Reviewer's report

Title: Impact of physical activity on energy balance, food intake and choice in normal weight and obese children in the setting of acute social stress: A randomized controlled trial

Version: 2 Date: 25 June 2014

Reviewer: Jana Strahler

Reviewer's report:

This Paper of Horsch et al. is a highly important addition to the literature on stress-induced eating behavior and possible buffering effects of physical activity. To this end, they examined 24 obese/overweight and 26 normal weight control children aged 7 to 11 yrs. This paper is well written and of interest to the readership of BMC Pediatrics. However, there are some concerns that need to addressed by the authors in a revised version.

My major issues concern the deduction of hypotheses, the presentation of results, and the discussion of a missing no stress control group and a missing manipulation check. Not measuring the acute psychobiological stress response is a clear limitation of this study and prevents important insight into biological mechanisms of stress-induced food intake (e.g. HPA axis activity).

Major Compulsory Revisions

Abstract results: the wording „decrease“ is somewhat misleading since the authors compared only stress-induced eating after either physical activity or sedentary behavior (and not before and after an intervention). Maybe „lower energy balance after physical activity compared to the sedentary condition“ would be more appropriate. – Please check the manuscript accordingly (results and discussion) ...

Hypotheses: From the literature review, hypotheses are expected in a slightly different way compared to their actual appearance. A) a direction of results can be hypothesized - from the literature, one can assume reduced food intake after activity. As well, PRECEDING or ACUTE physical activity would be a more precise operationalization. B) I’m not quite sure why the authors expect an independence of allocation. Since physical activity is introduced as a prevention strategy in obesity and to augment stress-induced eating, a physical activity by weight group interaction should be expected. Please comment and update if necessary.

Methods: Did any of the children take prescribed medication? Was any mental disorder reported? Were all children prepubertal – how was this measured? Did you control for physical fitness status/regular exercise (hours/week) - this might moderate the effect of an acute bout of exercise on stress-induced eating (see also discussion)?
Methods: As the authors state in their discussion, physical activity is not necessarily related to increased food consumption in the absence of stress – a relation that might have also been addressed by the authors. Why did they choose to refrain from investigating a no stress control group? I’m sure this was done on purpose. I would love to understand their decision.

Results, 2nd paragraph: I’m not sure what the percentages actually mean. Considering stress-induced eating in the sedentary condition as the „normal (=100%)“ state, do you mean 30/60% reduction from this baseline or reduction to 30/60%?

Results, 2nd para: Expenditure and balance results are missing for hypothesis b) (difference between OW and NW).

Results, last para: Is this association anyhow related to activity group allocation and weight group? Please state.

Discussion (Line 338-339): Intervals of physical activity are recommended as a stress coping strategy. This raises the question of a possible impact of physical fitness/regular physical activity where the body adapts to acute bouts of exercise (see also above). This should be discussed (as a limitation).

Discussion (Line 344-345): „decrease in stress reactivity due to physical activity“ – did the authors measure psychobiological stress reactivity? – also relevant as a manipulation check, i.e. did their stressor actually induced stress and can we assume a „stress-induced“ change in eating? As well, especially stress-induced HPA axis activity has been introduced as a possible modulator of food-intake after stress and a pathway to obesity (e.g., Sominsky & Spencer, 2014, Frontiers in Psychology). This mechanism might be included in the discussion as a possible future direction of research.

Figure 1: Since nearly all included information can also be found in the text, this figure is not necessary.

Minor Essential Revisions

In their abstract, the authors introduce physical activity as a regulating mechanism of eating behavior – „moderator“ or „influencing factor“ would be more appropriate.

As well, please be more precise in your wording – you are interested in ACTUAL or ACUTE physical activity.

Please mention your social stressor in the abstract (e.g. „(Trier Social Stress Test for Children)“).

Abstract: „At the end of the experiment“ – experiment should be stressor.

Statistics: chronic eating behavior should be HABITUAL eating behavior.
Discussion on parenting style (Line 367): Is this true for both groups/allocations? Please state.

Next sentence (Line 369): „autonomous“ regulation + „external food cues“— What do you mean?

Discretionary Revisions

The introduction comprehensively describes the authors line of reasoning and introduces all variables of interest in a very precise way. Some comments might further strengthen this part.

Line 81: physiological mediators should be endocrine, given your examples.

Line 80-82: Please consider dividing this long sentence.

Line 83: Effect of physical activity on what? „Reduced aversive states“ do you mean in response to physical activity?

Line 85: a short definition of comfort food should be integrated.

Line 104: „To what extent ASSUMED impulsivity IN OW“.

Methods: When describing energy expenditures, providing always the description of behavior first followed by (MET) might ease the understanding of this paragraph.

**Level of interest:** An article of importance in its field

**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.