Reviewer's report

Title: Influence of Socio-Economic Status on Habitual Physical Activity and Screen Time in Children

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Reviewer: Verity Cleland

Reviewer's report:

This manuscript addresses an important research topic, that is, it explores the relationship between socioeconomic status (SES) and physical activity and sedentary behaviour among children. While a number of cross-sectional studies have explored this area, results have generally been mixed, with few studies having used objective measures to quantify physical activity. It is here that the strength of this study lies. A second strength is the exploration of the relationship between SES and sedentary behaviour, which has been examined only a small number of times. Weaknesses of the study include its cross-sectional design, use of only one indicator of SES, and lack of thorough discussion of potential pathways through which SES may be related to physical activity and sedentary behaviour. I would like to see more information about response rates provided. Despite these limitations the manuscript is generally well written, the aims and method are mostly clearly described, the results presented appropriately. I do have concerns about the conclusions though and feel these need to be updated.

1. Major Compulsory Revisions

Abstract

1.1 The purpose also needs clarification – I suggest replacing the ‘and/or’ with ‘and’ as it currently looks like the authors are a little unsure what they want to do and that sedentary behaviour has been tacked on as an afterthought.

1.2 Conclusions: I think the first part of the sentence is meant to read “Children of low SES...”. Also should sex be included with BMI as a variable that helped explain differences in PA across SES groups? Also please specify who the comparison group was (i.e. children of high SES). I am not sure that the second sentence of the Conclusion fits well here – what can the authors conclude about the research question, which focused on SES and PA and SB? Why might they not have seen differences in steps and MVPA?

Background

1.3 Second paragraph: currently there is little rationale for including measures of SB; this is an ideal place to discuss the necessity to examine SB as a construct distinct to PA. Also a good place to refer to the Ball article (reference 28) which prospectively examined SES and various aspects of objectively measured and self-reported SB.
1.4 There is currently no rationale for the indicator of SES used, and no discussion of whether previous studies have differed in their findings according to the indicator used.

Methods
1.5 Subjects, Study 1: please clarify how many children were invited to participate so that readers can calculate a response rate. Please also specify the number of children who were non-compliant and who had missing data for PA, anthropometry and covariates.

1.6 Subjects, Study 2: how were children recruited? How many were approached? Is there information available on non-compliance as in Study 1? If so, please provide.

Discussion
1.7 Second paragraph: be careful with phrases such as ‘role of SES on physical activity' which suggests that we have an understanding of the temporal nature of the association. Something like ‘the relationship between SES and physical activity' may be more appropriate.

1.8 The third paragraph makes it sound as if the authors found differences in MVPA across SES groups, which when adjusted for confounding factors is not true. The authors have not synthesised their findings into this paragraph at all – for example, if others have hypothesised why SES may influence PA, why did the current study not find this? Did those other studies adjust for BMI and other important confounders? The last sentence of this paragraph doesn’t add anything. Why would you want to assess total energy expenditure – this wasn’t part of your research aims?

1.9 Fifth paragraph: I very much disagree with the statement that PA levels are a response to weight gain – there are many longitudinal studies demonstrating that physical inactivity leads to obesity (see CARDIA, the Health Professional Study, or the Nurses Health Study for example).

1.10 Another concern about the discussion is the lack of discussion about the indicator of SES used and the implications for the results. What if other indicators such as occupation, education or an area-level indicator were used? This may explain the null findings for MVPA.

1.11 Please acknowledge that a weakness of these studies were their cross-sectional design.

1.12 Please add discussion about the response rate and the implications for internal and external validity of the findings.

Conclusions
1.13 I disagree with the first sentence – it doesn’t answer the key research question. Low SES children did not engage in less PA once important
confounders were controlled for. Wouldn’t it be more important to highlight that there was no association between SES and PA but there was an association between SES and screen time? I would remove the BMI part from this sentence as it was not a key outcome (unless the authors choose to make BMI a key outcome and thus update the rest of the manuscript accordingly).

1.14 The statements that SES ‘appears to especially influence physical activity behaviour’ and ‘SES seems to be one aspect related to PA’ are in direct contrast to the findings. Please rectify.

1.15 Last sentence: I would remove the reference to ‘other health related variables’ as this cannot be determined from this study. Suggest replacing with ‘sedentary behaviour’.

1.16 Given this is a public health journal, please provide some implications for public health practitioners/policy makers.

2. Minor Essential Revisions

Title & throughout
2.1 The authors switch between the terms ‘screen time’ and ‘sedentary behaviour’ regularly – please pick one and be consistent with its use. It is probably preferable when referring to the measures and findings in this paper to use ‘screen time’ as sedentary behaviour could include sitting, lying etc which were not measured.

Abstract
2.2 Please clarify in the first sentence whether SES has been shown to be an important determinant of health and physical activity in adults or in children.

2.3 Please state the ages of the children somewhere in the Methods

2.4 Please specify whether the screen time measures were reported by the child themselves or a parent/guardian.

2.5 There is no mention in the Purpose about why the authors chose to adjust for BMI and leg length, despite this being a key component of the analyses. I think this needs to be highlighted.

2.6 Given the focus is on PA & SB, why is BMI the first reported result in the Results section? I would suggest moving this elsewhere.

Background
2.7 Last sentence of first paragraph: the word ‘high’ should be deleted

Methods
2.8 Do the authors have information on the number of people living in the household? This would enable calculation of the number of people dependent on income. If not, can the authors please add mention of this to the Discussion
including how it may have affected findings?

2.9 It seems from the methods that the authors are interested in examining relationships between SES, PA and SB independently of BMI. Perhaps the authors could add this to the purpose, aim, and title if it is to be such a focus in the paper.

2.10 First paragraph: which measure of SB was used, child or parent report? Please clarify.

2.11 Household income: How many participants did not provide this information?

2.12 Habitual physical activity: first paragraph, Bassett reference doesn’t appear to be referenced properly. Please provide a reference for the 10-step test. Please also provide information on number of participants that were excluded due to not meeting the minimum wear criteria. Were children assisted by parents in completing their pedometer record? Second paragraph: is information on number of participants excluded due to non-compliance available?

Sedentary behaviour: please clarify whether you used the measure reported by parents or by children, or a combination of both. Please add information regarding the reliability or validity of the SB tools.

2.13 Anthropometry: please specify the units of measurement for height and body mass.

2.14 Statistical analyses: I think age considered as a potential confounder/covariate?

Results

2.15 Table 1: Tables should be able to stand alone (i.e. there should be no need to consult the text) but I feel that this table currently doesn’t. It would be helpful if the authors could indicate which characteristics statistically differed across SES categories (e.g. insert a p-value column, or use * to indicate alpha level), and if proportions could be added to the row detailing the number of subjects. This would enable some of the text to be removed from the results. The word ‘height’ is used in the methods but ‘stature’ is used in the table – I would recommend selecting one of these for consistency. It would be helpful to include a list of abbreviations written in full as a footnote.

2.16 Table 2: Same comments as for Table 1 regarding adding p-values, proportions, stature/height and abbreviations. Please explain what MVPA_FM and MVPA_WEL mean. Total screen time doesn’t appear in this table, should it? Is the ‘(SD)’ in the Stature row after ‘(cm)’ supposed to be there?

2.17 Text, page 10: ‘small differences in body size’ – do the authors mean height, weight or BMI? Please specify.

2.18 Figure 3: * indicates significant difference to all other groups – do the authors mean all other groups with a higher income, just the highest income group (as the figure seems to depict), or really all other groups (which isn’t clear
from the figure)?

2.19 I can’t find a reference to Figure 5 in the results anywhere, apologies if I have missed it.

2.20 Suggest changing the order of Figures 4 and 5 to reflect the order in which these are reported in the Results

2.21 Page 11, Study 2: First sentence, should it read Table 2 rather than Table 3? Second sentence: were these differences statistically significant?

Discussion

2.22 Second paragraph: Along with references 13 and 31 I would add the Ball reference which is one of few to have used objective measures of both PA and SB, and was a longitudinal study

2.23 Fourth paragraph: I think ‘seem to be true’ is a little too strong a statement based on one study. Actually I think the discussion around these biological aspects, particularly the ‘central activity stat’, are of little relevance to the paper and suggest removing.

2.24 The discussion focuses very much on physiological mechanism underlying obesity (and by inference only, physical activity). I think there needs to be greater acknowledgement of potential individual, social and physical environmental pathways through which SES may influence PA.

2.25 Is the Blanc study in human or animal models?

3. Discretionary Revisions

None

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests