions have the benefit of reaching far and wide. They provide the users with anonymous and unlimited access to various program features, which may also reduce the burden of clinical contact for health personnel. We found that an Internet-based intervention influenced by SDT and MI may help some adolescents to change and maintain change, provided that participation is largely based on self-choice and that the adolescents have sufficient support in their social environments outside the intervention. Understanding the relationship between initiation and maintenance of PA, and the social-environmental variables that influence participants' adherence to such changes, contributes to important knowledge that should be taken into consideration when designing Internet-based interventions. Based on our findings, there is reason to question whether an Internet-based intervention alone is sufficient to support adolescents who are less motivated or face other challenges in life. We also question if overemphasizing an area of life that they are not ready to handle may provoke resistance and reinforce low self-esteem or negative health behavior rather than strengthen autonomy and well-being. Findings in this study may help in the development of future studies. Programs such as Young & Active may be used together with face-to-face counseling in school health services, provided that they are further refined on a larger scale and that the counseling is performed by qualified health service professionals.

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### Authors' Contributions

T. S. participated in designing the study, conducted all interviews, transcribed the interviews, analyzed the data, and drafted the manuscript. K. L., K. R., P. L., K. G., and S. H. contributed to the study design, data analysis, and drafting of the manuscript. All authors read and approved the final manuscript.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.



## Ethical Statement

The study was approved by the Norwegian Regional Committee for Medical and Health Research Ethics (REK no. 2010/2978A).

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## Supplemental Material

Supplemental material for this article is available online.

## References

- Anokye, N., Trueman, P., Green, C., Pavey, T., & Taylor, R. (2012). Physical activity and health related quality of life. *BMC Public Health, 12*, 624. doi:10.1186/1471-2458-12-624
- Arteburn, D. E. (2007). Obesity in children. *BMJ Clinical Evidence, 5*, 325.
- Brinkmann, S., & Kvale, S. (2018). *Doing interviews* (2nd ed.). Thousand Oaks, CA: SAGE.
- Chaplais, E., Naughton, G., Thivel, D., Courteix, D., & Greene, D. (2015). Smartphone interventions for weight treatment and behavioral change in pediatric obesity: A systematic review. *Telemedicine Journal and e-Health, 21*(10), 822. doi:10.1089/tmj.2014.0197
- Corder, K., Sharp, S. J., Atkin, A. J., Griffin, S. J., Jones, A. P., Ekelund, U., & van Sluijs, E. M. F. (2013). Change in objectively measured physical activity during the transition to adolescence. *British Journal of Sports Medicine, 49*, 730–736. doi:10.1136/bjsports-2013-093190
- Corder, K., van Sluijs, E. M. F., Ekelund, U., Jones, A. P., & Griffin, S. J. (2010). Changes in children's physical activity over 12 months: Longitudinal results from the speedy study. *Pediatrics, 126*(4), e926–e935. doi:10.1542/peds.2010-0048
- Dakanalis, A., Carrà, G., Calogero, R., Fida, R., Clerici, M., Zanetti, M. A., & Riva, G. (2015). The developmental effects of media-ideal internalization and self-objectification processes on adolescents' negative body-feelings, dietary restraint, and binge eating. *European Child and Adolescent Psychiatry, 24*(8), 997–1010. doi:10.1007/s00787-014-0649-1
- Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie canadienne, 49*(3), 182.
- Engström, A., Abildsnes, E., & Mildestvedt, T. (2016). "It's not like a fat camp"—A focus group study of adolescents' experiences on group-based obesity treatment. *International Journal of Qualitative Studies on Health and Well-Being, 11*, 32744. doi:10.3402/qhw.v11.32744
- Fortier, M. S., Duda, J. L., Guerin, E., & Teixeira, P. J. (2012). Promoting physical activity: Development and testing of self-determination theory-based interventions. *The International Journal of Behavioral Nutrition and Physical Activity, 9*, 20. doi:10.1186/1479-5868-9-20
- Friederichs, S. A. H., Oenema, A., Bolman, C., & Lechner, L. (2015). Long-term effects of self-determination theory and motivational interviewing in a web-based physical activity intervention: Randomized controlled trial. *The International Journal of Behavioral Nutrition and Physical Activity, 12*, 101.
- Gourlan, M., Trouilloud, D., & Sarrazin, P. (2013). Motivational characteristics of obese adolescents toward physical activity: Contribution of self-determination theory. *Revue europeenne de psychologie appliquee, 63*(4), 209–218. doi:10.1016/j.erap.2013.02.001
- Graneheim, U. H., Lindgren, B. M., & Lundman, B. (2017). Methodological challenges in qualitative content analysis: A discussion paper. *Nurse Education Today, 56*, 29–34. doi:10.1016/j.nedt.2017.06.002
- Graneheim, U. H., & Lundman, U. H. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today, 24*(2), 105–112. doi:10.1016/j.nedt.2003.10.001
- Karabanova, O. A., & Poskrebysheva, N. N. (2013). Adolescent autonomy in parent-child relations. *Procedia – Social and Behavioral Sciences, 86*, 621–628. doi:https://doi.org/10.1016/j.sbspro.2013.08.624
- Kerner, C., & Goodyear, V. A. (2017). The motivational impact of wearable healthy lifestyle technologies: A self-determination perspective on fitbits with adolescents. *American Journal of Health Education, 48*(5), 287–297. doi:10.1080/19325037.2017.1343161
- Kinnafick, F.-E., Thogersen-Ntoumani, C., & Duda, J. L. (2014). Physical activity adoption to adherence, lapse, and dropout. *Qualitative Health Research, 24*(5), 706–718. doi:10.1177/1049732314528811
- Koepke, S., & Denissen, J. J. A. (2012). Dynamics of identity development and separation-individuation in parent-child relationships during adolescence and emerging adulthood—A conceptual integration. *Developmental Review, 32*(1), 67–88. doi:10.1016/j.dr.2012.01.001
- Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies. *Qualitative Health Research, 26*(13), 1753–1760. doi:10.1177/1049732315617444
- Markland, D., & Ingledew, D. K. (2007a). Exercise participation motives: A self-determination theory perspective. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 23–34, 302–305). Champaign, IL: Human Kinetics.
- Markland, D., & Ingledew, D. K. (2007b). The relationships between body mass and body image and relative autonomy for exercise among adolescent males and females. *Psychology of Sport and Exercise, 8*(5), 836–853. doi:10.1016/j.psychsport.2006.11.002
- Markland, D., Ryan, R. M., Tobin, V. J., & Rollnick, S. (2005). Motivational interviewing and self-determination theory. *Journal of Social and Clinical Psychology, 24*(6), 811–831. doi: 10.1521/jscp.2005.24.6.811

- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York, NY: Guilford.
- Norwegian Institute of Public Health. (2016). *Child growth study of Norway*. Retrieved from www.fhi.no
- Olds, T. S., Ferrar, K. E., Schranz, N. K., & Maher, C. A. (2011). Obese adolescents are less active than their normal-weight peers, but wherein lies the difference? *Journal of Adolescent Health, 48*(2), 189–195. doi:10.1016/j.jadohealth.2010.06.010
- Ortega, F. B., Ruiz, J. R., Castillo, M. J., & Sjörström, M. (2007). Physical fitness in childhood and adolescence: A powerful marker of health. *International Journal of Obesity, 32*(1), 1. doi:10.1038/sj.ijo.0803774
- Oude Luttikhuis, H., Baur, L., Jansen, H., Shrewsbury, V. A., O'Malley, C., Stolk, R. P., & Summerbell, C. D. (2009). Cochrane review: Interventions for treating obesity in children. *Evidence-Based Child Health: A Cochrane Review Journal, 4*(4), 1571–1729. doi:10.1002/ebch.462
- Patrick, H., & Williams, G. C. (2012). Self-determination theory: Its application to health behavior and complementarity with motivational interviewing. *International Journal of Behavioral Nutrition and Physical Activity, 9*(1), 18. doi:10.1186/1479-5868-9-18
- Pearl, R. L., Puhl, R. M., & Dovidio, J. F. (2015). Differential effects of weight bias experiences and internalization on exercise among women with overweight and obesity. *Journal of Health Psychology, 20*(12), 1626–1632. doi:10.1177/1359105313520338
- Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (10th ed.). Philadelphia, PA: Wolters Kluwer.
- Riiser, K. (2015). *Young & Active: Development and evaluation of an internet intervention to increase fitness and health-related quality of life in adolescents with overweight and obesity* (Doctoral dissertation). Norwegian School of Sport Sciences, Oslo.
- Riiser, K., Løndal, K., Ommundsen, Y., Sundar, T., & Helseth, S. I. (2013). Development and usability testing of an internet intervention to increase physical activity in overweight adolescents. *JMIR Research Protocols, 2*(1), e7. doi:10.2196/resprot.2410
- Riiser, K., Løndal, K., Ommundsen, Y., Småstuen, M. C., Misvær, N., & Helseth, S. (2015). The outcomes of a 12-week internet intervention aimed at improving fitness and health-related quality of life in overweight adolescents: The young & active controlled trial. *PLoS ONE, 9*(12), e114732. doi:10.1371/journal.pone.0114732
- Riiser, K., Ommundsen, Y., Småstuen, M. C., Løndal, K., Misvær, N., & Helseth, S. (2014). The relationship between fitness and health-related quality of life and the mediating role of self-determined motivation in overweight adolescents. *Scandinavian Journal of Public Health, 42*(8), 766–772. doi:10.1177/1403494814550517
- Rodgers, R., Wertheim, E., Damiano, S., Gregg, K., & Paxton, S. (2015). “Stop eating lollies and do lots of sports”: A prospective qualitative study of the development of children awareness of dietary restraint and exercise to lose weight. *International Journal of Behavioral Nutrition and Physical Activity, 12*, 155. doi:10.1186/s12966-015-0318-x
- Ryan, R. M., & Deci, E. L. (2012). *Motivation, personality, and development within embedded social contexts: An overview of self-determination theory* (1st ed.). Oxford, England: Oxford University Press.
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY: Guilford Press.
- Ryan, R. M., Deci, E. L., Fowler, R. D., Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. doi:10.1037/0003-066X.55.1.68
- Samdal, G. B., Eide, G. E., Barth, T., Williams, G., Meland, E., & Samdal, G. B. (2017). Effective behaviour change techniques for physical activity and healthy eating in overweight and obese adults; systematic review and meta-regression analyses. *The International Journal of Behavioral Nutrition and Physical Activity, 14*(1), 42. doi:10.1186/s12966-017-0494-y
- Sebire, S. J., Jago, R., Fox, K. R., Edwards, M. J., & Thompson, J. L. (2013). Testing a self-determination theory model of children's physical activity motivation: A cross-sectional study. *International Journal of Behavioral Nutrition and Physical Activity, 10*(1), 111. <http://www.ijbnpa.org/content/10/1/111>
- Teixeira, P. J., Carraca, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *The International Journal of Behavioral Nutrition and Physical Activity, 9*, 78. doi:10.1186/1479-5868-9-78
- The Norwegian Directorate of Health. (2010). *Norwegian clinical guideline for growth measurement of children and adolescents in primary care*. Oslo, Norway: The Norwegian Directorate of Health.
- Van den Berghe, L., Vansteenkiste, M., Cardon, G., Kirk, D., & Haerens, L. (2014). Research on self-determination in physical education: Key findings and proposals for future research. *Physical Education and Sport Pedagogy, 19*(1), 97–121. doi:10.1080/17408989.2012.732563
- Van Petegem, S., Beyers, W., Vansteenkiste, M., & Soenens, B. (2012). On the association between adolescent autonomy and psychosocial functioning: Examining decisional independence from a self-determination theory perspective. *Developmental Psychology, 48*(1), 76–88. doi:10.1037/a0025307
- Vansteenkiste, M., Williams, G. C., & Resnicow, K. (2012). Toward systematic integration between self-determination theory and motivational interviewing as examples of top-down and bottom-up intervention development: Autonomy or volition as a fundamental theoretical principle. *International Journal of Behavioral Nutrition and Physical Activity, 9*(1), 23. doi:10.1186/1479-5868-9-23

- Verloigne, M., De Bourdeaudhuij, I., Tanghe, A., D'Hondt, E., Theuwis, L., Vansteenkiste, M., & Deforche, B. (2011). Self-determined motivation towards physical activity in adolescents treated for obesity: An observational study. *International Journal of Behavioral Nutrition and Physical Activity*, 8, 97. <http://www.ijbnpa.org/content/8/1/97>
- Voelker, D. K., Reel, J. J., & Greenleaf, C. (2015). Weight status and body image perceptions in adolescents: Current perspectives. *Adolescent Health, Medicine and Therapeutics*, 6, 149–158. doi:10.2147/AHMT.S68344
- World Health Organization. (2016). *Report of the commission on ending childhood obesity*. Geneva, Switzerland: Author.