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**Effect and mediating variables of a randomized-controlled trial to promote physical activity and reduce sedentary behavior on the health-related quality of life of schoolchildren in Florianópolis, Brazil**

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Alexsandra da Silva Bandeira

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Supervisor: Prof. Kelly Samara da Silva, Ph.D

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**Effect and mediating variables of a randomized-controlled trial to promote physical activity and reduce sedentary behavior on the health-related quality of life of schoolchildren in Florianopolis, Brazil**

O presente trabalho em nível de Doutorado foi avaliado e aprovada com louvor, em 25 de Agosto de 2022, pela banca examinadora composta pelos seguintes membros:

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Florianópolis, 2022.

Este trabalho é dedicado aos meus pais, Regina e Lucileudo; aos meus irmãos, Anderson e Gleidson; e às mulheres que lutam diariamente por um mundo mais justo e igualitário. Essa conquista também é de vocês.

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## RESUMO

**Introdução:** A escola tem sido um contexto essencial para o desenvolvimento de intervenções voltadas à promoção de atividade física (AF) e redução do tempo de tela (TT) de adolescentes. No entanto, estudos experimentais avaliando o impacto dessas intervenções nas dimensões da qualidade de vida relacionada à saúde (QVRS) são necessários para entender os caminhos complexos para a promoção efetiva da saúde. Ainda, evidências têm destacado a importância de avaliar a implementação de intervenções com o intuito de entender quais barreiras podem estar relacionadas a falta de efeito e quais os facilitadores para uma boa implementação das estratégias. Dessa forma, o objetivo geral da presente tese foi analisar o efeito de um estudo randomizado controlado nas dimensões da QVRS, verificar se o efeito foi mediado por mudanças nos indicadores de AF e TT, bem como investigar a implementação da intervenção em adolescentes. Com o intuito de responder o objetivo geral da tese, foram desenvolvidos três artigos científicos. O primeiro estudo teve como objetivo específico examinar o efeito da intervenção nas diferentes dimensões da QVRS (Bem-Estar Físico, Bem-Estar Psicológico, Autonomia & Relacionamento com os Pais, Pares & Apoio Social e Ambiente Escolar) de acordo com sexo, idade e os escores prévios de QVRS. O segundo estudo verificou se mudanças na AF, TT e seus determinantes psicossociais (autoeficácia, expectativas de resultados e apoio social) foram mediadores do efeito da intervenção e se estiveram diretamente associados às dimensões da QVRS. Por fim, o terceiro estudo investigou a implementação das estratégias de intervenção com base em dados quantitativos e qualitativos de professores, alunos e pais. **Métodos:** Um ensaio clínico randomizado controlado por conglomerado foi realizado em Florianópolis, região Sul do Brasil, durante um ano letivo (março-novembro/2017). Seis das dezoito escolas elegíveis concordaram em participar da pesquisa, três escolas sorteadas para cada condição (intervenção vs. controle). Entre 1427 alunos elegíveis, 921 (intervenção=538) participaram na linha de base. A intervenção incluiu: i) formação de professores com conteúdos relacionados à AF e TT; ii) estratégias educativas através da disponibilização de panfletos e cartazes; iii) criação e revitalização de espaços para a prática de AF na escola. Questionários validados para adolescentes brasileiros foram aplicados para mensurar as cinco dimensões da QVRS (Bem-Estar Físico, Bem-Estar Psicológico, Autonomia & Relacionamento com os Pais, Pares & Apoio Social e Ambiente Escolar), AF, TT e seus determinantes psicossociais (Autoeficácia, Resultados Esperados e Suporte Social). Para responder o primeiro estudo, foram utilizados modelos mistos lineares com o intuito de verificar o efeito da intervenção nas diferentes dimensões da QVRS conforme o sexo, idade e QVRS prévia. Em relação ao segundo estudo, modelos de equações estruturais examinaram o efeito mediador e direto das mudanças na AF, TT e seus determinantes psicossociais nas diferentes dimensões da QVRS. Finalmente, a avaliação da implementação da intervenção foi realizada usando uma abordagem de métodos mistos (quantitativa e qualitativa) com dados dos diferentes atores envolvidos no estudo (alunos, professores e pais). **Resultados:** Dos 921 alunos que responderam ao questionário na linha de base, 300 e 434 completaram o estudo nos grupos controle e intervenção, respectivamente (desistências: 20%). Os resultados do primeiro estudo demonstraram que a intervenção não foi efetiva em modificar as diferentes dimensões de QVRS. Por outro lado, foi observada uma redução dos escores da dimensão ambiente escolar em ambos os grupos (controle e intervenção) ao final do ano escolar. As análises de sensibilidade mostraram que os alunos com melhor QVRS na linha de base reduziram seus escores do pré para o pós-intervenção em ambos os grupos intervenção e controle. No que se refere ao segundo estudo, não houve efeito indireto significativo, ou seja, mudanças na AF, TT e seus determinantes psicossociais não foram mediadores do efeito da intervenção nas diferentes dimensões da



QVRS. No entanto, em um ano letivo, mudanças na autoeficácia, suporte social (família e amigos) e resultados esperados relacionados à AF e TT melhoraram a QVRS dos adolescentes, embora isso não tenha sido atribuído à intervenção. Finalmente, o terceiro estudo observou que os professores tiveram uma percepção mais positiva da intervenção quando comparados aos alunos e seus pais. Em resumo, embora as estratégias de intervenção tenham sido aceitas pelos professores, a maioria dos alunos e pais não percebeu a implementação da intervenção. As principais dificuldades apontadas para o sucesso da implementação foram a falta de engajamento da comunidade escolar (por exemplo, diretores) e dos pais, bem como a agenda lotada dos professores. **Conclusões:** O programa Movimento não melhorou efetivamente as dimensões da QVRS e adolescentes brasileiros com melhor QVRS na linha de base reduziram seus escores ao final do ano letivo. Mudanças nos determinantes psicossociais de AF e TT podem melhorar as dimensões da QVRS, mesmo que essas mudanças não tenham sido atribuídas à intervenção. O estudo de implementação identificou que a fidelidade da intervenção não foi como esperada, o que pode estar relacionado à falta de efeito da intervenção nos mediadores e na QVRS. Portanto, nossos resultados indicam a importância de investigar estratégias para melhorar o bem-estar dos adolescentes, incluindo intervenções para alterar determinantes psicossociais e métodos que garantam a fidelidade da intervenção.

**Palavras-chave:** Intervenção de base escolar; bem-estar; fatores psicossociais; implementação de intervenções.

## RESUMO EXPANDIDO

### Introdução

A escola tem sido um contexto essencial para o desenvolvimento de intervenções voltadas à promoção de atividade física (AF) e redução do tempo de tela (TT) de adolescentes. No entanto, estudos experimentais avaliando o impacto dessas intervenções nas dimensões da qualidade de vida relacionada à saúde (QVRS) são necessários para entender os caminhos complexos para a promoção efetiva da saúde. Ainda, evidências têm destacado a importância de avaliar a implementação de intervenções com o intuito de entender quais barreiras podem estar relacionadas a falta de efeito e quais os facilitadores para uma boa implementação das estratégias. Dessa forma, o objetivo geral da presente tese foi analisar o efeito de um estudo randomizado controlado nas dimensões da QVRS, verificar se o efeito foi mediado por mudanças nos indicadores de AF e TT, bem como investigar a implementação da intervenção em adolescentes.

### Objetivos

Com o intuito de responder o objetivo geral da tese, foram desenvolvidos três artigos científicos. O primeiro estudo teve como objetivo específico examinar o efeito da intervenção nas diferentes dimensões da QVRS (Bem-Estar Físico, Bem-Estar Psicológico, Autonomia & Relacionamento com os Pais, Pares & Apoio Social e Ambiente Escolar) de acordo com sexo, idade e os escores prévios de QVRS. O segundo estudo verificou se mudanças na AF, TT e seus determinantes psicossociais (autoeficácia, expectativas de resultados e apoio social) foram mediadores do efeito da intervenção e se estiveram diretamente associados às dimensões da QVRS. Por fim, o terceiro estudo investigou a implementação das estratégias de intervenção com base em dados quantitativos e qualitativos de professores, alunos e pais.

### Metodologia

Um estudo randomizado controlado por conglomerados (Programa Movimento) foi realizado em Florianópolis, região Sul do Brasil, durante um ano letivo (março-novembro/2017). Seis das dezoito escolas elegíveis concordaram em participar da pesquisa, três escolas sorteadas para cada condição (intervenção vs. controle). Entre 1.427 alunos elegíveis, 921 (intervenção = 538) participaram na linha de base. A intervenção incluiu: i) formação de professores com conteúdos relacionados à AF e TT; ii) estratégias educativas através da disponibilização de panfletos e cartazes; iii) criação e revitalização de espaços para a prática de AF na escola. Questionários validados para adolescentes brasileiros foram aplicados para mensurar as cinco dimensões de QVRS (Bem-Estar Físico, Bem-Estar Psicológico, Autonomia & Relacionamento com os Pais, Pares & Apoio Social e Ambiente Escolar), AF, TT e seus determinantes psicossociais (Autoeficácia, Resultados Esperados e Suporte Social). Para responder o primeiro estudo, foram utilizados modelos mistos lineares com o intuito de verificar o efeito da intervenção nas diferentes dimensões da QVRS conforme o sexo, idade e QVRS prévia. Em relação ao segundo estudo, modelos de equações estruturais examinaram o efeito mediador e direto das mudanças na AF, TT e seus determinantes psicossociais nas diferentes dimensões da QVRS. Finalmente, a avaliação da implementação da intervenção foi realizada usando uma abordagem de métodos mistos (quantitativa e qualitativa) com dados dos diferentes atores envolvidos no estudo (alunos, professores e pais).

### Resultados e Discussão

Dos 921 alunos que responderam ao questionário na linha de base, 300 e 434 completaram o estudo nos grupos controle e intervenção, respectivamente (desistências: 20%). Os resultados do primeiro estudo demonstraram que a intervenção não foi efetiva em modificar as diferentes dimensões de QVRS. Por outro lado, foi observada uma redução dos escores da dimensão ambiente escolar em ambos os grupos (controle e intervenção) ao final do ano escolar. As análises de sensibilidade mostraram que os alunos com melhor QVRS na linha de base reduziram seus escores do pré para o pós-intervenção em ambos os grupos intervenção e controle. No que se refere ao segundo estudo, não houve efeito indireto significativo, ou seja, mudanças na AF, TT e seus determinantes psicossociais não foram mediadores do efeito da intervenção nas diferentes dimensões da QVRS. No entanto, em um ano letivo, mudanças na autoeficácia, suporte social (família e amigos) e resultados esperados relacionados à AF e TT melhoraram a QVRS dos adolescentes, embora isso não tenha sido atribuído à intervenção. Finalmente, o terceiro estudo observou que os professores tiveram uma percepção mais positiva da intervenção quando comparados aos alunos e seus pais. Em resumo, embora as estratégias de intervenção tenham sido aceitas pelos professores, a maioria dos alunos e pais não percebeu a implementação da intervenção. As principais dificuldades apontadas para o sucesso da implementação foram a falta de engajamento da comunidade escolar (por exemplo, diretores) e dos pais, bem como a agenda lotada dos professores.

### **Considerações Finais**

O programa Movimento não melhorou efetivamente as dimensões da QVRS em adolescentes brasileiros. Além disso, observamos que os alunos com melhor QVRS na linha de base reduziram seus escores ao final do ano letivo. Por outro lado, nossos achados mostraram que mudanças nos determinantes psicossociais de AF e ST podem melhorar as dimensões da QVRS, mesmo que essas mudanças não tenham sido atribuídas à intervenção. Além disso, nosso estudo de implementação encontrou lacunas entre o que foi planejado e o que foi implementado. Ou seja, a fidelidade não foi a esperada, o que pode estar relacionado à falta de efeito da intervenção nos mediadores e na QVRS. Portanto, nossos resultados indicam a importância de investigar estratégias para melhorar o bem-estar dos adolescentes, incluindo intervenções para alterar determinantes psicossociais e métodos que garantam a fidelidade da intervenção.

**Palavras-chave:** Intervenção de base escolar; bem-estar; fatores psicossociais; implementação de intervenções.

## ABSTRACT

**Background:** Schools have been an essential context for adolescents' physical activity (PA) and screen time (ST) interventions. However, experimental data on whether they improve dimensions of the health-related quality of life (HRQoL) is required to understand the complex pathways toward effective health promotion. Also, evidence has highlighted the importance of evaluating intervention implementation to understand which barriers may be related to the lack of intervention's effect and which are the facilitators for a good implementation of strategies. Therefore, the present thesis aimed to evaluate the impact of a school-based intervention on dimensions of HRQoL, investigating whether sex, age, and HRQoL at baseline were moderators of the intervention effect. Moreover, we evaluated the direct and indirect effects of changes in PA, ST, and their psychosocial determinants (self-efficacy, outcome expectations, and social support) on the HRQoL dimensions. Finally, we assessed the implementation of the intervention strategies based on qualitative and quantitative data from different actors (teachers, students, and parents). Three studies were developed to answer the above aims. **Methods:** A cluster-randomized controlled trial was performed in Brazil over an academic year (March-November/2017). Six out of eighteen eligible schools agreed to participate in the research, three for each condition (intervention vs. control). Among 1,427 eligible students, 921 (intervention=538) participated at the baseline. The intervention included teacher training on PA and ST, educational strategies through the availability of pamphlets/posters, and environmental improvements to create/revitalize spaces for PA in school. Validated questionnaires measured HRQoL, PA, ST, and their psychosocial determinants. In the first article, mixed linear models were performed to evaluate the effect of the *Movimente* intervention on the five HRQoL dimensions. Regarding the second, a structural equation model examined the direct/indirect effects. In order to help understand the findings, the intervention's implementation was conducted using a mixed-methods approach with data from the different actors (students, teachers, and parents). **Results:** Of the 921 students who answered the questionnaire at baseline, 300 and 434 completed the study in control and intervention groups, respectively (dropouts: 20%). The first study's results revealed no significant effects of the intervention on any HRQoL dimensions. The school environment dimension was reduced in both control and intervention groups. Sensitivity analyses showed that students with better HRQoL at baseline reduced their scores from pre- to post-intervention in both school groups. Regarding the second study, there were no significant indirect effects, that is, changes in PA, ST, and their psychosocial determinants were not mediators of the intervention effect on the HRQoL dimensions. However, in one school year, changes in self-efficacy, social support (family and friends), and outcome expectations improved the HRQoL of adolescents, although it was not attributed to the intervention. Finally, the third study observed that teachers had a more positive perception of the intervention when compared to students and their parents. In summary, although the teachers accepted the intervention strategies, most students and parents did not perceive the implementation of the intervention. The lack of engagement of the school community (e.g., principals, parents) and the teachers' busy schedules were the main difficulties pointed out for the success of the implementation. **Conclusions:** The intervention did not improve the HRQoL dimensions, but changes in self-efficacy, outcome expectations, and social support related to PA and ST might improve HRQoL. Some barriers (e.g., teachers' busy schedules and lack of engagement from the school community and parents) prevented the successful implementation of the program, which might explain the lack of effects. Therefore, our results indicate the importance of investigating strategies to improve adolescent well-being, including

interventions to change psychosocial determinants and methods that ensure intervention fidelity.

**Keywords:** school-based intervention; well-being; psychosocial aspects; intervention implementation.

## **DOCUMENT STRUCTURE**

This Doctoral thesis is structured according to the norm 02/2008 of the Graduate Program in Physical Education of the Schools of Sports of the Universidade Federal de Santa Catarina. The present thesis is organized using the alternative format described in Art. 6º of the norm 02/2008. The document presents five chapters: 1) Introduction, composed of the rationale and justification for the research problem, its objectives, and hypotheses; 2) The Method, composed of the material and methods, including the operationalization of the concepts, description of the instruments and procedures, and the treatment and analysis of data; and 3) Results, presented in the form of three research articles: two already published and one under review; 4) Final considerations, summarized the main findings and presented the limitations, strengths, and implications; 5) Dissemination, presented the strategies to disseminate the knowledge acquired with the thesis. The sections of references and appendix follow these.

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## LIST OF ABBREVIATIONS

AIC: Akaike Information Criteria

BIC: Bayesian Information Criteria

BMI: Body Mass Index

CFI: Comparative Fit Index

HDI: Human Development Index

HRQoL: Health-related quality of life

ICC: Intraclass Correlation Coefficients

LMIC: Low-middle income countries

MICE: Multiple imputations by chained equations

PA: Physical activity

PE: Physical education

RE-AIM: Reach, Effectiveness, Adoption, Implementation, and Maintenance

RMSEA: Root Mean Square Error of Approximation

SES: Socioeconomic Status

SRMR: Standardized Root Mean Square Residual

ST: Screen time

TLI: Tucker-Lewis index

WHO: World Health Organization

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## 1 INTRODUCTION

Quality of life is a complex construct that can be considered from two perspectives; the first attempts to define the quality of life at the population level considering humanity as a whole (e.g., the Human Development Index - HDI); the second considers the quality of life as an individual-level construct (e.g., health-related quality of life - HRQoL) (Rapley, 2003). The World Health Organization (WHO) defines the quality of life as the individuals' perceptions of their position in life, considering their culture and its goals, expectations, and concerns (WHO, 1995). The WHO also recognizes a multidimensional nature of quality of life, encompassing aspects related to physical, psychological, social, environmental, and personal dimensions (WHO, 1995). Recently, a study observed significant five-year changes in health and well-being, with an increase in anxiety, depression, and behavioral problems, as well as a decrease in physical activity (PA) among 174 551 US children and adolescents, which can be related to worst HRQoL (Lebrun-Harris et al., 2022).

Systematic and meta-analysis reviews have sought to identify the correlates of HRQoL among youth to inform interventions and public health policies (Lubans et al., 2016b; Wu et al., 2017; Marker et al., 2018), to prevent diseases and promote health (Ravens-Sieberer and Kidscreen Group Europe, 2016). According to this evidence, a high level of physical activity (PA) and low time spent in sedentary behavior, including screen time (ST), have been associated with a better HRQoL among adolescents (Jalali-Farahani et al., 2016; Wong et al., 2017; Wu et al., 2017; Lee et al., 2019; Sánchez-Oliva et al., 2019). For instance, a longitudinal study tracking two cohorts of Australian children aged 0 to 5 years showed that those who increased PA and maintained low ST levels four years later presented better scores for HRQoL (del Pozo-Cruz et al., 2019). In addition, another study found that increased use of screen devices by children was related to a greater likelihood of being in the at-risk category for poorer well-being two years later (Hinkley et al., 2014). These findings suggest that using intervention strategies to improve PA and reduce ST might help to enhance both global and specific HRQoL dimensions (Wu et al., 2017; Neil-Sztramko et al., 2021).

However, when analyzing evidence from randomized controlled trials, systematic reviews have observed few studies investigating the effect of school-based interventions on HRQoL among healthy adolescents (Wu et al., 2017; Marker et al., 2018; Neil-Sztramko et al., 2021). A systematic review of the effect of PA on HRQoL found that only four out of nineteen intervention studies were developed with healthy children and adolescents, and the

authors observed a small effect size on HRQoL (Marker et al., 2018). Moreover, a study developed with children from low socioeconomic status (SES) in Ireland observed that a 12-week PA school-based intervention was insufficient to improve the dimensions of HRQoL (Breslin et al., 2019). It remains unclear whether school-based interventions can improve HRQoL through PA and ST strategies (Wu et al., 2017; Marker et al., 2018).

According to the social-cognitive theory, well-being can also be influenced by a core set of psychosocial determinants, including self-efficacy, outcome expectations, and social support (Bandura, 2004). Bandura argues that informing children about the expected costs and benefits of lifestyle behaviors, building a sense of self-efficacy to support their behavior change, and creating a social support environment could lead them to adopt healthy behaviors and improve well-being (Bandura, 2004). Cross-sectional and longitudinal evidence have shown that children and adolescents with a better sense of general self-efficacy, such as confidence to stick to their aims and accomplish their goals, presented better HRQoL (Otto et al., 2017; Haraldstad et al., 2019; Mikkelsen et al., 2020). In addition, when analyzing the role of social support as a predictor of the HRQoL, studies showed that higher general (Otto et al., 2017; Gomes et al., 2020) and PA-specific social support (Tilga et al., 2021) were associated with better HRQoL among children and adolescents. On the other hand, the relationship between outcome expectations and HRQoL dimensions still needs to be explored.

Mediation analysis is an alternative that has been used to identify which mechanisms explain the effect of interventions on specific outcomes (MacKinnon, 2008), providing evidence on which strategies can be prioritized to change the outcome. Despite longitudinal evidence on the relation of PA and ST with the HRQoL of children and adolescents (Otto et al., 2017), few studies analyzed the mediating role of PA, ST and their psychosocial factors (self-efficacy, outcome expectations, and social support) in the effect of school-based interventions on HRQoL (Quaresma et al., 2014; Lubans et al., 2016a). For instance, in a 2-year PA school-based intervention, increased perceived social support for PA mediated the effect of the intervention on HRQoL among Portuguese adolescents (Quaresma et al., 2014). Another study investigated the mediating mechanisms that explained the effects of a school-based intervention on psychological well-being among Australian boys (Lubans et al., 2016a). The authors found that the effect of the intervention was mediated by reducing ST (Lubans et al., 2016a). However, it is unclear whether interventions aimed at decreasing ST or improving PA and their psychosocial determinants can improve the HRQoL dimensions among adolescents from low- to middle-income countries (LMIC). Thus, identifying whether

interventions aimed at promoting PA and reducing ST promote changes in HRQoL indicators may provide insight into what strategies can be used to improve HRQoL in this population.

## 1.1 PURPOSE

### 1.1.1 General purpose

To analyze the effect of a randomized-controlled trial on dimensions of HRQoL, verify whether the effect is mediated by changes in the PA and ST indicators, and investigate the intervention implementation among adolescents of Florianopolis, Santa Catarina, Brazil.

### 1.1.2 Specific purposes

To examine the effect of a randomized controlled clinical trial on the different dimensions of HRQoL (physical; psychological; autonomy & parent's relation; peers & social support; and school environment) according to sex, age, and the baseline scores of HRQoL;

To verify the direct and indirect effects of changes in PA, ST, and their psychosocial determinants (self-efficacy, outcome expectations, and social support) on the HRQoL dimensions;

To evaluate the implementation of a school-based PA intervention, considering both qualitative and quantitative data from the different actors (students, teachers, and parents) inherent to the program's implementation.

## 1.2 HYPOTHESES

We hypothesize that the intervention will positively influence the dimensions of physical well-being, peers & social support, autonomy & parent's relation, and these effects will differ according to sex, age, and the baseline scores of HRQoL;

We hypothesize that there will be a mediating role of PA, ST, and their psychosocial determinants on the relationship of the intervention and the HRQoL dimensions.

We hypothesize that the effect of the intervention on the investigated behaviors will be directly influenced by the implementation level of the *Movimente* Program.

### 1.3 SIGNIFICANCE AND INNOVATION

Developing this thesis is relevant because it has been proved that adolescents' HRQoL has decreased throughout the years. Although there is longitudinal evidence about the potentially harmful effects of low PA and high ST on HRQoL dimensions (Hinkley et al., 2014; del Pozo-Cruz et al., 2019; Stiglic and Viner, 2019), it is still unclear whether interventions to improve these behaviors and their psychosocial determinants can impact the HRQoL among children and adolescents. Previous studies highlighted the need for interventions to reduce the use of electronic media and investigate potential changes in well-being indicators (Hinkley et al., 2014), as well as the use of multicomponent lifestyle interventions to incorporate a broader context beyond the individual, such as school-based strategies involving family, and the school's social and physical environment, especially in LMIC (Liu et al., 2022). Thus, understanding whether or not PA and ST strategies can improve the HRQoL will provide knowledge on the complex pathways toward effective health promotion. Our theoretical model can be observed in Figure 1.

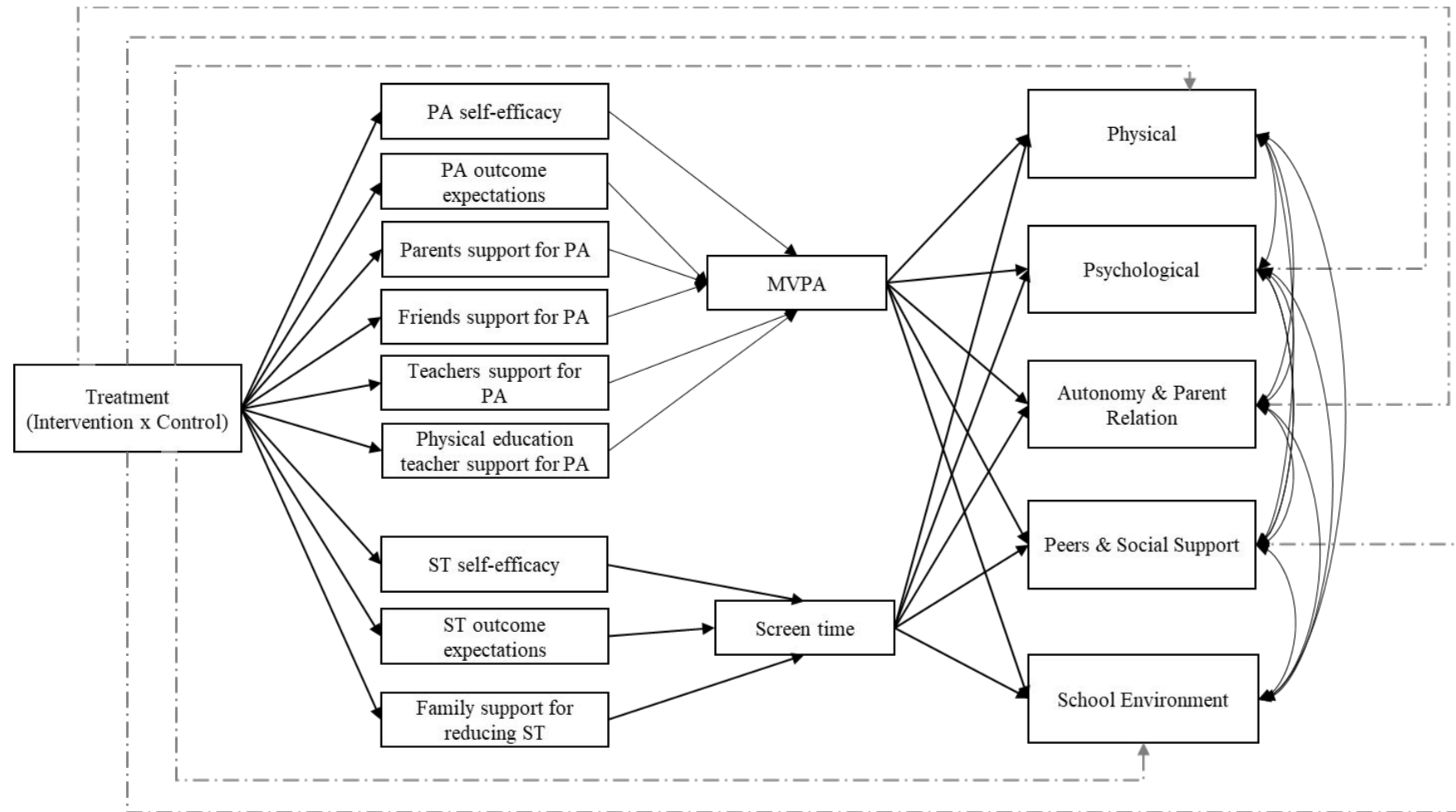
The innovation of this thesis should also be highlighted: it makes unique contributions to community science because of the novelty of evaluating PA, ST, and their psychosocial factors (self-efficacy, outcome expectations, and social support) as possible mediators of the relationship between the intervention and HRQoL. Furthermore, our results may help new interventions to improve adolescents' well-being since we highlight possible reasons for the findings, evaluated through a mixed-methods implementation study, as well as the implications, future directions, and dissemination techniques. Finally, we provide implications beyond the academic context, which can be helpful to those involved with the school environment routine.

### 1.4 RESEARCHER INVOLVEMENT



My involvement with school-based interventions began during the last year of my undergraduate program in 2013. At that moment, I participated in the development and data collection of the *Fortaleza Sua Saúde* (Strengthen your Health) project, a school-based intervention to improve physical activity and reduce sedentary behavior among adolescents from Fortaleza, Ceara. In 2015, I joined a Master's program at UFSC and began working on designing the *Movimente* program.

In 2015 and 2016, I worked on developing the intervention's strategies, measures, and procedures for data collection. In summary, during the weekly meetings, we discussed what strategies we would implement, what measures were more appropriate to evaluate the behaviors, and what procedures should be taken during the data collection and intervention implementation. Additionally, I participated in the pilot study execution, data collection, and intervention. Finally, I have been working on disseminating the *Movimente* findings, trying to reach the target audience. The *Movimente* timeline can be observed in Figure 2.



**Figure 1** - Theoretical model of the mediating role of PA, ST, and their psychosocial determinants in the relationship between intervention and HRQoL.

## 2 METHODS

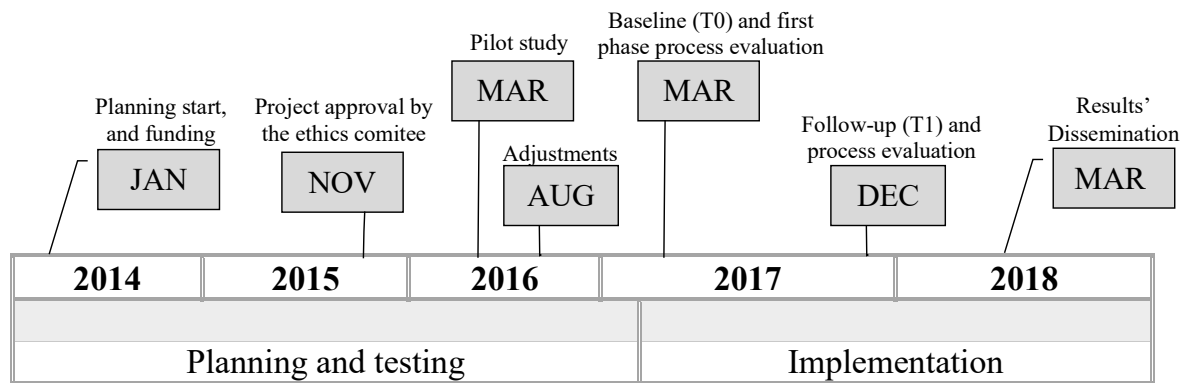
### 2.1 STUDY DESIGN

The present thesis is part of the *Movimente* Program (the Portuguese word for movement), a cluster-randomized controlled trial with randomization performed at the elementary school level (Silva et al., 2020). The program was conducted over one school year (March to November 2017), and it was developed to primarily promote PA, regardless of the intensity, and reduce ST. The secondary outcomes also included the five dimensions of HRQoL and the psychosocial variables related to PA and ST. The Research Ethics Committee approved the study protocol (No:1,259,910, CAAE: 49462015.0.0000.0121; date: November 23, 2015), and the project was registered in the Clinical Trials database (NCT02944318).

### 2.2 RECRUITMENT OF SCHOOLS AND PARTICIPANTS

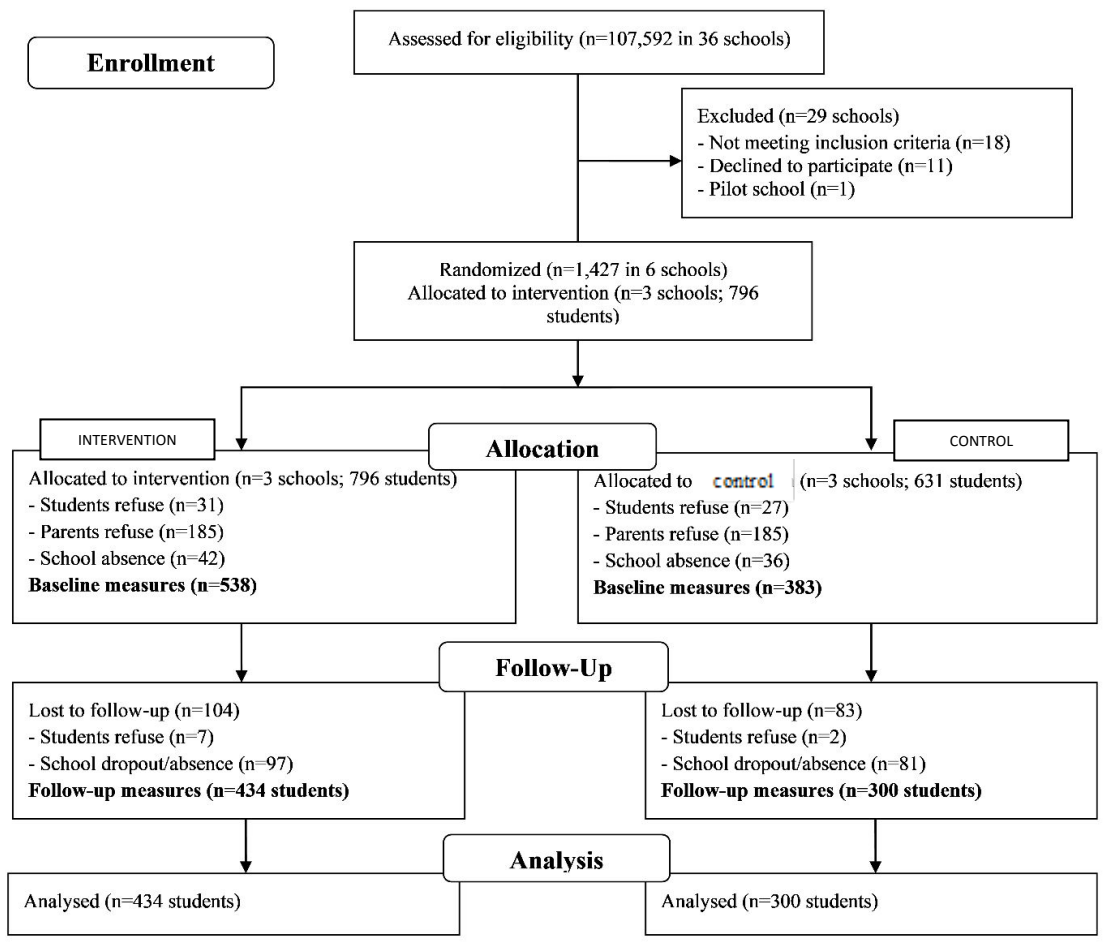
After approval by the Board of Education of the city of Florianopolis (southern Brazil) and recruitment of schools took place from October to November 2015, the inclusion criteria of the schools were: a) having elementary school ( $n = 27$ ); b) have at least two classes per grade from the 7th to 9th grade ( $n = 21$ ); c) the school could not be undergoing repair works during the collection period ( $n = 18$ ). The 18 schools that met the criteria were invited to participate. Seven schools accepted the invitation, and one was selected for the pilot study, in which the strategies were previously tested. The other six schools were randomly allocated into control and intervention groups, matched by size (two medium schools and one small in each group). All students in grades 7th to 9th from the six selected schools who attended the first weeks of school (1,427 students) were eligible to be part of the program (intervention = 796 and control group = 631). Students' exclusion criteria were: a) being mentally and/or physically disabled; b) absence during the first three weeks of the school year. Students and parents were asked to sign an assent and consent form, respectively, and they received no incentive to participate in the intervention. Further details regarding the intervention procedures can be found in the protocol report (Silva et al., 2020) and Figure 3.

Adolescents with disabilities were included in the data collection and could benefit from the intervention program. However, we excluded them only from the analyses as the applied instruments were not validated for this specific subgroup. Since no validated instrument was applied to evaluate the presence of disability, we decided to exclude those students who required additional help during the data collection (e.g., students who needed a research staff to help answer the questionnaire).



**Figure 2 – Timeline of *Movimente* study, adapted from (Silva et al., 2020).**

### CONSORT 2010 Flow Diagram



**Figure 3 – CONSORT flow diagram of recruitment, randomization, and participation of schools and adolescents in the *Movimente* study.**

### 2.3 INTERVENTION PROTOCOL

The following theories of behavior change and frameworks were used for the development of the intervention strategies: (i) social-cognitive (Bandura, 2004); (ii) socio-ecological (Sallis et al., 2006); (iii) transtheoretical (Marcus and Simkin, 1994); and (iv)

WHO health-promoting school framework (Langford et al., 2014). Based on the theories, the strategies of the *Movimente* Program were designed from three main components: teacher training, environmental improvements, and educational actions. Details of *Movimente* Program strategies and their relation to dimensions of the HRQoL are provided in Table 1.

### **2.3.1 Teacher training**

Teacher training was specifically designed to provide logistic support to teachers (general disciplines and physical education [PE]) and encourage them to talk about health with their students. Classroom teachers from 7th to 9th grades in the intervention schools were invited to participate in a training organized in three stages.

The first stage included a 4-hour face-to-face school meeting to discuss health issues, PA, and sedentary behavior. Different training days were offered to reach the maximum number of teachers. Second, teachers received a supplementary handbook to assist them with several lesson plans regarding health concepts, including PA and ST. For the teachers from general disciplines (e.g., Portuguese and Math), the handbook included an initial chapter with sedentary behavior break activities to be developed in the classroom and chapters for each discipline with suggested lesson plans linked to the discipline content. PE teachers received handbooks for each grade, including suggested activities and texts to be used as a support to the classroom content. All the handbooks in Portuguese can be found online (<https://movimente.ufsc.br/manuais/>), and detailed development information was published (Silva et al., 2020). We also provided logistic support via an online platform for disclosing and discussing the classroom's activities developed by teachers. Finally, the third stage included a face-to-face 2-hour meeting at the end of the intervention to discuss barriers, facilitators, and intention to continue using activities in their routine.

### **2.3.2 Environmental improvements**

In the intervention schools, active opportunities were promoted in the school environment with the creation and revitalization of spaces for the practice of PA. Each school received a kit of sports equipment (e.g., rackets, skipping rope, balls to play basketball, soccer, and volleyball) to make available for students during their free time. Schools had the autonomy to choose the best way to manage the kit for students to use before- and after-

school classes and during recess breaks. PE teachers also could use the material in their classes.

### 2.3.3 Educational actions

Educational strategies were implemented by delivering different banners (n = 4) and pamphlets (n = 4) on PA, ST, eating habits, and school performance. The four banners were delivered to schools at the beginning of the year, and the researchers instructed school principals to place them on school murals to reach many students strategically. The banners can be found on <https://movimente.ufsc.br/cartazes/#>.

In addition, pamphlets on a specific theme (PA, ST, or eating habits) were delivered to the school community every two months. During the training, teachers were encouraged to discuss the contents of these pamphlets with students and provide homework activities involving parents. The main goal was that the information would also reach the students' families. The pamphlets are available for download on <https://movimente.ufsc.br/folders/>.

### 2.3.4 Control schools

Students at control schools continued with their traditional schedule, which included PE classes twice a week. After the intervention period, the control schools received all intervention materials.

**Table 1 - Details of the *Movimente* Program**

Component	Strategies	Relationship between strategies and dimensions HRQoL
Teacher Training	<p>Face-to-face meeting focused on health topics and discussed possible activities to perform with students to improve PA and reduce SB.</p> <p>Support material (book) with activities was provided to assist the teachers with several lesson plans about PA and SB.</p> <p>Interactive media (social media and text messaging apps) for teachers to disclose and discuss their activities regarding health topics.</p>	<p><i>Physical Well-Being:</i> teachers received training about including PA content and breaking activities into the classroom. This strategy aimed to stimulate the students to improve PA, reduce SB, and improve how well and physically healthy they feel.</p> <p><i>Psychological Well-Being:</i> the teachers were stimulated to discuss psychosocial determinants of PA and SB with students. It may be related to the improvement of their positive emotions and confidence.</p>

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Environmental Improvements	Creation of new spaces	<p><i>Peers &amp; Social Support:</i> teachers were encouraged to highlight the <i>Physical Well-Being:</i> the availability of new spaces and equipment may be related to an increase in the practice of PA and, consequently, an improvement in the physical well-being of adolescents.</p>
	Revitalization of some spaces of the school for the practice of PA	<p><i>Psychological Well-Being:</i> the diversity of spaces and equipment available could encourage adolescents to have different alternatives for PA practice, promote positive emotions and inhibit feelings such as loneliness and sadness.</p>
Educational Actions	PA equipment (e.g., balls, jump ropes, rackets) is available to students during their free time in school.	<p><i>School Environment:</i> the availability of new spaces and equipment for PA practice could improve the perception and feelings of students about the environment school.</p>
	Four banners and four folders about PA and health, SB and health, PA and academic performance, and eating habits.	<p><i>Physical Well-Being:</i> This strategy aims to stimulate the students to improve PA, reduce SB, and consequently, improve how well and physically healthy the student feels.</p> <p><i>Autonomy &amp; Parent Relation:</i> the messages highlighted the importance of interactions between parents/family and students and how parents could support their child/adolescent to become more physically active.</p> <p><i>Peers &amp; Social Support:</i> the messages highlighted the importance of social relations with friends (e.g., <i>The practice of PA can provide opportunities for talks with your friends; Reduce time on screens can provide more time with your friends</i>)</p>

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## 2.4 PROCEDURES AND MEASURES

The *Movimente* Program was carried out between March and December 2017, and the variables were measured at two moments: in the baseline period (March/April 2017) and postintervention (November/December 2017). The data were obtained through a self-completed student questionnaire administered in class during school hours over a mean time of 90 minutes. The instructions were provided by trained researchers who facilitated survey completion with further information about each question. In the present study, we used HRQoL dimensions, PA, ST, psychosocial factors (self-efficacy, outcome expectations, social support), and sociodemographic variables. The detailed description of variables is presented in Table 2.

### 2.4.1 Primary outcome

The HRQoL assessment was performed using the KIDSCREEN-27 questionnaire, validated for the Brazilian population, allowing the evaluation of five dimensions: Physical Well-Being (n=5), Psychological Well-Being (n=7), Autonomy & Parent Relation (n=7), Peers & Social Support (n=4) and School Environment (n=4) (Ravens-Sieberer and Kidscreen Group Europe, 2016). The instrument has 27 questions with five response options, according to intensity (not at all, slightly, moderately, very, extremely) or frequency (never, almost never, sometimes, almost always, always). The scores for each dimension are reported as t-values, ranging from 0 to 100, with higher values indicating better HRQoL (Ravens-Sieberer and Kidscreen Group Europe, 2016). Translated version into Brazilian Portuguese and the syntaxes of the statistical program Statistical Package for the Social Sciences, version 22 for Windows (IBM SPSS Statistics, USA) for calculating the scores are available for authorized members on the official website of the Kidscreen group ([www.kidscreen.org](http://www.kidscreen.org)). In addition, reliability was tested in the pilot study of the *Movimente* program, and the Intraclass Correlation Coefficients (ICC) were observed to range from 0.71 to 0.78 between HRQoL dimensions (Silva et al., 2020).

### 2.4.2 Potential mediators

The theoretical models tested are shown in Figure 1.

#### *2.4.2.1 Potential mediators related to PA*

##### *Physical activity*

An adapted version of the Self-Administered Physical Activity Checklist – SAPAC was used to assess PA (Farias Júnior et al., 2012). The instrument provided a checklist of 22 moderate or vigorous activities commonly practiced in Southern Brazil. Students reported whether they usually participated in any of the listed activities in a typical week (Farias Júnior et al., 2012; Barbosa Filho et al., 2016c). They also reported the weekly frequency (1 to 7 days) and daily duration (in minutes). The total time in PA (minutes/week) was obtained by multiplying the frequency and duration of all student activities. Test-retest reliability was evaluated in the pilot study, and adequate parameters were observed (ICC = 0.69; Spearman rho = 0.68) (Silva et al., 2020).

##### *Psychosocial factors*

The PA psychosocial determinants were evaluated through an instrument constructed and validated for Brazilian adolescents (ICC ranging from 0.62 [support of parents] to 0.70 [self-efficacy]) (Farias Júnior et al., 2011; Barbosa Filho et al., 2016c), except for the outcome expectations scale, which was translated and adapted from Saunders and colleagues (Saunders et al., 1997). Self-efficacy related to the PA scale included eight items referring to the individual's belief in their ability to perform PA in adverse situations (e.g., lack of company or lack of PA places near home). PA outcome expectation was evaluated through 10 items measuring the students' perception of the positive and negative expectations about practicing PA. Six items measured students' perception of the frequency with which parents supported (e.g., encouraged, commented on, and transported) them to practicing PA. Finally, three scales measured the support of friends, teachers, and physical education teachers for PA (five items for each scale). For each psychosocial determinant, the total score (ranging from 1 to 4) was obtained from the mean of all items, and higher scores reflect a better scenario for the practice of PA. All the questions can be found in Table 2 and APPENDIX D.

#### *2.4.2.2 Potential mediators related to ST*

##### *Screen Time*

Based on the *Youth Risk Behavior Survey Questionnaire* (Guthold et al., 2010; Malta et al., 2014) and validated for the Brazilian population (Guedes and Lopes, 2010), the ST was evaluated using eight questions about the time spent in the following activities in a typical week: i) watching TV; ii) using a computer; iii) playing games; iv) and using a cellphone. Students had eight response options that were recoded as follows: "I do not use. . ." = 0; <1 h/day = 0.5; 1 h/day = 1; 2 h/day = 2; 3 h/day = 3; 4 h/day = 4; and 5 h/day = 5;  $\geq$  6h/day = 6 (Bucksch et al., 2016; Bandeira et al., 2020a). The reliability parameters observed in the pilot study ranged from *Cohen's Kappa* = 0.61 (watching TV) to 0.76 (playing videogames) (Silva et al., 2020). The average daily time for each device was calculated considering weekdays and weekends (for example,  $(((\text{TV week} * 5) + (\text{TV weekend} * 2)) / 7)$ ) (Silva et al., 2014; Bandeira et al., 2020a). Then, the total ST was obtained by the sum of the time spent on all devices (Bucksch et al., 2016).

### *Psychosocial factors*

The psychosocial determinants of ST reduction (self-efficacy, outcome expectations, and family support) were evaluated by an instrument previously validated for Brazilian adolescents (Barbosa Filho et al., 2021), with acceptable values for the construct validity, internal consistency, and reproducibility (ICC ranging from 0.63 [self-efficacy] to 0.74 [ST outcome expectations]) (Barbosa Filho et al., 2021). The self-efficacy scale included 11 items and evaluated the students' perception of abilities and confidence for reducing their ST. Family support for reducing ST evaluated students' perception of the support of household members for reducing their ST (5 items). The outcome expectations included 12 items on what students expect from their reduced ST. Items were assessed on a four-point Likert scale regarding intensity (strongly disagree to agree strongly) or frequency (never to always). For each psychosocial determinant, the total score (ranging from 1 to 4) was obtained from the mean of all items, and higher scores reflect a better scenario for reducing ST. All the questions can be found in Table 2 and APPENDIX D.

### **2.4.3 Covariates**

Sociodemographic variables were assessed: sex (boys and girls), age, and socioeconomic status (SES), obtained through a questionnaire that assessed household items (e.g., number of cars, refrigerators, and computers) as proposed by the Brazilian Economic

Classification Criteria (Silva et al., 2020). The Principal Component Analysis was used to reduce the set of a correlated count of household items to an asset index, ranging from 0 to 15, with higher values referring to greater family wealth (Vyas and Kumaranayake, 2006).

We have conducted sensitivity analyses that accounted for body mass index (BMI) to verify whether its inclusion would improve the models. However, the adjustment had no substantive impact on the results. Therefore, we decided not to include it.

	<b>Variable</b>	<b>Question/definition</b>	<b>Answer options</b>
<b>Independent</b>	Condition	Group	Intervention, Control
<b>Dependent variables</b>	Physical Well-Being	<p>Five items explore the level of PA, energy, and fitness and the extent to which the students feel bad and complain about health problems.</p> <ul style="list-style-type: none"> <li>• In general, how would you say your health is?</li> <li>• Have you felt fit and well?</li> <li>• Have you been physically active (e.g., running, climbing, biking)?</li> <li>• Have you been able to run well?</li> <li>• Have you felt full of energy?</li> </ul>	Five-point Likert scale according to intensity ( <i>not at all, slightly, moderately, very, extremely</i> ) or frequency ( <i>never, almost never, sometimes, almost always, always</i> )
	Psychological Well-Being	<p>Seven items examine students' psychological well-being, including positive emotions and satisfaction with life and the absence of feelings such as loneliness and sadness.</p> <ul style="list-style-type: none"> <li>• Has your life been enjoyable?</li> <li>• Have you been in a good mood?</li> <li>• Have you had fun?</li> <li>• Have you felt sad?</li> <li>• Have you felt so bad that you did not want to do anything?</li> <li>• Have you felt lonely?</li> <li>• Have you been happy with the way you are?</li> </ul>	Five-point Likert scale according to intensity ( <i>not at all, slightly, moderately, very, extremely</i> ) or frequency ( <i>never, almost never, sometimes, almost always, always</i> )

	Autonomy & Parent Relation	<p>Seven items explore the quality of the interaction between students and their parents or caregivers and how they feel loved and supported by the family. It also examines the perceived level of autonomy of the students and the perceived quality of financial resources.</p> <ul style="list-style-type: none"> <li>• Have you had enough time for yourself?</li> <li>• Have you been able to do the things that you want to do in your free time?</li> <li>• Have your parent(s) had enough time for you?</li> <li>• Have your parent(s) treated you fairly?</li> <li>• Have you been able to talk to your parent(s) when you wanted to?</li> <li>• Have you had enough money to do the same things as your friends?</li> <li>• Have you had enough money for your expenses?</li> </ul>	<p>Five-point Likert scale according to intensity (<i>not at all, slightly, moderately, very, extremely</i>) or frequency (<i>never, almost never, sometimes, almost always, always</i>)</p>
	Peers & Social Support	<p>Four items explore the quality of how students interacted with their peers and their perceived support.</p> <ul style="list-style-type: none"> <li>• Have you spent time with your friends?</li> <li>• Have you had fun with your friends?</li> <li>• Have you and your friends helped each other?</li> <li>• Have you been able to rely on your friends?</li> </ul>	<p>Five-point Likert scale according to intensity (<i>not at all, slightly, moderately, very, extremely</i>) or frequency (<i>never, almost never, sometimes, almost always, always</i>)</p>
	School Environment	<p>Four items explore the students' perception of their cognitive ability, learning, and concentration, feelings about the school, and relationships with teachers.</p> <ul style="list-style-type: none"> <li>• Have you been happy at school?</li> <li>• Have you got on well at school?</li> <li>• Have you been able to pay attention?</li> <li>• Have you got along well with your teachers?</li> </ul>	<p>Five-point Likert scale according to intensity (<i>not at all, slightly, moderately, very, extremely</i>) or frequency (<i>never, almost never, sometimes, almost always, always</i>)</p>
Potential mediators	Physical activity	<p>In general, what PA listed below do you do? Inform how many days of the week and how long a day you practice these activities.</p>	<p>Type, frequency, and duration of each activity.</p> <p>PA volume was calculated and used in the analysis.</p>

Self-efficacy related to PA	<p>Eight items refer to the individual's belief in their ability to perform to PA in adverse situations.</p> <p>I think I can practice physical activity most days of the week even if...</p> <ul style="list-style-type: none"> <li>• ...I do not have anyone to go with me (lack of company).</li> <li>• ... I do not feel like it (unmotivated).</li> <li>• ...I could stay at home to watch TV, play video games, and use the computer.</li> <li>• ...my friends invite me to do other things.</li> <li>• ... I think I do not have the skills to practice physical activity.</li> <li>• ...Lacks places to engage in physical activity near home.</li> <li>• ...I do not have anyone to teach me how to do it.</li> <li>• ...I am lazy.</li> </ul>	Four-point Likert scale. Total score ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) points
Outcome expectations	<p>Ten items regarding the students' perception of their PA practice's positive and negative expectations.</p> <p>I think if I used to practice physical activity on most the days of the week...</p> <ul style="list-style-type: none"> <li>• ...I would improve or keep my physical shape (cardiorespiratory fitness).</li> <li>• ...I would make new friends.</li> <li>• ...I would feel tired.</li> <li>• ...I would stop doing other things that are important to me</li> <li>• ...I would make more contact with my friends.</li> <li>• ...I would be happier (better mood).</li> <li>• ...I would hurt myself (bodily injury)</li> <li>• ...I would sleep better.</li> <li>• ...It would help me to control my body weight.</li> <li>• ...It would be boring.</li> </ul>	Four-point Likert scale. Total score ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) points
Support of parents related to PA	<p>Six items regarding the frequency that parents provide different types of support for PA practice.</p> <p>How often do your parents:</p> <ul style="list-style-type: none"> <li>• Encourage you to engage in physical activity?</li> <li>• Engage in physical activity with you?</li> <li>• Provide or arrange transport to you dislocate to the place where you practice physical activity?</li> <li>• Watch you engage in physical activity?</li> <li>• Comment positively on your performance when engaging in physical activity?</li> </ul>	Four-point Likert scale. Total score ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) points

		<ul style="list-style-type: none"> <li>• Talk to you about physical activity?</li> </ul>	
	Support of friends related to PA	<p>Five items regarding the frequency that friends provide different types of support for PA practice.</p> <p>How often do your friends:</p> <ul style="list-style-type: none"> <li>• Encourage you to engage in physical activity?</li> <li>• Engage in physical activity with you?</li> <li>• Invite you to practice physical activities with them?</li> <li>• Watch you engage in physical activity?</li> <li>• Comment positively on your performance when engaging in physical activity?</li> </ul>	Four-point Likert scale. Total score ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) points
	Support of teachers	<p>Five items regarding the frequency teachers provide different types of support for PA practice.</p> <p>How often do your teachers:</p> <ul style="list-style-type: none"> <li>• Encourage you to engage in physical activity?</li> <li>• Invite you to practice physical activities with them?</li> <li>• Watch you engage in physical activity?</li> <li>• Comment positively on your performance when engaging in physical activity?</li> <li>• Talk to you about physical activity?</li> </ul>	Four-point Likert scale. Total score ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) points
	Support of Physical Education teachers	<p>Five items regarding the frequency PE teachers provide different types of support for PA practice.</p> <p>How often do your PE teachers:</p> <ul style="list-style-type: none"> <li>• Encourage you to engage in physical activity?</li> <li>• Invite you to practice physical activities with them?</li> <li>• Watch you engage in physical activity?</li> <li>• Comment positively on your performance when engaging in physical activity?</li> <li>• Talk to you about physical activity?</li> </ul>	Four-point Likert scale. Total score ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) points
	Screen time	<p>In general, how many hours/day of the week do you:</p> <ul style="list-style-type: none"> <li>• Watch TV</li> <li>• Play games</li> <li>• Use computer</li> <li>• Use cellphone</li> </ul>	0; <1; 1; 2; 3; 4; 5 e ≥ 6 hours/day  The total ST was obtained from the sum of the time for each behavior.
	Self-efficacy related to ST	Eleven items refer to the students' perception of abilities and confidence to reduce ST use.	Four-point Likert scale. Total score ranging from



		<p>I think I am able...</p> <ul style="list-style-type: none"> <li>• ...to limit (decrease) my time watching TV for two hours a day.</li> <li>• ...to turn off the TV, even though I am watching a program I like.</li> <li>• ...not to watch TV on most days with school classes.</li> <li>• ...to limit (decrease) my time using the computer/video games for two hours a day.</li> <li>• ...to turn off the computer/video game, even though I am doing something I enjoy (favorite games, chatting).</li> <li>• ...not to use computer/video games on most days with school classes.</li> <li>• ...to determine limits for how long I am in front of the TV, computer, or video games.</li> <li>• ...to stop watching TV or using computer/video games in my leisure time to do physical activity.</li> <li>• ...to plan what I will watch on TV during the week.</li> <li>• ...to watch TV doing other activities that require body effort (clean, play) rather than sitting.</li> <li>• ...to plan what I will access on the computer or play video games during the week.</li> </ul>	1 (Strongly Disagree) to 4 (Strongly Agree) points
	ST outcome expectations	<p>Twelve items regarding the students' perception of ST activities' positive and negative expectations.</p> <ul style="list-style-type: none"> <li>• I think sitting in front of the TV is very relaxing.</li> <li>• I feel good (happy) when I am at the computer (talking or playing) or playing a video game.</li> <li>• I get excited (agitated) when using the computer or video game.</li> <li>• Using the computer or video games is my way of connecting to the world (making friends).</li> <li>• My friends would be sad if I shortened my time talking to them on the computer.</li> <li>• I like watching TV or playing computer/video games for many hours.</li> <li>• Watching TV or using the computer/video games is one of the things I enjoy doing in my leisure time.</li> <li>• I watch TV or use the computer/video games to escape the world (obligations, discussions, problems).</li> <li>• Watching TV or using the computer/video games traps me from doing important things (studying, eating).</li> <li>• I get lazy after spending many hours in front of the TV, computer, or video games.</li> <li>• I feel pain in the body (back, legs) after spending many hours in front of the TV, computer, or video games.</li> <li>• Watching TV or using the computer/video games burns my eyes and leaves me with a headache.</li> </ul>	Four-point Likert scale. Total score ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) points

	Family support related to ST	<p>Five evaluated the perception of students about the support of household members for reducing their ST.</p> <p>In general, the people of my house...</p> <ul style="list-style-type: none"> <li>• ...encourage me to decrease the time watching TV or using the computer/video games.</li> <li>• ...comment to me that much time in front of the TV or playing computer/video games can do harm to my health.</li> <li>• ...help me think about how I can decrease the time in front of the TV or computer/ video games.</li> <li>• ...praise me when I spend less time in front of the TV or computer/video games and more time doing physical activity.</li> <li>• ...prevent me from watching TV or using the computer/video games when I do something wrong.</li> </ul>	Four-point Likert scale. Total score ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) points
<b>Covariates</b>	Sex	What is your sex?	Girls, Boys
	Age	The students indicated how old they were at the data collection moment.	12 to 17 years
	Socioeconomic status	Check the items and quantities you have in your home (e.g., car; monthly maids; and washing machine)	0; 1; 2; 3; 4 or more.  These items were used to estimate an asset index by applying Principal Component Analysis, a proxy of SES.

## 2.5 IMPLEMENTATION OF THE INTERVENTION

### 2.5.1 Participants

In this mixed-method study, students who answered the follow-up measures ( $n = 463$ ) and all teachers ( $n = 63$ ) in the intervention group were invited to answer the evaluation questionnaire regarding the implementation of the actions. Parents ( $n = 150$ ) were randomly selected, according to a preliminary list of all participating students, to answer the questionnaire. For the qualitative evaluation, a purposive sampling approach was used (Emmel, 2013). All teachers from intervention schools were recruited in person, via e-mail or telephone, and interviews were scheduled for teachers who replied to our contact. In addition, we included teachers who had not been scheduled but had time available when the researchers were at school.

### 2.5.2 Evaluation process

The main objective of the evaluation was to assist decision-making by providing information on whether the program was executed as planned (Bauman and Nutbeam, 2014). A team of four members, who did not participate in the design and implementation process of the intervention, structured and validated an evaluative matrix, and defined the variables as well as their specific objectives according to the logical model of the program. It was considered the dimensions of Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM framework) (Glasgow et al., 2019). Considering the complexity of analyzing all dimensions of the RE-AIM framework (Glasgow et al., 2019), we have decided to analyze the implementation dimension to address in detail those components most appropriate for our research problem, setting, and stage of research in Brazil. Moreover, as a lesson learned from using this framework for two decades, Glasgow and colleagues recently recognized the need for more pragmatic uses of the RE-AIM rather than trying to comprehensively assess all its dimensions (Glasgow et al., 2019). This dimension was evaluated quantitatively and qualitatively at the end of the intervention period (carried out in November/December 2017) regarding the strategies adopted.

Quantitative data included ten dimensions organized according to each intervention strategy. For example, the strategy of teacher training was structured in 6 dimensions: 1) teacher training; 2) discussion on health in regular classes; 3) themes taught in class; 4) modification to the classes on general subjects; 5) difficulties in working on health contents; and 6) modification to PE classes. Likewise, the educational strategy was organized into two dimensions: 7) distribution of intervention pamphlets; and 8) distribution of intervention posters, and the strategy of environmental improvements was divided into two other dimensions: 9) creation and revitalization of spaces for PA practice and 10) availability of materials for PA practices.

The dimensions one (teacher training) and five (difficulties in working on health contents) were directed only to teachers, being the first dimension exclusive for teachers who participated in the training ( $n = 9$ ). All students and teachers answered the other dimensions. The parents participated only in dimension 7 (more details are presented in Supplementary Material 1). The questionnaires for students and teachers were distributed in November and December 2017. The parents answered the questionnaire by telephone during the same period.

Regarding the qualitative data, teachers participated in semi-structured individual interviews focused on evaluating the following themes: 1) teacher training, 2) educational strategies, 3) environmental actions, and 4) overall evaluation of the intervention program. The overall evaluation included the following: (a) importance of developing the intervention program at school; (b) feasibility of implementing the program; (c) difficulties in implementing the program; (d) suggestions for changing the program's development format; and (e) importance of the program in thinking about interdisciplinarity. After the participants signed the consent form, the staff conducted the interviews at a previously scheduled time. The collected data were recorded in audio format and later transcribed.

### **2.5.3 Data processing**

All quantitative data were entered by one researcher and verified by another researcher. Categorical measures were treated as relative frequencies.

The transcribed interviews were treated using the content analysis technique proposed by Bardin (Bardin, 2011), to organize the data for better interpretation. This study applied the units of meaning and context. We chose categorical analysis, among the various possibilities

of categorization, to discover the nuclei of meaning that makeup communication and whose presence or frequency holds significance to the analytical objective chosen (Bardin, 2011). Two researchers developed all the processes simultaneously, and disagreements were discussed without needing another researcher.

## 2.6 DATA ANALYSIS

### 2.6.1 Descriptive analyses and missing data

Different statistical procedures were used to describe the variables and answer this study's objectives. Continuous variables (e.g., total ST and PA) were described with central tendency and variability indicators. Categorical variables were described in absolute and relative frequency. The SES indicator score was calculated using Principal Component Analysis. Before applying the hypothesis tests, the normality of continuous data was analyzed by assessing kurtosis and skewness (high when  $\pm 2$ ). Differences at baseline between control and intervention groups were evaluated using the Chi-square test (categorical variables) and mixed regression models (continuous variables), accounting for clustering data.

Missing data were inspected for PA and ST psychosocial items and household items among participants who answered the questionnaire at the baseline ( $n = 921$ ) and follow-up ( $n = 734$ ). A mean of 1.5% and 0.9% of missing data were observed at the baseline and follow-up, respectively, among 83 items. The variable with the highest missing data had 4% (item eight of the PA outcome expectations scale – the students would sleep better if they practiced PA) and 1.7% (item three of the parents' support for PA – Providing transport to PA opportunities) non-response at baseline and follow-up. Visual inspection suggested that non-responses among the variables were random. Thus, missing data were assumed to be random (MAR), and a multiple imputation procedure was applied using the MICE (multiple imputations by chained equations) algorithm. The predictive mean matching (pmm) method imputes ten datasets with 50 iterations for higher precision (Van Buuren and Groothuis-Oudshoorn, 2011). The set predictors for each item were defined by including correlated variables ( $\geq 0.1$  Pearson Correlation) from a pool with demographic variables and all psychosocial items. The dataset was stratified according to time (pre-and post-intervention) and group (control and intervention) to avoid inserting bias related to group allocation. The

procedure was conducted using the "mice" package in R Project for Statistical Computing 3.5.1 (Van Buuren and Groothuis-Oudshoorn, 2011).

### **2.6.2 Intervention effect analyses**

Three-level linear mixed models were performed to evaluate the effect of the *Movimente* intervention on the five HRQoL dimensions. All models considered repeated measures (pre-and post-intervention) nested within participants, which were nested within schools. This hierarchical structure was used to consider the sampling design and the clustered nature of the data. As mixed models can accommodate unbalanced data, all available measures were included in the analyses. The interaction term of condition (intervention vs. control) by time (post- vs. pre-intervention) and the time-invariant covariates (i.e., sex, grade, and SES) were included as fixed effects. Sensitivity analyses were performed to evaluate potential moderators of the interventions' effect by testing three-way interaction terms (condition\*time\*moderator). The variables sex (Meade and Dowswell, 2016; Esteban-Gonzalo et al., 2019), age (Meade and Dowswell, 2016), and baseline terciles of HRQoL dimensions (Hartmann et al., 2010; Casey et al., 2014) were tested as potential moderators based on previous evidence. Thus, the slopes of time by the group were computed for each level of the moderator variable. Fitted models were evaluated according to the assumptions of homoscedasticity and residuals normality. Conclusions on interventions' effects were conducted by comparing 95% confidence intervals of the post-pre mean differences between intervention and control groups. Statistical analyses were conducted in Stata, version 14.0 (StataCorp LP., College Station, TX, USA).

### **2.6.3 Mediation analyses**

A structural equation modeling approach was used to identify whether changes in MVPA, ST, and their psychosocial factors were mediating variables of the effect of the intervention on the five dimensions of HRQoL. The theoretical model is presented in Figure 1. Mediators and outcomes were treated as the difference from pre- to post-intervention, considering the longitudinal nature of the data. Thus, coefficients are interpreted as the effect of one academic-year change of the mediator on the changes in HRQoL dimensions. The models were tested according to the statistical procedures of the product of the coefficients

(ab path) approach (MacKinnon et al., 2007). The direct effect of the intervention on HRQoL (coefficient c') was assessed by controlling the outcome at baseline, possible mediators, sex, age, and SES. Subsequently, the effect of the intervention on the mediators (PA, ST, and psychosocial factors), adjusted by these variables at baseline and the other control variables, were assessed (coefficient a). Next, the relationship of possible mediators to HRQoL at follow-up was estimated (coefficient b), adjusted for condition (intervention versus control), HRQoL, and mediators at baseline, as well as other control variables. Finally, for variables that presented significant coefficient b, the product of the coefficients (coefficient ab) was calculated to determine if there were indirect effects. This technique confirms mediation when the 95% confidence interval (95% CI) does not include the null value (MacKinnon et al., 2007). The variables of PA and ST were standardized (mean[variance] = 0[1]) for modeling. The model was tested using all variables in manifest form. Standardized scores were calculated using the maximum likelihood estimation (ML). In addition, to avoid bias for continuous but non-normal outcome variables, we applied the Satorra–Bentler statistic correction (Kline, 2015). Such modeling was conducted over the ten multiple imputed datasets, and the estimated parameters were pooled by applying Rubin rules (Rubin, 1987). This procedure was performed using the "sem.mi" function of the "semTools" R package (Jorgensen et al., 2018).

Evaluation of the goodness of fit of the models was performed considering several fit indexes: the  $\chi^2$ -likelihood ratio statistic, the Comparative Fit Index (CFI), the Tucker-Lewis index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). We also decided to use other evaluation parameters since the  $\chi^2$  tends to reject reasonably fitting models with large samples, and TLI tends to penalize models that estimate many parameters (Hoyle, 2012). CFI and TLI indicate a good model fit for values close to 0.95, while values close to 0.06 and 0.08 suggest a good model fit when RMSEA and SRMR are considered, respectively (Hu and Bentler, 1999). Inferential analyses were conducted on R version 4.1.0, using the *lavaan* package version 0.6-8.

### 3 RESULTS

#### 3.1 ARTICLE 1: EFFORTS ON CHANGING LIFESTYLE BEHAVIORS MAY NOT BE ENOUGH TO IMPROVE HEALTH-RELATED QUALITY OF LIFE AMONG ADOLESCENTS: A CLUSTER-RANDOMIZED CONTROLLED TRIAL

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**Efforts on changing lifestyle behaviors may not be enough to improve health-related quality of life among adolescents: A cluster-randomized controlled trial**

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#### **Abstract**

Schools have been the main context for physical activity (PA) and sedentary behavior (SB) interventions among adolescents, but there is inconsistent evidence on whether they also improve dimensions of the health-related quality of life (HRQoL). The aim of this study was to evaluate the effects of a school-based active lifestyle intervention on dimensions of HRQoL. A secondary aim was to verify whether sex, age, and HRQoL at baseline were moderators of the intervention effect. A cluster-randomized controlled trial was conducted at



three control and three intervention schools in Florianopolis, Brazil. All students from 7th to 9th grade were invited to participate. A school year intervention, designed primarily to increase PA and reduce SB, included strategies focused on (i) teacher training on PA, SB, and nutrition, and availability of teaching materials related to these contents; (ii) environmental improvements (i.e., creation and revitalization of spaces for the practice of PA in school), and (iii) education strategies, with the availability of folders and posters regarding PA, SB, and nutrition. Participants and the research staffs were not blinded to group assignment, but a standardized evaluation protocol was applied at baseline and after the intervention (March and November 2017) using the KIDSCREEN-27 to assess HRQoL across five dimensions. Mixed linear models were performed to evaluate the effect of the Movimento intervention on the five HRQoL dimensions. Of the 921 students who answered the questionnaire at baseline, 300 and 434 completed the study in control and intervention groups, respectively (dropouts: 20%). The results revealed no significant effects of the intervention on any HRQoL dimensions. A reduction of the school environment dimension was observed in both the control (-2.44; 95% CI: -3.41 to -1.48) and intervention groups (-2.09; 95% CI: -2.89 to -1.30). Sensitivity analyses showed that students in the highest baseline tertiles of HRQoL in any dimension had a reduction in their respective scores from pre- to post-intervention in both school groups. In conclusion, our results demonstrated no intervention effect on HRQoL dimensions and those students with the highest levels of HRQoL at baseline on all dimensions reduced from pre to post-intervention.

**Keywords:** Physical activity, sedentary behavior, health status, clinical trial, school-based intervention, students

**Trial registration:** The trial is registered at the Clinical Trial Registry (Trial ID: NCT02944318; date of registration: October 18 2016)

## **Introduction**

Health-related quality of life (HRQoL) is defined as a construct that measures global well-being, encompassing the physical, emotional, mental, social, and behavioral domains (Ravens-Sieberer et al., 2006). Although adolescents generally perceived a good health, previous longitudinal studies have found that total HRQoL decreases throughout adolescence (Esteban-Gonzalo et al., 2019; Langeland et al., 2019; Sánchez-Oliva et al., 2019). Therefore,

there is a need to develop strategies to sustain and improve HRQoL throughout adolescence (Wu et al., 2017; Marker et al., 2018).

Evidence has shown that physical activity (PA) and sedentary behavior (SB) are associated with HRQoL among adolescents (Jalali-Farahani et al., 2016; Wong et al., 2017; Lee et al., 2019). For instance, after two years of follow-up, Sánchez-Oliva and colleagues found that adolescents who increased their SB had a greater decrease in HRQoL compared to those who changed to active profiles (Sánchez-Oliva et al., 2019). Thus, the development of school-based interventions to promote active lifestyles may be an effective way of improving the HRQoL of adolescents (Wu et al., 2017).

Few studies have examined the effect of the interventions on the HRQoL among healthy adolescents, with the results of existing studies inconsistent (Wu et al., 2017; Marker et al., 2018). A systematic review observed that only three out of thirty-one studies assessed the effect of the school-based PA interventions on adolescents' HRQoL (Wu et al., 2017). In addition, a recent meta-analysis found that PA interventions positively impact HRQoL, but of the nineteen intervention studies included, only four were developed with apparently healthy children and adolescents (Marker et al., 2018). When considered these PA school-based interventions individually, the results have found inconsistent effects on specific dimensions of HRQoL (Hartmann et al., 2010; Azevedo et al., 2014; Casey et al., 2014; Ha et al., 2015). For instance, PA strategies that were incorporated into physical education classes, and linked to PA opportunities outside school had a positive effect on the physical well-being of Australian girls (Casey et al., 2014). On the other hand, an intervention involving strategies of teacher training on rope skipping, accessibility of resources, and active school recess was not effective for increasing physical well-being, but improved the autonomy and parent's relation among adolescents of Hong Kong (Ha et al., 2015). In addition, interventions to promote PA and reduce SB at schools, such as providing dance mat systems (Azevedo et al., 2014), additional physical education classes, and breaks during academic lessons (Hartmann et al., 2010; Casey et al., 2014), have presented a positive effect on the psychological well-being of adolescents. The effect of school-based interventions on the dimensions of peers and social support and school environment has been seldom studied, and no effects on these HRQoL dimensions have been observed (Azevedo et al., 2014; Ha et al., 2015). Therefore, the effect of PA and SB interventions in the specific dimensions of adolescents' HRQoL still requires scientific investigation.

Furthermore, it is important to examine individual characteristics that may influence changes in HRQoL (Ravens-Sieberer et al., 2006; Casey et al., 2014; Meade and Dowswell, 2016; Esteban-Gonzalo et al., 2019), which may change the direction and/or strength (i.e., moderator variable) of the intervention' effects. Researchers have proposed interventions that seem to be effective “for all” without testing whether the changes in the outcomes occurred in all relevant subgroups of adolescents. For instance, HRQoL can differ according to sex (Meade and Dowswell, 2016; Esteban-Gonzalo et al., 2019), age (Meade and Dowswell, 2016), and preceding HRQoL (Hartmann et al., 2010; Casey et al., 2014). Evidence have found a sex difference in the change over time in HRQoL, with girls being more prone to a reduction in HRQoL scores (Meade and Dowswell, 2016; Esteban-Gonzalo et al., 2019). It was also observed that the younger adolescents presented significantly higher scores of HRQoL throughout three academic years compared to older adolescents (Meade and Dowswell, 2016). In addition, previous findings suggest that adolescents with lower baseline HRQoL scores may be more susceptible to positive changes after an intervention (Ravens-Sieberer et al., 2006; Hartmann et al., 2010; Casey et al., 2014). A study filling these literature gaps may also help researchers and practitioners to identify groups of students that should be focused during school-based interventions that are aiming to improve adolescents' lifestyle and HRQoL.

To overcome this existing gap in research, we conducted a multicomponent school-based intervention (Movimente program) that targeted PA and SB among Brazilian students; additional information, and the results on other behaviors are available online ([www.movimente.ufsc.br](http://www.movimente.ufsc.br)) and in previous publication (Silva et al., 2020). In the present study, we evaluated the effects of this intervention on five dimensions of HRQoL and whether sex, age, and HRQoL at baseline were moderators of the intervention effect among adolescents. We hypothesized that the intervention would positively influence the dimensions of physical well-being, peers and social support, autonomy, and parent's relation and these effects would differ according to sex, age, and the baseline scores of HRQoL.

## **Methods**

### *Trial design and Participants*

The Movimente Program (the Portuguese word for movement) is a cluster randomized controlled trial, with randomization performed at the elementary school level. A detailed description of the theoretical background and methodological approach is in a

previous study (Silva et al., 2020). The program was conducted over one school year (March to November 2017). The primary outcomes of the intervention were PA and SB, and secondary outcomes included the five dimensions of HRQoL. The study protocol was approved by the Research Ethics Committee (No:1,259,910, CAAE: 49462015.0.0000.0121; date: in November 23rd, 2015) and the project was registered in the Clinical Trials database (NCT02944318).

After approval by the Board of Education of the city of Florianopolis (southern Brazil) and recruitment of schools took place in October to November 2015, the inclusion criteria of the schools were: a) having elementary school ( $n = 27$ ); b) have at least two classes per grade from the 7th to 9th grade ( $n = 21$ ); and c) the school could not be undergoing repair works during the collection period ( $n = 18$ ). The 18 schools that met the criteria were invited to participate. Seven schools accepted the invitation, one was selected for the pilot study, in which the strategies were previously tested, and the other six schools were randomly allocated into control and intervention groups, matched by size (two medium schools and one small in each group). All students in grades 7th to 9th from the six selected schools who attended the first weeks of school (1,427 students) were eligible to be part of the program (intervention = 796 and control group = 631). Exclusion criteria for students were: a) being mentally and/or physically disabled; b) absence during the first three weeks of the school year. Adolescents with disabilities were included and had the possibility to benefit from the intervention program, as well as the other students. However, we excluded them only from the analyzes as the applied instruments were not adequate to this specific subgroup. Students and parents were asked to sign an assent and consent form, and received no incentive to participate in the intervention. Further details regarding all the intervention procedures can be found in the protocol report (Silva et al., 2020) and figure 1.

### *Intervention*

The primary outcomes of the Movimente program were the time of total PA and time spent in SB, specifically screen time. Therefore, the strategies were focused to improve these outcomes and they comprised three main components: teacher training, active opportunities in the school environment, and health education for the school community.

Teacher training was specifically designed to provide logistic support to teachers of general disciplines and physical education, and encourage them to talk about health with their students. This strategy was organized in 3 stages: (i) a 4-hour face-to-face meeting, developed

at school, to discuss on health issues, PA and SB; (ii) a logistic support via online platform to disclose and discuss the activities developed by teachers at classroom; (iii) a face-to-face 2-hour meeting, developed at the end of the intervention, to discuss barriers, facilitators, and intention to continue using activities in their routine. The second component were active opportunities that were promoted in the school environment with the creation and revitalization of spaces for the practice of PA in the school. Each school received a kit of sports equipment (e.g., rackets, skipping rope, balls to play basketball, soccer, volleyball) to make available for students during their free time at school. Finally, health education materials were provided to the school community about the following themes: PA, SB, the relation between PA and academic performance, and eating habits. Every two months, teachers received folders to be discussed in the classroom, and to hand over to the students, which in turn should be delivered to their parents. In addition, at the beginning of the intervention, the school principals received four posters to be placed on school murals.

The strategies were expected to impact physical well-being, as the three components aimed to encourage students to improve PA and reduce SB, and consequently, improve how well and physically fit the student felt. Moreover, it was expected that there would be an effect on the dimension of peers and social support, since the strategies highlighted the importance of social relations with friends, as well as stimulated teachers to provide social support related to PA practice. For instance, teachers were encouraged to develop classroom activities with the educational materials of the intervention, which contained messages that encouraged the relationship between friends (e.g., The practice of PA can provide opportunities for talks with your friends; Reduce time on screens can provide more time with your friends). Regarding the autonomy and parent relation, some strategies, mainly in the educational component, highlighted the importance of the interactions between parents/family and students, as well as how parents could support their child/adolescent to become more physically active. Despite a lower intensity, it was also expected that the strategies could have an effect on the dimensions of psychological well-being and school environment, since the teachers were encouraged to discuss some psychosocial determinants of PA and SB, as well as there was the availability of new spaces and equipment for PA practice. Due to strategies focused on disseminate information regarding healthier changes on lifestyle and social interactions, positive effects on HRQoL dimensions may emerge independently of changes on PA and SB. Details of strategies of the Movimente Program are provided in supplementary material, and in previous publication (Silva et al., 2020).

The strategies were developed to reach all eligible students of the intervention schools, independently of their characteristics as sex, age, or level of HRQoL at baseline. Students of control schools continued with their traditional schedule, which included physical education classes twice a week. After the intervention period, the control schools received all materials of the intervention. Additionally, a mixed-method evaluation was conducted to analyze the implementation of the three program components in the intervention schools. In summary, this mixed-method evaluation was conducted considering both qualitative and quantitative measures of the intervention students, as well as their teachers and parents at follow-up. A detailed description of the implementation evaluation will be performed furthermore.

The theoretical basis for the development of the intervention, followed the structure of the program schools promoting health (HPS) (Langford et al., 2014) and the theories of behavior change: (i) socio-ecological (Sallis et al., 2006), (ii) social-cognitive (Bandura, 2004) and (iii) transtheoretical (Marcus and Simkin, 1994).

#### *Outcome measures*

Pre-intervention baseline (March/April 2017) and post-intervention (November/December 2017) measurements occurred at school during class hours. Students answered a standardized questionnaire which was guided and explained by a trained researcher, with two other researchers in the room to support students.

#### *Health-related quality of life*

The HRQoL was measured using Kidscreen-27. This instrument was developed in a large project in 13 European countries, showing Intraclass Correlation Coefficients (ICC) ranging between 0.61 and 0.74 (Ravens-Sieberer et al., 2006). The instrument comprises five dimensions of HRQoL: Physical Well-Being (n=5), Psychological Well-Being (n=7), Autonomy & Parent Relation (n=7), Peers & Social Support (n=4) and School Environment (n=4), the instrument has 27 questions with five response options, according to intensity (not at all, slightly, moderately, very, extremely) or frequency (never, almost never, sometimes, almost always, always). The scores for each dimension are reported as t-values, ranging from 0 to 100. Higher scores indicate better HRQoL (Ravens-Sieberer and Kidscreen Group Europe, 2016). Reliability was tested in the pilot study of the Movimente program and the

Intraclass Correlation Coefficients were observed to range from 0.71 to 0.78 between HRQoL dimensions (Silva et al., 2020).

### *Moderators and Covariates*

Students reported their sex (male or female), age (completed years), grade (seventh to ninth), and answered to a checklist of the ownership of household items according to the Brazilian Economic Classification Criteria (e.g. number of cars, refrigerators, and computers). These items were used to estimate an asset index by applying Principal Component Analysis, which is a proxy of socioeconomic status (SES) (Vyas and Kumaranayake, 2006). The SES score ranged from zero to fifteen, with higher values referring to greater family wealth. In addition, as there is no classification recommended by the Kidscreen group regarding HRQoL scores, baseline terciles values of HRQoL dimensions were considered for analysis.

### *Analyses*

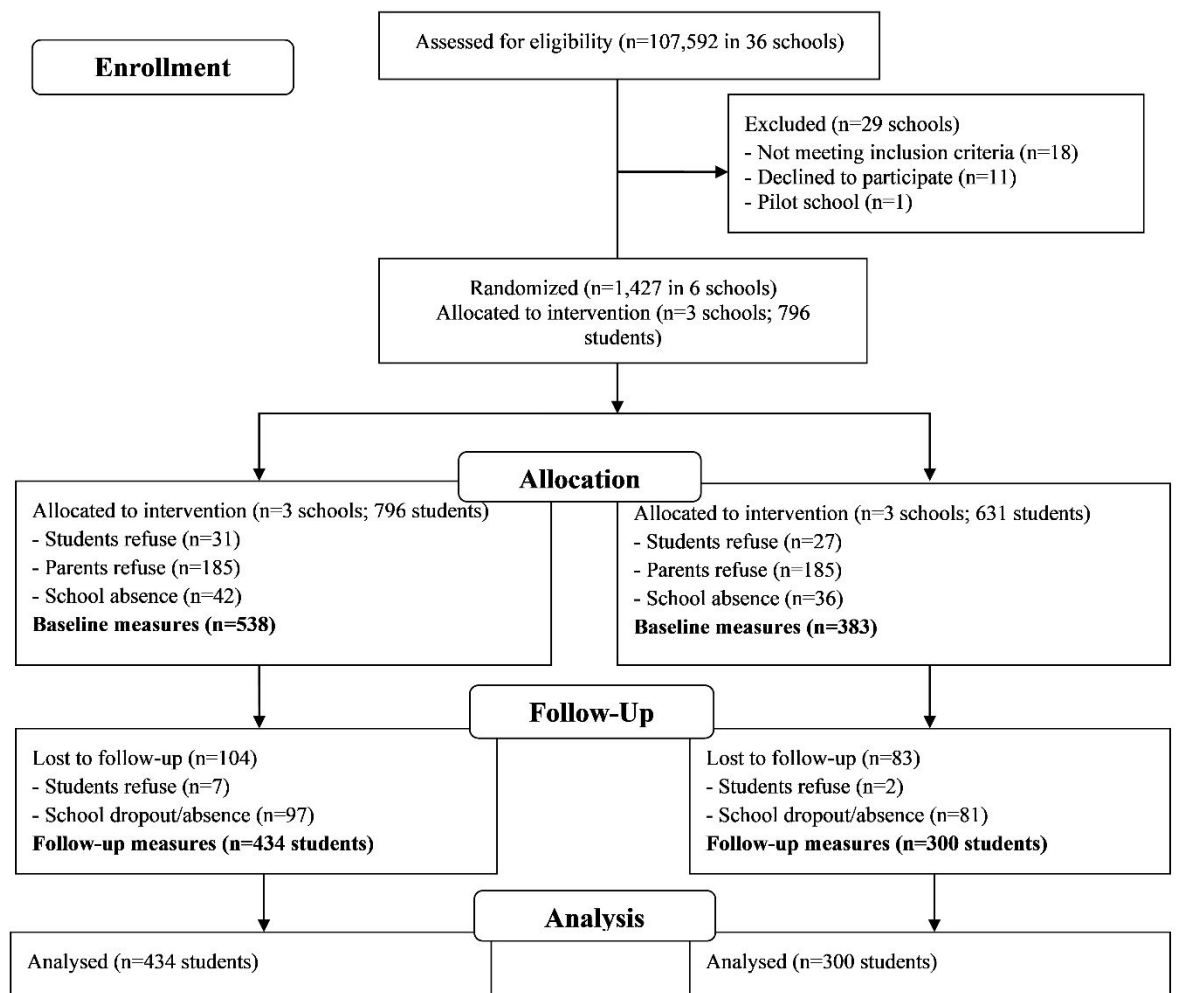
Sample characteristics were described using mean and standard deviation for continuous variable, and absolute and relative frequency for categorical variables. Student's t-tests and Pearson's chi-squared tests were applied to compare control and intervention groups at baseline, and to compare the baseline sample with dropouts.

Three-level linear mixed models were performed to evaluate the effect of the Movimente intervention on the five HRQoL dimensions. All models considered repeated measures (pre- and post-intervention) nested within participants, which were nested within schools. This hierarchical structure was used to consider the sampling design and the clustered nature of the data. As mixed models can accommodate unbalanced data, all available measures were included in analysis. The interaction term of condition (intervention vs control) by time (post- vs pre-intervention) and the time invariant covariates (i.e., sex, grade and SES) were included as fixed effects. Sensitivity analyses were performed to evaluate potential moderators of the interventions' effect by testing tree-way interactions terms (condition\*time\*moderator). The variables sex (Meade and Dowswell, 2016; Esteban-Gonzalo et al., 2019), age (Meade and Dowswell, 2016) and baseline terciles of HRQoL dimensions (Hartmann et al., 2010; Casey et al., 2014) were tested as potential moderators based on previous evidence. Thus, the slopes of time by group were computed for each level of the moderator variable. Fitted models were evaluated according to the assumptions of homoscedasticity and residuals normality. Conclusions on interventions effect was conducted

by comparing 95% confidence intervals of the post-pre mean differences between intervention and control groups. Statistical analyses were conducted in Stata, version 14.0 (StataCorp LP., College Station, TX, USA).



### CONSORT 2010 Flow Diagram



**Figure 1** – CONSORT flow diagram of recruitment, randomization, and participation of schools and adolescents in the *Movimente* study.



## Results

### *Recruitment and baseline measures*

Six out of 18 eligible schools indicated interest in the study, and three were randomly assigned for each condition. Of the 1,427 eligible students (control: 631; intervention: 796), 921 students participated of the baseline measures (control: 383; intervention: 538), and 734 (control: 300; intervention: 434) completed the study (dropouts: 20%). At baseline, 370 adolescents did not deliver the consent form, 58 refused to participate in the Movimente Program, and 78 were absent from school. At follow-up, a total of 187 adolescents were not assessed: 178 because of being absent, and 9 students refused to participate.

At baseline, the majority of students were girls (control: 52.7%; intervention: 51.1%), and students aged from 10 to 13 years old (control: 60.9%; intervention: 64.7%) (Table 1). The dimensions of HRQoL ranged from 43.8 ( $\pm$  10.0, physical) to 49.6 ( $\pm$  10.5, peers) for control schools, and 44.1 ( $\pm$  9.7, physical) to 49.8 ( $\pm$ 10.3, peers) for intervention schools. There were no differences between intervention and control schools in any variables at baseline. Dropouts were older, and presented lower scores of HRQoL than participants who completed the trial ( $p < 0.05$ , Table 1).

### *Intervention Effects*

As shown in Table and Figure 2, the adjusted mean of the school dimension reduced for both control group (-2.45; 95% CI: -3.41 to -1.48; effect size: -0.26) as for the intervention group (-2.09; 95% CI: -2.89 to -1.30; effect size: -0.22), but there was no difference between groups. Sensitivity analyses showed that students of the highest baseline terciles of all HRQoL dimensions reduced their HRQoL scores from pre- to post-intervention in both control and intervention groups (Figure 3 and Supplementary material). However, time (pre-post difference) by condition (intervention or control group) interaction effects did not vary between sexes, age groups and terciles of baseline HRQoL.

## Discussion

We hypothesized that our school-based active lifestyle intervention would positively influence the HRQoL dimensions of physical well-being, peers and social support, as well as the autonomy and parent's relation; and these effects would differ according to sex, age, and the previous level of HRQoL. However, our analyses revealed no significant effects of the

intervention on any HRQoL dimensions, but we found that the level of HRQoL at baseline was a moderator for the pre-post changes in all dimensions among both control and intervention conditions. Previous school-based interventions have found inconsistent evidence about effects on HRQoL (Hartmann et al., 2010; Finkelstein et al., 2013; Azevedo et al., 2014; Casey et al., 2014; Quaresma et al., 2014; Ha et al., 2015), which suggests that, owing to the multidimensionality of HRQoL, strategies to promote PA and reduce SB may not be enough to generate significant changes in the dimensions of HRQoL among adolescents.

Our results were distinct from a previous meta-analysis, which showed that PA interventions had a positive effect on global HRQoL; however, it included studies with healthy and chronic illness adolescents (Marker et al., 2018). When considered intervention effects on different HRQoL dimensions of healthy adolescents, findings are not consistent (Hartmann et al., 2010; Finkelstein et al., 2013; Azevedo et al., 2014; Casey et al., 2014; Quaresma et al., 2014; Ha et al., 2015). Regarding the physical well-being dimension of HRQoL, Casey and colleagues found that PA strategies for girls, into physical education classes and linked to PA opportunities outside school, provided positive effects, preventing the reduction of this dimension in the intervention group (Casey et al., 2014). However, studies combining both sexes have not shown significant effects on the physical well-being dimension of HRQoL (Hartmann et al., 2010; Finkelstein et al., 2013; Azevedo et al., 2014; Ha et al., 2015). A possible explanation for these results is that interventions did not have significant effects on the PA outcomes and, consequently, it was not able to improve the physical HRQoL of adolescents (Azevedo et al., 2014; Ha et al., 2015). Moreover, it is possible that school-based interventions may not have significant effects on healthy adolescents, or in subgroups that are less susceptible to reduce this dimension over time, since they already evaluate themselves with good physical HRQoL, which may mean that meaningful improvement is harder to achieve or that changes may be perceived in the long term from sustained chronic effects (Hartmann et al., 2010).

According our knowledge, only two previous studies evaluated the effects of PA interventions on peers and social support dimension among healthy adolescents, and both found no significant effects (Azevedo et al., 2014; Ha et al., 2015), which are aligned with our findings. On the other hand, the authors showed that strategies, including rope skipping programs and dance mat systems, were able to positively change the dimension of autonomy and parent's relation (Azevedo et al., 2014; Ha et al., 2015). Possibly, the lack of effect on these two HRQoL dimensions may be related to some barriers that prevented the successful

implementation of the program strategies. Despite the fact that the present intervention included strategies aimed to improve the parents' and peers' support for PA, the evaluation of the program's implementation found little engagement by parents and students in developing the strategies (data not shown). Furthermore, the dimension of autonomy and parent's relation also considers aspects regarding the perceived autonomy of the adolescents, including financial. Considering that HRQoL was not a primary outcome of the Movimente program, specific strategies for improving different types of autonomy were not considered. Therefore, future interventions that establish HRQoL as primary outcome may consider these dimensions for development of intervention strategies, aiming to make adolescents more autonomous, as well as to consider aspects that improve the implementation of strategies. The involvement of parents and friends, and the implementation of specific PA such as sports, dance, and others for boys and girls may also improve the effectiveness of interventions, as preference for PA types may differ according to sex (Bertuol et al., 2020), as well as its relation with HRQoL dimensions (Costa et al., 2020).

Considering the possible moderators, adolescents with higher baseline HRQoL had a reduction in their respective outcomes in both intervention and control groups. To our knowledge, no studies evaluated baseline HRQoL level as a possible moderator of the effect of the intervention on HRQoL dimensions. A possible explanation for our results is the context in which students lived at the time of data collection. The post-intervention measurement coincided with the end of the school year, with academic assessments that may have negatively influenced the HRQoL of adolescents (García-Moya et al., 2019). When considered intervention effects on HRQoL dimensions according sex and age groups, no significant difference was found between groups. Previous findings suggest that girls and older adolescents were more susceptible to present less HRQoL scores when compared with their peers (Meade and Dowswell, 2016; Esteban-Gonzalo et al., 2019), which indicates these two subgroups as more likely to improve HRQoL scores (Ravens-Sieberer et al., 2006; Hartmann et al., 2010; Casey et al., 2014). However, our intervention has not confirmed these hypotheses, thus it is important that future studies to evaluate which groups of adolescents that should be focused during school-based interventions aiming to improve HRQoL.

Collaborating with this finding, there was also a reduction on school environment dimension in both intervention and control groups. Two previous interventions that evaluated the effects of PA strategies on school environment dimension found no significant effects (Azevedo et al., 2014; Ha et al., 2015). However, a comparison with our results should be

made carefully because studies were different in the types of intervention strategies used and the social context of schools. Probably, this reduction occurs because the dimension of school environment explores the perception of the student about their cognitive ability, learning and concentration, which may be negatively influenced by the end of the academic year. For instance, longitudinal evidence has presented a reduction on school environment dimension, as well as an increase on emotional problems among adolescents from final years of elementary school (García-Moya et al., 2019). Also, the authors observed that the school environment dimension is linked to emotional problems in early adolescence (García-Moya et al., 2019), supporting our previous argument. Thus, it is notable that the current evidence highlighted the need for a school environment that provides strategies to promote well-being to students.

### *Strengths and Limitations*

Although previous studies have evaluated the effect of the interventions on HRQoL, as far as are aware, this is the first school-based intervention exploring the effect of active lifestyle strategies on different dimensions of HRQoL among adolescents from a middle-income country. Moreover, we conducted sensitivity analysis to evaluate the effect of the intervention among potential moderators, an important issue that was previously highlighted, since the strategies could have a different impact depending on the individual characteristics of adolescents. Limitations of the current study should be recognized and addressed in future interventions. First, HRQoL was not the primary outcome of the Movimente Program, which may have been related to the non-significant effect on the dimensions. Although our strategies have comprised some aspects of the different dimensions of HRQoL, it seems to have been insufficient to change these outcomes. Finally, we carried out post-intervention measures at the end of the school year, coinciding with the academic assessments that may have negatively influenced the HRQoL of adolescents.

### *Implications for research and practice*

Although we understand that multicomponent interventions are extremely necessary to improve the different aspects of health, the focus on more than one target outcome, and more than one theory in the same intervention may be complex to obtain substantial changes in the outcomes. Therefore, future interventions to improve HRQoL may focus on specific

strategies for its dimensions, with the possibility of evaluating different arms of interventions to compare scenarios and strategies focused on each dimension. In this regard, behavioral theories are important tools in the planning and implementation of these strategies, and how the changes on lifestyle behaviors may help HRQoL dimensions. In addition, it is important to consider the different levels of HRQoL of students since they tend to respond in different ways. Finally, considering that there is a tendency to reduce the dimensions of HRQoL over time, the school community must be careful in maintaining a healthy school environment that provides psychological well-being to students during the school year.

### **Conclusion**

The Movimente Program had no effect on HRQoL dimensions, and we observed that the level of HRQoL reduced from pre to post-intervention among those with higher HRQoL at the baseline. However, there was also no intervention effect on the changes of HRQoL dimensions, considering the possible moderators.

**Table 1** - Students' characteristics at baseline according to group (intervention and control) and in participants and dropouts of the *Movimente* Program, 2017

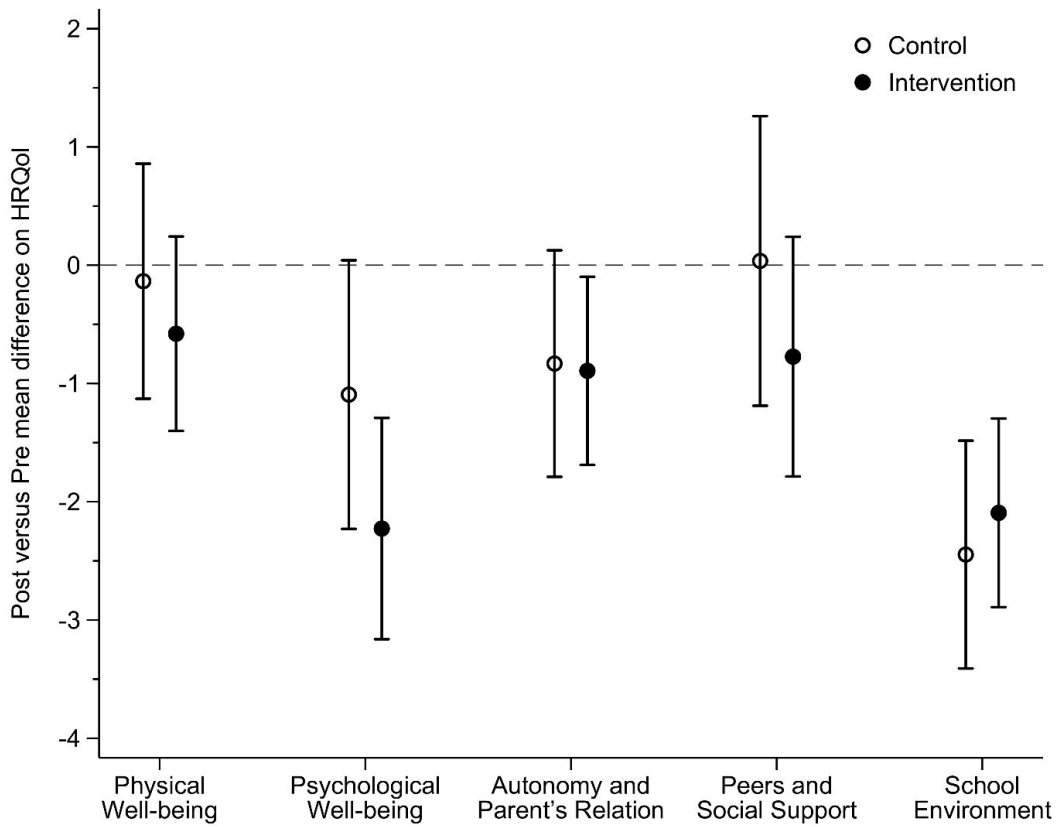
	<b>Participants (n=734)</b>		<b>Dropouts (n=187)</b>		<b>p-value</b>	<b>Control (n=383)</b>		<b>Intervention (n=538)</b>		<b>p-value</b>
	n (%)		n (%)			n (%)		n (%)		
<b>Sex</b>	n (%)		n (%)			n (%)		n (%)		
Boys	356 (48.5)		88 (47.1)		0.725	181 (47.1)		263 (48.9)		0.626
Girls	378 (51.5)		99 (52.9)			202 (52.7)		275 (51.1)		
<b>Age</b>										
10 to 13	477 (65.1)		103 (55.4)		0.014	232 (60.9)		348 (64.7)		0.241
14 to 16	256 (34.9)		83 (44.6)			149 (39.1)		190 (35.3)		
<b>SES (mean±SD)</b>	4.9 (1.8)		4.8 (1.8)		0.507	4.9 (1.9)		4.9 (1.8)		0.867
<b>HRQoL</b>	<b>n</b>	<b>M (±SD)</b>	<b>n</b>	<b>M (±SD)</b>		<b>n</b>	<b>M (±SD)</b>	<b>n</b>	<b>M (±SD)</b>	
<b>Physical</b>	727	44.3 (10.1)	185	42.4 (8.7)	0.018	378	43.8 (10.0)	534	44.1 (9.7)	0.748
<b>Psychological</b>	720	46.1 (11.4)	182	43.9 (11.8)	0.017	372	45.6 (12.5)	530	45.8 (10.8)	0.864
<b>Autonomy and Parent's relation</b>	724	47.1 (8.9)	179	45.4 (9.9)	0.035	372	46.5 (9.9)	531	46.9 (8.5)	0.558
<b>Peers and Social support</b>	727	50.3 (10.2)	185	47.3 (10.6)	<0.001	378	49.6 (10.5)	534	49.8 (10.3)	0.721
<b>School</b>	725	48.8 (9.0)	183	46.3 (8.9)	0.004	377	48.3 (9.4)	531	48.4 (8.6)	0.946

P-value estimated using the Chi-square test for categorical variables and independent t-test for continuous variables; SES was the variable with the highest missing data (n=86).

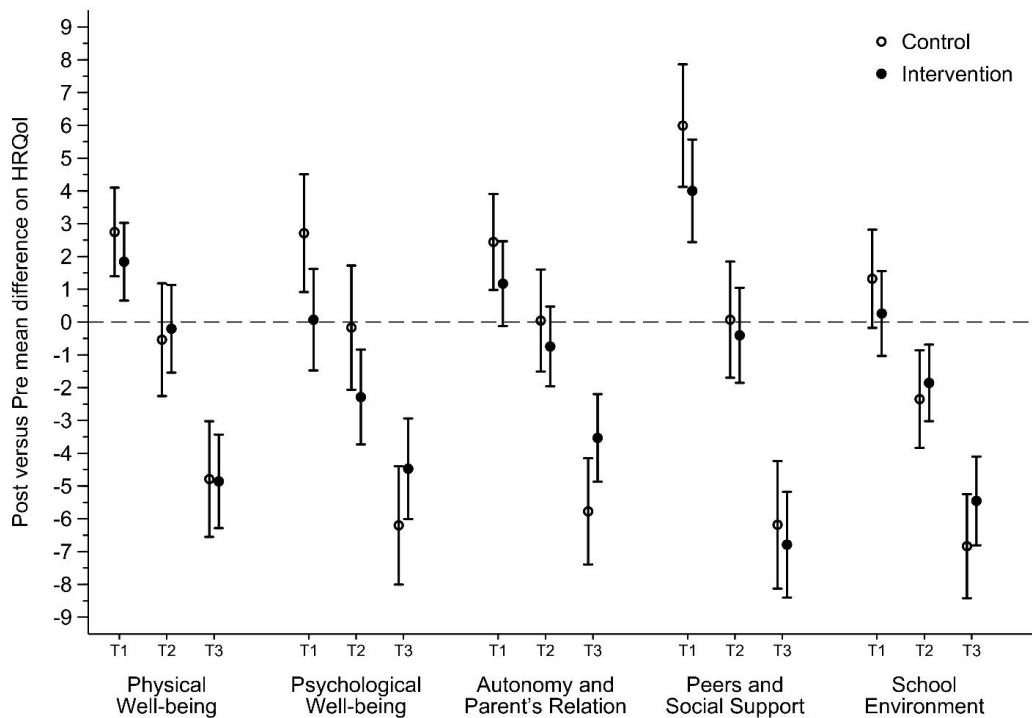
**Table 2** – Effects of the *Movimente* Program on dimensions of HRQoL among total sample.

Dimensions	Estimates				
	Baseline mean	Follow-up mean	$\beta$ (95% CI)	Delta (%)	Effect Size
<b>Physical Well-being</b>					
Control	44.1	44.0	-0.14 (-1.13,0.86)	-0.31	-0.01
Intervention	44.1	43.5	-0.58 (-1.40,0.24)	-1.31	-0.06
<b>Psychological Well-being</b>					
Control	46.0	45.0	-1.09 (-2.23,0.04)	-2.38	-0.09
Intervention	45.7	43.5	-2.23 (-3.16,-1.29)	-4.87	-0.19
<b>Autonomy and Parent's Relation</b>					
Control	46.9	46.1	-0.83 (-1.79,0.13)	-1.77	-0.09
Intervention	47.0	46.1	-0.89 (-1.69,-0.10)	-1.90	-0.10
<b>Peers and Social Support</b>					
Control	49.9	50.0	0.04 (-1.19,1.26)	0.07	0.00
Intervention	49.9	49.1	-0.77 (-1.79,0.24)	-1.55	-0.07
<b>School Environment</b>					
Control	48.6	46.2	-2.45 (-3.41,-1.48)	-5.03	-0.26
Intervention	48.5	46.4	-2.09 (-2.89,-1.30)	-4.32	-0.22

Linear mixed models were used to calculate baseline and follow-up means, adjusted for sex, age, grade, SES, and HRQoL



**Figure 2.** Effect of the Movimente Program on dimensions of HRQoL among total sample.





**Figure 3.** Effect of the Movimente Program on dimensions of HRQoL according the terciles (T1: lower; T2: medium; T3: highest) of HRQoL at baseline

3.2 ARTICLE 2: PHYSICAL ACTIVITY, SCREEN TIME, AND THEIR  
PSYCHOSOCIAL DETERMINANTS IN THE PATHWAYS OF THE HEALTH-  
RELATED QUALITY OF LIFE IN ADOLESCENTS: A MEDIATION ANALYSIS OF  
A CLUSTER-RANDOMIZED CONTROLLED TRIAL

The present manuscript is under review in the Journal of Child Psychology and Psychiatry's special issue, Innovation in Child and Adolescent Mental Health Interventions.

**Physical activity, screen time, and their psychosocial determinants in the pathways of the health-related quality of life in adolescents: a mediation analysis of a cluster-randomized controlled trial**

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## Abstract

**Background:** Experimental data assessing the mediation of PA and ST on the relationship between school-based interventions and adolescents' health-related quality of life (HRQoL) is required to understand the complex pathways toward effective health promotion. We evaluated the direct and indirect effects of changes in PA, ST, and their psychosocial determinants (self-efficacy, outcome expectations, and social support) on the HRQoL dimensions.

**Methods:** A cluster-randomized controlled trial was performed in Brazil over an academic year (March-November/2017). Six out of eighteen eligible schools agreed to participate in the research, three for each condition (intervention *vs.* control). Among 1,427 eligible students, 921 (intervention=538) participated at the baseline. The intervention included teacher training on PA and ST, educational strategies through the availability of pamphlets/posters, and environmental improvements to create/revitalize spaces for PA in school. Validated questionnaires measured HRQoL, PA, ST, and their psychosocial determinants. A structural equation model examined the direct/indirect effects.

**Results:** 694 students completed all measures at baseline and follow-up (girls=52%, age mean=13.0). There were no significant indirect effects. We found the following direct effects: (i)PA self-efficacy ( $b=0.072$ ,  $p=0.026$ ), PA outcome expectations ( $b=0.135$ ,  $p<0.001$ ), parents support for PA ( $b=0.086$ ,  $p=0.008$ ), and peers support for PA ( $b=0.075$ ,  $p=0.022$ ) on physical well-being; (ii)PA self-efficacy ( $b=0.074$ ,  $p=0.024$ ), PA outcome expectations ( $b=0.086$ ,  $p=0.009$ ), parents support for PA ( $b=0.070$ ,  $p=0.034$ ), and family support for reducing ST ( $b=0.121$ ,  $p<0.001$ ) on psychological well-being; (iii)ST self-efficacy ( $b=0.079$ ,  $p=0.022$ ), and friends support for PA ( $b=0.095$ ,  $p=0.006$ ) on peers & social support; (iv)parents support for PA ( $b=0.140$ ,  $p<0.001$ ) on autonomy & parent's relation; (v)PA outcome expectations ( $b=0.089$ ,  $p=0.010$ ), friends support for PA ( $b=0.138$ ,  $p<0.001$ ); and ST ( $b=0.081$ ,  $p=0.025$ ) on school environment.

**Conclusions:** Although the observed effects were not due to the intervention, changing self-efficacy, outcome expectations, and social support related to PA and ST might improve HRQoL, suggesting that future interventions may target these psychosocial determinants.

**Keywords:** Adolescent well-being; psychosocial aspects; sedentary behavior; clinical trial; low- and middle-income countries.

**Abbreviations:**

PA: physical activity

ST: screen time

HRQoL: health-related quality of life

**Trial registration:** Clinicaltrials.gov identifier NCT02944318 (25/10/2016).

## Introduction

Multidimensional elements of children and adolescents' health and well-being have been a global priority for health promotion (United Nations, 2016), such as health-related quality of life (HRQoL) (Ravens-Sieberer et al., 2006). Nonetheless, several adverse health outcomes (e.g., bullying, stress, and depression) are increasing among younger people and further in life (Mojtabai et al., 2016; Kandola et al., 2020; Murray et al., 2020), and well-being has deteriorated over adolescence (Esteban-Gonzalo et al., 2019; Langeland et al., 2019). Different factors have potentially harmful effects on HRQoL among children and adolescents, such as low physical activity (PA) and high screen time (ST) (Hinkley et al., 2014; del Pozo-Cruz et al., 2019; Stiglic and Viner, 2019). On the other hand, a longitudinal study tracking two cohorts of Australian children aged 0 to 5 years showed that those who increased PA and maintained low ST levels four years later presented better scores for HRQoL (del Pozo-Cruz et al., 2019). These findings suggest that using intervention strategies to improve PA and reduce ST might help to enhance both global and specific HRQoL dimensions, but the evidence is still incipient (Wu et al., 2017; Neil-Sztramko et al., 2021).

According to the social-cognitive theory, well-being can also be influenced by a core set of psychosocial determinants, including self-efficacy, outcome expectations, and social support (Bandura, 2004). Evidence showed that children and adolescents with a better sense of general self-efficacy, such as presenting confidence to stick to their aims and accomplish their goals, presented better HRQoL (Otto et al., 2017; Haraldstad et al., 2019; Mikkelsen et al., 2020). In addition, studies demonstrated that higher general (Otto et al., 2017; Gomes et al., 2020) and PA-specific social support (Tilga et al., 2021) were associated with better HRQoL. Moreover, recent evidence highlighted the relevance of multicomponent lifestyle interventions to incorporate a broader context beyond the individual, such as strategies involving family and the schools' social and physical environment, especially in low-middle income countries (LMIC) (Liu et al., 2022).

Evaluating the mediation variables is a relevant way to understand the mechanisms that might explain the interventions' effect on HRQoL, such as changes in behaviors and psychosocial determinants. For instance, in a 2-year school-based intervention, PA social support mediated the effect of the intervention on HRQoL among Portuguese adolescents (Quaresma et al., 2014). Another study found that the effect of an intervention on psychological well-being was mediated by reducing ST among Australian boys (Lubans et al., 2016a). However, it is

unclear whether interventions to decrease ST or improve PA and their psychosocial determinants impact the HRQoL among adolescents from LMIC. Therefore, identifying which mechanisms explain the effect of interventions on HRQoL through mediator variables provides evidence on which psychosocial factors and strategies should be prioritized in health and well-being interventions. Based on these gaps, our primary aim was to investigate whether changes in PA, ST, and psychosocial determinants (self-efficacy, outcome expectations, and family, friends, and teachers' support) mediate the effect of a multicomponent intervention on the different dimensions of HRQoL among adolescents. The secondary goal was to evaluate whether changes in the proposed mediators directly affect the HRQoL dimensions.

## **Methods**

### *Trial design*

This study is a cluster-randomized controlled trial where the school was the primary unit of randomization, carried out over one school year (March to December 2017). The main goal of this intervention (called *Movimente* Program) was to promote PA and reduce adolescents' ST. The design, methods, and flowchart of study participants were described in previous publications, based on the recommendations of the Consolidated Standards of Reporting Trials (CONSORT) (Silva et al., 2020; Bandeira et al., 2021). The study was approved by the National Research Ethics System (protocol number: 1.259.910; CAAE: 49462015.0.0000.0121; date: November 23, 2015) and registered in Clinical Trials (NCT02944318; date of registration: October 18, 2016).

### *Participants*

The *Movimente* program was developed in Florianopolis, Southern Brazil. Eligible schools should have elementary classes, at least two classes per grade from 7<sup>th</sup> to 9<sup>th</sup> grade, and an environment available for physical education classes during the trial. A total of eighteen schools were eligible, representing 50% of all elementary schools in the municipality. Seven out of eighteen invited schools accepted to participate in the study. The smaller school (six classes) was selected for the pilot study. The other six were matched according to the number of classes (from seven to thirteen) and geographic location (North and South), then randomly allocated into control and intervention conditions. All students who attended the first three weeks of school were eligible to participate in the study (total = 1,427; intervention = 796 and control = 631).

### *Interventions*

All rationale and description of the *Movimente* program strategies were previously described (Silva et al., 2020), including how strategies addressed dimensions of the HRQoL (Bandeira et al., 2021). Briefly, the strategies were based on the following theories of behavior change and frameworks: (i) social-cognitive (Bandura, 2004); (ii) socio-ecological (Sallis et al., 2006); (iii) transtheoretical (Marcus and Simkin, 1994); and (iv) WHO health-promoting school framework (Langford et al., 2014). Thus, the strategies of the *Movimente* program comprised of three main components: (i) teacher training, which was specifically designed to provide logistic support to teachers of general disciplines and physical education (training on health issues, physical activity, and sedentary behavior, availability of teaching materials and discussion group on text messaging apps); (ii) environmental improvements, with changes in the school environment (creation and revitalization of spaces for the practice of PA in school); and (iii) educational strategies regarding health issues (diet, PA, and ST), with the availability of four posters to be placed on school murals and four pamphlets to distribute among students, aiming to reach their parents. Control schools remained with their traditional schedule. After the end of the intervention, all control schools received the same materials delivered to the intervention group.

The implementation of the intervention strategies was evaluated through qualitative and quantitative data from students, teachers, and parents involved in the program (da Silva Bandeira et al., 2021). In summary, teachers presented a more positive perception of the intervention, whereas most students and parents have not perceived the implemented strategies. The lack of engagement from the entire school community and the teachers' busy schedules were the main barriers that prevented the successful implementation of the intervention (da Silva Bandeira et al., 2021).

### *Outcomes*

The variables were measured at two moments of the academic year: in the baseline period (March/April 2017) and post-intervention (November/December 2017). For obtaining data, the research staff administered a standardized questionnaire in class during school hours over a mean time of 90 minutes. Trained researchers provided further information about each question to facilitate the survey completion. The questionnaires can be accessed online ([movimente.ufsc.br/en/questionarios](http://movimente.ufsc.br/en/questionarios)). Participants and the research staff were not blinded to group assignment, but a standardized evaluation protocol was applied at both time points.

### *Health-related Quality of Life*

We used the Kidscreen-27 questionnaire to evaluate the five HRQoL dimensions: Physical Well-Being (n = 5 items), Psychological Well-Being (n = 7 items), Autonomy & Parent Relation (n = 7 items), Peers & Social Support (n = 4 items), and School Environment (n = 4 items) (Ravens-Sieberer and Kidscreen Group Europe, 2016). The instrument showed appropriate reliability (ICC ranged from 0.71 [School Environment] to 0.78 [Physical]) and consistency (Omega ranged from 0.82 [School Environment] to 0.91 [Psychological]) (da Silveira et al., 2021). Items were assessed on a five-point Likert scale, and the scores were reported as t-values (from 0 to 100), with higher scores indicating better HRQoL (Ravens-Sieberer and Kidscreen Group Europe, 2016). The translated version into Brazilian Portuguese and the syntaxes for calculating the scores are available upon request on the official website of the Kidscreen group ([www.kidscreen.org](http://www.kidscreen.org)).

### *Physical Activity*

The PA was assessed using an adapted version of the Self-Administered Physical Activity Checklist, an instrument that provided a checklist of 22 moderate or vigorous activities (Farias Júnior et al., 2012). The students reported whether they usually participated in any of the activities, the weekly frequency (1-7 days), and the daily duration (minutes) (Farias Júnior et al., 2012; Barbosa Filho et al., 2016c). The total time in PA (minutes/week) was obtained by multiplying the frequency and duration of all activities. Test-retest reliability provided adequate parameters (ICC=0.69; Spearman rho=0.68) (Silva et al., 2020).

### *Screen Time*

Based on the *Youth Risk Behavior Survey Questionnaire* (Guthold et al., 2010; Malta et al., 2014) and validated for the Brazilian population (Cohen's Kappa from 0.61 [TV] to 0.76 [videogames]) (Guedes and Lopes, 2010), the ST was evaluated using eight questions about the time spent: i) watching TV; ii) using a computer; iii) playing games; iv) and using a cellphone. Eight response options were recoded as follows: “I do not use...”=0; <1 h/day=0.5; 1 h/day=1; 2 h/day=2; 3 h/day=3; 4 h/day=4; and 5 h/day=5; ≥ 6h/day=6 (Bucksch et al., 2016; Bandeira et al., 2020b). The average daily time for each device was calculated considering weekdays and



weekends (e.g.,  $(((TVweek*5) + (TVweekend*2))/7)$ ) (Silva et al., 2014; Bandeira et al., 2020b); then, the total ST was obtained by the sum of the time spent on all devices (Bucksch et al., 2016).

### *Psychosocial factors*

The PA psychosocial determinants were evaluated through an instrument constructed and validated for Brazilian adolescents (ICC ranging from 0.62 [support of parents] to 0.70 [self-efficacy]) (Farias Júnior et al., 2011; Barbosa Filho et al., 2016c), except for the outcome expectations scale, which was translated and adapted from Saunders and colleagues (Saunders et al., 1997). Self-efficacy related to the PA scale included eight items referring to the individual's belief in their ability to perform PA in adverse situations (e.g., lack of company or lack of PA places near home). PA outcome expectation was evaluated through 10 items measuring the students' perception of the positive and negative expectations about practicing PA. Six items measured students' perception of the frequency with which parents supported (e.g., encouraged, commented on, and transported) them to practicing PA. Three scales measured the support of friends, teachers, and physical education teachers for PA (five items for each scale).

The psychosocial determinants of ST reduction (self-efficacy, outcome expectations, and family support) were evaluated by an instrument previously validated for Brazilian adolescents (Barbosa Filho et al., 2021), with acceptable values for the construct validity, internal consistency, and reproducibility (Barbosa Filho et al., 2021). The self-efficacy scale included 11 items and evaluated the students' perception of abilities and confidence for reducing their ST. Family support for reducing ST evaluated students' perception of the support of household members for reducing their ST (5 items). The outcome expectations included 12 items on what students expect from their reduced ST. Items were assessed on a four-point Likert scale regarding intensity (strongly disagree to agree strongly) or frequency (never to always). For each psychosocial determinant, the total score was obtained from the mean of all items, and higher scores reflect a better scenario for the practice of PA or for the reduction of ST.

### *Control variables*

Sociodemographic variables were assessed: sex (boys and girls), age, and socioeconomic status (SES), obtained through a questionnaire that assessed household items (e.g., number of

cars, refrigerators, and computers) as proposed by the Brazilian Economic Classification Criteria (Silva et al., 2020). The Principal Component Analysis was used to reduce the set of a correlated count of household items to an asset index, ranging from 0 to 15, with higher values referring to greater family wealth (Vyas and Kumaranayake, 2006).

### *Statistical methods*

We used mean, standard deviation, and frequency to describe the sample characteristics. Differences at baseline between control and intervention groups were evaluated using the Chi-square test (categorical variables) and mixed regression models (continuous variables), accounting for clustering data.

Missing data were inspected for PA and ST psychosocial items and household items among participants who answered the questionnaire at the baseline ( $n = 921$ ) and follow-up ( $n = 734$ ). A mean of 1.5% and 0.9% of missing data were observed at the baseline and follow-up, respectively, among 83 items. The variable with the highest missing data had 4% and 1.7% non-responses at the baseline and follow-up, respectively. Visual inspection suggested that non-responses among the variables were random. Thus, missing data were assumed to be random (MAR), and a multiple imputation procedure was applied using the MICE (multiple imputations by chained equations) algorithm. The predictive mean matching (pmm) method was applied to impute 10 datasets with 50 iterations for higher precision (Van Buuren and Groothuis-Oudshoorn, 2011). The set predictors for each item were defined by including correlated variables ( $\geq 0.1$  Pearson Correlation) from a pool with demographic variables and all psychosocial items. The dataset was stratified according to time (pre-and post-intervention) and group (control and intervention) to avoid inserting bias related to group allocation. The procedure was conducted using the “mice” package in R Project for Statistical Computing 3.5.1 (Van Buuren and Groothuis-Oudshoorn, 2011).

A structural equation modeling approach was used to identify whether changes in PA, ST, and psychosocial factors were mediating variables of the effect of the intervention on the five dimensions of HRQoL. The theoretical model is presented in Figure 1. Mediators and outcomes were treated as the difference from pre- to post-intervention, considering the longitudinal nature of the data. Thus, coefficients are interpreted as the effect of one academic-year change of the mediator on the changes in HRQoL dimensions. The models were tested

according to the product of the coefficients (ab path) approach (MacKinnon et al., 2007). The direct effect of the intervention on HRQoL (coefficient c') was assessed by controlling the outcome at baseline, possible mediators, sex, age, and SES. Subsequently, the effect of the intervention on the mediators (PA, ST, and psychosocial factors), adjusted by these variables at baseline and the other control variables, were assessed (coefficient a). Next, the relationship of possible mediators to HRQoL at follow-up was estimated (coefficient b), adjusted for condition (intervention versus control), HRQoL, and mediators at baseline, as well as other control variables. Finally, for variables that presented significant coefficient b, the product of the coefficients (coefficient ab) was calculated to determine if there were indirect effects. This technique confirms mediation when the 95% confidence interval (95% CI) does not include the null value (MacKinnon et al., 2007). The variables of PA and ST were standardized (mean[variance] = 0[1]) for modeling. The model was tested using all variables in manifest form. Standardized scores were calculated using the maximum likelihood estimation (ML). In addition, to avoid bias for continuous but non-normal outcome variables, we applied the Satorra–Bentler statistic correction (Kline, 2015). Such modeling was conducted over the 10 multiple imputed datasets, and the estimated parameters were pooled by applying Rubin rules (Rubin, 1987). This procedure was performed using the “sem.mi” function of the “semTools” R package (Jorgensen et al., 2018).

Evaluation of the goodness of fit of the models was performed considering several fit indexes: the  $\chi^2$ -likelihood ratio statistic, the Comparative Fit Index (CFI), the Tucker-Lewis index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). We also decided to use other evaluation parameters since the  $\chi^2$  tends to reject reasonably fitting models with large samples, and TLI tends to penalize models that estimate many parameters (Hoyle, 2012). CFI and TLI indicate a good model fit for values close to 0.95, while values close to 0.06 and 0.08 suggest a good model fit when RMSEA and SRMR are considered, respectively (Hu and Bentler, 1999). Inferential analyses were conducted on R version 4.1.0, using the *lavaan* package version 0.6-8.

## [FIGURE 1]

### Results

Recruitment and retention are detailed in previous publications (Silva et al., 2020; Bandeira et al., 2021). Of the 921 students who participated at the baseline, 886 and 694 students

presented completed data for all measures at baseline and follow-up, respectively. There were no significant differences between both school conditions at baseline (table 1). Dropouts were older and presented lower scores on HRQoL dimensions than participants who completed the trial (Bandeira et al., 2021). The range of average HRQoL (0 – 100) dimensions was from 43.8 (physical) to 49.8 (peers & social support) for control schools and 44.1 (physical) to 49.7 (peers & social support) for intervention schools.

### [TABLE 1]

#### *Primary goal*

PA, ST, and their psychosocial determinants were not observed as mediation variables of the relationship between the intervention and HRQoL dimensions (*ab* coefficients equal to zero, Table 3). Except for TLI and  $\chi^2$ , according to the provided criteria, the model presented appropriate goodness-of-fit indices:  $\chi^2$  (df) = 1093.76 (286),  $p < 0.001$ ; CFI = 0.933; TLI = 0.897; RMSEA = 0.068 (Upper 90%CI: 0.075); SRMR = 0.062.

#### *Secondary goal*

The intervention had no impact on the HRQoL dimensions (physical = -0.038,  $p = 0.244$ ; psychological = -0.055,  $p = 0.099$ ; autonomy & parent's relation = -0.018,  $p = 0.597$ ; peers & social support = -0.028,  $p = 0.409$ ; school environment = 0.032,  $p = 0.350$ ), PA (-0.023,  $p = 0.414$ ) and ST (0.018,  $p = 0.585$ ) (Table 2). There was a significant effect of the intervention on the support of teachers from general disciplines (0.088,  $p = 0.004$ ) and physical education (0.072,  $p = 0.029$ ). The direct effects of the intervention on the other MVPA and ST psychosocial determinants were not statistically significant (Table 2).

### [TABLE 2]

The increase of PA self-efficacy ( $b = 0.072$ ,  $p = 0.026$ ), PA outcome expectations ( $b = 0.135$ ,  $p < 0.001$ ), support of parents ( $b = 0.086$ ,  $p = 0.008$ ), and friends for practicing PA ( $b = 0.075$ ,  $p = 0.022$ ) was associated with the increase of physical well-being (Table 2). PA self-efficacy ( $b = 0.074$ ,  $p = 0.024$ ), PA outcome expectations ( $b = 0.086$ ,  $p = 0.009$ ), parents support for PA ( $b = 0.070$ ,  $p = 0.034$ ), and family support for reducing ST ( $b = 0.121$ ,  $p < 0.001$ ) were positive associated with changes of psychological well-being. Increased parents support for PA was associated to better autonomy & parent's relation ( $b = 0.140$ ,  $p < 0.001$ ). Friends support for PA ( $b = 0.095$ ,  $p = 0.006$ ) and ST self-efficacy ( $b = 0.079$ ,  $p = 0.022$ ) were positively associated with changes of peers & social support. The increase of ST ( $b = 0.081$ ,  $p = 0.025$ ), PA outcome

expectations ( $b = 0.089$ ,  $p = 0.010$ ), and friends support for PA ( $b = 0.138$ ,  $p < 0.001$ ) was associated with the increase of school environment dimension.

### [TABLE 3]

#### Discussion

Our study analyzes the hypothesis that multicomponent interventions could change HRQoL through ST, PA, and their psychosocial determinants among Brazilian adolescents. However, we found no significant mediation effects of these variables on the relationship between intervention and HRQoL. On the other hand, our analyses revealed significant positive direct effects as follows: (i) PA self-efficacy on physical and psychological well-being, and ST self-efficacy on peers and social support; (ii) PA outcome expectations on physical, psychological, and school environment dimensions; (iii) parents support for PA on physical, psychological, and autonomy & parent's relation, and family support for reducing ST on psychological well-being; (iv) friends support for PA on physical, peers & social support, and school environment dimensions; (v) and ST on the school environment.

A potential explanation for the nonsignificant mediation was the lack of intervention's effect on PA, ST, and psychosocial factors, similar to previous studies (Bandeira et al., 2020b). It could be explained by some problems that prevented the successful implementation of the strategies (da Silva Bandeira et al., 2021). Our previous study found a gap between the planned strategies for the *Movimente* program and those that reached the students (da Silva Bandeira et al., 2021). For instance, our results showed improved teachers' support for PA (both PE and other disciplines) after the intervention. Still, it has not been reflected in the students' perception of the implemented strategies (da Silva Bandeira et al., 2021) nor the HRQoL dimensions. Regarding the contents taught in the classroom, few teachers and students affirmed that sedentary behavior was addressed, while PA and diet were the most common themes (da Silva Bandeira et al., 2021). Therefore, the intervention could not change the possible mediators; consequently, there were no mediating variables. This issue was highlighted by the Medical Research Council guidance on process evaluation (Moore et al., 2015a), which emphasized that the intervention implementation may impact the mechanisms responsible for producing behavior changes (i.e., mediators).

Our secondary goal observed that increased PA self-efficacy was associated with better physical and psychological well-being. In contrast, ST self-efficacy was related to improved

peers & social support. Adolescents who perceive themselves as competent and confident to improve PA and reduce ST may be more likely to consider self-care attitudes and practices; for instance: being active, healthy, happy, emotionally balanced, and supported by a peer group, which are characteristics of better HRQoL (Ravens-Sieberer and Kidscreen Group Europe, 2016). Previous studies have observed that the general sense of self-efficacy (e.g., "It is easy for me to stick to my aims and accomplish my goals") contributed significantly to predicting HRQoL of children and adolescents (Otto et al., 2017; Haraldstad et al., 2019; Mikkelsen et al., 2020). A survey with Norwegian adolescents found that a better sense of self-efficacy positively affected nine HRQoL scales, with a more substantial impact on physical dimension (Haraldstad et al., 2019). When analyzing the influence of general self-efficacy on HRQoL longitudinally, a study with German children and adolescents has shown that improving self-efficacy was associated with better HRQoL over time (Otto et al., 2017). The current findings further support and highlight the importance of promoting interventions to improve self-efficacy to practice PA, reduce ST, and enhance their perception of physical, psychological, and peers & social support well-being.

Previous studies have seen general social support as a predictor of HRQoL, indicating that higher social support was linked with better HRQoL among children and adolescents (Mohamadian et al., 2011; Otto et al., 2017; Gomes et al., 2020). In our study, the increase in parents support for PA was associated with better physical, psychological, and autonomy & parents' relation. In contrast, the increase in friends' support for PA was positively related to peers & social support and the school environment. Similarly, a previous study indicated that higher parents' encouragement of healthy lifestyle behaviors, including PA, was associated with better physical, psychosocial, and global HRQoL among Australian adolescents (Nicholls et al., 2014). Also, a four-wave longitudinal study involving 264 Estonian adolescents found that perceived PA support from parents and peers significantly predicted the adolescents' HRQoL at time four (Tilga et al., 2021). Our results also showed that improving family support for reducing ST was associated with increased psychological well-being. This construct refers to how much the students perceive that people in their house encourage them to minimize ST, comment on, and praise them when they spend less time on screens (Barbosa Filho et al., 2021). These findings suggest that adolescents who perceive support from their family and friends are more

likely to have energy, feel happy, be in a good mood, present better relationships and go well at school.

Although previous studies found a negative association between ST and HRQoL (Stiglic and Viner, 2019), our results indicated that high ST was associated with better school environment well-being. A potential explanation for this result might be the type of activities developed by students on screens (Sanders et al., 2019). For example, students who spend more time studying on screens than doing other activities may be prone to going well at school, paying attention, having a good relationship with their teachers, and, consequently, presenting better scores for the school environment HRQoL. Longitudinal research has shown that educational (e.g., computer use for homework) and interactive ST (e.g., video games) were positively associated with school achievement among adolescents (Sanders et al., 2019). Therefore, since the ST devices and the type of activity performed could have a distinct impact on HRQoL, it is essential to consider what activities are being developed on different devices (Knebel et al., 2021).

Our study has limitations: first, we simultaneously evaluated PA, ST, psychosocial factors, and HRQoL dimensions in pre-and post-intervention measures. As a causal model, it is assumed that changes in HRQoL occur after changing the mediators, that is, in the medium or long term (Cerin, 2010). Our study only assessed the ST; however, different screen devices, contents, and types might have a different impact on HRQoL (Knebel et al., 2021). In the same way, other psychological factors that may influence HRQoL were not investigated (Bandura, 2004). Nonetheless, several strengths must be acknowledged. First, we extend previous research by demonstrating which aspects could be focused on in future interventions. Although we have not found mediation, these results could help future interventions improve adolescents' HRQoL living in LMIC. Second, we used structural equation modeling taking into account a robust correction for non-normal outcome variables. In addition, despite the model complexity, we performed a model evaluation through measures of global fit.

According to the time framework proposed by theoretical models, we recommend that new research consider measuring the mediators previously to the outcomes. Moreover, future research might test if strategies focusing on changing self-efficacy, outcome expectations, and social support can improve HRQoL among adolescents. Finally, interventions should be

concerned with the type of activities and contents students are developing on different screen devices, as they might have a different impact on the HRQoL.

### **Conclusions**

In summary, PA, ST, and psychosocial factors related to these behaviors (self-efficacy, outcome expectations, and social support) were not mediators of the relationship between the intervention and different dimensions of HRQoL among adolescents. Nonetheless, increased self-efficacy, social support (family and friends), and PA outcome expectations have improved HRQoL at the follow-up. These findings may be helpful in creating new interventions that aim to improve the well-being of adolescents from disadvantaged backgrounds.

### **Key points and relevance**

- Cross-sectional and longitudinal evidence has shown the impact of PA, ST, and psychosocial factors on HRQoL among youth, yet little is known about their role as mediators of interventions.
- This cluster-randomized controlled trial involving 734 Brazilian students has not observed mediation effects. Still, we found that in one school year, changes in PA and ST psychosocial determinants were related to better HRQoL.
- Although the observed effects were not due to the intervention, our study indicated that changing self-efficacy, outcome expectations, and social support related to PA and ST may improve HRQoL dimensions among adolescents.
- Future interventions targeting the improvement of adolescents' HRQoL may focus on strategies to change the PA and ST psychosocial determinants.



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### *Registration*

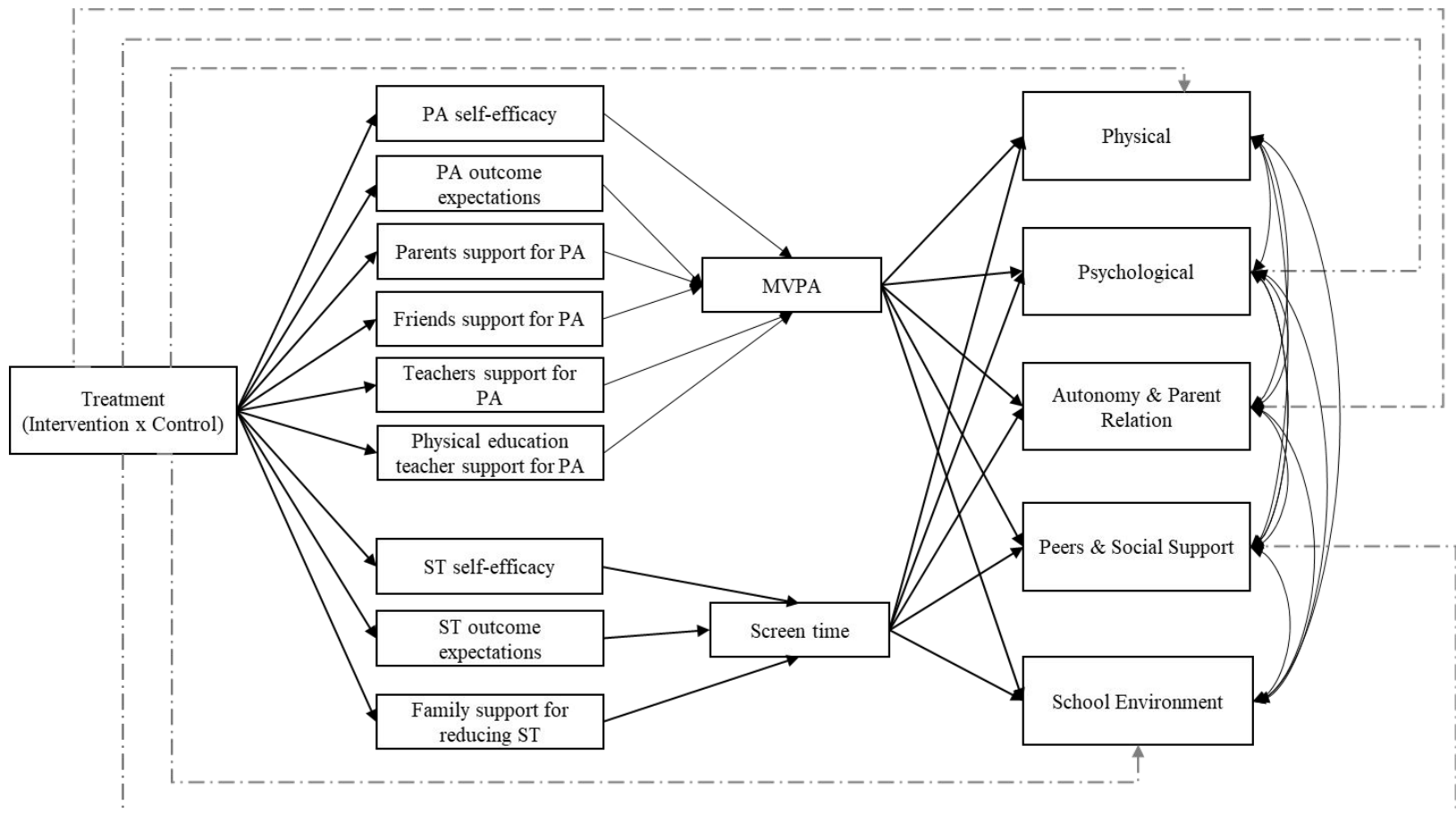
Clinical Trial Registration: The trial is registered at the Clinical Trial Registry (Trial ID: NCT02944318; date of registration: October 18, 2016).

### *Protocol*

The full trial protocol can be accessed on Clinical Trial Registration and a previously published article (Silva et al., 2020).

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**Figure 1** – Theoretical model of the mediating role of screen time and its psychosocial determinants on health-related quality of life.

Control variables (sex, age, and socioeconomic status), the direct effects of the intervention on physical activity and screen time, as well as the effects of psychosocial determinants on HRQoL were omitted from the model for clarity, but they were considered in the analyses.

**Table 2** - Multiple mediation analyses of the PA, ST, and psychosocial factors on the relationship between intervention and HRQoL dimensions. Brazil (2017)

	Intervention > mediators		Psychosocial > PA or ST		Intervention and Mediators > HRQoL									
	Coefficient a	p	Coefficient a <sup>2</sup>	p	Physical well-being	Psychological well-being	Autonomy and parent's relation	Peers and social support	School environment	Coefficients b or c'				
					p	p	p	p	p	p	p	p	p	p
MVPA	-0.023	0.414	NA		0.020	0.540	0.019	0.561	-0.020	0.560	0.016	0.634	0.001	0.976
Screen time	0.018	0.585	NA		-0.014	0.686	-0.007	0.852	0.037	0.315	0.020	0.577	<b>0.081</b>	<b>0.025</b>
PA self-efficacy	-0.035	0.309	0.029	0.312	<b>0.072</b>	<b>0.026</b>	<b>0.074</b>	<b>0.024</b>	0.019	0.586	-0.017	0.625	0.053	0.116
PA outcome expectations	-0.034	0.347	0.006	0.835	<b>0.135</b>	<b>0.000</b>	<b>0.086</b>	<b>0.009</b>	0.000	0.994	0.047	0.166	<b>0.089</b>	<b>0.010</b>
Parents support for PA	-0.005	0.903	-0.016	0.570	<b>0.086</b>	<b>0.008</b>	<b>0.070</b>	<b>0.034</b>	<b>0.140</b>	<b>0.000</b>	-0.051	0.136	0.025	0.463
Friends support for PA	-0.033	0.353	-0.011	0.703	<b>0.075</b>	<b>0.022</b>	0.063	0.060	0.017	0.623	<b>0.095</b>	<b>0.006</b>	<b>0.138</b>	<b>0.000</b>
Teachers support for PA	<b>0.088</b>	<b>0.004</b>	0.015	0.600	-0.022	0.509	0.009	0.781	-0.008	0.829	0.002	0.951	-0.016	0.650
Physical education teacher support for PA	<b>0.072</b>	<b>0.029</b>	0.051	0.072	0.032	0.327	-0.035	0.295	-0.013	0.713	0.002	0.952	-0.030	0.381
ST self-efficacy	-0.011	0.766	<b>-0.128</b>	<b>0.000</b>	0.017	0.610	-0.064	0.060	-0.035	0.326	<b>0.079</b>	<b>0.022</b>	0.054	0.123
ST outcome expectations	0.026	0.474	<b>-0.173</b>	<b>0.000</b>	-0.041	0.226	-0.047	0.171	-0.031	0.378	-0.033	0.348	-0.052	0.136
Family support for reducing ST	0.021	0.557	<b>0.076</b>	<b>0.023</b>	-0.040	0.217	<b>0.121</b>	<b>0.000</b>	0.063	0.066	0.041	0.229	0.044	0.200
Intervention <sup>c'</sup>	NA		NA		-0.038	0.244	-0.055	0.099	-0.018	0.597	-0.028	0.409	0.032	0.350

Standardized coefficients corrected using the Satorra-Bentler; NA = Not applicable; Control variables = sex, age, socioeconomic status; MVPA = moderate-vigorous physical activity; ST = screen time

a = Direct effect of the intervention on mediators adjusted for their respective values on the baseline, and control variables; a<sup>2</sup> = Direct effect of the psychosocial factors on physical activity or screen time adjusted for the treatment, physical activity or screen time on the baseline, and control variables; b = Direct effect of the mediators on HRQoL adjusted for the treatment, HRQoL on the baseline, and control variables; c' = Direct effect of the intervention on HRQoL, adjusted for mediators, baseline HRQoL, and control variables.

CFI = 0.933; TLI = 0.897; RMSEA = 0.068 (Upper 90%CI: 0.075); SRMR = 0.062



**Table 3** – Indirect effects of the intervention on HRQoL through PA, ST, and psychosocial factors. Brazil (2017)

<b>Physical well-being</b>	<b>Coefficients ab</b>	<b>CI 95%</b>	
Intervention > PA self-efficacy > HRQoL	-0.003	-0.150	0.055
Intervention > PA self-efficacy > MVPA > HRQoL	0.000	-0.002	0.001
Intervention > PA outcome expectations > HRQoL	0.000	-0.001	0.001
Intervention > PA outcome expectations > MVPA > HRQoL	0.000	-0.001	0.001
Intervention > Parents support for PA > HRQoL	0.000	-0.118	0.104
Intervention > Parents support for PA > MVPA > HRQoL	0.000	0.000	0.000
Intervention > Friends support for PA > HRQoL	-0.002	-0.149	0.056
Intervention > Friends support for PA > MVPA > HRQoL	0.000	-0.001	0.001
<b>Psychological well-being</b>			
Intervention > PA self-efficacy > HRQoL	-0.003	-0.182	0.067
Intervention > PA self-efficacy > MVPA > HRQoL	0.000	-0.002	0.001
Intervention > PA outcome expectations > HRQoL	-0.003	-0.212	0.084
Intervention > PA outcome expectations > MVPA > HRQoL	0.000	-0.001	0.001
Intervention > Parents support for PA > HRQoL	0.000	-0.109	0.095
Intervention > Parents support for PA > MVPA > HRQoL	0.000	0.000	0.001
Intervention > ST family support > HRQoL	-0.003	-0.137	0.250
Intervention > ST family support > ST > HRQoL	0.000	-0.003	0.002
<b>Autonomy and parent's relation</b>			
Intervention > Parents support for PA > HRQoL	-0.001	-0.185	0.163
Intervention > Parents support for PA > MVPA > HRQoL	0.000	0.000	0.000
<b>Peers and social support</b>			
Intervention > Friends support for PA > HRQoL	-0.003	-0.230	0.089
Intervention > Friends support for PA > MVPA > HRQoL	0.000	-0.001	0.001
Intervention > ST self-efficacy > HRQoL	-0.001	-0.141	0.104
Intervention > ST self-efficacy > ST > HRQoL	0.000	-0.004	0.005
<b>School environment</b>			
Intervention > ST > HRQoL	0.001	-0.069	0.121
Intervention > PA outcome expectations > HRQoL	-0.003	-0.174	0.069
Intervention > PA outcome expectations > MVPA > HRQoL	0.000	0.000	0.000
Intervention > Friends support for PA > HRQoL	-0.005	-0.252	0.090
Intervention > Friends support for PA > MVPA > HRQoL	0.000	0.000	0.000

The intervention did not present significant effects on variables; control variables: sex, age, socioeconomic status, and baseline HRQOL. MVPA = moderate-vigorous physical activity; ST = screen time; Standardized coefficients corrected using the Satorra-Bentler; Goodness-of-fit indices =  $\chi^2$  (df) = 899.0767 (286),  $p < 0.001$ ; CFI = 0.933; TLI = 0.897; RMSEA = 0.068 (Upper 90%CI: 0.075); SRMR = 0.062

### 3.3 ARTICLE 3: IMPLEMENTATION OF A SCHOOL-BASED PHYSICAL ACTIVITY INTERVENTION FOR BRAZILIAN ADOLESCENTS: A MIXED-METHODS EVALUATION

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#### **Implementation of a school-based physical activity intervention for Brazilian adolescents: A mixed-methods evaluation**

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#### **Abbreviations:**

LMICs: Low- and middle-income countries

PA: physical activity

SB: sedentary behavior

PE: physical education

**ABSTRACT**

**BACKGROUND:** One way to improve the effectiveness of physical activity interventions is by elucidating the aspects related to its implementation process. However, little evidence is available and even less among low- and middle-income countries. This study aimed to evaluate the implementation of a school-based physical activity intervention considering both qualitative and quantitative data from the different actors (students, teachers, and parents) inherent to the development of the program. **METHODS:** The program was conducted in 2017 with 3 main components: i) teacher training, ii) environmental changes, and iii) educational actions. Mixed-method evaluation was performed by an independent evaluation team using a validated indicator matrix for the implementation process, including the self-reported information of students, teachers, and parents, as well as interviews with teachers. **RESULTS:** In the 3 eligible schools, 350 adolescents (51% girls) answered the implementation questionnaire, as did 45 parents (84% mothers), and 47 teachers (70% female). Regarding the qualitative analysis, 18 teachers participated. According to the results of the categorical analysis, the intervention was considered feasible by teachers. In general, teachers had a more positive perception of the implementation compared with students. The lack of engagement from the school community and parents and the busy schedule of teachers were pointed out as the main difficulties. **CONCLUSIONS:** In conclusion, despite the teachers' motivation, some barriers prevented the successful implementation of the program.

**Keywords:** cluster-randomized controlled trial; implementation research; mixed methods; sedentary behavior; health behavior

## 1. INTRODUCTION

There is a global call for actions focused on promoting physical activity (PA) and reducing sedentary behavior (SB) among children and adolescents (World Health Organization, 2018). School-based interventions with multiple components (e.g., educational strategies, environmental changes, and personal training) reported to address the multidimensional factors of PA-related behavior (Russ et al., 2015; Barbosa Filho et al., 2016b). However, even for multicomponent interventions, the results have been diverse and shown inconsistent effect sizes (Maniccia et al., 2011; Barbosa Filho et al., 2016a; Jones et al., 2019), and still few studies have focused on elucidating how the actions are implemented (i.e., the fidelity, feasibility, and quality of the proposed action for the target audience) (Naylor et al., 2015).

The evaluation of the implementation of an intervention can be an important tool to shed light on the factors that influence the effectiveness of the program (Craig et al., 2013), because it links the theoretical models and practical experience of the intervention (Naylor et al., 2015), it helps bridge the gap between planning and adopting strategies (Durlak and DuPre, 2008). Additionally, it can identify which strategies are feasible, favorable to adaptation, or those that may be not applicable, in order to improve the cost–benefit balance of interventions (Durlak and DuPre, 2008). Despite the broad acknowledgment of the importance of performing evaluations of implementation (Moore et al., 2015b), and the existence of both process and program assessments of PA and SB interventions have been published by now (Kennedy et al., 2021), Glasgow and colleagues highlighted the need for more pragmatic uses of the RE-AIM rather than trying to comprehensively assess all framework dimensions (Glasgow et al., 2019). Therefore, more evidence is needed on evaluating the implementation of PA interventions (Daly-Smith et al., 2020).

Evidence highlighted the relevance of using a mixed-methods evaluation design, by combining quantitative data (e.g., students, teachers, and parents) with qualitative data from purposively selected samples (Moore et al., 2015b). This design may help develop better intervention strategies based on the perception of different actors in the context of interest (Daly-Smith et al., 2020), as the quantitative and qualitative analyses build upon each other; for example, using qualitative data to help explain the quantitative findings (Moore et al., 2015b; Creswell and Clark, 2017). Therefore, there have been recent calls for using mixed-methods to identify explanatory processes across RE-AIM dimensions (Glasgow et al., 2019).



Regarding low- and middle-income countries (LMICs), the promotion of PA interventions for adolescents in this context is a research priority, including the development, testing, and implementation and delivery of school-based interventions (Morton et al., 2016; Nagata et al., 2016; Fair et al., 2018). Amid an increased call for implementation research in LMICs, the body of evidence is scarce. Therefore, this study aimed to evaluate the implementation of a school-based PA intervention in Brazil, considering both qualitative and quantitative data from the different actors (students, teachers, and parents) inherent to the implementation of the program.

## **2. METHOD**

### *2.1. Design*

In this mixed-method study (Creswell and Clark, 2017), we evaluated the implementation of a cluster-randomized controlled intervention, registered in the Clinical Trials (NCT02944318), and approved by the National Research Ethics System (protocol number: 1.259.910; CAAE:

49462015.0.0000.0121; date: in November 23rd, 2015). The methodological and theoretical information regarding the proposition of intervention actions was previously published (Silva et al., 2020).

In summary, the inclusion criteria of the schools were: a) having secondary level grades ( $n = 27$ ); b) having at least two classes per grade from the 7<sup>th</sup> to 9<sup>th</sup> grade ( $n = 21$  schools remaining); and c) were not under environment reform/repair during the intervention period ( $n = 18$  schools remaining). Seven out of 18 eligible schools agreed to participate in the intervention. Thus, the school with the lowest number of students was selected to participate in the pilot study, and the other 6 schools were randomly allocated to the intervention ( $n = 3$ ) and control ( $n = 3$ ) groups. All students enrolled from the 7<sup>th</sup> to 9<sup>th</sup> grade who were at school in the beginning of the school year were eligible participants ( $n = 1,427$ ). It was excluded students who: a) were mentally and/or physically disabled; b) missed classes during the first three weeks of the school year (period of the collecting data). Therefore, 999 (70% of the total) were authorized by their legal guardians and agreed to participate in the study.

For the present study, only intervention schools were included, and the method of determining the final sample size was based on the opportunistic pragmatic nature of this implementation study (Emmel, 2013).

## *2.2. Description of the intervention*

Multicomponent actions were proposed to increase PA and reduce SB, based on different theoretical models (Silva et al., 2020). In particular, the Health Promoting Schools framework was used to guide the main pillars of actions used in the intervention: inclusion of health education content into the school curriculum; provision of health opportunities at school through social and/or physical environment; and family engagement (Langford et al., 2014).

The strategies were developed during a school year (March to November 2017) and had the following components of actions: 1) teacher training; 2) active opportunities in the school environment; and 3) health education for the school community. The working group for the development of the program involved professionals and master's/doctorate students from the Federal University of Santa Catarina, Brazil. Detailed description of the intervention program can be obtained online ([www.movimente.ufsc.br](http://www.movimente.ufsc.br)) and in a previous publication (Silva et al., 2020).

### *2.2.1. Teacher training*

Training with certification and a support material (book) with proposed activities on health topics for teachers of all disciplines were prepared. Interactive media (Facebook and WhatsApp) were tapped for teachers to disclose and discuss their activities in relation to the health topics. Additionally, support materials (3 books) specific for each grade were delivered for physical education (PE) teachers.

### *2.2.2. Active opportunities in the school environment*

This action included the creation and revitalization of some spaces of the school for the practice of PA, and making PA equipment (e.g., balls, jump ropes, rackets) available to students during their free time in school.

### *2.2.3. Health education for the school community*

Four posters on PA and health, SB and health, PA and academic performance, and eating habits were prepared. Four pamphlets on PA and health, SB and health, eating habits, and PA and SB were disseminated (information shared among teachers, students, parents).

## *2.3. Evaluation of implementation of the intervention*

### *2.3.1. Participants*

In this mixed-method study, students who answered the follow-up measures (n = 463) and all teachers (n = 63) in the intervention group were invited to answer the evaluation

questionnaire regarding the implementation of the actions. Parents ( $n = 150$ ) were randomly selected, according to a prior list of all participating students, to answer the questionnaire. For the qualitative evaluation, a purposive sampling approach was used (Emmel, 2013). All teachers from the intervention schools were recruited in person and/or via e-mail or telephone, and interviews were scheduled for teachers who replied to our contact. We included teachers who had not been scheduled but who had time available when the researchers were at school.

### 2.3.2. Evaluation process

The main objective of the evaluation was to assist decision making by providing information on whether the program was executed as planned (Bauman and Nutbeam, 2014). A team of four members, who did not participate in the design and implementation process of the intervention, structured and validated an evaluative matrix, as well as defined the variables and their specific objectives according to the logical model of the program. It was considered the dimensions of Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM framework) (Glasgow et al., 2019). Considering the complexity of analyzing all dimensions of the RE-AIM framework (Glasgow et al., 2019), we have decided to analyze the implementation dimension to address with details those components most appropriate for our research problem, setting, and stage of research in Brazil. Moreover, as a lesson learned from using this framework for two decades, Glasgow and colleagues recently recognized the need for more pragmatic uses of the RE-AIM rather than trying to comprehensively assess all its dimensions (Glasgow et al., 2019). This dimension was evaluated quantitatively and qualitatively at the end of the intervention period (carried out November/December 2017) regarding the strategies adopted during the scholar year.

Quantitative data included 10 dimensions organized according to each intervention strategy. The strategy of teacher training was structured in 6 dimensions: 1) teacher training; 2) discussion on health in regular classes; 3) themes taught in class; 4) modification to the classes on general subjects; 5) difficulties in working on health contents; and 6) modification to PE classes. The educational strategy was organized into 2 dimensions: 7) distribution of intervention pamphlets; and 8) distribution of intervention posters, and the strategy of environmental improvements was divided into 2 other dimensions: 9) creation and revitalization of spaces for PA practice and 10) availability of materials for PA practices.

The dimensions 1 (teacher training) and 5 (difficulties in working on health contents) were directed only to teachers, being the first dimension exclusive for teachers who participated in the training ( $n = 9$ ). The other dimensions were answered by all students and

teachers. The parents participated only in dimension 7 (more details are presented in Supplementary Material 1). The questionnaires for students and teachers were distributed in November and December 2017. The parents answered the questionnaire by telephone during the same period.

Regarding the qualitative data, teachers participated in semi-structured individual interviews focused on the evaluation of the following themes: 1) teacher training, 2) educational strategies, 3) environmental actions, and 4) overall evaluation of the intervention program. The overall evaluation included the following: (a) importance of developing the intervention program at school; (b) feasibility for implementing the program; (c) difficulties in implementing the program; (d) suggestions for changing the program's development format; and (e) importance of the program in thinking about interdisciplinarity. After the participants signed the consent form, the interviews were conducted by the staff at a previously scheduled time. The collected data were recorded in audio format and later transcribed.

#### *2.4. Data processing*

All quantitative data were entered by 1 researcher and verified by another researcher. Categorical measures were treated by relative frequencies.

The transcribed interviews were treated using the content analysis technique proposed by Bardin (**Bardin, 2011**), to organize the data for better interpretation. This study applied the units of meaning and context. We chose categorical analysis, among the various possibilities of categorization, in discovering the nuclei of meaning that make up communication and whose presence or frequency holds meaning to the analytical objective chosen (**Bardin, 2011**). All the processes were developed simultaneously by 2 researchers, and disagreements were discussed without the need for another researcher.

### **3. RESULTS**

In the 3 eligible schools, out of 463 students who participated in the follow-up measures, 350 adolescents (51% girls) answered the implementation questionnaire, as did 45 out of 150 parents (84% mothers), and 47 out of 63 teachers (70% female). Regarding the qualitative analysis, 18 teachers gave their consent to participate.

#### *TABLE 1*

##### *3.1. Teacher training*

The quantitative and qualitative results regarding teacher training are presented in Tables 1 and 2, respectively. Seven out of the 9 teachers who participated in the training considered the content very useful (Table 1). Most of the teachers reported that the school coordinators encouraged participation in training (f=7). They also identified a need for better disclosure of the training's existence by e-mail or pamphlets (f=4), or even at the initial pedagogical meeting of the school (f=4). The theme was considered relevant for teacher training and/or practice (f=18), but the unavailability of schedules was pointed out as the main difficulty (f=6). The positive point more mentioned was the quality of the support material (f=8) and the negative was the poor functioning of the online platform (f=5) (Table 2).

Most of the teachers (68%) stated having classroom health discussions, and 52% of the students did not perceive it. A total of 48% of the students and 73% of the teachers reported not using the educational materials in these discussions.

According to the teachers, the face-to-face training contributed to the updating of themes (f=5) and development of practical classes outdoors (f=4) (Table 2). A total of 43% of the students and 44% of the teachers confirmed the development of active breaks in the classroom (Table 1).

Almost half of the teachers reported difficulty in addressing health-related topics (46%) (Table 1). The qualitative results (Table 2) identified the need for the development of outdoor activities in the face-to-face training (f=6).

Most students (80%) and all PE teachers (100%) stated that more active PE classes were developed and 57% of the students reported that the PE teacher addressed the health content in the classroom (Table 1).

#### *TABLE 2*

##### *3.2. Educational strategies*

Most of the teachers and students reported receiving the pamphlets (81% and 55%, respectively) and seeing the posters (79% and 54%, respectively), whereas only one-third of the parents did (Table 1). The teachers stated receiving the materials through the school coordinators (f=4) or at the teachers' room and at pedagogical meetings (f=4) (Table 3).

According to 79%, 42%, and 22% of the teachers, students, and parents, respectively, the messages delivered through the pamphlets were able to alter positively the lifestyle of the students (Table 1).

Regarding the main reasons for using the materials (Table 3), the teachers reported the relevance of the theme (f=9). However, the lack of teacher planning (f=4), non- participation

in the face-to-face training (f=3), and the researchers' failure to disclose the utilization strategy (f=3) were reasons for non-use.

*TABLE 3*

*3.3. Environmental improvements*

A total of 31% of the students and 76% of the teachers perceived the spaces revitalized by the staff, but only one-third of the students utilized these spaces to practice PA. A total of 84% of the teachers noticed the materials supplied by the program; nonetheless, almost one-third of the students did not know that (Table 1). The teachers suggested the development of play during recess (f=3) and PE classes (f=3) to encourage the use of PA equipment (Table 4).

*3.4. Overall evaluation of the intervention*

The teachers reported the main role of this program was making students aware of a healthier lifestyle (f=6), and they reported that the intervention was feasible owing to the importance of the theme (f=3) and involvement of the students (f=2). The non-involvement of all segments of the school was the main difficulty (f=2). For improving the intervention, the most frequent suggestion was to plan theme-based activity days with parental involvement, inside or outside the school (f=5).

*TABLE 4*

*TABLE 5*

## **4. DISCUSSION**

*4.1. General findings*

Our results indicated that the interdisciplinary and multicomponent approach of the intervention accommodated different points of view on PA and health beyond PE classes. However, mixed results were observed when the indicators were reported by different actors in the intervention implementation (teachers, students, and their parents).

*4.2. Teacher training*

The training content was considered highly useful, and most of the teachers also reported having discussed health in the classroom, especially on PA and diet. These results were in line with previous studies (van den Berg et al., 2017; Gammon et al., 2019), which suggest good acceptability of teacher training aimed at introducing PA to the classroom. Gammon and colleagues observed an improvement in the teachers' efficacy in integrating PA into subject content (Gammon et al., 2019). Another study showed that teacher training leads

to changes in classroom PA implementation time from 4.1 to 5.4 minutes (Hivner et al., 2019).

Meanwhile, less than half of the students were receptive to the classroom health discussions, and most of them pointed out that messages were not enough to improve their lifestyle. These results may be related to 2 main aspects: the low number of teachers who participated in face-to-face training and the lack of involvement of all segments of the school community (e.g., school administration). In the first, teachers reported as main argument their unavailability in terms of schedule. In the second, although the teachers were appropriately invited for the training, they were not authorized to be released from their class schedules. These findings were in line with previous studies that suggested the lack of time and the unsupportive school climate as important barriers for the implementation of PA strategies at school (Naylor et al., 2015; van den Berg et al., 2017).

Moreover, the lack of knowledge on introducing active strategies in the classroom has also been recognized as an important barrier, which should be considered in future PA interventions (Daly-Smith et al., 2020). These findings highlight the importance of considering activities that are easy to implement or require little or no preparation time, the implementation of which needs to involve key stakeholders (e.g., principals) (van den Berg et al., 2017; Lander et al., 2019).

In the present study, 5 out of 10 teachers adopted active breaks in the classroom, as perceived by the students. Another study found that the number of activities to introduce breaks to students' sitting time increased after the end of the intervention (Köykkä et al., 2019). However, a concern previously highlighted was the lack of time to plan and apply strategies for reducing SB in the classroom (Routen et al., 2018). The authors pointed out that although teachers are aware of the importance of breaks, they could not easily include breaks in their routine owing to time constraints (Routen et al., 2018), as also reported in our study.

In the present study, most students and all teachers reported that more active PE classes were developed and that students' participation in classes improved. A systematic review noted that factors like self-efficacy, engagement, and motivation of teachers can directly affect the implementation of interventions (Naylor et al., 2015). A recent intervention assessed the implementation fidelity of PE teachers' training to improve the opportunities for adolescents to be physically active during lessons, and the results showed that the intervention had large positive effects on teachers' behavior, with the maximization of opportunities for

movement and development of skills, and consequently, better support for students (Lonsdale et al., 2019).

In our findings, half of the PE teachers perceived that the development of more active classes enabled positive changes in adolescents' lifestyles. Previous evidence has shown that internet-supported training produces positive effects on students' moderate to vigorous PA during PE lessons (Lonsdale et al., 2019). Contrary to our findings, the authors assessed both the students' behavior and the implementation of the strategies objectively. Future research could combine the evaluation of implementation fidelity and student behaviors.

#### *4.3. Educational Strategies*

In this study, 8 out of 10 teachers, half of the students, and 1/3 of the parents received the pamphlets. All posters were made available in schools, but only half of the students noticed them. Pamphlets and posters were rarely used in the activities by the teachers. Among the reasons for not using the educational materials, the teachers reported as follows: lack of planning, non-participation in face-to-face training, and the researchers' failure to share the strategies for using the materials in the classroom. These results could also indicate the perceived complexity of implementing strategies, reinforcing the idea that activities should be easy to use in the classroom (van den Berg et al., 2017). An important topic that the teachers highlighted is the relevance of the theme and articulation of the intervention pamphlets with respect to the interdisciplinary content. In agreement with previous research (Daly-Smith et al., 2020), although the teachers reported knowing the relevance of PA strategies, they still needed to know how to implement these strategies effectively, indicating the importance of teacher training.

During the interviews, the teachers also suggested that posters should be placed in more visible places, such as at the entrance to courts and sports facilities, given the low number of students who noticed them. Therefore, in future interventions, activities with the use of educational materials by teachers should be made available, considering issues such as time constraints (Naylor et al., 2015) and teacher confidence necessary for delivery (Routen et al., 2018).

Another important point is the involvement of parents in the intervention. Our main strategy was to deliver pamphlets with messages for parents, but these pamphlets seemed to have no impact; few parents noticed this strategy and reported its lack of impact on the behavior of the students. Previous studies have similarly identified that ensuring parental involvement is a major challenge for school-based interventions, as parents are seen as



important contributors to the success of interventions (Jago et al., 2015; Naylor et al., 2015). However, despite being one of the three domains of the Health Promotion Schools framework, the evidence has highlighted as the most challenging and least successful intervention element (Langford et al., 2015). On the other hand, a previous study highlighted that parents' engagement is important in supporting children and adolescents who are not completely independent in terms of decision making regarding PA-related behavior (Jago et al., 2015). Moreover, school-based interventions that directly engage parents (e.g., educational meetings) have shown more beneficial results for PA and SB in adolescents compared with indirect involvement (Verjans-Janssen et al., 2018). These findings are in line with the recommendation of the teachers for future interventions: parents need to be directly involved in strategies together with students, for example, in planning a PA-related theme-based day inside or outside the school.

#### *4.4. Environmental Improvements*

Most of the teachers perceived the implementation of environmental improvements, whereas the students had different perceptions. Most of the students also reported not having used the spaces or materials to practice PA. Despite requiring more investment in materials and time, our process of implementing these actions may not have been the most appropriate, as the target audience had not been reached. Another point that may justify these findings is that the students did not have many free hours during the school period to use the materials and to perceive spaces for PA practice. In the Brazilian school system, the regular class schedule lasts 4 hours a day, including only a 15-minute recess period. Strategies related to environmental changes are relevant to the promotion of PA in adolescents (Morton et al., 2016), being the organizational structure of schools an eminent barrier (Fair et al., 2018; Guldager et al., 2018). As alternatives the teachers highlighted the needed of development of play in the recess period and in PE classes, and the possibility of alternative games (e.g., bowling with recyclables).

#### *4.5. Strengths and limitations*

The main strength of this study is its focus on implementation evaluation, including data collected from multiple actors to understand different perspectives on the same intervention program. Furthermore, the mixed-methods approach allowed us to describe a broad picture of program implementation and evaluation by combining qualitative and quantitative sources, which helped to answer complex questions that could not be answered by quantitative or qualitative approaches alone (Creswell and Clark, 2017; Glasgow et al.,

2019). Finally, the originality of the study is highlighted because of the scarcity of evidence focused on the implementation of PA interventions in LMICs (Naylor et al., 2015).

However, the present study also had some limitations: first, the process evaluation was carried out in a single moment, which makes it impossible to determine the continuity or discontinuity of the strategies, and our findings were derived from opinions and self-reported measures rather than observation of the strategies.

#### *4.6. Implications for research and practice*

Teacher training could be better implemented, particularly whether to consider strategies to involve key school stakeholders (e.g., principals). The training of PE teachers seemed to be an important strategy for the development of more active classes and greater participation of adolescents.

The breaks proved to be a promising strategy because of its good implementation and feasibility to be carried out in interventions aimed at promoting PA in the school context. Future studies may focus on delving into large-scale implementation and its effectiveness in the school context.

The educational strategies had low reach to the groups of interest, particularly the students and parents.

Future research should likewise investigate how environmental changes in the school context must occur to stimulate changes in students' attitudes and behaviors.

#### *4.7. Conclusion*

Our findings suggested that the intervention was acceptable to teachers, who considered the theme, classroom discussions, and development of breaks as relevant to raising students' awareness about a healthy lifestyle. However, we found a gap between the strategies planned and the reach among students and parents, most of whom did not perceive the implementation of the intervention.

#### **Impact statement:**

This study provides evidence that the teacher training is an important strategy to promote PA, but it may be better implemented if consider principals involvement. Moreover, PE teachers training, and breaks activities seem to be promising strategies for the development of more active classes. On the other hand, educational strategies had low reach

to the students and parents. Furthermore, new studies should explore how to implement environmental changes in schools in the context of LMICs.

**Conflict of interest**

The Authors declare that there is no conflict of interest.

**Table 1.** Quantitative results about dimensions and indicators of implementation of the strategies, Brazil, 2017.

<b>Dimensions (D) e indicators (I)</b>	<b>Categories</b>	<b>% students (n=350)</b>	<b>% teachers (n=47)</b>	<b>% parents (n=45)</b>
<b>D1: Teacher training</b>				
I1: Usefulness of the content provided in the training #	Very useful	-	67%	-
	Useful	-	33%	-
	Little/No useful	-	0%	-
<b>D2: Classroom health discussions</b>				
I1: Discussion on health at the classroom	Yes	48%	68%	-
	No	52%	32%	-
I2: Discussion positively changed the students' lifestyle	Substantial change	19%	47%	-
	Insignificant change	33%	39%	-
	Without change	48%	14%	-
I3: Use of the educational materials in these discussions	Yes	20%	27%	-
	No	48%	73%	-
	Did not remember	32%	-	-
<b>D3: Themes taught in class</b>				
I1: PA	Yes	43%	61%	-
	No	57%	39%	-
I2: Food	Yes	29%	81%	-
	No	71%	19%	-
I3: PA and School performance	Yes	24%	4%	-
	No	76%	96%	-
I4: Sedentary behavior	Yes	19%	38%	-
	No	81%	62%	-
<b>D4: Modification to the classes on general subjects</b>				
I1: Development of breaks at the classroom	Yes*	43%	44%	-
	No	57%	56%	-
I2: Active breaks positively changed the students' lifestyle	Substantial change	-	84%	-
	Insignificant change	-	11%	-
	Without change	-	5%	-
<b>D5: Difficulties in working on health contents</b>				
I1: Difficulty in addressing health-related topics	Yes	-	46%	-
	No	-	54%	-
I2: Lack of interest among students	Yes	-	9%	-
	No	-	91%	-
I3: Difficulty in the adaptation of classes	Yes	-	11%	-
	No	-	89%	-
I4: Lack of support from the school members (coordinators and teachers)	Yes	-	0%	-
	No	-	100%	-
I5: Lack of adequate materials	Yes	-	3%	-
	No	-	97%	-
I6: Lack of time to plan activities	Yes	-	9%	-
	No	-	91%	-
<b>D6: Modification into Physical Education classes</b>				

Teacher training

	I1: Health discussion at PE classroom	Yes	57%	-	-
		No	43%	-	-
	I2: Development of more active classes	Yes	80%	100%	-
		No	20%	0%	-
	I3: The most active classes positively changed the students' lifestyle	Substantial change	-	50%	-
		Insignificant change	-	50%	-
	I4: Improvement of students' class participation	Yes	-	75%	-
		No	-	25%	-
	<b>D7: Distribution of the intervention pamphlets</b>				
	I1: Receipt of pamphlets during the semester	Yes	55%	81%	33%
		No	45%	19%	67%
	I2: Pamphlet messages positively changed the students' lifestyle	Substantial change	42%	79%	22%
		Insignificantly change	58%	21%	11%
		NA	-	-	67%
	I3: Pamphlet messages positively changed the parents' lifestyle	Substantial change	-	-	22%
		Without change	-	-	11%
		NA	-	-	67%
	<b>D8: Distribution of the intervention posters</b>				
	I1: View of posters during the semester	Yes	54%	79%	-
		No	46%	21%	-
	I2: Posters messages positively changed the students' lifestyle	Substantial change	23%	47%	-
		Insignificant change	27%	30%	-
		Without change	50%	23%	-
	<b>D9: Creation and revitalization of spaces for PA practice</b>				
	I1: Perception of revitalization/creation of PA spaces	Yes	31%	76%	-
		No	69%	24%	-
	I2: Use of the new PA spaces	Yes	33%	-	-
		No	67%	-	-
	<b>D10: Availability of materials for PA practices</b>				
	I1: Perception of the new materials for PA practice	Yes	-	84%	-
		No	-	16%	-
	I2: Use of new materials for PA practice	Yes	28%	-	-
		No	40%	-	-
		Did not know	32%	-	-

Abbreviations: PA = physical activity; PE = physical education; D: dimension; I: indicators for each dimension; NA: not applicable

D1: 9 teachers answered

\*General subjects that developed *breaks*: 25% assistant professor; 15% geography; 15% science; 10% portuguese; 10% history; 10% art; 5% mathematics; 5% english; 5% theater

D6: 4 Physical Education teachers

**Table 2.** Qualitative results with the categories and subcategories of responses of the perception of teachers regarding training, Brazil, 2017.

Categories	Subcategories	<i>f</i>
Improvement suggestions for training dissemination	Improvement and strengthening of dissemination through virtual means and educational materials (e.g., pamphlets and posters)	4
	Disclosure could be made at the beginning of the year during the initial pedagogical meeting of the school, with details on the training	4
Incentives and barriers via coordination	Encouragement by inviting teachers via e-mail and/or in person	7
	Authorization to release class schedules	2
	Authorization to participate in the training during class time	1
Reasons for participation in training	Relevance of the theme for teacher training and/or practice	18
	Ease of participation, with the training being in the school itself	1
	Possibility of relationship between school and university	1
Reasons for not attending face-to-face and online training	Unavailability of schedules	6
	Lack of interest in the program	2
	Lack of a suitable cellphone for sharing activities	1
Positive (+) and negative (-) points about face-to-face and online training	Qualified support material (+)	8
	Content was important, didactic, and accessible (+)	5
	Facilitated the discussion on food through the vegetable garden at school (+)	3
	Training hours were sufficient (+)	2
	Provided the exchange of experiences through digital media (+)	1
	Experience report among teachers (+)	1
	Important for being interdisciplinary (+)	1
	Poor functioning of the online platform (-)	5
	Need for diversification of supporting texts and activities (-)	3
	Difficulty sharing photos/videos of developed activities (-)	2
	Little involvement of researchers in the process (-)	2
	Need to create new strategies for the online stage (-)	1
	Need for participation of all teachers (-)	1
Extensive training hours (-)	1	
Contribution of face-to-face training to teaching practice	Updating of themes, contributing to the teaching performance	5
	Assistance in the development of practical classes in outdoor environments	4
	Adoption of breaks in the classroom	3
	Assistance in the elaboration of physical activity dynamics and games	3
	Improved teachers' confidence and motivation	2
	Facilitated the articulation of the theme with the school component	1
Improvement suggestions for teacher training	Need for the development of outdoor activities in the face-to-face training	6
	Researchers should participate more actively during the school year	4
	Need for another meeting at the end of the school year	1
	Need for more specific content on sports	1
	Training could be carried out at another time, outside of school	1

Note: qualitative data obtained from content analysis technique proposed by Bardin (2011); *f*: frequency of reports (i.e., how many times the subcategory was cited); +: positive aspects; -: negative aspects.

**Table 3.** Qualitative results with the categories and subcategories of responses of the perception of teachers regarding educational strategies, Brazil, 2017.

Categories	Subcategories	<i>f</i>
Delivery of pamphlets and posters via the school coordinators	Pamphlets were delivered to each teacher	4
	Pamphlets were delivered to the teachers' room or at pedagogical meetings	4
	Pamphlets were not shared with the teachers	3
	Pamphlets were in the teachers' room, but there was no guidance on how to use them	2
	Posters were displayed at the school, but there was no guidance on how to use them	2
	The school coordinators distributed the pamphlets to the classroom and commented about them	1
Reasons for using pamphlets and posters	Relevance of the theme and link with interdisciplinary content	9
	Benefits for promoting health and concentration	2
Reasons for not using pamphlets and posters	Lack of teacher planning	4
	Failure to participate in training and the school did not give instructions on how to use them	3
	Researchers' failure to disclose the utilization strategy	3
	Lack of interest	2
	Posters were displayed in unviable places	1
Activities developed using pamphlets	Discussion with families about health contents	2
	Writing, debates, and tasks on healthy behaviors in the classroom	2
Improvement suggestions for pamphlets and posters strategies	Deliver directly to students, in the classroom and/or through digital media groups (via class leaders)	3
	Affix the posters in the gym or in front of the physical education room	2
	Deliver pamphlets directly to teachers	1
	The pamphlets' content should be linked to the city's curriculum proposal.	1
	Create a thematic place for the project	1
	Pamphlets should have had fewer photos and more content	1
	Establish how, when, and where pamphlets will be used	1
	Posters could be bigger and more expressive	1
	Add content on mental health	1
Materials should be developed together with the students	1	

Note: qualitative data obtained from content analysis technique proposed by Bardin (2011); *f*: frequency of reports (i.e., how many times the subcategory was cited)

**Table 4.** Qualitative results with the categories and subcategories of responses of the perception of teachers regarding environmental improvements, Brazil, 2017.

<b>Categories</b>	<b>Subcategories</b>	<b><i>f</i></b>
Ways of encouraging given by teachers for the use of spaces and materials	Development of play during recess (before and after classes)	3
	Development of play during PE classes	3
	Verbal encouragement and availability of PA material	2
	There was no need for encouragement, as the students appropriated the spaces and materials	1
Improvement suggestions for spaces and PA materials	Provide more alternative games, such as bowling with recyclables and chess	3
	Use of spaces far from the classroom	2
	Increase the number of spaces and PA materials	2
	Provide games made by students	2
	Make it clear that spaces are part of the program	1

Note: qualitative data obtained from content analysis technique proposed by Bardin (2011); *f*: frequency of reports (i.e., how many times the subcategory was cited); abbreviations: PA = physical activity; PE = physical education



**Table 5.** Qualitative results with the categories and subcategories of responses of the perception of teachers regarding the overall evaluation of the intervention, Brazil, 2017.

Categories	Subcategories	<i>f</i>
Importance of developing the intervention at school	Makes students aware of a healthier lifestyle, addressing issues about food, sports, obesity, quality of life, and respect for nature	6
	Provides initial contact with the theme	3
	Aims to reduce sedentary behavior and promote healthy eating habits	3
	PA can contribute to improving quality of life, social relationships, and mental aspects	3
	Encourages and prepares teachers to work with students	3
	Provides interdisciplinary reach with the support of the research team	3
	Encourages teachers to take care of their own health and to understand that health is not only the practice of PA	2
Feasibility of implementing the program	Assists in improving the thinking of the school community in relation to PA, considering that the school is an environment that promotes a sedentary lifestyle	2
	Theme is relevant to the age group	3
	Involvement of the students	2
	Theme is linked to interdisciplinary content	1
	Supports teachers' activities regarding PA	1
	Program has a beginning, middle, and end, making it possible to have a permanent implementation in school	1
Difficulties in implementing the program	Active participation of the school administration helps in the implementation of the program	1
	Involvement of all segments of the school (e.g., school coordinators, teachers)	2
	Failures in the researchers' incentive to teachers	1
Suggestions for changing the program's development format	Lack of time to organize activities relevant to the content of different disciplines	1
	Plan theme-based activity days with parental involvement, inside or outside the school	5
	Conduct the invitation for all teachers at the beginning of the school year	4
	Insert themes that involve physical and mental health and that are linked to each discipline	2
	Establish greater university-school interaction, with the participation of researchers in the development of activities	2
	Establish schedules with the school coordinators so that teachers can dedicate time to the intervention	2
	Insert texts in the support material that are more academic and educational area	2
	Expand the scope to the lower grades of elementary school	1
Expand the reporting of experiences among teachers	1	
Importance of the program to be interdisciplinary	PA and health are not just physical education issues; it must be discussed by several teachers in the classroom	2
	Enables different points of view on the same theme	2

Note: qualitative data obtained from content analysis technique proposed by Bardin (2011); *f*: frequency of reports (i.e., how many times the subcategory was cited); Abbreviations: PA = physical activity

## 4 FINAL CONSIDERATIONS

### 4.1 LIMITATIONS AND STRENGTHS

Limitations of the current thesis should be recognized and addressed in future interventions. First, HRQoL was not the primary outcome of the *Movimente* program. Although our strategies have comprised some aspects of the different dimensions of HRQoL, it seems to have been insufficient to change these outcomes. In addition, we simultaneously evaluated the possible mediators and HRQoL in pre-and post-intervention measures. As a causal model, it is assumed that changes in HRQoL occur after changing the mediators, that is, in the medium or long term (Cerin, 2010). Other factors influencing HRQoL were not investigated, for instance, our study only assessed the ST; however, different screen devices, contents, and types might have a different impact on HRQoL (Knebel et al., 2021). In addition, although we used validated measures to evaluate the PA and ST, it is possible that the self-reported questionnaires have not captured small effect-size behavior changes. Finally, we performed the process evaluation at a single time-point through opinions and self-reported measures rather than direct observations, making it impossible to determine the strategies' continuity or discontinuity.

Nonetheless, several strengths must be acknowledged. First, we conducted sensitivity analyses to evaluate the effect of the intervention on the HRQoL according to different potential moderators. We extend previous research by demonstrating which aspects could be focused on in future interventions. Although we have not found mediation, these results could help future interventions improve adolescents' HRQoL living in LMIC. In addition, we used structural equation modeling, considering a robust correction for non-normal outcome variables. Finally, we used a mixed methods approach with data from multiple actors to understand different perspectives on the same intervention program, which helped to answer complex questions that could not be answered by quantitative or qualitative approaches alone.

### 4.2 CONCLUSION

The present thesis aimed to evaluate the effect of a randomized controlled trial on the HRQoL; however, we observed that the intervention was not effective in changing the

adolescents' HRQoL. To understand the possible reasons for the efficacy results, we also evaluated whether PA, ST, and their psychosocial determinants were mediators of the intervention's effect, that is, if changes in these variables could lead to the improvement of the HRQoL. Finally, we investigated the implementation of the intervention to understand whether or not the fidelity of the strategies could also be related to the non-effective results.

In the first article, our findings revealed no significant effects of the intervention on any HRQoL dimensions. On the other hand, we found that the level of HRQoL at baseline was a moderator for the pre-post changes in all dimensions, with adolescents with higher baseline HRQoL presenting a reduction in their well-being. Considering these results, it seemed that investigating only the effect of the intervention on the HRQoL would not provide enough information on how to change this outcome. Additional questions about why the intervention was ineffective seemed to be necessary. Would interventions aiming to change PA and ST outcomes be enough to improve the HRQoL of healthy adolescents? Would the implementation of the intervention's strategies be related to the non-effective results? In order to answer these questions, we developed the other two thesis articles.

Our second study aimed to understand whether or not changes in PA, ST, and their psychosocial determinants (self-efficacy, outcome expectations, and family, friends, and teachers' support) could lead to improved HRQoL. The results have not observed mediation effects. Still, in one school year, changes in self-efficacy, social support (family and friends), and PA outcome expectations have improved adolescents' HRQoL at the follow-up, although it was not attributed to the intervention. These findings suggest that intervention strategies to change PA and ST psychosocial determinants might improve adolescents' HRQoL. However, our study was ineffective in changing these possible mediators, which led us to our last study to understand the reasons for the lack of intervention's effect.

The last study aimed to evaluate the implementation of the intervention strategies based on qualitative and quantitative data from different actors (teachers, students, and parents). We observed that teachers had a more positive perception of the intervention than students and their parents. In summary, although the intervention strategies were acceptable to teachers, most students and parents did not perceive the implementation of the intervention. The main difficulties indicated for the successful implementation were the lack of engagement from the school community (e.g., principals) and parents and the teachers' busy schedules.

In conclusion, the *Movimente* program did not effectively improve the HRQoL dimensions among Brazilian adolescents. In addition, we observed that students with better HRQoL at the baseline reduced their scores at the end of the school year. On the other hand, our findings have shown that changes in PA and ST psychosocial determinants may improve the HRQoL dimensions, even though these changes were not attributed to the intervention. Furthermore, our implementation study found gaps between what was planned and what was implemented. That is, the fidelity was not as expected, which can be related to the lack of intervention's effect on mediators and HRQoL. Therefore, our results indicate the importance of investigating strategies to improve adolescents' well-being, including interventions to change psychosocial determinants and methods that guarantee the fidelity of the intervention.

### 4.3 IMPLICATIONS

Considering the results of the present thesis, it is essential to highlight some possible implications:

- Future interventions to improve HRQoL may focus on specific strategies for its dimensions. Our study indicated that changing self-efficacy, outcome expectations, and social support related to PA and ST might improve HRQoL dimensions among adolescents.
- New studies should consider measuring the mediators and HRQoL dimensions at different time points since it is assumed that outcome changes will occur after the mediators.
- The school community must be careful in maintaining a healthy school environment that provides psychological well-being to students during the school year since there is a tendency to reduce the dimensions of HRQoL over time.
- Given the complexity of implementing the intervention strategies, we recommend that future studies include as their primary goal to identify strategies to improve the implementation process, that is, procedures to be taken to guarantee the fidelity of the intervention.

## 5 DISSEMINATION

The results' dissemination has been performed according to the key audiences for this research, ensuring that the outputs inform evidence-based practice and provide information about the analyzed population. Therefore, we used different strategies to reach the following groups:

- Parents, students, and schools: digital and hard-copy reports were distributed to each school. The students and parents could access the report with results regarding the different lifestyle behaviors. In addition, we presented the results in general meetings, including the school community (principals, teachers, and parents).
- Community: reports and presentations containing the results for each school were provided to the Board of Education of the city of Florianopolis. In addition, theses and dissertations have been developed as a way to inform the community about the results. Finally, we also have used lectures and social media to spread the knowledge acquired by the intervention program.
- Scientific community: articles have been the most used strategy to reach this audience. We have published different research articles in recognized journals, trying to disclose the findings. Additional approaches include presenting the results at conferences and meetings involving other researchers; and disseminating results using social media such as Twitter.
- The *Movimente* website is another way to disseminate the intervention materials (<https://movimente.ufsc.br/en/>). All the intervention information is provided online, including publications (<https://movimente.ufsc.br/en/artigos-2/>), questionnaires (<https://movimente.ufsc.br/en/questionarios/>), teachers' handbooks (<https://movimente.ufsc.br/en/manuais/>), pamphlets (<https://movimente.ufsc.br/en/folders/>), posters (<https://movimente.ufsc.br/en/cartazes/>), and photos (<https://movimente.ufsc.br/en/fotos/>).

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## APPENDIX A - First page of Article 1, published at Frontiers in Psychology



# Efforts on Changing Lifestyle Behaviors May Not Be Enough to Improve Health-Related Quality of Life Among Adolescents: A Cluster-Randomized Controlled Trial

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## OPEN ACCESS

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Schools have been the main context for physical activity (PA) and sedentary behavior



**APPENDIX B - First page of Article 2, submitted on the Journal of Child Psychology & Psychiatry**

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**Physical activity, screen time, and their psychosocial determinants in the pathways of the health-related quality of life in adolescents: a mediation analysis of a cluster-randomized controlled trial**

PA, ST, and psychosocial factors as mediators of quality of life

Alexsandra da Silva Bandeira,<sup>1,2</sup> Michael W Beets,<sup>2</sup> Valter Cordeiro Barbosa Filho,<sup>3,4</sup> Priscila Cristina Santos,<sup>1</sup> Marcus V V Lopes,<sup>1</sup> Kelly Samara Silva<sup>1</sup>

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## APPENDIX C - First page of Article 3, published on Health Promotion International

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Advance Access Publication Date: 23 July 2021

Article

OXFORD

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## Implementation of a school-based physical activity intervention for Brazilian adolescents: a mixed-methods evaluation

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Ana Caroline Ferreira Campos de Sousa<sup>1</sup>, Jaqueline Aragoni da Silva<sup>1</sup>,  
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### Summary

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APPENDIX D – *Movimente* questionnaires

			
<h2>Programa MoviMente</h2>			
<b>ORIENTAÇÕES E INSTRUÇÕES PARA O PREENCHIMENTO:</b>			
<p><b>OLÁ!</b></p> <ul style="list-style-type: none"> <li>· Este questionário é sobre o que você faz, conhece ou sente.</li> <li>· Ninguém irá saber o que você respondeu, por isso, seja bastante sincero nas suas respostas.</li> <li>· Por favor, leia com atenção todas as questões!</li> <li>· Procure responder às informações solicitadas preenchendo os espaços no questionário.</li> </ul>			
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141		Página 1 / 15	

### INFORMAÇÕES PESSOAIS

**1. Qual o seu sexo?**

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- Masculino
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- Feminino

**2. Em que série (ano) você está?**

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- 7º ano
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- 8º ano
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**3. Marque a alternativa que melhor representa o nível de estudo do seu pai e de sua mãe:**

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Micro-ondas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Motocicletas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Secadoras de roupas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Videogame	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acesso a internet...	<input type="radio"/> sim		<input type="radio"/> não		

**5. Assinale os itens que você tem no seu quarto (PODE MARCAR MAIS DE UMA OPÇÃO):**

- |  |  |
|--|--|
| <input type="radio"/> TV                             | <input type="radio"/> Tablet                                   |
| <input type="radio"/> Computador, notebook e netbook | <input type="radio"/> Acesso a internet                        |
| <input type="radio"/> Videogame                      | <input type="radio"/> Não possuo nenhum desses itens no quarto |

### ATIVIDADES FÍSICAS E COMPORTAMENTOS SEDENTÁRIOS

**6. Qual a atividade de lazer de sua preferência? (MARCAR APENAS UMA OPÇÃO)**

- |   |  |
|---|--|
| <input type="radio"/> Atividades físicas (esportes, danças, outros) | <input type="radio"/> Usar o computador                                    |
| <input type="radio"/> Jogos de mesa (cartas, dominó, sinuca)        | <input type="radio"/> Atividades culturais (cinema, teatro, apresentações) |
| <input type="radio"/> Assistir TV                                   | <input type="radio"/> Atividades manuais (bordar, costurar, outros)        |
| <input type="radio"/> Jogar videogame                               | <input type="radio"/> Outras atividades                                    |

**7. "Eu gosto de fazer atividades físicas!" O que você diria dessa afirmação?**

Discordo totalmente     
 Discordo em parte     
 Nem concordo, nem discordo     
 Concordo em parte     
 Concordo totalmente

**8. Em uma semana típica (normal), em quantos dias VOCÊ VAI E VOLTA A PÉ OU DE BICICLETA para a escola?**

0     
 1     
 2     
 3     
 4     
 5     
 6     
 7

**9. Considerando os trajetos de IDA e VOLTA à escola, na maioria dos dias da semana, QUANTO TEMPO do percurso você gasta CAMINHANDO ou PEDALANDO?**

Menos de 10 minutos por dia     
 40 a 49 minutos por dia  
 10 a 19 minutos por dia     
 50 minutos ou mais  
 20 a 29 minutos por dia     
 Não caminho e nem pedalo  
 30 a 39 minutos por dia

**10. Eu acho que o recomendado para a minha idade é:**

Fazer atividade física alguns dias por semana  
 Fazer atividade física todos os dias, por pelo menos 30 minutos  
 Fazer atividade física todos os dias, por pelo menos 1 hora  
 Fazer atividade física todos os dias, por pelo menos 2 horas  
 Eu não sei o que é recomendado

**11. EM GERAL, quais atividades físicas listadas abaixo você pratica? Informe quantos dias da semana e quanto tempo por dia você pratica essas atividades.**

Exemplo:      vezes por semana      duração por dia (minutos)

	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
■ Dança			●																								
□ Futebol																											
□ Futsal (quadra)																											
□ Basquetebol																											
□ Handebol																											
□ Voleibol																											
□ Tênis (de quadra)																											
□ Tênis de Mesa																											
□ Natação																											
□ Atletismo																											
□ Lutas																											
□ Capoeira																											
□ Dança																											
□ Ginástica Rítmica																											
□ Gin. de Academia																											
□ Musculação																											
□ Andar de bicicleta																											
□ Caminhar																											
□ Correr/Trotar																											
□ Patins/Skate																											
□ Surfe																											
□ Brincadeiras ativas																											
□ Outras _____																											
□ Não pratico AF																											

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### HÁBITOS ALIMENTARES

26. Em quantos dias de uma semana normal você consome:

	0 dia	1	2	3	4	5	6	7 dias
A. Frutas (não incluir suco de frutas)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Verduras (saladas verdes, cenoura...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Salgadinhos (coxinha, pastel, batata frita...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Doces (bolos, tortas, sonhos, sorvete)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Refrigerantes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### PERCEÇÃO DE BEM-ESTAR E COMPORTAMENTOS DE SAÚDE

27. Durante os últimos 30 dias, em QUANTOS DIAS você tomou, pelo menos, uma dose de bebida alcoólica?  
**ATENÇÃO: BEBIDAS ALCOÓLICAS INCLUEM: cerveja, vinho, cachaça, rum, gim, vodca, uísque ou qualquer outra bebida destilada ou fermentada contendo álcool.**

- Nenhum dia   
  1 ou 2 dias   
  3 ou 5 dias   
  6 a 9 dias   
  10 a 19 dias  
 20 a 29 dias   
  Todos os 30 dias

28. Durante os últimos 30 dias, em quantos dias você fumou cigarros?

- Nenhum dia   
  1 ou 2 dias   
  3 ou 5 dias   
  6 a 9 dias   
  10 a 19 dias  
 20 a 29 dias   
  Todos os 30 dias

29. Com que frequência você considera que DORME BEM?

- Sempre   
  Quase sempre   
  Às vezes   
  Quase nunca   
  Nunca

30. Em média, quantas horas você dorme por dia?

	Menos de 6 horas	6	7	8	9	10	Mais de 10 horas
Em um DIA DA SEMANA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Em um DIA DO FIM DE SEMANA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### RESULTADOS ESPERADOS

Marque a resposta que melhor representa o quanto você **DISCORDA** ou **CONCORDA** com as seguintes afirmações:

**EU ACHO QUE SE EU PRATICASSE ATIVIDADE FÍSICA NA MAIORIA DOS DIAS DA SEMANA...**

	Discordo muito	Discordo	Concordo	Concordo muito
1. ...melhoraria ou manteria a minha forma física (aptidão física).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...eu faria novos(as) amigos(as).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...eu iria me sentir cansado(a).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...eu deixaria de fazer outras coisas que são importantes para mim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...eu teria mais contato com os(as) meus(minhas) amigos(as).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. ...eu ficaria mais alegre, bem humorado.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. ...eu poderia ter alguma lesão (machucar).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. ...eu dormiria melhor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. ...ajudaria a controlar o meu peso corporal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. ...seria chato.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



### ATITUDE

Marque a resposta que melhor representa A SUA OPINIÃO para cada um dos itens abaixo.

**1. Praticar atividade física, na maioria dos dias da semana, é...**

- Sem importância     Pouco importante     Importante     Muito importante

**2. Praticar atividade física, na maioria dos dias da semana, é...**

- Muito inseguro     Inseguro     Seguro     Muito seguro

**3. Praticar atividade física, na maioria dos dias da semana, é...**

- Muito ruim     Ruim     Bom     Muito bom

**4. Praticar atividade física, na maioria dos dias da semana, é...**

- Muito prejudicial     Prejudicial     Saudável     Muito saudável

**5. Praticar atividade física, na maioria dos dias da semana, é...**

- Muito chato     Chato     Divertido     Muito divertido

### AUTOEFICÁCIA

Marque a resposta que melhor representa o quanto você DISCORDA ou CONCORDA com as seguintes afirmações:

**EU ACHO QUE POSSO PRATICAR ATIVIDADE FÍSICA NA MAIORIA DOS DIAS DA SEMANA MESMO QUE...**

	Discordo muito	Discordo	Concordo	Concordo muito
1. ...eu não tenha ninguém para ir comigo (falta de companhia).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...eu esteja sem vontade de praticar (desmotivado).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...eu possa ficar em casa para assistir TV, jogar games, usar computador.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...meus amigos(as) me chamem para fazer outras coisas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...eu ache que não tenha habilidade para praticar atividade física.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. ...não tenham locais para praticar atividade física próximos a minha casa.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. ...eu não tenha ninguém para me ensinar como fazer (orientar).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. ...mesmo quando estou com preguiça.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### AMBIENTE ESCOLAR

Marque a resposta que melhor representa o quanto você DISCORDA ou CONCORDA com as seguintes afirmações:

**NA ESCOLA ONDE EU ESTUDO...**

	Discordo muito	Discordo	Concordo	Concordo muito
1. ...tem MATERIAL DISPONÍVEL para usar durante o recreio ou após as aulas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...tem LOCAIS INTERESSANTES para brincar e praticar atividade física.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...os locais para praticar atividade física são BEM CUIDADOS.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...tem aula de Educação Física que me ESTIMULA a praticar atividade física.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### APOIO DOS PAIS

#### Com que frequência os SEUS PAIS...

	Nunca	Raramente	Frequentemente	Sempre
1. ...ESTIMULAM você a praticar atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...PRATICAM atividade física com você?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...TRANSPORTAM ou disponibilizam transporte para que você possa ir até o local onde você pratica sua atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...ASSISTEM você praticando atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...COMENTAM que você está praticando bem sua atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. ...CONVERSAM com você sobre atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### APOIO DOS AMIGOS

#### Com que frequência os SEUS AMIGOS...

	Nunca	Raramente	Frequentemente	Sempre
1. ...ESTIMULAM você a praticar atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...PRATICAM atividade física com você?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...CONVIDAM você para praticar atividade física com ele?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...ASSISTEM você praticando atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...COMENTAM que você está praticando bem sua atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### APOIO DOS PROFESSORES DA ESCOLA (FORA OS PROFESSORES DE EDUCAÇÃO FÍSICA)

#### Com que frequência os SEUS PROFESSORES DA ESCOLA...

	Nunca	Raramente	Frequentemente	Sempre
1. ...ESTIMULAM você a praticar atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...CONVIDAM você para praticar atividade física com ele?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...ASSISTEM você praticando atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...COMENTAM que você está praticando bem sua atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...CONVERSAM com você sobre atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### APOIO DOS PROFESSORES DE EDUCAÇÃO FÍSICA

#### Com que frequência os SEUS PROFESSORES DE EDUCAÇÃO FÍSICA...

	Nunca	Raramente	Frequentemente	Sempre
1. ...ESTIMULAM você a praticar atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...CONVIDAM você para praticar atividade física com ele?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...ASSISTEM você praticando atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...COMENTAM que você está praticando bem sua atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...CONVERSAM com você sobre atividade física?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### ATIVIDADES FÍSICAS NO LAZER

Quais atividades físicas listadas abaixo você pratica no seu **TEMPO DE LAZER**? Informe quantos dias da semana e quanto tempo por dia você pratica essas atividades.

Exemplo:                          vezes por semana                          duração por dia (minutos)

	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
■ Dança			●											●						●							
<input type="checkbox"/> Futebol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Futsal (quadra)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Basquetebol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Handebol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Voleibol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Tênis (de quadra)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Tênis de Mesa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Natação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Atletismo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Lutas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Capoeira	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Dança	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Ginástica Rítmica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Gin. de Academia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Musculação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Andar de bicicleta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Caminhar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Correr/Trotar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Patins/Skate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Surfe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Brincadeiras ativas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Outras _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="checkbox"/> Não pratico AF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

### ESCALAS DE SILHUETAS (OLHE PARA AS FIGURAS DO BANNER)

1. Qual o número que melhor representa A SUA APARÊNCIA FÍSICA ATUALMENTE?

1     2     3     4     5     6     7     8     9

2. Qual o número que você considera uma IMAGEM DE CORPO SAUDÁVEL?

1     2     3     4     5     6     7     8     9

3. Qual o número que VOCÊ GOSTARIA DE TER?

1     2     3     4     5     6     7     8     9

### EXPECTATIVAS COM USO DE TV, COMPUTADOR/TABLET/NOTEBOOK E VIDEOGAME

Marque o quanto você **DISCORDA** OU **CONCORDA** com as seguintes afirmações:

	Discordo muito	Discordo	Concordo	Concordo muito
1. "EU ACHO MUITO RELAXANTE quando eu fico sentado na frente da TV".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. "EU ME SINTO BEM (FELIZ) quando estou no computador (conversando ou jogando) ou no videogame".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. "EU FICO EMPOLGADO quando estou usando o computador ou videogame".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. "Usar computador ou videogame É O MEU JEITO DE ME CONECTAR COM O MUNDO (FAZER AMIGOS)".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. "MEUS AMIGOS FICARIAM TRISTES se eu diminuísse o tempo conversando com eles pelo computador".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. "Eu GOSTO de assistir TV ou usar computador/videogame POR MUITAS HORAS SEGUIDAS".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. "Assistir TV ou usar computador/videogame É UMA DAS COISAS QUE MAIS GOSTO DE FAZER NO MEU TEMPO LIVRE".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. "Eu assisto TV ou uso computador/videogame PARA FUGIR DO MUNDO (OBRIGAÇÕES, DISCUSSÕES, PROBLEMAS)".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. "Assistir TV ou usar computador/videogame ME ATRAPALHA A FAZER COISAS IMPORTANTES (ESTUDAR, COMER)".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. "EU FICO PREGUIÇOSO depois que passo muitas horas na frente da TV ou do computador/videogame".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. "EU SINTO DOR NO CORPO (COSTAS, PERNAS) depois que passo muitas horas na frente da TV ou do computador/videogame".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. "Assistir TV ou usar computador/videogame FAZ ARDER MEUS OLHOS E ME DEIXA COM DOR DE CABEÇA".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### ATITUDE PARA REDUZIR O USO DE TV, COMPUTADOR/NOTEBOOK/TABLET E VIDEOGAME

Responda a SUA OPINIÃO sobre as seguintes afirmações:

**1. DIMINUIR O TEMPO na frente da TV, computador ou videogame é IMPORTANTE PARA VOCÊ.**

Discordo muito     Discordo     Concordo     Concordo muito

**2. DIMINUIR O TEMPO na frente da TV, computador ou videogame É CHATO.**

Discordo muito     Discordo     Concordo     Concordo muito

**3. DIMINUIR O TEMPO na frente da TV, computador ou videogame É BOM PARA A SUA SAÚDE.**

Discordo muito     Discordo     Concordo     Concordo muito

### AUTOEFICÁCIA E O USO DE TV, COMPUTADOR/TABLET/NOTEBOOK E VIDEOGAME

Responda a SUA OPINIÃO sobre as seguintes afirmações:

#### EU ACHO QUE SOU CAPAZ DE...

	Discordo muito	Discordo	Concordo	Concordo muito
1. ...LIMITAR (DIMINUIR) MEU TEMPO assistindo TV para 2 horas por dia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...DESLIGAR A TV mesmo que esteja passando um programa que eu goste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...NÃO ASSISTIR TV na maioria dos dias com aula na escola.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...LIMITAR (DIMINUIR) MEU TEMPO usando computador/videogame para 2 horas por dia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...DESLIGAR O COMPUTADOR/VIDEOGAME mesmo que eu esteja fazendo algo que eu goste (jogos prediletos, conversando).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. ...NÃO USAR COMPUTADOR/ VIDEOGAME na maioria dos dias com aula na escola.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. ...DETERMINAR LIMITES PARA O TEMPO que irei ficar na frente da TV, computador ou videogame.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. ...DEIXAR DE assistir TV ou usar o computador/videogame no meu tempo livre PARA FAZER ATIVIDADE FÍSICA.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. ...PENSAR (PLANEJAR) NO QUE EU VOU ASSISTIR na TV durante a semana.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. ...ASSISTIR TV FAZENDO OUTRAS ATIVIDADES QUE EXIGAM ESFORÇO DO CORPO (limpar, brincar), ao invés de ficar sentado.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. ...PENSAR (PLANEJAR) NO QUE EU VOU ACESSAR no computador ou jogar no videogame durante a semana.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### MODELO FAMILIAR E O USO DE TV, COMPUTADOR/TABLET/NOTEBOOK E VIDEOGAME

Durante uma SEMANA TÍPICA (NORMAL), COM QUE FREQUÊNCIA...

	0 dia	1	2	3	4	5	6	7 dias	NA
1. ...seus PAIS (mãe e/ou pai) assistem TV?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...OUTRAS PESSOAS DA SUA CASA assistem TV?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...você E SEUS PAIS assistem TV JUNTOS?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...você e OUTRAS PESSOAS DA SUA CASA assistem TV JUNTOS?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...seus PAIS usam computador/videogame?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. ...OUTRAS PESSOAS DA SUA CASA usam computador/videogame?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. ...você e SEUS PAIS usam computador/videogame JUNTOS?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. ...você e OUTRAS PESSOAS DA SUA CASA usam computador/videogame JUNTOS?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



### REGRAS FAMILIARES DE CONTROLE DO USO DE TV, COMPUTADOR/TABLET/NOTEBOOK E VIDEOGAME

Durante uma semana típica (normal) com que frequência MEUS PAIS...

	0 dia	1	2	3	4	5	6	7 dias
1. ...LIMITAM O TEMPO que posso assistir TV (ex. somente após o jantar ou quando terminar o dever de casa).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...OBSERVAM O QUE ESTOU ASSISTINDO na TV.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...DESLIGAM A TV se eles acharem que estou assistindo TV por muito tempo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...LIMITAM O TEMPO que posso passar no computador/videogame (ex. somente após o jantar ou quando terminar o dever de casa).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...OBSERVAM O QUE ESTOU ACESSANDO /JOGANDO no computador ou videogame.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. ...DESLIGAM O COMPUTADOR/VIDEOGAME se eles acharem que estou jogando por muito tempo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### CRENÇA FAMILIAR E O USO DE TV, COMPUTADOR/TABLET/NOTEBOOK E VIDEOGAME

Em geral, AS PESSOAS DA MINHA CASA...

	Discordo muito	Discordo	Concordo	Concordo muito
1. ...acham que assistir TV ou usar computador /videogame É UM COISA LEGAL DE SE FAZER.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...PREFEREM FICAR SENTADAS na frente da TV, computador ou videogame do que fazendo atividade física.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...ACHAM MAIS SEGURO eu ficar em casa na frente da TV, computador ou videogame do que fazer atividade física fora de casa.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### APOIO FAMILIAR PARA REDUÇÃO DE TV, COMPUTADOR/TABLET/NOTEBOOK E VIDEOGAME

Em geral, AS PESSOAS DA MINHA CASA...

	Discordo muito	Discordo	Concordo	Concordo muito
1. ...ME ENCORAJAM a diminuir o tempo assistindo TV ou usando computador/videogame.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ...COMENTAM COMIGO que muito tempo na frente da TV, computador ou videogame pode fazer mal à minha saúde.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ...ME AJUDAM A PENSAR em como eu posso diminuir o tempo na frente da TV, computador ou videogame.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ...ME ELOGIAM quando eu passo menos tempo na frente da TV, computador ou videogame e mais tempo fazendo atividade física.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ...ME IMPEDEM de assistir TV ou usar computador/videogame quando eu faço algo errado.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### HÁBITOS DE ESTUDO

A seguir, são apresentadas algumas frases sobre comportamentos que os estudantes apresentam no seu dia-a-dia.

**1. Algumas vezes fico escutando música, assistindo televisão ou lendo quando deveria estar estudando.**

- Completamente falso   
  Falso em parte   
  Nem verdadeiro, nem falso   
  Verdadeiro em parte   
  Completamente verdadeiro

**2. Frequentemente me sinto disperso (sonhando, voando) quando quero estudar.**

- Completamente falso   
  Falso em parte   
  Nem verdadeiro, nem falso   
  Verdadeiro em parte   
  Completamente verdadeiro

**3. Existem dias durante o semestre (excluindo os fins de semana) nos quais não estudo ou faço exercícios escolares.**

- Completamente falso   
  Falso em parte   
  Nem verdadeiro, nem falso   
  Verdadeiro em parte   
  Completamente verdadeiro

**4. Sempre começo a me preparar muito tarde para as provas, geralmente um dia antes.**

- Completamente falso   
  Falso em parte   
  Nem verdadeiro, nem falso   
  Verdadeiro em parte   
  Completamente verdadeiro

**5. Geralmente prefiro copiar dos colegas as respostas dos exercícios do que me dedicar a fazê-los.**

- Completamente falso   
  Falso em parte   
  Nem verdadeiro, nem falso   
  Verdadeiro em parte   
  Completamente verdadeiro

**6. Se não consigo resolver um exercício imediatamente, desisto logo ou então o adio o máximo possível.**

- Completamente falso   
  Falso em parte   
  Nem verdadeiro, nem falso   
  Verdadeiro em parte   
  Completamente verdadeiro

### QUALIDADE DE VIDA

#### ATIVIDADES FÍSICAS E SAÚDE

**1. De uma forma geral, como está sua saúde?**

- Excelente   
  Muito boa   
  Boa   
  Ruim   
  Muito ruim

**PENSANDO SOBRE A SEMANA PASSADA...**

**2. Você tem se sentido bem e disposto?**

- Nada   
  Pouco   
  Moderadamente   
  Muito   
  Totalmente

**3. Você tem praticado atividades físicas (por exemplo: correr, andar de bicicleta, escalar)?**

- Nada   
  Pouco   
  Moderadamente   
  Muito   
  Totalmente

**4. Você tem sido capaz de correr bem?**

- Nada   
  Pouco   
  Moderadamente   
  Muito   
  Totalmente

**5. Você tem se sentido com energia?**

- Nunca   
  Raramente   
  Algumas vezes   
  Frequentemente   
  Sempre

**SENSAÇÕES**

**PENSANDO SOBRE A SEMANA PASSADA...**

**6. A sua vida tem sido agradável?**

- Nada       Pouco       Moderadamente       Muito       Totalmente

**7. Você tem estado de bom humor?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**8. Você tem se divertido?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**HUMOR EM GERAL**

**PENSANDO SOBRE A SEMANA PASSADA...**

**9. Você tem se sentido triste?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**10. Você tem se sentido tão mal que não tem vontade de fazer nada?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**11. Você tem se sentido sozinho?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**SOBRE VOCÊ**

**PENSANDO SOBRE A SEMANA PASSADA...**

**12. Você se sente feliz do jeito que você é?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**TEMPO LIVRE**

**PENSANDO SOBRE A SEMANA PASSADA...**

**13. Você tem tido tempo suficiente para você mesmo?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**14. Você tem feito as coisas que quer no seu tempo livre?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre



### FAMÍLIA E VIDA EM CASA

#### PENSANDO SOBRE A SEMANA PASSADA...

**15. Seus pais têm tempo suficiente para você?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**16. Seus pais te tratam com justiça?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**17. Seus pais estão disponíveis para falar quando você deseja?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

### DINHEIRO

#### PENSANDO SOBRE A SEMANA PASSADA...

**18. Você tem dinheiro suficiente para fazer as mesmas coisas que seus amigos?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**19. Você tem dinheiro suficiente para suas despesas?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

### AMIGOS

#### PENSANDO SOBRE A SEMANA PASSADA...

**20. Você tem passado tempo com seus amigos?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**21. Você se diverte com seus amigos?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**22. Você e seus amigos se ajudam?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**23. Você confia em seus amigos?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

### ESCOLA E APRENDIZADO

#### PENSANDO SOBRE A SEMANA PASSADA...

**24. Você se sente feliz na escola?**

- Nada       Pouco       Moderadamente       Muito       Totalmente

**25. Você está indo bem na escola?**

- Nada       Pouco       Moderadamente       Muito       Totalmente

**26. Você tem se sentido capaz de prestar atenção na escola?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**27. Você se dá bem com os seus professores?**

- Nunca       Raramente       Algumas vezes       Frequentemente       Sempre

**APPENDIX E – Authorization Term of the Prefeitura Municipal de Florianópolis**

SECRETARIA MUNICIPAL DE EDUCAÇÃO  
DIRETORIA DE ADMINISTRAÇÃO ESCOLAR  
GERÊNCIA DE FORMAÇÃO PERMANENTE  
Rua Ferreira Lima, 82 – Centro  
CEP 88014-420 – Florianópolis – SC  
Telefones: (48) 32120922 – (48) 32120923

Florianópolis, 31 de Agosto de 2016.

**DECLARAÇÃO**

Declaro para os devidos fins e efeitos legais que, objetivando atender as exigências para a obtenção de parecer do Comitê de Ética em Pesquisa com Seres Humanos, e como representante legal da Secretaria Municipal de Educação de Florianópolis (Gerência de Formação Permanente), tomei conhecimento do projeto de pesquisa: **“PROMOÇÃO DE UM ESTILO DE VIDA SAUDÁVEL EM ADOLESCENTES E SUA RELAÇÃO COM O DESEMPENHO ESCOLAR”**, em desenvolvimento no Departamento de Educação Física, da Universidade Federal de Santa Catarina (UFSC), no período de 2015 a 2018. A pesquisa está sob coordenação do (a) **Profª Dra Kelly Samara da Silva**. Cumprirei os termos das Resoluções do CNS nº 466/2012 e nº 510/2016 e suas complementares, e como esta instituição tem condição para o desenvolvimento deste projeto, autorizo a sua execução nos termos propostos.

Regina Bittencourt Souto  
Gerência de Formação Permanente

*Regina Bittencourt Souto*  
Gerente de Formação Permanente  
Decreto nº 13.928/2015

## APPENDIX F – Protocol of the Ethics Committee in Research with Human Beings of the UFSC

UNIVERSIDADE FEDERAL DE  
SANTA CATARINA - UFSC



### PARECER CONSUBSTANCIADO DO CEP

#### DADOS DA EMENDA

**Título da Pesquisa:** PROMOÇÃO DE UM ESTILO DE VIDA SAUDÁVEL EM ADOLESCENTES E SUA  
RELAÇÃO COM O DESEMPENHO ESCOLAR

**Pesquisador:** Kelly Samara da Silva

**Área Temática:**

**Versão:** 3

**CAAE:** 49462015.0.0000.0121

**Instituição Proponente:** Universidade Federal de Santa Catarina

**Patrocinador Principal:** CNPQ

#### DADOS DO PARECER

**Número do Parecer:** 1.807.825

#### Apresentação do Projeto:

Solicitação de emenda justificando atraso no início do estudo postergado para o ano letivo de 2017, aumento do tempo de avaliação, intervenções mais longas e utilização dos acelerômetros em maior escala.

#### Objetivo da Pesquisa:

Já definidos no projeto aprovado.

#### Avaliação dos Riscos e Benefícios:

Já avaliados no projeto aprovado.

#### Comentários e Considerações sobre a Pesquisa:

Na proposta inicial, a intervenção ocorreria no segundo semestre de 2016, entre os meses de agosto e dezembro. Entretanto, a intervenção que havia começado dia primeiro de agosto, foi paralisada em decorrência da greve dos professores do município de Florianópolis, que ocorreu do dia 8 até o dia 19 de agosto. Devido a modificação nas datas previamente organizadas, assim como, percepções do estudo piloto e informações da literatura científica sobre duração necessária para observar efetividade da intervenção, os autores decidiram adiar o projeto. Levando em consideração as evidências da literatura, que mostram maior efetividade nas mudanças de comportamento em intervenções mais longas, e com a anuência da secretária municipal de

**Endereço:** Universidade Federal de Santa Catarina, Prédio Reitoria II, R: Desembargador Vitor Lima, nº 222, sala 401  
**Bairro:** Trindade **CEP:** 88.040-400  
**UF:** SC **Município:** FLORIANOPOLIS  
**Telefone:** (48)3721-6094 **E-mail:** cep.propesq@contato.ufsc.br

Continuação do Parecer: 1.807.825

Florianópolis, optou-se por realizar a intervenção durante todo o ano letivo de 2017 (fevereiro até dezembro). Levando em consideração a extensão do período do programa de intervenção para um ano, optou-se por expandir também a duração do curso de formação continuada para os professores e articuladores das escolas. O curso de formação foi previamente planejado para ser realizado em 40 horas, porém, decidiu-se aumentar as horas totais do curso para 60 horas. Desta forma, serão realizados três encontros presenciais de quatro horas cada, em fevereiro, junho e novembro de 2017. As demais horas serão realizadas por discussões via facebook, como programado anteriormente. Acredita-se que esta adaptação permitirá um maior contato com os professores das escolas, o que resultará em maior aprofundamento da temática abordada durante o curso. Inicialmente, os acelerômetros seriam utilizados apenas nos escolares do 7º ano. Contudo, com o intuito de obter-se um panorama sobre a prática de atividade física e comportamento sedentário de toda a faixa etária envolvida no projeto, optou-se por utilizar os aparelhos em uma subamostra de todos os anos escolares. Desta forma, escolares do 7º ao 9º ano de duas escolas de pequeno porte irão utilizar os acelerômetros por uma semana. Os aparelhos serão entregues no início da aula e recolhidos após uma semana, sendo utilizado pelos escolares por todo este período, retirando apenas para atividades na água e horas de sono no período noturno. Este instrumento permitirá uma melhor compreensão do efeito da intervenção nos comportamentos relacionados à atividade física e comportamento sedentário. Além disso, como a identificação da aptidão cardiorrespiratória é muito importante para a avaliação da saúde de adolescentes, percebeu-se a possibilidade de inserir essa variável no projeto, que é mensurada por meio de um teste de vai-e-vem de 20 metros. Salientamos que as mudanças sugeridas já foram discutidas e aprovadas na Secretaria da Educação do Município de Florianópolis. Assim sendo, pedimos deferimento para proceder com essas mudanças.

**Considerações sobre os Termos de apresentação obrigatória:**

Estão de acordo com as exigências do sistema CEP-CONEP.

**Recomendações:**

Nenhuma recomendação é necessária.

**Conclusões ou Pendências e Lista de Inadequações:**

Recomendamos a aprovação da presente emenda.

**Considerações Finais a critério do CEP:**

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 Bairro: Trindade CEP: 88.040-400  
 UF: SC Município: FLORIANOPOLIS  
 Telefone: (48)3721-6094 E-mail: cep.propesq@contato.ufsc.br

UNIVERSIDADE FEDERAL DE  
SANTA CATARINA - UFSC



Continuação do Parecer: 1.807.825

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_800819E1.pdf	28/09/2016 17:30:00		Aceito
Declaração de Instituição e Infraestrutura	Declaracao_da_Secretaria_Municipal_Atualizada.pdf	28/09/2016 17:23:13	Kelly Samara da Silva	Aceito
Outros	Adendo.pdf	28/09/2016 17:22:22	Kelly Samara da Silva	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_pais_intervencao.pdf	28/09/2016 17:21:44	Kelly Samara da Silva	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_pais_controle.pdf	28/09/2016 17:21:33	Kelly Samara da Silva	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_escola_intervencao.pdf	28/09/2016 17:21:21	Kelly Samara da Silva	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_escola_controle.pdf	28/09/2016 17:20:55	Kelly Samara da Silva	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_aluno_intervencao.pdf	28/09/2016 17:20:42	Kelly Samara da Silva	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_aluno_controle.pdf	28/09/2016 17:18:10	Kelly Samara da Silva	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_aluno_piloto.pdf	26/10/2015 11:37:36	Kelly Samara da Silva	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_pais_piloto.pdf	26/10/2015 11:37:23	Kelly Samara da Silva	Aceito
Projeto Detalhado / Brochura Investigador	Projeto_CEPSH.pdf	26/10/2015 11:32:54	Kelly Samara da Silva	Aceito
Recurso Anexado pelo Pesquisador	Carta_resposta_pendencias.pdf	26/10/2015 11:31:21	Kelly Samara da Silva	Aceito

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Bairro: Trindade CEP: 88.040-400  
UF: SC Município: FLORIANOPOLIS  
Telefone: (48)3721-6094 E-mail: oep.propesq@contato.ufsc.br



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Continuação do Parecer: 1.807.825

Outros	Declaracao_da_Secretaria_Municipal.pdf	22/09/2015 10:59:59	Kelly Samara da Silva	Aceito
Folha de Rosto	DocUFSC.pdf	04/09/2015 10:22:42	Kelly Samara da Silva	Aceito

**Situação do Parecer:**

Aprovado

**Necessita Apreciação da CONEP:**

Não

FLORIANOPOLIS, 07 de Novembro de 2016

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**Assinado por:**  
**Washington Portela de Souza**  
(Coordenador)

**Endereço:** Universidade Federal de Santa Catarina, Prédio Reitoria II, R: Desembargador Vitor Lima, nº 222, sala 401  
**Bairro:** Trindade **CEP:** 88.040-400  
**UF:** SC **Município:** FLORIANOPOLIS  
**Telefone:** (48)3721-8094 **E-mail:** cep.propesq@contato.ufsc.br

## APPENDIX G – Consent forms for the parents/guardians from Control Schools



Universidade Federal De Santa Catarina  
 Centro de Desportos  
 Departamento de Educação Física  
 Núcleo de Pesquisa em Atividade Física e Saúde



### Termo de Consentimento Livre e Esclarecido – Pais/Responsáveis Legais

#### Senhores pais ou responsáveis

Este termo tem o objetivo de solicitar a sua autorização para que seu (a) filho (a) participe da pesquisa de *Promoção de um estilo de vida saudável em adolescentes e sua relação com o desempenho escolar*. O presente projeto encontra-se vinculado à Universidade Federal de Santa Catarina, com a participação de professores vinculados aos Programas de Pós-Graduação em Educação Física, Nutrição e Saúde Coletiva, tendo como coordenadora a Profª Drª Kelly Samara da Silva. A participação na pesquisa é voluntária e antes de assinar este termo, é importante que você entenda todas as informações e esclareça as dúvidas com os pesquisadores.

**Medidas e avaliações:** Nesta pesquisa, o seu filho responderá questionários e participará de medidas que serão realizados três vezes durante o estudo: fevereiro, julho e dezembro de 2017. A coleta das informações acontecerá por meio da participação dos alunos em: a) medidas de atividade física e de comportamentos sedentários (uso de aparelhos eletrônicos e questionários para alunos e pais/responsáveis); b) informações do desempenho escolar (consulta às notas dos alunos nos boletins, com autorização da escola); c) estado nutricional e adiposidade abdominal (medidas aferidas de massa corporal, estatura e circunferência da cintura); d) aptidão cardiorrespiratória (por meio de teste físico de corrida) e e) informações demográficas (sexo, idade e classe econômica), qualidade de vida, hábitos alimentares e outras variáveis do estilo de vida serão respondidas pelos alunos (questionário). Informações complementares serão fornecidas pelos pais (renda familiar e qualidade de vida). A aplicação dos questionários será procedida em sala de aula, a aferição das medidas antropométricas em uma sala reservada e o teste de aptidão cardiorrespiratória em local adequado, sendo todos executados por uma equipe de pesquisadores previamente treinados. Os alunos utilizarão um pequeno aparelho de registro do movimento humano durante uma semana e um questionário que avalia a qualidade de vida dos filhos e a renda per capita da família será enviado (via estudante) aos pais/responsáveis para o preenchimento.

**Riscos e Desconfortos:** Os procedimentos utilizados neste protocolo de investigação apresentam possibilidade de danos bastante reduzida à dimensão física, psíquica, moral, intelectual, social, cultural ou espiritual dos participantes. As medidas antropométricas adotadas neste estudo já integram a rotina escolar. Os questionários serão respondidos pelos estudantes, e pais/responsáveis, preencherão somente algumas informações (por exemplo, informações sobre qualidade de vida do seu filho, nível de escolaridade). Os estudantes receberão orientações sobre o uso dos acelerômetros, que tem sido bastante utilizado em estudos com adolescentes e não apresenta riscos adicionais. O teste de aptidão cardiorrespiratória exigirá esforço físico, entretanto será respeitada a individualidade dos alunos. Pesquisadores e instituições envolvidas nesta pesquisa fornecerão assistência imediata aos participantes, no que tange possíveis complicações e/ou danos decorrentes da pesquisa. Em casos em que os participantes sejam expostos a situações de constrangimento, como divulgação de dados pessoais acidentais de menores sem autorização prévia, os pesquisadores preveem aos participantes o reparo, com reconsideração e desculpas por escrito em qualquer uma das

fases da pesquisa. Em casos de desconforto, como por acidentes decorrentes de alguma das ações de intervenção dirigidas pelos integrantes dessa pesquisa, haverá assistência imediata com todos os cuidados necessários, como forma de indenização. Por fim, salientamos que os procedimentos que assegurem a confidencialidade e a privacidade, a proteção da imagem, a não estigmatização dos participantes serão realizados em sua totalidade. Asseguramos que os dados obtidos com essa pesquisa não serão usados para outros fins além dos previstos no protocolo e/ou no consentimento livre e esclarecido desse estudo.

**Benefícios:** As informações da pesquisa permitirão que o(a) Senhor(a) tenha conhecimento sobre a situação de alguns aspectos de saúde de seu(a) filho(a), como a prática de atividade física e comportamento sedentário, e a relação da mudança desses aspectos sobre o desempenho escolar deles, por meio dos resultados individuais que o Senhor(a) receberá.

**Asseguramos antecipadamente que:**

- a. Seu (a) filho (a) somente participará da pesquisa com a sua autorização, por meio da entrega desse termo de consentimento livre e esclarecido devidamente assinado;
- b. Não haverá nenhum custo aos participantes do estudo;
- c. Será garantido aos participantes a privacidade à sua identidade e o sigilo de suas informações;
- d. Seu (a) filho (a) terá liberdade para recusar-se a participar da pesquisa e, após aceitar, também poderá desistir da pesquisa a qualquer momento, sem qualquer tipo de penalidade ou prejuízo para si;
- e. Os participantes terão acesso aos seus resultados individuais.

Caso você tenha dúvidas ou perguntas a respeito do estudo, no que se refere à participação do seu filho(a), você poderá contatar a professora Kelly Samara da Silva (coordenadora da pesquisa) por e-mail [kelly.samara@ufsc.br](mailto:kelly.samara@ufsc.br), ou pelo telefone (48) 3721-3862 ou 37218519.

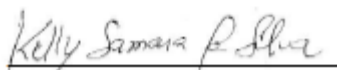
Eu, \_\_\_\_\_ responsável pelo aluno(a) \_\_\_\_\_ li e entendi todas as informações contidas nesse termo de consentimento e, assino abaixo, confirmando através deste documento meu consentimento para participação do(a) meu(minha) filho(a) na coleta de dados referente ao preenchimento de questionários, realização das medidas de acelerometria, de peso corporal e de altura e circunferência da cintura.

\_\_\_\_\_  
Assinatura

Florianópolis - SC, \_\_\_\_ de \_\_\_\_\_ de 2017.

**Declaração do pesquisador**

Declaro, para fins da realização da pesquisa, que cumprirei todas as exigências acima, na qual obtive de forma apropriada e voluntária, o consentimento livre e esclarecido do declarante.



Profª Drª Kelly Samara da Silva

Coordenadora do Projeto Professora da UFSC

Agradeço a colaboração!



## APPENDIX H – Consent forms for the parents/guardians from Intervention Schools



Universidade Federal De Santa Catarina  
 Centro de Desportos  
 Departamento de Educação Física  
 Núcleo de Pesquisa em Atividade Física e Saúde



### Termo de Consentimento Livre e Esclarecido – Pais/Responsáveis Legais

#### Senhores pais ou responsáveis

Este termo tem o objetivo de solicitar a sua autorização para que seu (a) filho (a) participe da pesquisa de *Promoção de um estilo de vida saudável em adolescentes e sua relação com o desempenho escolar*. Esta pesquisa é coordenada pela professora Dr<sup>a</sup> Kelly Samara da Silva, professora do Centro de Desportos da Universidade Federal de Santa Catarina. A participação na pesquisa é voluntária e antes de assinar este termo, é importante que você leia as informações contidas neste documento, que informa os procedimentos para a realização da pesquisa.

**Objetivo do estudo:** Avaliar o efeito de um programa de intervenção sobre a prática de atividade física, comportamentos sedentários e outros componentes de saúde, e a relação dessa mudança com o desempenho escolar em escolares do 7º ao 9º ano das escolas públicas municipais de Florianópolis, SC, Brasil.

**Medidas e avaliações:** Os questionários e medidas serão realizados três vezes durante o estudo: fevereiro, julho e dezembro de 2017. A coleta das informações acontecerá por meio da participação dos alunos em: a) medidas de atividade física e de comportamentos sedentários (uso de pequeno aparelho eletrônico e questionários para alunos e pais/responsáveis); b) informações do desempenho escolar (consulta às notas obtidas dos alunos nos boletins, com autorização da escola); c) estado nutricional e adiposidade abdominal (medidas aferidas de massa corporal, estatura e circunferência da cintura); d) aptidão cardiorrespiratória, por meio de teste físico de corrida; e) informações demográficas (sexo, idade e classe econômica), qualidade de vida, hábitos alimentares e outras variáveis do estilo de vida serão respondidas pelos alunos (questionário). Informações complementares serão fornecidas pelos pais/responsáveis (renda familiar e qualidade de vida). A aplicação dos questionários será procedida em sala de aula, a aferição das medidas antropométricas em uma sala reservada, e os testes de aptidão cardiorrespiratória em local adequado, sendo todos realizados por uma equipe de pesquisadores previamente treinados. Os alunos utilizarão um pequeno aparelho de registro do movimento humano durante uma semana e um questionário que avalia a qualidade de vida dos filhos e a renda per capita da família será enviado (via estudante) aos pais/responsáveis para o preenchimento.

**Procedimentos do estudo:** o programa de intervenção ocorrerá no horário escolar, durante o ano letivo de 2017 (de fevereiro a dezembro). O escolar poderá participar frequentemente das atividades que ocorrerão dentro da escola, que serão orientadas pelo próprio professor de Educação Física, professores de outras disciplinas e professores de Educação Física da Universidade Federal de Santa Catarina. Estas atividades farão parte da estrutura escolar e foram aprovadas pela direção da escola e pela Secretaria Municipal de Educação. As escolas participarão do programa com três focos de intervenção, a saber: a) formação de pessoal (de professores de diferentes disciplinas; de professores de Educação Física; entrega de material de apoio aos professores; e auxílio na elaboração do cronograma anual de

trabalho do Programa Saúde do Escolar); b) ações educativas (distribuição de materiais educativos à comunidade escolar; confecção mensal de cartazes informativos, pelos escolares; duas palestras para discutir informações sobre saúde; e atividades com recurso audiovisual realizadas na escola); e c) alterações ambientais para mudança de comportamento (criação de espaços físicos; disponibilização de materiais para uso comum; atividades e jogos recreativos durante o recreio; e realização de pequenos intervalos ativos de dois a três minutos em sala de aula).

**Riscos e Desconfortos:** Os procedimentos utilizados neste protocolo de investigação apresentam possibilidade de danos bastante reduzida à dimensão física, psíquica, moral, intelectual, social, cultural ou espiritual dos participantes. As medidas antropométricas adotadas neste estudo já integram a rotina escolar. Os questionários serão respondidos pelos estudantes, e pais/responsáveis, preencherão somente algumas informações (por exemplo, informações sobre qualidade de vida do seu filho, nível de escolaridade). Os estudantes receberão orientações sobre o uso dos acelerômetros, que tem sido bastante utilizado em estudos com adolescentes e não apresenta riscos adicionais. O teste de aptidão cardiorrespiratória exigirá esforço físico, entretanto será respeitada a individualidade dos alunos. Pesquisadores e instituições envolvidas nesta pesquisa fornecerão assistência imediata aos participantes, no que tange possíveis complicações e/ou danos decorrentes da pesquisa. Em casos em que os participantes sejam expostos a situações de constrangimento, como divulgação de dados pessoais acidentais de menores sem autorização prévia, os pesquisadores preveem aos participantes o reparo, com reconsideração e desculpas por escrito em qualquer uma das fases da pesquisa. Em casos de desconforto, como por acidentes decorrentes de alguma das ações de intervenção dirigidas pelos integrantes dessa pesquisa, haverá assistência imediata com todos os cuidados necessários, como forma de indenização. Por fim, salientamos que os procedimentos que assegurem a confidencialidade e a privacidade, a proteção da imagem, a não estigmatização dos participantes serão realizados em sua totalidade. Asseguramos que os dados obtidos com essa pesquisa não serão usados para outros fins além dos previstos no protocolo e/ou no consentimento livre e esclarecido desse estudo.

**Benefícios:** As informações da pesquisa permitirão que o (a) Senhor (a) tenha conhecimento sobre a situação de alguns aspectos de saúde de seu (a) filho(a) e a relação da mudança desses aspectos sobre o desempenho escolar deles, por meio dos resultados individuais que o Senhor(a) receberá. Também, a participação nas atividades propostas poderá contribuir para que seu filho (a) tenha um estilo de vida mais saudável, com possível reflexo no seu rendimento escolar e no seu comportamento, principalmente, na escola.

**Asseguramos antecipadamente que:**

- a. Seu(a) filho(a) somente participará da pesquisa com a sua autorização, por meio da entrega desse termo de consentimento livre e esclarecido devidamente assinado;
- b. Não haverá nenhum custo aos participantes do estudo;
- c. Será garantido aos participantes a privacidade à sua identidade e o sigilo de suas informações;
- d. Seu(a) filho(a) terá liberdade para recusar-se a participar da pesquisa e, após aceitar, também poderá desistir da pesquisa a qualquer momento, sem qualquer tipo de penalidade ou prejuízo para si;
- e. Os participantes terão acesso aos seus resultados individuais.

Caso você tenha dúvidas ou perguntas a respeito do estudo, no que se refere à participação do seu filho (a), você poderá contatar a professora Kelly Samara da Silva (coordenadora da pesquisa) por e-mail [kelly.samara@ufsc.br](mailto:kelly.samara@ufsc.br), ou pelo telefone (48) 3721-3862 ou 37218519.

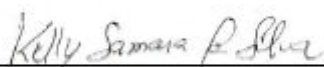
Eu, \_\_\_\_\_ responsável pelo aluno(a) \_\_\_\_\_ li e entendi todas as informações contidas nesse termo de consentimento e, assino abaixo, confirmando através deste documento meu consentimento para participação do(a) meu(a) filho(a) na coleta de dados referente ao preenchimento de questionários, realização das medidas de acelerometria, de peso corporal, de altura e circunferência da cintura, e da participação no programa de intervenção.

\_\_\_\_\_  
Assinatura

Florianópolis - SC, \_\_\_\_ de \_\_\_\_\_ de 2017.

#### **Declaração do pesquisador**

Declaro, para fins da realização da pesquisa, que cumprirei todas as exigências acima, na qual obtive de forma apropriada e voluntária, o consentimento livre e esclarecido do declarante.



Profª Drª Kelly Samara da Silva

Coordenadora do Projeto

Professora da UFSC

Agradeço a colaboração!



## APPENDIX I – Consent forms for the students from Control Schools



Universidade Federal De Santa Catarina  
 Centro de Desportos  
 Departamento de Educação Física  
 Núcleo de Pesquisa em Atividade Física e Saúde



### Termo de Assentimento

Prezado(a) Aluno(a)

Este termo tem o objetivo de convidá-lo para participar de uma pesquisa que será realizada na sua escola por pesquisadores da Universidade Federal de Santa Catarina. O presente projeto encontra-se vinculado à Universidade Federal de Santa Catarina, com a participação de professores vinculados aos Programas de Pós-Graduação em Educação Física, Nutrição e Saúde Coletiva, tendo como coordenadora a Profª Drª Kelly Samara da Silva. A participação na pesquisa é voluntária e antes de assinar este termo, é importante que você entenda todas as informações e esclareça as dúvidas com os pesquisadores.

**Medidas e avaliações:** Nesta pesquisa, você responderá questionários e participará de medidas que serão realizados três vezes durante o estudo: em fevereiro, julho e dezembro de 2017.

As avaliações serão de: a) medidas de atividade física e comportamento sedentário, por meio do uso de um equipamento eletrônico e de preenchimento de um questionário; b) informações do seu desempenho escolar serão obtidas na secretaria da escola; c) medidas de peso corporal, altura e circunferência da cintura serão realizadas, d) aptidão cardiorrespiratória, por meio de teste físico de corrida; e) vocês e/ou seus pais/responsáveis responderão questões sobre qualidade de vida, hábitos alimentares, dificuldades de praticar atividade física e informações de sexo, idade, escolaridade dos pais e nível econômico. O questionário será aplicado em sala de aula, as medidas de peso, altura e perímetro da cintura serão feitas em uma sala reservada e o teste de aptidão cardiorrespiratória em local adequado para corrida, sendo todos executados por pesquisadores experientes. Vocês utilizarão um pequeno aparelho de registro do movimento durante uma semana. Por fim, vocês enviarão para os seus pais/responsáveis um questionário, para que eles possam responder e encaminhar de volta.

**Riscos e Desconfortos:** As avaliações que iremos fazer apresentam desconfortos mínimos e não irá constrangê-los, inclusive algumas vocês já conhecem, como peso e altura. Os questionários, são somente perguntas relacionadas à qualidade e o estilo de vida de vocês, como prática de atividade física e comportamento sedentário. O uso do acelerômetro é simples e não há risco adicional. O teste de aptidão cardiorrespiratória exigirá esforço físico, entretanto, serão respeitados os limites individuais de cada um. Se necessário, forneceremos assistência imediata a vocês, caso exista alguma complicação ou dano decorrente dos procedimentos dessa pesquisa. Por exemplo, se houver algum constrangimento com a divulgação de dados pessoais, a equipe preparará um documento por escrito com pedido formal de desculpas ao participante. Ainda, se houver algum desconforto causado por acidentes decorrentes das ações de intervenção, haverá assistência imediata com os cuidados necessários, como forma de ressarcimento.

**Benefícios:** Você saberá como está alguns aspectos de sua saúde e também se a adoção de alguns comportamentos saudáveis reflete no seu rendimento escolar.

**Asseguramos antecipadamente que:**

- a. Você somente poderá participar da pesquisa se você entregar esse termo assinado e trazer a autorização dos seus pais ou responsáveis;

- b. Não haverá nenhum custo decorrente de sua participação no estudo;
- c. O seu nome e as informações suas não serão divulgadas;
- d. Você poderá se recusar a participar da pesquisa e, mesmo que você aceite, também poderá desistir da pesquisa quando quiser, sem qualquer problema para você;
- e. Você receberá os resultados de suas avaliações.

A professora Kelly Samara da Silva (coordenadora da pesquisa) estará disponível para esclarecer suas dúvidas quando você tiver, por e-mail [kelly.samara@ufsc.br](mailto:kelly.samara@ufsc.br), ou pelo telefone (48) 3721-3862 ou 37218519.

Eu, \_\_\_\_\_, li e entendi todas as informações contidas nesse termo e, assino abaixo, confirmando através deste documento que:

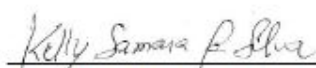
Aceito participar da coleta de dados referente ao preenchimento de questionários, realização de medidas de peso corporal, de altura, de circunferência da cintura, do uso do acelerômetro, bem como a participação no programa de intervenção.

\_\_\_\_\_  
Assinatura do (a) aluno(a)

Florianópolis - SC, \_\_\_\_ de \_\_\_\_\_ de 2017.

#### Declaração do pesquisador

Declaro, para fins da realização da pesquisa, que cumprirei todas as exigências acima, na qual obtive de forma apropriada e voluntária, o consentimento livre e esclarecido do declarante.



Prof<sup>a</sup> Dr<sup>a</sup> Kelly Samara da Silva  
Coordenadora do Projeto  
Professora da UFSC

Agradeço a colaboração!

## APPENDIX J – Consent forms for the students from Intervention Schools



Universidade Federal De Santa Catarina  
 Centro de Desportos  
 Departamento de Educação Física  
 Núcleo de Pesquisa em Atividade Física e Saúde



## Termo de Assentimento

## Prezado (a) Aluno(a)

Este termo tem o objetivo de convidá-lo para participar de uma pesquisa que será realizada na sua escola por pesquisadores da Universidade Federal de Santa Catarina. O objetivo é avaliar o efeito de um programa de intervenção sobre a prática de atividade física, comportamentos sedentários e outros componentes de saúde, e a relação dessa mudança com o desempenho escolar de vocês. A participação na pesquisa é voluntária e antes de assinar este termo, é importante que você entenda todas as informações e esclareça as dúvidas com os pesquisadores.

**Medidas e avaliações:** Nesta pesquisa, você responderá questionários e participará de medidas que serão realizadas três vezes durante o estudo: fevereiro, julho e dezembro de 2017. As avaliações serão de: a) medidas de atividade física e comportamento sedentário, por meio do uso de um equipamento eletrônico e de preenchimento de um questionário; b) informações do seu desempenho escolar serão obtidas na secretaria da escola; c) medidas de peso corporal, altura e circunferência da cintura serão realizadas, d) aptidão cardiorrespiratória, por meio de teste físico de corrida; e) vocês e/ou seus pais/responsáveis responderão questões sobre qualidade de vida, hábitos alimentares, dificuldades de praticar atividade física e informações de sexo, idade, escolaridade dos pais e nível econômico. O questionário será aplicado em sala de aula, as medidas de peso, altura e perímetro da cintura serão feitas em uma sala reservada e o teste de aptidão cardiorrespiratória em local adequado, sendo todos executados por pesquisadores experientes. Vocês utilizarão um pequeno aparelho de registro do movimento durante uma semana. Todos vocês levarão para os seus pais/responsáveis um questionário, para que eles possam responder e encaminhar de volta.

**Procedimentos do estudo:** O programa de intervenção ocorrerá no horário escolar, durante o ano letivo de 2017 (de fevereiro a dezembro). O programa será de formação de professores das disciplinas curriculares; você participará de palestras sobre saúde; receberá folders e cartazes educativos; terá materiais para brincar e jogar no intervalo escolar; e também terá a oportunidade de participar de algumas brincadeiras durante os intervalos.

**Riscos e Desconfortos:** As avaliações que iremos fazer apresentam desconfortos mínimos e não irá constrangê-los, inclusive algumas vocês já conhecem, como peso e altura. Os questionários, são somente perguntas relacionadas à qualidade e o estilo de vida de vocês, como prática de atividade física e comportamento sedentário. O uso do acelerômetro é simples e não há risco adicional. O teste de aptidão cardiorrespiratória exigirá esforço físico, entretanto será respeitado o limite individual. Se necessário, forneceremos assistência imediata a vocês, caso exista alguma complicação ou dano decorrente dos procedimentos dessa pesquisa. Por exemplo, se houver algum constrangimento com a divulgação de dados pessoais, a equipe preparará um documento por escrito com pedido formal de desculpas ao participante. Ainda, se houver algum desconforto causado por acidentes decorrentes das ações de intervenção, haverá assistência imediata com os cuidados necessários, como forma de ressarcimento.

**Benefícios:** Você saberá como estão alguns aspectos de sua saúde e também se a adoção de alguns comportamentos saudáveis reflete no seu rendimento escolar. Você terá mais conhecimento sobre a importância de fazer atividade física, os alimentos que são mais saudáveis, a importância de reduzir o tempo de frente à televisão,

entre outras informações importantes para você ter uma vida mais saudável e ativa, e a relação disso com o seu desempenho escolar.

**Asseguramos antecipadamente que:**

- a. Você somente poderá participar da pesquisa se você entregar esse termo assinado e trazer a autorização dos seus pais ou responsáveis;
- b. Não haverá nenhum custo decorrente de sua participação no estudo;
- c. O seu nome e as informações suas não serão divulgadas;
- d. Você poderá se recusar a participar da pesquisa e, mesmo que você aceite, também poderá desistir da pesquisa quando quiser, sem qualquer problema para você;
- e. Você receberá os resultados de suas avaliações.

A professora Kelly Samara da Silva (coordenadora da pesquisa) estará disponível para esclarecer suas dúvidas quando você tiver, por e-mail [kelly.samara@ufsc.br](mailto:kelly.samara@ufsc.br), ou pelo telefone (48) 3721-3862 ou 37218519.

Eu, \_\_\_\_\_, li e entendi todas as informações contidas nesse termo e, assino abaixo, confirmando através deste documento que:

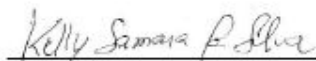
Aceito participar da coleta de dados referente ao preenchimento de questionários, realização de medidas de peso corporal, de altura, de circunferência da cintura, do uso do acelerômetro, bem como a participação no programa de intervenção.

\_\_\_\_\_  
Assinatura do (a) aluno(a)

Florianópolis - SC, \_\_\_\_ de \_\_\_\_\_ de 2017.

**Declaração do pesquisador**

Declaro, para fins da realização da pesquisa, que cumprirei todas as exigências acima, na qual obtive de forma apropriada e voluntária, o consentimento livre e esclarecido do declarante.



Profª Drª Kelly Samara da Silva

Coordenadora do Projeto

Professora da UFSC

Agradeço a colaboração!