Title: Response to “Physical Activity and Depression: Type of Exercise Matters”

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We thank Pareja-Galeano et al for their comments on the findings reported in our recent publication on the association between physical activity and symptoms of depression in adolescents. Firstly, we would like to clarify that the measure of physical activity that we used was individually calibrated combined heart rate and movement sensing, not just heart rate. Secondly, the lack of statistically significant associations in our study is strictly speaking not in disagreement with the meta-analysis showing an effect of physical activity on depressive symptoms, as the confidence limits overlap. What is key to appreciate is that this is a prospective and developmentally sensitive study regarding the putative causal associations between routine activity and the mergence of depressive symptoms in a random sample of community-based adolescents. Our study addresses a quite distinct element in the interplay between physical and mental health development compared to any intervention study of activity on mood.

That said, it is worth pointing out that part of the variance in self-reported activity may reflect a person’s perception of him or her being an active and dynamic person, irrespective of true activity level, and that this self-image may in fact be protective against depression. This presents a challenge to our understanding of the aetiology of depressive symptoms, which likely includes a complex interplay of true behavioural differences, social norms, and perception. It is also possible that there are true population differences in the aetiology of depression; the meta-analysis was focussed on clinical trials interventions in clinically depressed adults ranging in age from 18 to 71.6 years, whereas our work concentrates on a population-based sample of adolescents.
It is possible that variations in activity type may relate to depressive symptoms in adolescents, irrespective of their overall volume of activity or time spent at higher intensities. Whilst our objective data are not well-suited to infer these types of activity, we do have additional data from self-report (at baseline), which relates to different types of activity performed including participation in weight training collected as number of days per week. We used this frequency measure as indicative of strength-based exercise classifying participants into those performing weight training at least once per week (n=166 and n=147 during term and holidays, respectively) and those who did not.

We added these strength-based exercise variables to linear and logistic regression models originally presented in our manuscript (with sex and objective physical activity as predictors). We found that strength-based exercise did not predict depression or alter the effects of objective physical activity measures in any of the models. The logistic regression models at baseline were not tested due empty cells.

In summary, these analyses using self-reported frequency of weight training suggest that in this population of adolescents, strength-based exercise did not have a differential beneficial effect on depressive symptoms compared to overall physical activity. Well-designed studies addressing the role of different types of activity in the aetiology of depressive symptoms within this age group need to be conducted before any firm conclusions can be drawn.
