



# Sedentary behavior, depressed affect, and indicators of mental well-being in adolescence: Does the screen only matter for girls?



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## ABSTRACT

The study investigated the effects of sedentary behavior (SB) on mental well-being and examined differences between screen-based (sSB) and non-screen-based sedentary behaviors (nSB) separately by gender. In a total sample of 1296 students (609 girls) aged 12–17 ( $m = 13.7$ ,  $SD = 0.67$ ), SB, depressed affect, self-esteem, physical self-concept, general self-efficacy and physical activity were assessed through self-administered questionnaires. Among girls, lower scores in self-esteem, physical self-concept as well as general self-efficacy were associated with higher sSB but not nSB. Among boys higher levels of sSB related to higher self-esteem, nSB but not sSB predicted higher scores in depressed affect, and there was a u-shaped association between sSB and general self-efficacy. Results replicate the inverse association between SB and mental well-being, and suggest a distinction between nSB and sSB especially among girls. Additional studies will be necessary to replicate, and further examine mediating mechanisms.

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## Background

Sedentary behavior (SB) comprises activities requiring low levels of energy expenditure (Pate, O'Neill, & Lobelo, 2008). In addition to traditional SB such as reading or sitting while talking to others, modern societies offer a multitude of screen-based sedentary leisure-time pursuits such as using Social Media, playing video or computer games or watching television (TV). Children and adolescents in western societies spend about 4–8 h a day being sedentary (Pate, Mitchell, Byun, & Dowda, 2011).

A growing body of research examining negative impacts of SB on youth's physical health found increased SB to be linked to an unfavorable body composition, lower cardiovascular fitness and a higher cardio-metabolic health risk (Tremblay et al., 2011). Negative effects of a sedentary lifestyle on indicators of adolescents' mental health seem to be evident as well. Regarding the nine included primary studies in a brief review by Biddle and Asare (2011), the authors found consistent negative associations between SB and mental health outcomes, mainly psychological well-being, depressive symptoms and physical self-concept. Consistent with these findings a review by Tremblay et al. (2011) outlined the negative impacts of SB on self-esteem as well.

These findings could be of major importance, since adolescence is a critical period for the development of mental health problems (Kessler et al., 2005). There are some studies investigating long-term effects of SB on mental health

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providing first hints for causality. For instance, using a 7 year follow-up [Primack, Swanier, Georgiopoulos, Land, and Fine \(2009\)](#) found media exposure in adolescence to be associated with increased depressive symptoms in young adulthood. Other longitudinal studies have revealed similar small but consistent negative impacts of SB on health-related quality of life ([Gopinath, Hardy, Baur, Burlutsky, & Mitchell, 2012](#)), self-esteem ([Martins & Harrison, 2012](#)) and psychological adjustment ([Parkes, Sweeting, Wight, & Henderson, 2013](#)). Furthermore, reducing the amount of time spent with sedentary activities is assumed to be a promising strategy for prevention of mental health problems ([Goldfield et al., 2007](#)).

A number of studies dealing with SB used the time spent watching TV as a proxy of overall SB. But in consideration of a decline in TV viewing and an increase of non-gaming computer use during the past decade ([Bucksch, Inchley, Hamrik, Finne, & Kolip, 2014](#)), TV use seems not to be a suitable indicator for overall sitting time. In addition, asking only for TV use or even total screen time might underestimate adolescents' overall SB, since adolescents participate in a variety of non-screen-based SB as well ([Bauer, Friend, Graham, & Neumark-Sztainer, 2012](#); [Zabinski, Norman, Sallis, Calfas, & Patrick, 2007](#)). [Biddle, Gorely, and Marshall \(2009\)](#) found a negative association between the amounts of time spent watching TV, and doing sedentary hobbies, homework or sitting and talking. To date, it is unclear whether there are differential effects of screen-based sedentary behavior (sSB) and non-screen-based sedentary behavior (nSB) on adolescents' mental health. Thus, it is not possible to attribute the negative mental health effects of screen time to the fact that it is spent sedentary or to negative media influences.

A significant proportion of studies investigating associations between SB and adolescents' mental health did not take into account moderate to vigorous physical activity (MVPA). For more than a decade both behaviors have been conceptualized as distinct health risk factors ([Pate et al., 2008](#)). Previous research demonstrated that there are a lot of adolescents being both highly active and highly sedentary ([Wong & Leatherdale, 2009](#)). Both MVPA and SB relate to mental health in children and adolescents but in opposite directions ([Biddle & Asare, 2011](#)). However, SB has emerged as an independent health risk factor, since studies that controlled for MVPA still found associations between SB and indicators of mental health which are indeed smaller but still significant ([Finne, Bucksch, Lampert, & Kolip, 2014](#); [Iannotti et al., 2009](#)).

Furthermore, it seems to be important to differentiate between boys and girls, since they differ not merely with respect to the time spent sedentary ([Pate et al., 2011](#)) but also concerning the prevalence of internalizing mental health problems: depressive disorders, low self-esteem and anxiety problems affect girls more often than boys ([Durkin & Barber, 2002](#); [Patton & Viner, 2007](#)).

This exploratory study has two aims: 1) to examine differences in the relationship between mental health outcomes, and sSB and nSB, respectively, and 2) to investigate effects of SB on depressed affect and different indicators of mental well-being taking MVPA into account. These objectives will be pursued separately for boys and girls.

## Methods

### *Study design and participants*

Baseline data from the cluster-randomized controlled trial of the "läuft." program ([Suchert et al., 2013](#)) were used for the current cross-sectional study. The "läuft." program is a school-based intervention aimed at fostering a physically active lifestyle in adolescence. The whole study has been approved by the ethics committee of the German Psychological Society as well as the Ministry of Education and Science of Schleswig-Holstein. To recruit the study sample 134 secondary schools in the federal state of Schleswig-Holstein in Germany were invited to participate with their 8th grade classes. Finally, 29 schools (21.6%) with 61 classes and 1489 students decided to take part in the study. Data collection took place from January to March 2014. Data of 1296 students were eligible.

### *Measures*

An anonymous, self-administered questionnaire was employed to obtain data about students' socio-demographic characteristics, the amount of time spent with different SB and MVPA as well as indicators of their mental well-being. Additionally, body weight and height were measured.

### *Sedentary behavior*

An adapted version of the survey method by [Zabinski et al. \(2007\)](#) was used to assess leisure time SB. Students were asked how much time they spent on the most recent school day and the most recent Sunday with the following activities: watching TV/DVDs, playing video/computer games (except active electronic gaming), other leisure-time pursuits on the computer/mobile phone, passive transport, doing homework, reading, listening to music, creative hobbies, and talking to others. Average numbers of minutes spending with each activity were summed up to a total amount of SB. The time spent with sSB was determined by summing up the first three activities. The average minutes spending with the other sedentary activities were summed up to total time spent with nSB. Each of these scores was cut down to a maximum of 24 h. Due to their skewed distribution these three summed scores (total SB, sSB and nSB) were each grouped into quartiles based on the gender-specific samples.

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