

Perception of neighborhood safety and screen time in adolescents from Curitiba, Brazil

Percepção de segurança no bairro e tempo despendido em frente à tela por adolescentes de Curitiba, Brasil

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ABSTRACT: *Objective:* To analyze the association between perceptions of neighborhood safety (PNS) and screen time among adolescents and to assess the moderating effects of sex, age and socioeconomic status. *Methods:* A cross-sectional study with school survey was conducted in Curitiba, Brazil. First, six schools (three public and three private) were intentionally selected. Next, one class within each educational level (from the sixth year of elementary school to the third year of high school) was randomly selected. PNS was assessed using a NEWS-Y scale, and daily screen time was defined as the time spent watching TV/videos/DVDs, playing video games and using the Internet. Multinomial logistic regression models were used to test the association between PNS and screen time, adjusting for the confounding variables. *Results:* The sample included 776 adolescents (boys and girls), aged between 11 and 18 years old. Perceived crime was associated with time playing video games among older teenagers ($p < 0.05$). Pedestrian and traffic safety was inversely associated with time playing video games among adolescents with high socioeconomic status ($p < 0.05$). *Conclusion:* The association between PNS and screen time is complex among adolescents and varies according to sociodemographic variables and the screen time outcome (TV/videos/DVDs, video games and the Internet). *Keywords:* Perception. Sedentary lifestyle. Adolescents. Gender. Age groups. Socioeconomic status.

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RESUMO: *Objetivo:* Analisar a associação entre a percepção de segurança (PS) no bairro e o tempo despendido em frente à tela pelos adolescentes e verificar o papel moderador das variáveis sexo, idade e nível socioeconômico nessa relação. *Métodos:* Trata-se de um estudo transversal, com inquérito escolar realizado em Curitiba, Paraná. Inicialmente foram selecionadas, de modo intencional, seis escolas (três públicas e três privadas), e em seguida foi sorteada uma turma de cada período de ensino (sexto ano do ensino fundamental ao terceiro ano do ensino médio). A PS foi avaliada com a escala NEWS-Y, e o tempo diário despendido em frente à tela foi definido por aquele passado diante da televisão/vídeo/DVD, jogando *videogame* e utilizando a internet. Modelos de regressão logística multinomial foram utilizados para testar a associação entre a PS e essa atividade, ajustando para as variáveis moderadoras. *Resultados:* Participaram do estudo 776 adolescentes, com idade entre 11 e 18 anos. A PS relacionada aos crimes foi associada com o uso de *videogame* por adolescentes mais velhos, no sentido contrário ao esperado ($p < 0,05$). A PS relacionada ao tráfego de pedestres foi associada inversamente ao uso de *videogame* por adolescentes de maior nível socioeconômico ($p < 0,05$). *Conclusão:* A associação entre PS e tempo despendido em frente à tela é complexa para os adolescentes e difere em relação às variáveis sociodemográficas e o desfecho analisado (televisão/vídeo/DVD, *videogame* e internet).

Palavras-chave: Percepção. Estilo de vida sedentário. Adolescentes. Sexo. Grupos etários. Nível socioeconômico.

INTRODUCTION

Time spent in front of screens, which includes watching television, playing video games, and using the computer or Internet, is a common sedentary activity among adolescents^{1,2}. Currently in Brazil, 79.5% of adolescents aged between 12 and 14 years spend over two hours a day on these activities³. Evidence indicates a positive association between this behavior and obesity, diabetes and low levels of physical fitness in adolescents⁴⁻⁶. There is also indication that this behavior increases throughout adolescence. For example, in a longitudinal study with 4,218 adolescents, an average increase of 60 minutes/day per year in the screen time in adolescents aged 11 and 15 years was observed; and this increase was associated with body adiposity⁷. In addition, this behavior is more likely to continue into adulthood⁸.

Given this context, there is a growing interest in understanding the aspects that affect screen time, particularly aspects from the community environment⁹⁻¹², and especially public safety and traffic. In fact, the perception of neighborhood safety related to crimes and traffic has an inverse association with sedentary behavior among young people¹¹⁻¹³. This relationship is also observed when parents perceive that their the neighborhood is unsafe^{9,10}. These findings may be partly explained by the absence of safe walking places, as it reduces the adolescent's physical activity going to and from home, and induces the adolescent to spend more time doing sedentary activities^{14,15}. Such aspects may be even more important in the Brazilian context, since crime rates and traffic-related deaths¹⁶⁻¹⁸ are among the highest in the world.

To date, studies on the association between perceived safety and time spent by adolescents in front of the screen (watching TV/ videos/DVDs, playing video games or using the

internet) have not been identified in the country. Greater attention was observed in the associations between time spent watching TV, and less attention was given to other behaviors like playing videogames and using the Internet, which presented a high prevalence in this population¹⁹.

Likewise, the moderating role of sociodemographic variables in the relationship between safety and time spent by adolescents in front of screens is also not well demonstrated. However, these variables are believed to exhibit differences in the screen-related behaviors of the population subgroups. Considering some scientific articles, there is a greater possibility for boys to play videogames in unsafe places¹¹. In addition, younger female adolescents with a higher income reported a lower perceived safety^{20,21}. Moreover, it is believed that socioeconomic level is an important variant to be considered, since people with a higher income feel more unsafe in their neighborhood, possibly because those neighborhoods are more attractive to criminals²². Identifying subgroups that are more exposed to the effect of insecurity can improve the understanding of this complex relationship, especially considering the role of sociodemographic aspects, which have not yet been explored.

Thus, this study aimed to:

1. analyze the association between the perception of neighborhood security and screen time, including time spent watching television/videos/DVDs, playing videogames and surfing the internet;
2. verify the moderating role of sociodemographic variables such as gender, age and socioeconomic level in this relationship.

METHODS

POPULATION AND STUDY DESIGN

This is a cross-sectional study that was conducted between September and October of 2012. The participants were adolescents aged between 11 and 18 years, of both sexes, from Curitiba, Paraná, Brazil. All procedures were approved by the Human Research Ethics Committee of the Pontifícia Universidade Católica do Paraná (Protocol No. 93.664/12).

The most recent estimates suggest that Curitiba has around 269,505 adolescents aged between 10 and 19 years, evenly distributed in terms of gender (50.5% boys). According to data from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*, IBGE), the number of students enrolled in primary and secondary education in 2012 was 234,215 and 81,614, respectively²³. Most students, from both the elementary and high school, attended public educational institutions (76.4 and 73.9%, respectively). Thus, to try to obtain a sample that contemplated students of public and private schools, the selection was performed in two stages. Initially, six schools (three public and three private)

were chosen from the elementary and middle schools in Curitiba, Paraná. This criterion was adopted in order to include students from the region that belongs to both the highest and lowest socioeconomic classes. In the second stage, all schools that met the following criteria were eligible:

1. having at least one grade between the sixth year of elementary school and the third year of high school in the daytime;
2. having at least 20 students in each class.

Thereby, it was decided to randomly select one teaching period at each school among the eligible classes. Finally, 42 classes and an estimated total of 1,344 adolescents were selected. However, a sample of 1,081 adolescents (54% girls) was obtained during the collection.

STUDY VARIABLES

For data collection, an instrument composed of three sessions was applied:

1. sociodemographic information;
2. perception of the neighborhood environment;
3. sedentary behavior.

The instrument was applied at school and during the classes with the permission of the school board and conducted by a team of three trained evaluators.

Screen time was analyzed based on the time spent watching television/videos/DVDs daily, in addition to playing videogames and using the Internet. This did not include school hours or weekend days. Participants were asked how many minutes per day they spent on these activities. The response was obtained on an ordinal scale of seven points (none, 15 minutes, 30 minutes, 1 hour, 2 hours, 3 hours, ≥ 4 hours). This procedure has been used in similar studies to analyze screen time²⁴. For analysis purposes, responses were grouped into three levels: up to 15 minutes; from 30 minutes to 1 hour; 2 hours or more.

Perceptions of traffic and crime-related safety were assessed using the Neighborhood Environment Walkability Scale for Youth (NEWS-Y)²⁵. The scales that were related to traffic safety and crime were translated and adapted to the Brazilian context and its final version presented adequate conceptual and semantic equivalence²⁶. Perceptions on traffic safety were evaluated using eight items related to vehicle traffic and pedestrians in the neighborhood. Safety from crimes in the neighborhood was evaluated through seven items and using a four-point ordinal scale ranging from “totally disagree” to “totally agree”.

Finally, participants were asked about sociodemographic characteristics such as gender (male/female), age (years) and socioeconomic status (SES). Finally, SES was determined

through a protocol suggested by the Brazilian Association of Research Companies (*Associação Brasileira das Empresas de Pesquisa*—ABEP), which considers the possession of items at home and categorize families into the seven economic (A1, A2, B1, B2, C1, C2, D and E)²⁷. For this study participants were grouped into three categories: high (class A1 + A2), middle (class B1 + B2) and low (class C1 + C2 + D + E).

DATA ANALYSIS

The description of the study variables was performed by means of descriptive statistics according to the measurement scale of each variant. Quantitative variables were described by mean and standard deviation, while qualitative variables were determined by means of the absolute and relative frequency distribution. In order to confirm the main components of each NEWS-Y scale, an exploratory factorial analysis was performed with traffic and crime-related safety perception scales.

The bivariate association between the variables gender, age and SES was measured using the χ^2 test for proportions. The multivariate association of the variables gender, age, SES, safety perception and the three categories of time of sedentary behaviors (up to 15 minutes, from 30 minutes to 1 hour, and 2 hours or more) was examined using multinomial logistic regression analysis, as the data did not confirm previous assumptions to allow ordinal logistic regression to be performed. In the multivariate analysis, all variables were inserted into the model. The odds ratio (OR) was estimated from the association between independent variables (perception of crime-related safety, vehicle traffic and pedestrian traffic), inserted in the model as continuous variables (standardized factor load) and interpreted as the cause of increase of the OR and for the increase of a standard deviation in the standard factorial load.

Furthermore, the interaction between the independent variables (perception of crime-related safety, vehicular traffic and pedestrian traffic) was tested with the variables gender (male = 0 versus female = 1), age (11–14 years = 0 versus 15 to 18 years = 1) and socioeconomic level (“C”, “B” and “A”). To this end, a term was created to describe the interaction between the independent variables and the potential moderating variables (gender, age and SES) by means of the product between them. SES was converted into two dummy variants to identify participants with socioeconomic status “B” and “A”. The interaction terms were inserted into the adjusted model for the other potential confounding variables. All analyzes were performed using the statistical package STATA, version 11.0, and adopting a significance level of $p < 0.05$.

RESULTS

The results of the exploratory factor analysis (Table 1) were composed of three factors:

1. perception of safety related to crime, consisting of five items;
2. perception of safety related to vehicle traffic, composed of four items;
3. perception of safety related to pedestrian traffic, composed of three items.

A total of 1,081 adolescents (55.0% girls), aged between 11 and 18 years, participated in this study. Of these, 776 (72% of the initial sample) had a complete set of data to perform the analysis. First, a non-response evaluation was carried out to identify possible differences between adolescents who were included and those who were not included in the sample. There was no significant difference in this analysis (data not shown). A large part of the participants of the sample was aged between 14 and 16 years old (57.0%) and had high SES (51.0%; n = 393). The proportion of adolescents that watch television more than 2 hours per day was 45.0%, with a 95% confidence interval (95%CI) 42.4 – 48.7. This proportion was higher among girls (48.0 versus 41.0%), aged 13 years old (54.0%), and in the middle class (57.0%). Videogame use for more than 2 hours per day was reported

Table 1. Results of the analysis of the main components for scales of safety perception in adolescents. Curitiba, 2015.

Items	Descriptive analysis		Confirmatory Factor Analysis		
	A	SD	F1	F2	F3
Is there a lot of traffic on the streets near your neighborhood?	2.5	1.0	0.09	0.63	-0.32
Is the speed of traffic in the surrounding areas less than 40 km/h?	2.4	1.0	-0.10	0.61	0.16
Do drivers drive above the speed limit?	2.3	0.9	0.01	0.68	0.20
Are the streets of your neighborhood well lit at night?	2.7	1.0	0.14	0.12	0.70
Can pedestrians and cyclists be seen easily?	2.7	1.0	0.02	0.09	0.53
Are there pedestrian lanes and traffic signs?	2.6	1.1	0.03	-0.19	0.72
Is there a lot of exhaust smoke/pollution on the streets?	2.7	1.0	0.18	0.59	-0.02
Are there many crimes in your neighborhood?	2.6	1.0	0.41	0.30	0.41
Does the crime rate make it unsafe to walk at night?	2.3	1.1	0.53	0.28	0.36
Fear of being attacked by a stranger at home	3.1	1.1	0.78	0.00	0.07
Fear of being attacked by a stranger in the vicinity	3.2	1.0	0.82	0.00	0.02
Fear of being attacked by a stranger while walking	3.0	1.0	0.82	0.10	0.02
Fear of being attacked by a stranger in the park	2.8	1.0	0.73	-0.01	0.05
% variance explained			22.95	14.01	13.68

A: average; SD: standard deviation; F1: perception of crime-related safety; F2: perception of vehicle traffic-related safety; F3: perception of pedestrian traffic-related safety.

by 48.0% (95%CI 45.9 – 52.2) of the sample, with a higher prevalence for boys (62.0 versus 36.0%), aged 13 years old (54.0%) and high SES (50.0%). More time spent in front of the screen surfing the Internet was observed in 61.0% (95%CI 57.8 - 63.9) of the sample. Girls (63.0 versus 57.0%) aged 15 years old (67.0%) and “middle” SES (62.0%) showed a higher prevalence for this behavior. Table 2 presents other descriptive characteristics of the participants.

The bivariate analysis observed a lower chance of adolescents watching TV in excess as they grow older (OR = 0.84, 95%CI 0.74 – 0.94). There was a 13.0% increase in the possibility of excessive Internet use for each year of life. Girls were less likely to spend their time playing videogames (OR = 0.18; 95%CI 0.12 – 0.27) compared to boys.

Perception of safety was not associated with time devoted to watching television; however, statistically significant association were observed between pedestrian traffic safety and time devoted to playing videogames (OR = 1.27, 95%CI 1.04 – 1.55) and vehicle traffic safety and time on the Internet (OR = 1.32, 95%CI 1.04 – 1.69), both in the reverse order than expected. The perception of safety related to crime (Table 3) remained associated with the use of videogames and the Internet, contrary to our hypothesis ($p < 0.05$).

After adjusting for the confounding variables (Table 4), the perception of safety related to crime was associated with 30 minutes to 1 hour playing videogames by older adolescents (OR = 1.15, 95%CI 1.03 – 1.29). The perception of safety related to pedestrian traffic was associated with the presence of 30 minutes to 1 hour playing videogames by adolescents with higher SES (OR = 2.40, 95%CI 1.05 – 5.47). The association between safety perception related to pedestrian traffic and playing videogames for 2 hours or more, decreases with increasing age (OR = 0.87; 95%CI 0.79 – 0.97).

DISCUSSION

The results in this study indicate different directions and magnitudes in the association between the perception of safety and the screen time of adolescents. There was a high prevalence of adolescents who did screen-related activities for more than two hours daily, corroborating other findings^{3,7,13}. When considering the sedentary activities separately, it was observed that the prevalence of each one differs according to gender, age and SES.

The predominance in TV use was higher among girls and low-income youth. The lack of safety present in the community, combined with social norms that inhibit girls' autonomy, could, at least partially, explain this result. For example, parents may prohibit activities away from home, leading girls to opt for more sedentary activities. Greater TV use in low-income economic classes has been demonstrated in other studies^{9,12,28,29}. Among girls, during adolescence, there is a predominance of Internet use. It can be speculated that this age group prefers to participate in social networks, chats,

Table 2. Descriptive characteristics of adolescents according to screen time (n = 776). Curitiba, 2015.

	Total		Time spent watching TV/videos/DVDs						χ^2 test	Time spent playing videogames						χ^2 test	Time spent on the internet						χ^2 test
			0 – 15 minutes		30 minutes – 1 hour		2 hours or more			0 – 15 minutes		30 minutes – 1 hour		2 hours or more			0 – 15 minutes		30 minutes – 1 hour		2 hours or more		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Males	347	45	62	18	141	41	143	41	0.12	39	11	94	27	214	62	0.00	49	14	100	29	198	57	0.20
Females	429	55	60	14	163	38	206	48		161	38	112	26	156	36		50	12	107	25	272	63	
Age (years)																							
11	72	09	11	15	30	42	31	43	0.25	22	31	15	21	35	49	0.35	25	35	15	21	32	44	0.00
12	92	12	7	08	36	39	49	53		23	25	25	27	44	48		10	11	25	27	57	62	
13	101	13	12	12	35	35	54	54		20	20	27	27	54	54		7	07	33	33	61	60	
14	147	19	24	16	53	36	69	47		34	23	44	30	69	47		15	10	41	28	91	62	
15	155	20	26	17	64	41	65	42		38	25	43	28	74	48		11	07	41	27	103	67	
16	136	18	24	18	57	42	55	40		38	28	29	21	69	51		18	13	30	22	88	65	
17	60	08	14	23	23	38	23	38		18	30	20	33	22	37		10	17	20	33	30	50	
18	13	02	4	31	6	46	3	23		7	54	3	23	3	23		3	23	2	15	8	62	
SES																							
C	46	06	4	09	16	35	26	57	0.38	10	22	17	37	19	41	0.41	7	15	14	30	25	54	0.47
B	337	43	57	17	137	41	143	42		93	28	89	26	155	46		48	14	81	24	208	62	
A	393	51	61	16	151	39	180	46		97	25	100	25	196	50		44	11	112	29	237	60	

SES: socioeconomic status.

Table 3. Association between sociodemographic characteristics and screen time in adolescents (n = 776). Curitiba, 2015.

	Time spent watching TV/videos/DVDs				Time spent playing videogames				Time spent on the internet			
	30 minutes – 1 hour		2 hours or more		30 minutes – 1 hour		2 hours or more		30 minutes – 1 hour		2 hours or more	
	OR	CI95%	OR	CI95%	OR	CI95%	OR	CI95%	OR	CI95%	OR	CI95%
Females*†	1.19	(0.78 – 1.82)	1.49	(0.98 – 2.25)	0.29	(0.19 – 0.45)	0.18	(0.12 – 0.27)	1.05	(0.65 – 1.69)	1.35	(0.87 – 2.08)
Age	0.89	(0.79 – 1.01)	0.84	(0.74 – 0.94)	0.98	(0.88 – 1.09)	0.94	(0.85 – 1.03)	1.11	(0.97 – 1.26)	1.13	(1.00 – 1.28)
SES B	0.60	(0.19 – 1.88)	0.39	(0.13 – 1.16)	0.56	(0.24 – 1.30)	0.88	(0.39 – 1.97)	0.84	(0.32 – 2.24)	1.21	(0.50 – 2.97)
SES A	0.62	(0.20 – 1.93)	0.45	(0.15 – 1.35)	0.61	(0.26 – 1.39)	1.06	(0.48 – 2.38)	1.27	(0.48 – 3.36)	1.51	(0.61 – 3.70)
PS crimes	0.88	(0.70 – 1.09)	0.89	(0.72 – 1.11)	1.10	(0.91 – 1.34)	1.23	(1.04 – 1.47)	1.17	(0.92 – 1.49)	1.14	(0.92 – 1.41)
PS veh. traf.	1.14	(0.92 – 1.41)	0.95	(0.77 – 1.17)	1.20	(0.98 – 1.46)	1.12	(0.94 – 1.33)	1.30	(1.02 – 1.66)	1.09	(0.88 – 1.36)
PS ped. traf.	0.91	(0.74 – 1.12)	1.14	(0.93 – 1.41)	1.26	(1.03 – 1.53)	1.12	(0.95 – 1.33)	1.22	(0.96 – 1.55)	1.10	(0.89 – 1.36)
**Females†	1.12	(0.73 – 1.73)	1.39	(0.91 – 2.13)	0.28	(0.18 – 0.44)	0.18	(0.12 – 0.27)	1.18	(0.72 – 1.94)	1.50	(0.96 – 2.35)
Age	0.89	(0.79 – 1.01)	0.84	(0.75 – 0.95)	0.98	(0.87 – 1.10)	0.92	(0.83 – 1.02)	1.15	(1.01 – 1.32)	1.16	(1.03 – 1.31)
SES B	0.61	(0.19 – 1.93)	0.42	(0.14 – 1.26)	0.54	(0.23 – 1.28)	0.84	(0.36 – 1.97)	0.75	(0.28 – 2.02)	1.11	(0.45 – 2.77)
SES A	0.63	(0.20 – 1.98)	0.47	(0.16 – 1.43)	0.51	(0.22 – 1.21)	0.88	(0.38 – 2.06)	1.10	(0.41 – 2.94)	1.42	(0.57 – 3.52)
PS crimes	0.88	(0.71 – 1.11)	0.91	(0.73 – 1.14)	1.02	(0.83 – 1.25)	1.08	(0.90 – 1.30)	1.20	(0.94 – 1.54)	1.19	(0.95 – 1.49)
PS veh. traf.	1.12	(0.91 – 1.39)	0.93	(0.75 – 1.14)	1.20	(0.98 – 1.47)	1.10	(0.91 – 1.32)	1.32	(1.04 – 1.69)	1.11	(0.89 – 1.39)
PS ped. traf.	0.89	(0.72 – 1.10)	1.10	(0.89 – 1.36)	1.27	(1.04 – 1.55)	1.13	(0.94 – 1.35)	1.23	(0.97 – 1.57)	1.12	(0.90 – 1.39)

*Bivariate analysis; **multivariate analysis; Gender † (ref. males = 1); SES: socioeconomic status (ref. C = 1); PS: perception of safety; veh. traf.: vehicle traffic; ped. traf.: pedestrian traffic; OR: odds ratio; CI95%: confidence interval 95%.

Table 4. Multinomial regression analysis (n = 775). Reference = 0 – 15 minutes per day. Curitiba, 2015.

		OR	Gender	p-value	OR	Age	p-value	OR	SES A	p-value	OR	SES B	p-value	
TV/Videos/DVDs	30 minutes – 1 hour	PS crimes	0.82	(0.52 – 1.29)	0.39	1.01	(0.89 – 1.14)	0.87	0.97	(0.35 – 2.73)	0.96	1.33	(0.48 – 3.70)	0.59
		PS veh. traf.	1.10	(0.72 – 1.68)	0.65	1.01	(0.89 – 1.13)	0.91	0.53	(0.14 – 2.06)	0.36	0.80	(0.21 – 3.07)	0.74
		PS veh. traf.	0.86	(0.56 – 1.31)	0.48	0.98	(0.87 – 1.11)	0.78	0.48	(0.15 – 1.54)	0.22	0.56	(0.17 – 1.79)	0.33
	2 hours or +	PS crimes	0.84	(0.54 – 1.32)	0.45	1.06	(0.94 – 1.19)	0.38	1.01	(0.37 – 2.73)	0.99	1.31	(0.49 – 3.50)	0.60
		PS veh. traf.	1.07	(0.70 – 1.63)	0.76	1.02	(0.90 – 1.14)	0.80	0.50	(0.14 – 1.87)	0.31	0.68	(0.18 – 2.54)	0.57
		PS veh. traf.	0.82	(0.54 – 1.25)	0.36	0.95	(0.85 – 1.08)	0.45	0.33	(0.10–1.08)	0.07	0.43	(0.13 – 1.39)	0.16
Videogames	30 minutes – 1 hour	PS crimes	0.87	(0.54 – 1.40)	0.57	1.15	(1.03 – 1.29)	0.01	0.70	(0.32 – 1.52)	0.37	1.36	(0.63 – 2.93)	0.43
		PS veh. traf.	0.95	(0.60 – 1.49)	0.82	0.99	(0.89 – 1.11)	0.93	0.77	(0.33 – 1.81)	0.55	1.15	(0.49 – 2.69)	0.75
		PS veh. traf.	1.36	(0.87 – 2.14)	0.18	0.93	(0.83 – 1.05)	0.25	2.40	(1.05 – 5.47)	0.04	2.04	(0.89 – 4.65)	0.09
	2 hours or +	PS crimes	0.71	(0.46 – 1.09)	0.12	1.09	(0.98 – 1.20)	0.11	0.49	(0.22 – 1.07)	0.08	0.86	(0.39 – 1.88)	0.71
		PS veh. traf.	0.76	(0.50 – 1.16)	0.20	1.03	(0.93 – 1.14)	0.61	1.79	(0.72 – 4.42)	0.21	1.72	(0.70 – 4.25)	0.24
		PS veh. traf.	0.91	(0.60 – 1.37)	0.65	0.87	(0.79 – 0.97)	0.01	1.53	(0.68 – 3.44)	0.31	1.57	(0.70 – 3.55)	0.28
Internet	30 minutes – 1 hour	PS crimes	1.12	(0.68 – 1.84)	0.66	0.97	(0.85 – 1.11)	0.70	1.01	(0.42 – 2.45)	0.98	1.68	(0.70 – 4.01)	0.24
		PS veh. traf.	0.93	(0.57 – 1.51)	0.76	1.11	(0.97 – 1.26)	0.13	0.47	(0.15 – 1.46)	0.19	0.67	(0.22 – 2.04)	0.48
		PS veh. traf.	1.10	(0.68 – 1.78)	0.71	1.01	(0.89 – 1.16)	0.83	1.67	(0.64 – 4.34)	0.29	2.37	(0.91 – 6.17)	0.08
	2 hours or +	PS crimes	0.89	(0.57 – 1.40)	0.63	0.96	(0.85 – 1.08)	0.47	0.93	(0.41 – 2.09)	0.86	1.49	(0.67 – 3.30)	0.33
		PS veh. traf.	1.06	(0.68 – 1.65)	0.80	1.08	(0.96 – 1.22)	0.19	0.78	(0.28 – 2.20)	0.64	0.86	(0.31 – 2.39)	0.77
		PS veh. traf.	0.90	(0.58 – 1.39)	0.63	0.97	(0.86 – 1.09)	0.59	0.69	(0.29 – 1.66)	0.41	0.97	(0.41 – 2.31)	0.94

OR: odds ratio; SES: socioeconomic status; PS: perception of safety; PS: perception of safety; veh. traf.: vehicle traffic; ped. traf.: pedestrian traffic. Adjusted for the variables: gender, age, SES, PS crimes, PS vehicle traffic, PS pedestrian traffic; *p < 0.05.

blogs and other activities related to the Internet³⁰, which is different from boys, who prefer electronic games^{11,31}.

There was a positive association between the perception regarding crime-related safety and playing videogames. This result is contrary to the hypothesis of the present study. In a survey conducted in Texas, in the United States, different results were obtained, and the high crime rate in the neighborhood was associated with more time devoted to videogames¹¹. However, a survey of a large sample of Brazilian schoolchildren found no association between neighborhood characteristics and time spent watching television³². The use of self-reported measures regarding public safety may present limitations, and suggests the need to improve the understanding of the phenomenon of violence in young people's perception of safety.

There was an inverse association between the understanding of pedestrian, traffic-related safety and adolescents playing videogames. Generally, older adolescents spend more time away from home and have greater independence with regard to mobility¹⁵. As such, these factors can contribute so that they spend less time on activities such as video games. Nevertheless, the perception of safety related to pedestrian traffic was not associated with TV and Internet use. It is believed that these activities, in this age group, are tied to individual preferences. The Internet is a communication tool that is an integral part of adolescents' daily life³⁰. Thus, neighborhood environment aspects may have less relation to these behaviors.

Finally, it is important to emphasize that this study approached adolescents' perception of safety, since evidence obtained through the parents' perceptions tend to differ³³. This may be related to the adolescent's lack of awareness about the reality of the neighborhood, or to the fact that the family can transmit a sense of safety. Moreover, this subjective evaluation does not allow us to identify the reality of the neighborhood nor the exact amount of screen time. Another limitation related to the measurement of screen time is the lack of information considering the weekends, which could imply different results for the investigation. Thus, future research related to the topic is suggested, which includes other control variables, such as the caregiver's perceptions of safety and the adolescents' practice of physical activity. In addition, these investigations should include objective ways of assessing screen time, in addition to different study designs, so that it is possible to identify cause and effect relationships between neighborhood safety and time adolescents spend in front of screens.

Some factors should be considered when interpreting these results. The self-reported measurements represent another limitation, since they reflect perceptions about behaviors and environments, and are not a direct measure of such attributes. Therefore, a classification error cannot be completely ruled out in interpreting the results. Still, approximately 30% of the initial sample did not contribute a complete set of data for analysis, which resulted in a smaller testing pool. In addition, the fact that the neighborhood is not perceived to be unsafe does not mean that there are no crimes or traffic accidents. However, these measurements have been used in several national and international studies and present valid

results. This study was carried out with adolescents aged 11 to 18 years, who are students from public and private schools in Curitiba, Paraná. Thus, it is not possible to extrapolate these results to other populations.

Despite these limitations, the issues addressed here are extremely important for the implementation of policies aimed at reducing the time spent by adolescents in front of screens. Although only one expected association was found, other important information must be considered. The results in this study allow us to observe the characteristics in the profile of the adolescents who use television, videogames and the Internet, thus enabling future interventions aimed at reducing these activities in this age group. In addition, different outcomes related to screen time and more specific characteristics related to the perception of neighborhood safety were considered. In low- and middle-income countries like Brazil, this type of research involving adolescents is still scarce.

CONCLUSION

The association between perceived safety and time spent by adolescents in front of screens is complex and varies according to sociodemographic characteristics and the type of equipment used during screen time (television/videos/DVDs, videogames and the Internet). The prevalence of screen time among adolescents over two hours daily is high. Greater perception of crime in the neighborhood was associated with more time spent playing videogames by older adolescents. Thus, new research is recommended that may include objective measurements of safety in the neighborhood, and also that investigate the perception of parents, in order to better understand this complex relationship. Furthermore, it is suggested that interventions that reduce screen time should be priorities in the health agenda for adolescents.

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