Dear Editor

We thank Costa et al. for carefully reading our paper (1) and providing feedback. We understand that some wording might have been confusing, such as using the term ‘maximize’ when referring to sensitivity and specificity in the receiver operating characteristic (ROC) analysis. We also agree that we could have elaborated more on the advantage/disadvantage of the derived threshold values, the protocol used and the discussion about the use of vector magnitude (VM) vs. the vertical axis. Due to the limited space available for each article published in Pediatric Obesity, we deliberately kept the discussion about these issues brief. As mentioned in the article, wrist-worn devices might improve compliance of participants. The data output from the ActiGraph GT3X+ may be used to estimate sleep duration by applying developed algorithms. Thus a comfortable placement, such as the wrist, is required. The aim of our study was to derive intensity thresholds from the accelerometer placed at the wrist, as these are lacking for this specific population. Wrist placement appears to gain much attention in population-based research (2). In addition, wrist placement was used in the Early STOPP study (3). Comparison with already existing intensity thresholds derived for older children/other placement sites appears inappropriate. The VM may estimate energy expenditure more accurately compared with the acceleration from the vertical axis (4). Thus, deriving VM intensity thresholds for different populations is of importance. It is possible that the VM performs better than the vertical axis for assessing children’s physical activity when using a wrist-mounted accelerometer.

We agree on the importance of being clear about the procedures. The obstacle course was arranged so that the children were running in a circle, climbing a sofa, jumping on pillows, etc. In the outdoor free play session various activities were seen, e.g. digging in a sandpit seated, playing with branches and running back and forth. No parent was present but caregivers sometimes helped to keep children within the playing area so that they could be captured by the camera. When scoring activities according to the Children’s Activity Rating Scale (CARS), an average score over every 5 s bout was estimated. Regarding the specific methodological questions, we believe Costa et al. may have misunderstood the cross-validation analysis. We assessed time (number of minutes) spent in the different intensities according to CARS and compared it with time spent in the same intensity according to the accelerometer data. Thus, data were on a scale level, ruling out the possibility to use Cohen’s kappa, which requires categorical data. We used Spearman’s rank correlation as a crude measure of correlation. However, Costa et al. are right that we should not have used the term agreement. Intraclass correlation provides similar values as the Spearman’s rank correlation (0.55–0.95). Since no ROC analyses were used in the cross-validation, the question about sensitivity, specificity and area under the curve (AUC) is inappropriate. Costa et al. ask for the sensitivity, specificity and AUC for the low-intensity threshold. These values regard the threshold values, not the intensity levels. The sensitivity, specificity and AUC for the sedentary threshold regard the threshold between sedentary and low-intensity physical activity. The intensity threshold for high-intensity physical activity refers to the threshold between low-intensity and high-intensity physical activity. This way of developing threshold values for toddlers has been used previously by Trost et al. (5). Thus, the question about sensitivity, specificity and AUC for the low-intensity threshold appears irrelevant.

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References

1. Johansson E, Ekelund U, Nero H, Marcus C, Hagstromer M. Calibration and cross-validation of a wrist-worn Actigraph in young preschoolers. Pediatr Obes 2014; doi: 10.1111/j.2047-6310.2013.00213.x; Epub ahead of print.
2. Dumith S, Muniz L, Tassitano R, Hallal P, Menezes A. Clustering of risk factors for chronic diseases among adolescents from Southern Brazil. Prev Med 2012; 54: 393–396.
3. Sobko T, Svensson V, Ek A, et al. A randomised controlled trial for overweight and obese parents to prevent childhood obesity – Early STOPP (STockholm Obesity Prevention Program). BMC Public Health 2011; 11: 336.
4. Sasaki J, John D, Freedson P. Validation and comparison of ActiGraph activity monitors. J Sci Med Sport 2011; 14: 411–416.
5. Trost S, Fees B, Haar S, Murray A, Crowe L. Identification and validity of accelerometer cut-points for toddlers. Obesity (Silver Spring) 2012; 20: 2317–2319.