



On successfully avoiding communication inequalities and instilling positive impacts: The experience of the 2012–2016 WIXX campaign in Québec

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ABSTRACT

Communication campaigns can contribute to promoting physical activity (PA) among children. However, health inequalities can ensue from this type of public health intervention. Using a pre-test posttest design, we examined the effects of social disadvantage on the large-scale WIXX communication campaign and whether or not social disadvantage moderated WIXX's impact on PA. Parents of youths were identified using random digit dialing procedures and asked permission for their child to participate in a telephone survey. Surveys were conducted each year between 2012 and 2016. Moderating effects of individual-level and area-based indicators of social disadvantage on campaign effectiveness were examined. Self-reported levels of PA and trying new PAs were the outcomes. Exposure was defined as a function of ads recall and brand awareness. Logistic regression analyses controlling for survey periods, screen time, language, school grade, and attitudes toward PA were performed in 2020. Among girls, no significant interaction effects were observed for household income, parental education, and material deprivation. A significant interaction effect was observed for minority group status on PA (OR = 2.4; 95% CIs: 1.2, 4.9) and trying of new activities (OR = 2.5; 95% CIs: 1.2, 5.1). A significant interaction effect between social deprivation and exposure was observed for trying new activities among girls (OR = 1.8; 95% CIs: 1.0, 3.2). Among boys, no significant interaction effects were observed for any indicators. Results suggest no clear evidence of communication inequalities as a result of the WIXX campaign but reveal positive impacts of the campaign among more socially disadvantaged girls.

1. Introduction

Physical activity (PA) is associated with an important number of health benefits among children (Janssen and Leblanc, 2010). However, according to recent data, only 39% of Canadian children aged between 5 and 17 years are meeting current PA recommendations with girls being significantly less active than boys (Statistics Canada, 2019). As consistently observed in past decades, a decline in PA also occurs early in adolescence in Canada (Colley et al., 2017). In addition to low levels of PA among children and youth, substantial prevalence of childhood obesity is observed (Lobstein et al., 2004). To date, unfortunately, interventions have shown only modest effects in increasing and

maintaining high levels of PA (Metcalf et al., 2012).

To support public health efforts, the diffusion of mass communication campaigns is strongly recommended (GAPA, 2011; Bauman and Chau, 2009). For instance, significant positive dose–response effects of the landmark VERB campaign on levels of PA and *The Truth* campaign on preventing smoking initiation were observed among children and youth in the mid-2000 s (Farrelly et al., 2005; Huhman et al., 2010). Inspired by the VERB campaign, the WIXX communication campaign was launched by the non-profit organization *Québec en forme* in the Province of Québec, Canada, in the fall of 2012 to promote PA. In previous studies, positive short- and long-term impacts of WIXX on PA beliefs and behaviors among girls was observed (Bélanger-Gravel et al., 2017;

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Bélanger-Gravel et al., 2019), thus supporting the role of communication in promoting this behavior. However, a number of communication and public health scholars have raised concerns regarding the possibility that communication campaigns increase inequalities in health (Viswanath and Ackerson, 2011; Lorenc et al., 2013). To date, mixed findings regarding the inequitable impact of communication campaigns have been reported for different health issues and behaviors (e.g., smoking, healthy eating, etc.) (Niederdeppe et al., 2008; Bala et al., 2017; McGill et al., 2015). Regarding PA communication campaigns, Thomas et al. (2018) recently concluded that no clear communication inequalities would be likely to occur from this type of intervention among adults. Nevertheless, some of the campaigns included in this review showed poorer campaign outcomes among socioeconomically disadvantaged groups.

Regarding children and youth, the influence of family socioeconomic position (SEP) or other indicators of social disadvantage (e.g., place of residence, ethnic/racial minority status, language, sex) on the impact of communication campaigns promoting PA remains largely unknown. In an evaluation study of the WIXX campaign's early implementation, household income and parental education were not associated with unaided and aided ads recall (Bélanger-Gravel et al., 2017). In contrast, higher recall (based on similar measures of unaided and aided ads recall) among children and youth living in higher socioeconomic conditions was observed for the VERB (during the first year of campaign implementation) and Long Live Kids campaigns (Faulkner et al., 2011; Huhman et al., 2008). Interestingly, though, PA levels associated with ads recall and understanding of the VERB campaign ads during the early phases of implementation were significantly higher among children living in lower socioeconomic contexts (Huhman et al., 2005). Similarly, Pena-Y-Lillo and Lee (2019) recently reported no direct negative influence of SEP or race/ethnicity after two years of the VERB campaign implementation. Although they used a different measure of exposure (the frequency of exposure based on ads recall and understanding), these authors observed more positive attitudes among children living in families with lower SEP. To our knowledge, no other studies have examined the influence of SEP or other indicators of social disadvantage on the impact of communication campaigns aimed at promoting PA among children and youth. Moreover, these two studies relied on ads recall to capture exposure to the VERB campaign. Although ads recall is a well-recognized and valid measure of exposure, particularly in the context of evaluating the effect of specific campaigns' content, the use of broader indicators of exposure (e.g., brand or campaign awareness) was recommended to capture cumulative exposure across time (Niederdeppe, 2014). Thus, the aim of this study was to examine whether or not 1) levels of WIXX campaign overall exposure varied according to the SEP/population groups status, and 2) the SEP and other indicators of disadvantage moderated the impact of the campaign on PA.

2. Methods

2.1. Study design and sampling

This study is part of a larger project aimed at evaluating the WIXX communication campaign on PA and the procedures are fully described elsewhere (Bélanger-Gravel et al., 2017; Bélanger-Gravel et al., 2019). Briefly, the WIXX campaign spanned from 2012 through 2016 (see <http://wixx.ca/>) and included mass communication and community-based activities. The evaluation design involved conducting repeated cross-sectional surveys of youths aged 9 to 13 years and their parents. Random digit dialling of landlines was used to identify parents of children aged 9 to 13 years. The sampling frame included the entire province of Québec and was stratified according to the administrative regions of residence. The response rates varied between 66.3% and 68.8% (i.e., the ratio between the number of completed questionnaires + the number of individuals who agreed to participate but did not meet the inclusion criteria on the total number of calls excluding non-valid

telephone numbers) across the different waves of data collection. The proportion of completed interviews varied between 6.8% and 10.6%. These rates corresponded to the ratio between the number of completed questionnaires on the number of individuals who met the inclusion criteria. Eligibility criteria included age (9 to 13 years old), language (French or English) and place of residence (Québec, Canada). After a brief interview with the parent, consent was obtained to interview the child, and then assent was obtained from the child to answer the questionnaire. Surveys tapped into PA behaviors, beliefs, attitudes, and opportunities for PA (Heitzler et al., 2006). Survey questions remained essentially the same through the five surveys but brand awareness was not assessed during the first follow-up survey. Therefore, only baseline (T₀: 2012) and the last three years of data collection were used in the current analyses (T₂: 2014, T₃: 2015 and T₄: 2016). Initially, a sample size of 204 respondents was calculated (medium effect size for two independent samples at $\alpha = 0.05$ and $\beta = 0.80$), but around 1000 children and youth by survey period were recruited to perform stratified analyses. This study was approved by the Human Research Ethics Committee of the *Centre Hospitalier de l'Université de Montréal* (CER-CHUM #12.042) and all respondents provided their verbal consent or assent to participate.

2.2. Measures

Exposure to the WIXX campaign was assessed using previously validated and recommended indicators to capture cumulative exposure (Niederdeppe, 2014; Niederdeppe, 2005). A composite score including unaided and aided ads recall as well as brand awareness was created. As described elsewhere (Bélanger-Gravel et al., 2017; Bélanger-Gravel et al., 2019), children were asked if they had “seen, read, or heard any advertising on 9–13 year old kids’ PA in the past few weeks.” Those indicating “yes” and recalling the name of the campaign without prompts were deemed as having “unaided recall”. Those who had not heard any PA advertising or had not recalled the name of the campaign were provided with a verbal description of the WIXX ads. Those that recalled the campaign were deemed as having “aided recall”. All others were deemed as having no recall. Brand awareness was determined using the following item: “Before today, did you know or had you heard about the WIXX brand?”. Children were categorized as having or not having brand awareness. To examine overall campaign exposure, respondents were classified as being exposed to the campaign (unaided/aided recall or brand awareness or both) or not. All respondents from the baseline survey were considered as having no exposure.

Children self-reported their PA using a modified version of the SHAPE questionnaire (Wong et al., 2006). Children reported frequency (days spent in moderate and vigorous PA during weekdays and weekend days) and duration. Children were categorized as either meeting [1] PA recommendations (7 days of moderate to vigorous PA for at least 60 min daily, including 3 days of 60 min of vigorous PA) (Tremblay et al., 2011) or not [0]. Trying of new PA, an intermediate PA behavior (Bagozzi and Warshaw, 1990), was assessed by one item: “In the last four weeks, have you tried a new PA that you’ve never done before?”. Children were categorized as having tried [1] or not tried [0] a new PA.

Individual-level indicators of social disadvantage were assessed among the responding parent. Education (the highest degree completed as defined by Statistic Canada (Statistics Canada. Educational attainment of person, 2021) was dichotomized as having a high school degree or less [1] versus college and university degrees [0]. This cut-point was chosen because PA inequalities were observed between children living in families characterized by lower education in comparison to those with higher education (Stalsberg and Pedersen, 2010). Household annual income was dichotomized as <\$60,000 CAN [1] versus ≥\$60,000 CAN [0]. This level of income corresponds to the median household income in Canada at the time of data collection (Statistics Canada. Canadian Income Survey, 2016). The parent’s minority status was established with the following Canadian Census question: “Among the following socio-

cultural groups, which one represents you best?'. Examples of response choices were: White, Chinese, South Asian, Black, Filipino, etc. Although Indigenous status is assessed in separate sets of questions in the Canadian Census, this response option was added to our answer choices. In the present study, respondents were dichotomized as belonging to the majority group (White [0]) versus minority groups (other answer choices [1]). Area-level indicators of social disadvantage were calculated by matching postal codes with census-based information on local material and social deprivation (Pampalon et al., 2012). These indicators are based on the dissemination area that represents the smallest area for which census information is available. These areas comprise generally between 400 and 700 individuals (Pampalon et al., 2012). The material deprivation indicator is a composite score of average household income, unemployment rate, and high school education rate at the dissemination area level, whereas social deprivation is a composite of proportion of the population separated, divorced, or widowed; proportion of the population that lives alone; and proportion of single-parent families. These variables were dichotomized as being in the most deprived quintile [1] versus the others [0].

2.3. Statistical analysis

A series of univariate logistic regression analyses were performed to examine variations in WIXX exposure as a function of social disadvantage. Then, interaction terms were created between indicators of social disadvantage and exposure. For each indicator of social disadvantage and outcome variables, a logistic regression analysis was performed involving main effects of time, exposure, social disadvantage, and the interaction of social disadvantage and exposure. Logistic regressions were adjusted for confounding variables (screen time, language, school grade, and attitudes toward PA) and children were the unit of analysis. Screen time was measured using parental reports of time their child spent in front of screens (Richter et al., 2011). This variable was dichotomized as meeting or not the Canadian recommendation for children at the time of data collection (≥ 2 hrs/day [0] versus < 2 hrs/day [1]) (Lipnowski and Leblanc, 2012). Attitude was a composite score of 5 items that assessed classical and campaign-oriented beliefs toward PA (Heitzler et al., 2006). In addition, analyses adjusted for the year of data collection. Since boys (57.7%) and girls (47.6%) had substantially different levels of PA and because selected communication strategies of WIXX were aimed to capture the attention of girls (Belanger-Gravel et al., 2014), all analyses were stratified according to sex. Analyses were conducted on the largest set of complete data available and were performed using SAS 9.4 (SAS Institute Inc., Cary, NC).

3. Results

The sample for these analyses comprised data from 4001 (T₀: 1000; T₂: 1000; T₃: 1000; T₄: 1001) children (2046 boys and 1955 girls). Characteristics of the sample are presented in Table 1. The proportion of girls and boys reflects census information, but the proportion of respondents who lived in families with higher levels of education and income was over the average distribution of these characteristics in Québec (Quebec Ministry of Family, 2021; Quebec Ministry of Family and Elderly, 2011). Among the samples of girls and boys (both exposed and not), analyses revealed no significant difference in PA according to individual- and area-level indicators of social disadvantage (Supplementary File 1), with the exception of the minority group status among girls. Girls belonging to the minority groups were significantly less likely to be active (41.9%; OR = 0.7; 95%CI: 0.5, 1.0) than girls belonging to the majority group (50.2%). No significant association between the trying of new PAs and the indicators of social disadvantage were observed among boys and girls (data not reported).

Variations in exposure to the WIXX campaign according to social disadvantage appear in Table 2. Overall, no significant variation in exposure was observed among girls, with the exception of population

Table 1
Characteristics of 4001 Québec children and youth according to sex who responded to telephone surveys between 2012 and 2016.

Behaviors	Girls	Boys
	N (%)	
Meeting PA recommendations		
Yes	965 (49.5)	1161 (56.8)
No	986 (50.5)	882 (43.2)
Trying new PAs		
Yes	787 (40.3)	778 (38.0)
No	1168 (59.7)	1268 (62.0)
Meeting screen time recommendations		
Yes	1614 (82.8)	1597 (78.5)
No	335 (17.2)	438 (21.5)
Sociodemographic variables		
School grade		
Primary school	1477 (75.7)	1575 (77.2)
High school	475 (24.3)	465 (22.8)
Mother tongue		
French	1789 (91.5)	1854 (90.1)
Others	166 (8.5)	191 (9.3)
Parental education		
High school degree or less	292 (15.0)	308 (15.1)
College/university degrees	1659 (85.0)	1732 (84.9)
Household annual income (CAN\$)		
< 60,000	526 (28.5)	542 (28.4)
$\geq 60,000$	1320 (71.5)	1368 (71.6)
Material deprivation		
Most deprived quintile	296 (18.6)	315 (18.9)
Other quintiles	1292 (81.4)	1354 (81.1)
Social deprivation		
Most deprived quintile	263 (16.7)	283 (17.0)
Other quintiles	1325 (83.4)	1386 (83.0)
Population group status		
Minority groups	160 (8.3)	195 (9.7)
Majority group	1774 (91.7)	1824 (90.3)

Table 2
Results of bivariate logistic regression analyses of data from 4001 Québec children and youth predicting exposure to the WIXX campaign between 2012 and 2016 as a function of sex and social disadvantage indicators.

Variables	Boys		Girls	
	%	OR (95%CI)	%	OR (95%CI)
Household annual income (CAN\$)	n = 1405		n = 1388	
$\geq 60,000$ (ref)	78.5		83.0	
< 60,000	75.5	0.8 (0.6, 1.1)	81.9	0.9 (0.7, 1.3)
Education of one parent	n = 2037		n = 1477	
College/university (ref)	79.8		82.1	
High school or less	68.6	0.6 (0.4, 0.8)	84.7	1.2 (0.8, 1.8)
Material deprivation	n = 1168		n = 1141	
Others (ref)	78.0		82.1	
Most deprived	78.4	1.0 (0.7, 1.5)	82.6	1.0 (0.7, 1.5)
Social deprivation	n = 1168		n = 1141	
Others (ref)	79.0		81.7	
Most deprived	73.7	0.8 (0.5, 1.1)	84.9	1.3 (0.8, 2.0)
Population groups	n = 2016		n = 1930	
Majority group (ref)	79.1		83.4	
Minority groups	71.9	0.7 (0.5, 1.0)	73.9	0.6 (0.4, 0.9)

group status: girls belonging to the minority groups were less likely to be exposed to WIXX (73.9%: OR = 0.6; 95%CI: 0.4, 0.9) when compared to those belonging to the majority group (83.4%). Among boys, differences in exposure were observed for parental education and minority group status. Boys living in families with lower levels of education were less likely to be exposed to the WIXX campaign (68.6%: OR = 0.6; 95%CI: 0.4, 0.8) compared to boys living in families with higher levels of education (79.8%). Similarly, boys belonging to the minority groups were less likely to be exposed to WIXX (71.9%: OR = 0.7; 95%CI: 0.5, 1.0) when compared to those belonging to the majority group (79.1%).

No significant moderating effects of household annual income with exposure to the WIXX campaign were observed on PA levels among girls (OR = 1.2; 95%CI: 0.8, 1.9; n = 1834) and boys (OR = 1.0; 95%CI: 0.7, 1.6; n = 1891). Similarly, no interaction effects of parental education with exposure to the WIXX campaign on PA were observed for girls (OR = 1.2; 95%CI: 0.7, 2.0; n = 1938) and boys (OR = 0.9; 95%CI: 0.5, 1.4; n = 2019). With regard to material deprivation, no significant interaction effects were observed among boys (OR = 1.1; 95%CI: 0.7, 1.9; n = 1653) and girls (OR = 0.8; 95%CI: 0.5, 1.4; n = 1578). Similarly, no significant interaction effects between exposure and social deprivation were observed among boys (OR = 0.7; 95%CI: 0.4, 1.2; n = 1653) and girls (OR = 0.9; 95%CI: 0.5, 1.5; n = 1578). Finally, the interaction effect for minority group status and exposure on PA was not statistically significant among boys (OR = 0.6; 95%CI: 0.3, 1.1; n = 1999) but a significant interaction effect of minority status by exposure to the WIXX campaign was observed among girls for this outcome (OR = 2.4; 95%CI: 1.2, 4.9; n = 1921). Hence, when disentangling this interaction, girls living in a family reporting being in a minority group *and* who were exposed to the WIXX campaign were more likely to meet PA guidelines when compared to girls living in minority groups families but that were not exposed to the campaign. Also, girls living in a family reporting being in a minority group *and* exposed to the WIXX campaign were more likely to meet PA guidelines when compared to girls from families reporting being in the majority group, whether or not girls were exposed (see Fig. 1 for the illustration of the interaction).

Regarding trying new PAs, no interaction effects of family income with exposure were observed for girls (OR = 1.0; 95%CI: 0.7, 1.6; n = 1837) and boys (OR = 1.1; 95%CI: 0.9, 1.5; n = 1894). No significant interaction effects of parental education and exposure were observed (boys: OR = 1.1; 95%CI: 0.6, 1.8; n = 2022 and girls: OR = 1.3; 95%CI: 0.8, 2.2; n = 1942). The same was true for the interaction between material deprivation and exposure (boys: OR = 0.9; 95%CI: 0.5, 1.5; n = 1655 and girls: OR = 0.9; 95%CI: 0.5, 1.4; n = 1581). Among girls,

significant interaction effects were observed for the moderating effects of social deprivation and minority group status. Hence, girls living in the highest socially deprived areas *and* exposed to WIXX were more likely to have tried new PAs (OR = 1.8; 95%CI: 1.0, 3.2; n = 1581) when compared to girls living in a similar area but that were not exposed to the WIXX campaign (Fig. 2a). Also, girls living in the highest socially deprived areas and exposed to the campaign were more likely to have tried new PAs when compared to girls living in areas characterized by low to moderate deprivation, whether they were exposed or not. Similarly, girls belonging to families reporting minority group status *and* exposed to WIXX were more likely to have tried new PAs (OR = 2.5; 95%CI: 1.2, 5.1; n = 1925) when compared to girls living in minority groups families but not exposed and compared to those living in families reporting belonging to the majority group (Fig. 2b). Finally, no significant interactions were observed among boys for social deprivation (OR = 1.1; 95%CI: 0.7, 1.9; n = 1655) and minority group status (OR = 1.0; 95%CI: 0.5, 1.8; n = 2002).

4. Discussion

In this study, we sought to ascertain whether or not different indicators of social disadvantage were associated with exposure to the WIXX communication campaign. We also examined whether different indicators of social disadvantage moderated the effect of campaign exposure on two indicators of PA: meeting PA recommendations and trying new PAs. Consistent with the systematic review of Thomas et al. (2018) findings of the present study revealed no clear evidence for communication inequalities associated with the WIXX campaign on behavioral outcomes. More importantly and despite the fact that exposure varied according to some indicators, we observed that the campaign led to *more* favorable behavioral outcomes among girls belonging to minority groups and living in areas characterized by higher levels of social deprivation. This result is important since descriptive information from the overall sample of girls showed that girls belonging to families declaring being part of minority groups were significantly less likely to be active than girls from the majority group. Hence, our findings suggest that the WIXX campaign may have alleviated existing inequalities: WIXX may have contributed to attenuating differences in levels of PA between the minority and the majority groups in the province of Québec, Canada. Unfortunately though, differences in likelihood of exposure was observed among boys living in families with lower levels of education and belonging minority groups, thus highlighting potential communication inequalities for this segment. Happily, this disparity did not translate into poorer PA outcomes.

One interesting feature of the WIXX campaign that might have led to this positive impact of WIXX among more socially disadvantaged girls is the use of the 4As principles of social marketing in the campaign's design (Hasting, 2007). That is, the WIXX campaign messages and activities were designed to be *Appealing, Affordable, Available, and Appreciated*. Indeed, to be appealing and appreciated, all campaign messages were formulated around the idea that PA is a fun activity (one of the principal predictors of PA among kids) and adopted a humorous tone (see the YouTube channel of the campaign: <https://www.youtube.com/user/WixxTV/videos>). Also, a number of popular personalities (comedians and athletes) were associated to the campaign. More importantly for children living in lower socioeconomic conditions and to leverage the "availability" and "affordability" dimensions, emphasis of the messages and campaign activities was focused on non-competitive activities, activities that would not require expensive equipment, and activities that could be performed anywhere (at home, in the backyard or the alley, in public parks, etc.). Moreover, the campaign material and activities (intervention toolkits, lists of WIXX activities, reach-out activities, etc.) were freely distributed to schools and communities that were interested in implementing a WIXX activity. Although the extent to which the campaign material was used in more deprived areas was not measured, it is possible that local partners working in these areas benefit

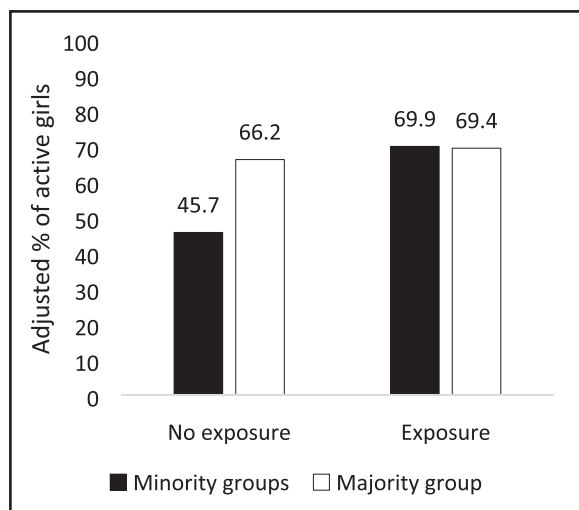


Fig. 1. Predicted proportions of girls meeting PA recommendations as a function of exposure to the WIXX campaign and population group status.

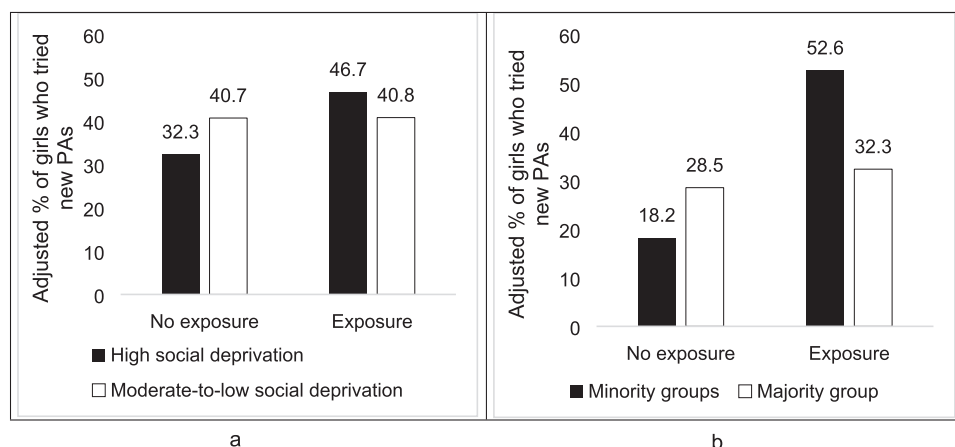


Fig. 2. Predicted proportions of girls trying new PAs as a function of exposure to the WIXX campaign and area-based social deprivation (panel a) population group status (panel b).

more from this promotional material to improve service provision to their communities.

The present findings also highlight variations in the influence of different types of social disadvantage indicators on a communication campaign's impact. This underscores the need to examine the influence of a variety of indicators of social disadvantage when evaluating such public health interventions. This is therefore in line with previous recommendations stating that social disadvantage indicators are not interchangeable and likely have their own mechanisms of action (Galobardes et al., 2006a; Galobardes et al., 2006b). To support communication campaign design, formative steps should be included throughout examination of these specific segments profiles and contexts.

In the field of PA, a number of studies have shown that more supportive environments are generally observed in more wealthy neighborhoods (Sallis et al., 2011; Molina-Garcia et al., 2017). According to this, we might have expected that the WIXX campaign would have led to different outcomes according to place of residence. However, no moderating effects of the area-level indicator of material deprivation were observed in this study. This might be partially due to the fact that campaign activities were designed to be highly available and affordable, thus alleviating the lack of adequate infrastructures. However, deprivation indices do not capture the specific features of the built environment that might be more importantly associated with PA. For instance, in a previous study, the walkability of neighborhoods moderated the impact of a PA campaign among adults (Barnes et al., 2013). In future studies, it will be necessary to examine the moderating effects of specific features of the built environment such as the walkability index or the density of recreational infrastructures on campaign outcomes.

4.1. Study limitations and strengths

This study has some limitations. First, a coverage bias cannot be ruled out since respondents were only recruited via landline telephone. Also, although little evidence of nonresponse bias among telephone surveys was reported (Keeter et al., 2006), a nonresponse bias might nevertheless occur given the observed decreasing number of people that participated in telephone surveys (Galea and Tracy, 2007). A second limitation of this study is the use of a self-reported measure of PA, thus potentially leading to overestimations of children and youth participation in PA. However, given the design of this study, this overestimation might have been distributed into all categories of exposure. Finally, it is important to note that multiple tests were performed in this study. As a result, it is possible that some significant interactions may have been detected by "chance". Consequently, results should be interpreted with caution and require replication in future studies. Among strengths, this study adopted a rigorous procedure to recruit a representative sample of

children and youth living in the province of Québec, Canada, thus increasing the external validity of the present findings. Also, this study is among the very few studies that examined potential inequity effects of a public health PA communication campaigns among youth and, consequently, significantly contributes to improvement in our knowledge in this field.

5. Conclusions

To conclude, no clear evidence for widespread communication inequalities that could be attributable to the WIXX campaign was observed in the present study. In fact, the campaign appeared to alleviate some inequities in PA that were observed in the targeted population among girls. The design of future communication campaigns should ensure that messages are appealing, affordable, available, and appreciated for all segments of the population including population experiencing greater deprivation.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pmedr.2021.101582>.

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