Original Article

PREVALÊNCIA E FATORES SOCIODEMOGRÁFICOS ASSOCIADOS AO COMPORTAMENTO SEDENTÁRIO EM ADOLESCENTES DE RIO CLARO-SP

PREVALENCE AND SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH SEDENTARY BEHAVIOR IN ADOLESCENTS FROM RIO CLARO-SP, BRAZIL

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RESUMO

O objetivo do estudo foi analisar a prevalência, os fatores sociodemográficos e o comportamento sedentário (CS) associados as situações do CS (1) obrigações; 2) computador/*tablet* e *videogame*; 3) *smartphone*; 4) televisão; 5) CS total) de adolescentes de Rio Claro-SP. Participaram do estudo 482 adolescentes (14,4±2,1 anos) de 3 escolas públicas e 2 particulares, avaliados por um questionário de identificação, anamnese clínica e nível socioeconômico; Questionário de Comportamento Sedentário, com questões adicionais relacionadas ao CS e o uso de *smartphones* e *videogames*; Questionário de Atividade Física Habitual para Adolescentes; e mensuração do peso e estatura para o cálculo de Índice de Massa Corporal (IMC) (kg/m²). Realizou-se análise descritiva, teste *t* de *Student* para comparar as situações de CS e nível de atividade física entre meninos e meninas e regressão logística para verificar a associação das situações com o CS total (p<0,05). Identificou-se que 47,5% dos adolescentes permanecem mais de 14 horas/dia em CS (média de 13,7±3,4 horas/dia). As situações associados ao CS total foram: *smartphone* (RO=6,23; p<0,001); computador/*tablet* e *videogame (RO=*2,5; p=0,012); obrigações (RO=2,43; p=0,009) e televisão (RO=2,35; p=0,009). Relatou-se alta prevalência de CS, porém não houve nenhum fator sociodemográfico associado com esse comportamento. Adicionalmente, o uso do *smartphone* apresentou maior associação com o alto tempo de CS total.
Palavras chave: Estilo de vida sedentário. Adolescente. Epidemiologia.

ABSTRACT

The objective of this study was to analyze the prevalence of and sociodemographic factors associated with sedentary behavior (SB) situations among adolescents from Rio Claro, São Paulo, Brazil, namely: (1) obligations; 2) computer/tablet and video game; 3) smartphone; 4) television; 5) total SB. It included 482 teenagers (14.4 ± 2.1 years old) from 3 public and 2 private schools. They were assessed through an identification, clinical history and socioeconomic level questionnaire; Sedentary Behavior Questionnaire, with additional questions related to SB and use of smartphones and video games; Habitual Physical Activity Questionnaire for Adolescents; and weight and height measurement for Body Mass Index (BMI) calculation (kg/m²). Descriptive analysis was performed, Student's t test was run to compare SB situations and level of physical activity between boys and girls, and logistic regression was carried out to verify the association of the situations with total SB (p <0.05). Results revealed that 47.5% of the adolescents spend more than 14 hours/day on SB (mean of 13.7 ± 3.4 hours/day). The situations associated with total SB were: smartphone (OR=6.23; p<0.001); computer/tablet and video game (OR=2.5; p=0.012); obligations (OR=2.43; p=0.009) and TV (OR=2.35; p=0.009). High SB prevalence was found, but there was no sociodemographic factor associated with this behavior. Additionally, smartphone use presented a greater association with high amount of time for total SB.
Keywords: Sedentary lifestyle. Adolescent. Epidemiology.

Introduction

Sedentary Behavior (SB) is characterized by activities performed in a sitting, reclining or lying position, with low energy expenditure (between 1 to 1.5 METs), which can be done within the scope of obligations (such as work and school), leisure and transportation[1]. For children and adolescents, it is advised that the maximum screen and entertainment time does not exceed 2 hours a day[2], in order to prevent health issues, such as: obesity, high blood pressure, hypercholesterolemia, compromised self-esteem and behavioral problems, low physical fitness, and poor academic performance[3].

Although SB is performed at different everyday moments and by people of all ages, it is known that habits acquired in childhood and adolescence tend to extend into adult life. Moreover, there is evidence to suggest that SB increases by 10 to 20 minutes every school year[4,5]. Studies show that more than 50% of Brazilian adolescents spend at least 2 hours a day on SB, which is represented by screen time[6,7], and that young people from different countries spend, overall, 5 to 10 hours on sedentary activities, with 2 to 4 hours of screen time (a proxy of total SB)[8]. Thus, Salmon et al.[8] suggest that future research should assess other situations of total SB and not only screen time, as seen in most studies, for sitting time in other situations is also a significant part of total SB, such as transportation, school, work and leisure.

In addition to SB prevalence in adolescents, some studies have focused on investigating SB-related sociodemographic factors in young Brazilians. These studies have consistently found that "lower level of physical activity" and "high weight level" have a significant association with SB in this population[9]. In addition, other aspects, such as being older at school, high socioeconomic level, not engaging in physical education at school, living in the urban area of the city, being a girl (for TV time) and being a boy (for computer, video game and smartphone time)[5,10], are also associated with SB. However, there still are controversies about the sociodemographic factors linked to this behavior, especially in developing countries such as Brazil[6,11]. This is important for future interventions to be created based on the characteristics of young people with a higher amount of SB time, increasing the chances of success. Besides, a study focused on this objective will contribute with evidence for the area and may favor the creation of strategies for counseling and future interventions in similar cities[12].

Thus, the objective of the present study was to analyze the prevalence of and sociodemographic factors associated with SB situations in adolescents of both sexes, in the final years of elementary school (6th to 9th grade) and in high school, from public and private schools in the municipality of Rio Claro-SP. The study hypotheses were: a) there is a high prevalence of SB in adolescents; b) girls present a greater SB compared to boys; c) the biggest influencer of SB is smartphones; d) different SB situations can have a greater influence on SB.

Methods

Ethical Aspects

The research protocol was approved by the Research Ethics Committee of "Júlio de Mesquita Filho" São Paulo State University, UNESP, Rio Claro-SP (Process No 59053516.0.0000.5465). The adolescents and their legal guardians signed an assent and consent form, before data collection, accepting to participate in the research.

Participants and Sampling Calculation

This is a cross-sectional epidemiological study. It involved adolescents in the final years of elementary education (6th to 9th grade) and in high school (1st to 3rd grade), of both sexes, from public and private schools in the city of Rio Claro-SP. Thirty schools in the municipality were deemed eligible (21 public and 9 private) (final years of elementary school, and/or high school, excluding education for youth and adults, and schools for special education only) and, for sample calculation, cluster analysis was used (in this case, the clusters were the schools), as suggested by Campbell et al.[13].

The calculation included the following variables: prevalence, 95% confidence, statistical power, and design effect. The prevalence of teenagers who spent less than 2 hours watching TV every day stood at 0.2, whereas the prevalence for more than 2 hours was 0.8, with 95% confidence and 80% power. For design effect, an Intraclass Correlation Coefficient (ICC) of 0.19 was considered. Thus, at first, 4 schools with 72 students were necessary but, after adjusting this value to a loss of 47%, 106 participants in total were needed.

Thus, 3 public and 3 private schools were invited to join the study, but one private school declined to participate because it is the institution's policy not to participate in any research. The invitation was made to 860 students, but a total of 378 students did not return the assent and consent form and were therefore excluded from the study. Thus, 482 adolescents made up the sample (56% response rate), with 355 students from public schools, and 127 from private schools.

Questionnaires and Anthropometric Measures

The collections happened between March and May 2017, and the questionnaires were applied on a scheduled date in the classroom, during regular class hours, with at least three instructors trained to answer possible questions.

Sample Characterization

To characterize the sample, an identification questionnaire was applied, containing questions regarding age, sex, academic year, school and health condition. For family socioeconomic level, a questionnaire developed by the Brazilian Association of Research Companies[14] was used.

Sedentary Behavior

To identify the level of total SB, because it was difficult to find an SB questionnaire specifically developed for young Brazilians, the Sedentary Behavior Questionnaire[15] was chosen, with a validity study in Brazil for the adult population. In order to meet the objectives of the study, said questionnaire was complemented by questions covering use of smartphones and video games (sitting, reclining or lying). The score for total SB was calculated by summing the minutes per day of SB spent on work, school, transportation, TV, computer and/or tablet, video game and smartphone. For analysis, the median (14.3 hours/day) for total SB was considered. In addition, categories were created to represent SB situations, namely: 1) SB obligations – total SB time in minutes spent on transportation, school and work; 2) SB computer/tablet and video game, which was also defined by summing these activities (leisure time); 3) SB smartphone, which considered only the time spent using this device (leisure time); 4) SB TV, which used the time spent watching TV (leisure time); and 5) total SB, which is the sum of all SB situations.

Level of Physical Activity

The Habitual Physical Activity Questionnaire for Adolescents[16] was used. It had its validity and reproducibility verified in a previous study[16]. The score is given in minutes per week, but the "minutes per day" parameter was adopted, since the current recommendation for children and adolescents is 60 minutes of moderate to vigorous daily physical activity[11].

Anthropometric Measures

The participants' weight was measured on a portable digital electronic scale (Mallory Oslo, Sagittarius model), with capacity for 150 kg and resolution of 100g, whereas their height was taken using a mobile stadiometer (Sanny, Personal Caprice model), with measurement capacity of 115 to 210 cm and resolution of 1 cm, so that it was possible to calculate their Body Mass Index (BMI) – weight (kg)/height² (m²). To categorize the values, the following classification was adopted: malnourished (<18.5 kg/m²), eutrophic (18.5 - 24.9 kg/m²), overweight (25 - 29.9 kg/m²) and obese (≥ 30 kg/m²)[17].

Statistical Procedure

Data were tabulated on the Epidata computer program by means of double entry, and statistical analyses were run on SPSS, version 22.0. The data were analyzed descriptively, with Student's t test for independent samples being performed to compare SB situations, level of physical activity, age and sex. Additionally, a binary logistic regression test was conducted to verify associations between the study variables and the SB outcome, with $p < 0.05$ and a 95% confidence interval (CI). Before the analyses started, non-collinearity was identified for all variables using the Linear Regression collinearity test. Thus, the predictor variables of the model were: sex (female and male), age (continuous), education (primary and secondary), school (public and private), time (hours) using smartphone during the day (cutoff point of 2 hours/day), computer, tablet and video game time (cutoff point of 2 hours/day), TV time (cutoff point of 2 hours/day), SB involving school obligations, work and transportation (cutoff point of 6.1 hours/day - median), level of leisure physical activity (cutoff point of 60 minutes/day), level of physical activity in transportation (cutoff point of 10 minutes/day), level of total physical activity (cutoff point of 60 minutes/day), BMI (malnourished/eutrophic and overweight/obese), socioeconomic income (A/B1/B2 and C1/C2/D) and time (years) using smartphone (cutoff point of 1 year).

Results

A total of 482 adolescents participated in the study, with an average age of 14.4±2.1 years old; 55.0% were eutrophic, and 41.5% belonged in the BS economic class. The mean for total SB was 13.7±3.4 minutes per day, with 47.5% of the adolescents spending more than 14.1 hours per day on total SB: boys (50.0%), final years of elementary school (48.2%), and public schools (48.9%). Table 1 displays the participants' characteristics.

Table 1. Sample characterization in terms of sex, school and self-reported diseases (n=482, Rio Claro-SP, 2017)

	Variables	N	%
Sex	Female	249	51.7
	Male	233	48.3
Education	Primary (final years)	255	52.9
	Secondary	227	47.1
School	Public	335	73.7
	Private	127	26.3

Note: n = number of people; % = percentage
Source: The authors

Table 2. Quantity (n), mean ± standard deviation (SD) and significance (p<0.05) for Student's t-test for independent samples (female and male) concerning the variables (n=482, Rio Claro-SP, 2017)

Variables	Girls		Boys		p	d-Cohen's
	N	**Mean±SD**	**N**	**Mean±SD**		
Age (years)	249	14.2± 2.1	233	14.6±2.1	0.41	0.19
Smartphone time (years)*	249	4.05±2.6	229	3.6±2.5	0.671	14.4
SB time (min/day)*						
TV	222	132.7±116.9	210	113.7±242.2	0.462	0.09
Computer/tablet and video game	218	291.1±167.9	209	272.9±242.6	0.24	0.08
Obligations (school, transportation and work)	249	367.3±34.5	233	370.1±34.1	0.534	0.08
Smartphone	208	431.2±282.8	204	292.9±242.2	0.001[a]	0.52
Total SB	123	827.4±211.7	134	820.2±198.1	0.376	0.03
**LPA (min/day) ** **						
LPA Leisure	241	30.1±35.3	212	47.7±40.3	0.028[a]	0.46
LPA Transportation	249	65.1±110.4	231	71.6±117.5	0.29	0.05
Total LPA	243	43.8±41.3	219	67.1±49.9	0.001[a]	0.50

Note: SB = Sedentary Behavior; LPA = Level of Physical Activity; *4 people did not answer this question; ** sample size defined from the values considered as loss; [a] p<0.05. SD = Standard Deviation; P = Student's t test; n = number of people; Med = Median; Min = Minimum; Max = Maximum
Source: The authors.

According to the t test, girls stay seated longer using smartphones (p=0.001) compared to boys, and boys engage more in leisure-time physical activity (p=0.028) and total physical activity (p=0.001) compared to girls (Table 2).

Table 3. Crude and adjusted Odds Ratio (OR) and respective confidence intervals (95% CI) for sociodemographic variables, considering high amount of time spent on sedentary behavior as the median value (14.1 hours/day) (n=482, Rio Claro-SP, 2017)

Variables	Crude OR	95% CI	*P*	Adjusted OR	95% CI	*P*
Sex						
Female	1			1		
Male	1.236	0.757 - 2.020	0.213	1.544	0.780- 2.058	0.213
Age						
	0.997	0.869 - 1.098	0.692	0.844	0.682 - 1.195	0.267
School						
Private	1			1		
Public	1.187	0.702 - 2.007	0.521	1.214	0.564 - 2.612	0.621
Education						
Secondary	1			1		
Primary	0.951	0.508 - 1.560	0.843	1.707	0.463 - 6.298	0.442
Disease						
No	1			1		
Yes	1.123	0.535 - 2.335	0.76	2.552	0.92 - 7.093	0.072
Years owning a smartphone						
+ 1 year	1			1		
- 1 year	0.836	0.469 -1.494	0.545	1.019	0.469 - 2.218	0.961

Table 3 continues...

Variables	Crude OR	95% CI	*P*	Adjusted OR	95% CI	*P*
Smartphone						
<2 hours/day	1			1		
≥2 hours/day	4.572	2.469 - 8.468	0.000[a]	6.227	2.853 - 13.588	0.000[a]
TV						
<2 hours/day	1			1		
≥2 hours/day	2.006	1.219 - 3.302	0.006[a]	2.351	1.238 - 4.463	0.009[a]
Computer, tablet and video game						
<2 hours/day	1			1		
≥2 hours/day	2.138	1.296 - 3.526	0.003[a]	2.496	1.228 - 5.075	0.012[a]
SB obligations - school, work and transportation						
<median (6.1 h/day)	1			1		
≥median (6.1 h/day)	1.999	1.209 -3.305	0.007[a]	2.429	1.251 - 4.717	0.009[a]
LPA Leisure						
≥60 min/day	1			1		
<60min/day	0.9833	0.554 - 1.743	0.952	1.367	0.381 - 4.908	0.632
LPA Transportation						
≥10 min/day	1			1		
<10 min/day	0.928	0.548 - 1.571	0.782	1.036	0.492 - 2.182	0.925
Total LPA						
<60 min/day	1			1		
≥60 min/day	0.983	0.599 - 1.614	0.946	1.008	0.298 - 3.408	0.989
BMI						
Overweight and Obesity	1			1		
Malnourished and Eutrophic	1.071	0.499 - 2.303	0.86	1.034	0.413 - 2.588	0.943
Monthly income						
C1, C2, D	1			1		
A, B1, B2	1.194	0.704 - 2.026	0.51	1.374	0.69 - 2.739	0.366

Note: OR = Odds Ratio; 95% CI = 95% Confidence Interval; P = significance; [a] = P <0.05; SB = Sedentary Behavior; LPA = Level of Physical Activity; BMI = Body Mass Index
Source: The authors

To check possible associations between the variables and total SB, a crude and adjusted logistic regression test was performed. The equation considered for the present model was: $[X^2(15)=51.427; p<0.001, R^2nagelkerke=0.281]$. The variables associated with high amount of SB time (over 14.1 hours/day) were: smartphone use for more than 2 hours/day, over 2 hours/day spent on TV, more than 2 hours/day using computer, tablet or video game, and more than 6.1 hours/day of SB obligations (school, work and transportation) (Table 3). Thus, among the adolescents who make frequent use of smartphone, TV, computer/tablet or video game, SB obligations tend to have a high amount of total SB time.

Discussion

The present study aimed to analyze the prevalence of and sociodemographic factors associated with SB situations in adolescents from Rio Claro-SP. The main results were: a) 47.5% of the assessed adolescents spent more than 14.1 hours a day on SB; b) high amount of time spent on smartphone, TV, computer/tablet and video game; and c) SB obligations were associated with high amount of time spent on total SB among the adolescents.

Prevalence

One major difficulty in studying SB among adolescents is that most investigations use screen time only and do not have a consensus on the cutoff point, but the most widely used values are between 2 and 4 hours per day[6,10,18]. In the present study, if a cutoff point of 3 hours is considered for screen time (TV, video game, computer/tablet and smartphone), 92.5% of the adolescents exceed this value: 90.6% for girls, 95% for boys, 92.8% for public school, 91.7% for private school, 91.2% for elementary education, and 94% for high school.

Unlike the findings of the present study, results reported by the National Student Health Survey[6] [*Pesquisa Nacional de Saúde do Escolar*] (PeNSE) show that the prevalence was lower (56.1%) considering the cutoff point of 3 hours of screen time for 9th graders. Moreover, according to the PeNSE, girls presented a higher prevalence of screen time (57.6%) than boys did (54.5%), and private schools (65.2%) presented a higher prevalence than public schools did (54.2%)[6], differing from the present findings. These differences showed that schoolchildren in Rio Claro-SP present a high amount of screen time and make an intense use of technologies. This emphasizes that actions must be taken toward reducing screen time, bearing in mind that a maximum of 2 daily hours is recommended for this behavior, and that SB correlates with diseases and mood swings[2].

As for total SB, the adolescents in this study spend a high amount of time (13.7 ± 3.4 hours/day) compared to those in the study by Salmon et al.[8], who found that adolescents from European countries, Canada and the United Kingdom spend between 5.5 to 8.5 hours per day on SB. However, this difference in time can be attributed due to the instruments used to assess SB, since the present study applied a questionnaire, whereas Salmon et al.[8] employed accelerometers. Another influencing aspect is social and cultural differences, which have an impact on activities performed throughout the day, such as greater encouragement for physical activity in schools and use of active transportation in everyday life.

Questionnaires or diaries tend to overestimate values when compared to accelerometers or Actipal[9]. Another explanation may be the fact that the present study adapted a questionnaire designed for Brazilian adults[15], since no questionnaire targeting youths and with studies validated for the Brazilian reality was found. For this reason, the questionnaire introduced in Mielke[15] was used, which includes questions referring to video games and smartphones and may explain why the present study found a high SB value compared to the study by Salmon et al.[8]. At certain times, better than creating questionnaires is adapting existing ones, considering that, oftentimes, creating will not bring anything new, nor will it increase the accuracy of the instrument[19]. This procedure may favor greater precision in the questionnaires and allow the tool to be applied to different populations[19].

Sedentary Behavior Situations

Comparing the SB situations, girls spend more time using smartphone compared to boys. In the literature, no study that has assessed this variable separately was found, which highlights the importance of studying SB according to its situations. In addition, investigations seem to indicate that, depending on the situation analyzed, the behavior between boys and girls is different. On the one hand, girls usually engage more in TV and screen time activities, while boys engage more in screen time and computer and/or video game activities[6,20,21].

On the other hand, the boys in this study are more physically active than the girls are, as reported in other studies[6,11,21,22]. Although SB is independent of level of physical activity[1], spending 60 to 75 minutes on moderate to vigorous physical activity daily can mitigate the losses associated with up to 5 hours of sitting time[23]. Also, the World Health Organization shows that reducing and having breaks in SB through physical activity promotion, such as

standing up and choosing active transportation, helps reduce this behavior, in addition to raising levels of physical activity, resulting in a double gain for health[11].

However, these differences as to sex did not remain in the adjusted logistic regression analysis. Total SB was associated with these variables only: smartphone; TV; computer/tablet and video game; and SB involving obligations. It is known that these behaviors are part of SB activities, being the main explanation to these relations. These results are difficult to compare with other studies, as several of them consider SB as screen time, as previously mentioned[8,9], and not in a more comprehensive manner, as the assessment shown in the present study.

The findings of the present study corroborate with the results of previous studies conducted with a similar sample, since the adolescents who spend a high amount of time on smartphones are more likely to accumulate total SB compared to those who use this device for a shorter time[6,21]. Additionally, TV was the situation that presented lower values compared to computer/tablet/video game and SB obligations, just as in other studies[2,3], showing the importance of studying SB situations separately, as evidenced by Sugiyama et al.[24] and Schmid et al.[25]. In this way, smartphone presents a higher risk to raise total SB. This is probably due to the fact that smartphones are portable devices with a number of features, such as: calls, messages, photos, games, internet, GPS (Global Positioning System) and e-mail[26]. Furthermore, on smartphone applications one can watch TV shows, write and read texts, use social networks, and others. Thus, all other screen activities are inserted in one single device that is easy to carry, hence the users' preference for it.

Sociodemographic Factors

Sociodemographic factors were not associated with total SB in the present study. This finding does not corroborate the results of previous studies[3,9]. However, this result may be controversial, since these studies only assessed screen time and did not take into account other SB situations. Association between physical activity and SB was not found either, which is in line with some investigations[10,27] and may be explained by SB and PA being independent and presenting different characteristics[1].

Besides, other studies consider screen time[6,7,9] rather than total SB, as it is the case of this one. The present study found no correlation between SB and diseases and, in some cases, this was reported as well, showing the need for further research[3]. It is worth noting that only 10.6% presented any type of disease; therefore, to confirm the results, a larger number of individuals with a pathology would be necessary.

It is possible to say that the variable that most favor high SB among Rio Claro's schoolchildren is smartphone, followed by time spent on computer/tablet and video games, obligations and TV. Thus, for this population, future studies should create strategies to decrease sedentary time in these situations and with a focus on smartphone use, and/or take advantage of this tool as a means to favor breaks and reduce sedentary time[11]. To this end, smartphone applications meant for reducing and generating breaks in SB among adolescents seem to be a good strategy[28], since, according to the World Health Organization, developing and testing technologies that favor SB and physical activity monitoring are promising ideas to help in reducing SB and encouraging physical activity[11]. But, before, cross-sectional and longitudinal studies addressing SB in adolescents[11] should be conducted

Limitations and Final Remarks

One of the limitations of the present study is its high sample loss rate, which makes selection bias likely. However, this is justified by the students being minors; therefore, to participate in the research, they would need the consent form signed by their parents/guardians and the assent form signed by themselves. It is relevant to say that this obstacle was minimized, since the researchers went to the schools numerous times to request

the signed documents. Another limitation was the non-use of direct measures; a bias was found in the application of the questionnaire, as several adolescents reported spending 24 hours a day or more on SB, which would not be possible, considering that one needs to sleep and perform other activities every day. Perhaps this happened because two or more SB situations performed at the same time may have been counted jointly, considering that the instrument does not allow the individual to report activities performed together[29]. Thus, "losses" were considered for individuals who claimed spending 20 hours a day or more on these behaviors. Therefore, this reinforces that the ideal would be to use direct measures combined with self-report measures, enabling more comprehensive results[25]. Future studies should use both instruments, because the accelerometer will result in more accurate times as to SB, and the questionnaires will be capable of identifying which SB situations are most frequent[25].

However, it is important to highlight that the present study found other SB situations besides screen time, such as transportation, work and school, as reported by Schmid, Jochem and Leitzmann[25] as well, and this is relevant because most of the studies that research self-reported SB do not present these measures. Moreover, this study has a robust methodology, in addition to considering different SB situations rather than screen time alone.

Conclusion

A high prevalence of SB was identified among Rio Claro's schoolchildren in the final years of elementary education and in high school, in addition to a correlation between high amount of total SB and excessive use of smartphone, computer, video game and tablet, SB obligations (school, work and transportation) and TV. The results of the present study can assist in the creation of strategies and programs for prevention, intervention and counseling to decrease and generate breaks in sitting time among adolescents in general, since the use of technologies is something quite common in this age group. Thus, one possibility is to consider the development of an application for smartphones meant for reducing and generating breaks in SB, since this device is very present in the lives of schoolchildren, and there already is preliminary evidence that using this device may cause behavioral changes in this population.

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