Author’s response to reviews

Title: Dietary Quality linkage to Overall Competence at School and Emotional Disturbance in Representative Taiwanese Young Adolescents: dependence on Gender, Parental Characteristics and Personal Behaviors

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Dietary Quality linkage to School Performance and Emotional Disturbance in Representative Taiwanese Young Adolescents: dependence on Gender, Parental Characteristics and Personal Behaviors

Lin-Yuan Huang; Mark L Wahlqvist; Meei-Shyuan Lee; Po-Huang Chiang

Nutrition Journal

Reviewer reports:

Reviewer #1:

1. Overall comments

This paper explores the associations between emotional disturbance, school performance and dietary intake in Taiwanese adolescents. These are important and relevant areas for research in a vulnerable life stage.

However, the paper would benefit from some revisions before it is publishable.

Main comments are that the aims of the paper are not clearly stated, and this has impacted on the order/logic of the rest of the paper, mainly the presentation of results and order of discussion points.
Response

Thank you for these suggestions. The approach we have now taken is to represent the aims, hypotheses and findings diagrammatically. This diagram is introduced in the Background, developed in the Results, Discussed and summarised in the Conclusions. It allows the enquiry about factors which might affect any association between emotional disturbance (ED) and school achievement, represented by overall competence (OC), to be presented systematically. (new figure 1)

Background

2. Overall the background could be improved by adding further detail and discussion of the current literature, and clarity of study aims. This is an important topic, however there needs to be more rationale as to why it is important.

Response:

Our principal hypothesis is that emotional disturbance (ED) during the child to adult transition is adversely associated with school performance as represented by overall competence (OC) and that dietary quality (YHEI-TW) modulates this pathway. This association may also be modulated by various environmental (home and school), personal behavioral (recreational, physical activity, substance abuse), developmental (pubertal), and nutritional (body fatness) factors. Some of these, like school environment, physical activity and body fatness have been explored in previously published work from our group [1-4], but are identified in the text and diagram where possible. As will be seen, the Background has now been expanded correspondingly.

References:


3. Line 25: The aims of the paper need to be made clearer. There seems to be quite a few aims: exploring the association between diet and emotional disturbance, the association between diet and school performance, and the association between emotional disturbance and school performance, as well as influence of puberty, parental and personal characteristics. Are there primary and secondary aims?

If the authors state these aims more clearly here the reporting of the rest of the paper should follow this logic. i.e. if the primary aim is exploring the association between emotional disturbance and school performance these results should be reported and discussed first.

Response:

Hopefully, the conceptual diagram, which captures our aims, now satisfies this point.

4. The background also needs to address and include stronger justification for why all of these associations are being studied and what studies already exist in this area.

- The link between emotional disturbance and school performance is not currently addressed

- The impacts of puberty, parental and personal behavioral characteristics are also not sufficiently addressed

Response:

Thank you. More background is now provided by way of paragraph/lines, along with references (line 7-36).

5. Line 7: Not sure 'expected' objective is the best wording to use here. Consider rephrasing, for example, desired objective?

Response:

Thank you. ‘expected’ has been changed to ‘desirable’.

“Line 7: …is a desirable research and policy objective.”
6. Several key terms in the background, and the paper as a whole, have been referred to differently and interchangeably throughout. To prevent confusion and aid readership it would be recommended to use one or the other consistently.

- Emotional disturbance and behavioural disturbance have been used interchangeably, for example Line 12 uses emotional disturbance where Line 16 uses behavioural disturbance

- School performance is also referred to as cognitive and scholastic performance, performance or overall competence

- Dietary quality and dietary status are used interchangeably

Response:

“Emotional” rather than “behavioral” performance is now consistently used.

“Scholastic” has been deleted and replaced with “school”.

“School performance” is used throughout except when reference is made to literature using alternative nomenclature.

“Dietary status” has been changed to “dietary quality”

7. Line 17: In regards to the references cited for the association between diet and cognitive and scholastic performance - there are several systematic reviews exploring the associations between diet and academic achievement in children and adolescents that are pertinent to refer to here -


Response:

Thank you.

These have been included (References: 17 and 18)
8. Line 18: Please explain the appropriateness of references 14 and 15 here?

Response:

The narrative has been expanded to be more explanatory:

“It may operate through energy regulation in conjunction with physical activity and sedentariness given that cognitive function appears amenable to measures which alter cellular energy regulation [19-22], particularly in relation to the increasing burden of the metabolic syndrome and diabetes [23, 24].” (Lines 17-21)

9. Line 19: Not sure of the relevance of metabolic syndrome and diabetes here?

Response:

See changes made to lines 17-21 as indicated in Response to ‘8’ above.

10. Line 19: Dietary quality has also been shown to play a role in emotion, mood [19] and mental performance [7].

The authors could provide further explanation of this point, how and in what direction are these factors associated?

Response:

This sentence has been elaborated to:

“Dietary quality has also been shown to play a role in emotion, mood [25] and mental performance [13] where limited food biodiversity, notably of plant foods, and degree of processing, with more ready-to-eat low nutrient density food items are the riskier consumption patterns [18, 25, 26].” (lines 21-24)

Measures

11. Line 65 & Line 74 - what is the rationale behind the relevant z-score cut points for emotional disturbance and overall competence?

Response:

The SAED is a standardized, norm-referenced scale that assists in the identification of children who qualify for the federal special education category of ED. On the SAED subscale, higher
scores are considered deviant. Compared with the Taiwanese Non-Emotional Disturbance Norms, a substantially deviant SAED score is indicated by a score that above the 91 percentile (>90th percentile), which corresponds to standardized scores ≥13 [1]. Therefore, a score of 13 was chosen as the cut point. Children with a score ≥13 were considered to have emotional disturbance. Besides, children with a score <6 (fell below the 9th percentile) were considered to have an unfavorable overall school performance.

Reference:


12. Line 80-82: were the FFQ and 24 h recalls completed by/with the adolescents? This detail needs to be added.

Response:

Yes. The FFQ and 24 h dietary recall were completed by the adolescents as indicated in the NAHSIT methodology. This is indicated in the text (lines 54-58).

13. Line 93: Are there data on mean scores on the YHEI-TW from other studies using this measure? If yes it may be useful to report this to provide context for the scores reported in this study.

Response:

Yes, and also in our prior publications (see references 13, 35, 36)

14. Line 96: 'Covariates were collected from questionnaires'. Were questionnaires completed by the adolescents or others? This detail needs to be added.

Response:

Yes. The survey included two components: the face-to-face interview and the health examination. Covariates were collected from questionnaires. Questionnaires for the face-to-face interview included number of family members, socio-demographics, 24-hour dietary recall, food frequency, food preference, nutritional knowledge, attitudes and practices, smoking, level of physical activity, and pubertal development.

This has been added in the text (lines 54-58 and 116-117)
15. Line 102: What reference ranges were used for determining BMI classifications (i.e. underweight, normal weight, overweight, obese)? Detail of cut points and a reference should be provided.

Response:

The Childhood Obesity Expert Panel of the Taiwanese Department of Health has defined ‘obesity’ and ‘overweight’ (≥95th and ≥85th percentile value of body mass index (BMI), respectively) using age- and gender-specificity percentiles for BMI; these criteria were applied in the present study. Thus, within each gender, year of age from 2 to 18 had its own cut-off point for overweight and for obesity. This information has been inserted in lines 124-128.

Reference:


16. Line 101: Are the physical activity ranges based on Taiwanese recommendations? Explanation and a reference should also be provided here.

Response:

Three or more times per week for at least 30 min activity of moderate intensity per session which is national activity recommendation in Taiwan. We, therefore, used 30min/day as the cut point. This has been inserted in lines 123, along with the reference below:


Statistical analysis

17. This section does not provide enough detail of the statistical methods used.

Line 106: The variables compared using t-tests and chi squared tests should be specified.

Response:

The chi-square tests were used to assess the significant difference between categorical variables and OC. The t tests were used to assess the means of continuous variables.

In lines 131-134, this now replaces:
“Chi-square tests were used to assess the significant differences between categorical variables. We used t tests to assess differences in continuous variables. Categorical variables are presented as percentages (%), and continuous variables are presented as means (standard errors, SE).”

18. Line 107: A sentence should be added to describe how variables are reported - this has been included as a footnote to table 1 but should also be briefly explained here.

The outcomes of dietary quality, emotional disturbance and overall competence have not been referred to, please provide an explanation of how these were treated in the multiple linear regression models?

Response:

Categorical variables are presented as percentage (%), and continuous variables are presented as mean (standard errors, SE). This has been inserted in lines 133-134.

Full models are considered including all relevant variables. The regression coefficients provided are from these models. This is now stated in lines 134-141.

19. Line 122: Please provide a brief explanation of what SUDAAN is and how it was used in analyses.

Response:

The design of the NAHSIT survey was to obtain a representative sample of Taiwanese junior high school students and, at the same time, to have sufficient power to perform sub-group analyses of minority groups such as the indigenous population. To this end, minorities were over-sampled. In turn, in analyses, adjustments were required to re-establish representativeness. Data were analyzed using SAS 9.3 for Windows, weighted by SUDAAN. SUDAAN also adjusted for design effect with cluster sampling to obtain unbiased estimates of the standard errors. (lines 143-144)

Results

20. The results section would be easier to read with sub headings - these should relate to the different aims/analyses conducted and follow the order of study aims as per previous comments.

In addition only key results should be presented in the text, as there is quite a bit of repetition of what is in the tables.
Response:

Sub-headings have been added.

We have reviewed the text in relation to the tables.

21. Line 115: it would be good to see a few key descriptive statistics of the overall sample reported in the opening paragraph of the results section, to provide a quick overview of the sample, e.g. mean age and gender split, as well as for primary outcomes, e.g. mean emotional disturbance, overall competence and dietary quality scores.

Response:

Thanks. We consider that the text is now sufficient as modified.

22. Line 132: Results are reported here for HDL cholesterol, however this measure hasn't been mentioned previously in the paper. All measures included in analyses should be mentioned in the methods section.

Response:

Lipid, including HDL cholesterol, methodology is covered under ‘covariates’, by reference to laboratory methodology. We do not consider that more detail is required for these commonly performed assays. (lines 54-58 and 116-117)

Discussion

23. It would be recommended to add an opening paragraph to briefly reiterate the study aims and summarise the main findings in relation to the aims.

The sub headings in the discussion should be consistent with and follow the same order as the study aims, and the presentation of results.

The sub headings could also be more descriptive than current - e.g. Line 210: As opposed to Personal behaviours, the sub heading could be something like Associations between personal behaviours with school performance and emotional disturbance

It would also be recommended to add a paragraph on the implications of the study findings e.g. what does this paper add to the evidence base? What are the implications for health promotion practitioners or others working with adolescents in the school setting?
Response:

The opening paragraph now makes use of the schematic diagram with study variables and a focus on the key hypothesis. This summarises the principal findings and their relevance to overall competence at school.

24. Line 181: emotional disturbance and school performance paragraph - this area of the discussion is particularly lacking. The authors need to elaborate on the associations found and how this compares with other studies.

Response:

We consider our changes in Lines 264-279 now to be adequate.

25. Line 184: What are these factors that may be contributory to the relationship between emotional disturbance? Need to be discussed.

Response:

As studied, these are now represented in detail in Figure 1 along with Tables 3A and 3B. See also Lines 264-279.

26. Line 186: Dietary quality and pattern paragraph - As per comments made in the background section there are key literature missing -


Response:

Thank you.

These have been included (References: 17, 18, 26)
27. Line 187: The association between dietary quality and emotional disturbance is not further elaborated on? This finding also needs to be discussed.

Response:

Please refer to Figure 1 and where it is discussed in the text (lines 280-301).

Conclusions

28. Line 263: 'These associations may have both immediate and longer term health relevance.'

What are the implications of the study findings- as per comment above a paragraph on study implications would benefit the paper and an additional sentence could be added here in the conclusion on this point.

Response:

This sentence has been elaborated to:

“The most supportable link of dietary quality to OCS is apparently direct rather than through ED to which it is also related in the present study. While ED is associated with OCS, and the intake of foods of limited nutritional value is seen with ED, the linkage of ED to OCS is minimally dependent on dietary quality. For both genders, socio-economic, parental education, reading or screen viewing, and smoking were associated with ED and OCS. These factors may modulate the association between ED and OCS. Thus, the ways by which diet may affect OCS as a basis of school performance are likely to be complex.”

Tables and Figures

29. What is the justification for presenting some of the multiple linear regression results in tables and others in figures? The tables are easier to read and interpret than the figures.

Response:

Thanks for your recommendation. We prefer figures than tables. But, we can provide Tables as shown below.

Figure 4 is shown below as a Table:

Socio-demographic, behavioral, nutritional and pubertal β-coefficients from the multiple linear regressions for the Overall Competence (OC) Z-score by gender.
OC
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>YHEI-TW</td>
<td>0.05**</td>
<td>0.07***</td>
</tr>
</tbody>
</table>

Mother’s education (Ref: Low)
- High (University and above) 0.18 0.61

Household income (Ref: 0-30,000 NTD/month)
- 30,000-50,000 NTD/month 0.48 -0.11
- 50,000-80,000 NTD/month 1.02* -0.17
- > 80,000 NTD/month 0.82 0.25

Ever smoking (Ref: No)
  - Yes -1.26* -0.97*

Read during weekdays (Ref: 0-1 h/day)
- 1-3 h/day 0.50 0.53
- ≥3 h/day 0.30 1.23*

Watch TV during weekdays (Ref: 0-1 h/day)
- 1-3 h/day -0.76* -0.58
- ≥3 h/day -0.25 -0.80

Play computer games during weekdays (Ref: 0-1 h/day)
- 1-3 h/day -0.93*** -0.27
- ≥3 h/day -0.54 -0.90

Moderate or heavy physical activity (Ref: 0-30 min/day)
- ≥ 30 min/day 0.002 0.64

BMI (Ref: Normal weight)
- Underweight 0.05 -0.47
- Overweight 0.21 -0.57
- Obesity -0.80 -1.34**

Beard growth (Boys only) (Ref: Not yet)
- At first -0.23
- In progress -0.29
- Completed -0.47

Menarche (Girls only) (Ref: No)
- Yes 0.88

* p<0.05; ** p<0.01; *** p<0.001.
Tables 1 and 2

30. If characteristics are presented by overall competence categories, percentages within each overall competence category should add to 100 rather the percentages for each characteristic category adding to 100. i.e. for gender it should be the percentage of the group with z-score \( \leq 6 \) who are male/female adding to 100% and the same for the group with z-score \( >6 \).

Response:

Below we provide an alternative table to reflect this recommendation. However, the authors prefer to show the percentage distribution within each subject characteristic.

Table 1 Basic characteristics of junior high school students by Overall Competence (OC) (N=1371)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>OC(^a)</th>
<th>Z-score ( \leq 6 )</th>
<th>Z-score &gt; 6</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>1371</td>
<td>98 (5.90)</td>
<td>1273 (94.1)</td>
<td>0.130</td>
</tr>
<tr>
<td>Mean age in years (SE)</td>
<td>13.6 (0.07)</td>
<td>13.3 (0.12)</td>
<td>13.6 (0.07)</td>
<td></td>
</tr>
<tr>
<td>Gender (%)</td>
<td></td>
<td></td>
<td></td>
<td>0.042</td>
</tr>
<tr>
<td>Boys</td>
<td>51.7</td>
<td>61.3</td>
<td>51.1</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>48.3</td>
<td>38.7</td>
<td>48.9</td>
<td></td>
</tr>
<tr>
<td>Father’s ethnicity (%)</td>
<td>0.777</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fukienese</td>
<td>76.6</td>
<td>71.9</td>
<td>76.9</td>
<td></td>
</tr>
<tr>
<td>Hakka</td>
<td>13.0</td>
<td>15.8</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>Mainlander</td>
<td>8.26</td>
<td>9.17</td>
<td>8.21</td>
<td></td>
</tr>
<tr>
<td>Indigenes</td>
<td>2.18</td>
<td>3.17</td>
<td>2.11</td>
<td></td>
</tr>
<tr>
<td>Father’s educational level (%)</td>
<td>0.008</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary education and below</td>
<td>40.5</td>
<td>61.9</td>
<td>39.1</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>59.5</td>
<td>38.1</td>
<td>60.9</td>
<td></td>
</tr>
<tr>
<td>and above</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother’s educational level (%)</td>
<td>0.018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary education and below</td>
<td>33.4</td>
<td>47.5</td>
<td>32.5</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>66.6</td>
<td>52.5</td>
<td>67.5</td>
<td></td>
</tr>
<tr>
<td>and above</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household income (%)</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-30,000</td>
<td>19.3</td>
<td>34.5</td>
<td>18.4</td>
<td></td>
</tr>
<tr>
<td>NTD/month</td>
<td>30,000-</td>
<td>21.7</td>
<td>24.1</td>
<td>21.6</td>
</tr>
</tbody>
</table>
50,000 NTD/month
   50,000-  29.8  30.1  29.6
80,000 NTD/month
   > 80,000  29.2  11.2  30.3

Ever smoking (%)  0.019
   No  89.9  75.5  90.8
   Yes  10.1  24.5  9.19

Drinking alcohol (%)  0.730
   No  87.4  85.4  87.6
   Yes  12.6  14.6  12.4

Read during weekdays (%)  0.010
   0-1 (h/day)  45.6  67.2  44.3
   1-3  42.0  30.0  42.8
   ≥3  12.4  2.86  13.0

Watch TV during weekdays (%)  0.006
   0-1 (h/day)  58.1  33.9  59.7
   1-3  33.7  53.2  32.5
   ≥3  8.13  12.9  7.83

Play computer games during weekdays (%)  0.064
   0-1 (h/day)  62.3  48.8  63.2
   1-3  29.2  37.6  28.7
   ≥3  8.45  13.6  8.13

Moderate or heavy physical activity (%)  0.734
   (min/day)
   0-30  26.0  24.7  26.1
   ≥30  74.0  75.3  73.9

---
a Categorical variables are presented as percentage (%), and continuous variables are presented as mean (SE).

b Students with an OC Z-score less than or equal to 6 were considered to have unfavorable overall school performance.
<table>
<thead>
<tr>
<th>OC&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Overall</th>
<th>Z-score ≤ 6</th>
<th>Z-score &gt; 6</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SE) Dietary score (YHEI-TW)</td>
<td>48.1 (0.46)</td>
<td>44.0 (1.05)</td>
<td>48.4 (0.46)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean (SE) Food consumption (times/week)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast foods</td>
<td>1.70 (0.13)</td>
<td>2.29 (0.34)</td>
<td>1.67 (0.14)</td>
<td>0.086</td>
</tr>
<tr>
<td>Fast foods from fast food chain store</td>
<td>0.45 (0.03)</td>
<td>0.69 (0.12)</td>
<td>0.43 (0.04)</td>
<td>0.029</td>
</tr>
<tr>
<td>Fast foods from non-fast food chain store</td>
<td>1.25 (0.12)</td>
<td>1.60 (0.26)</td>
<td>1.24 (0.13)</td>
<td>0.206</td>
</tr>
<tr>
<td>Sugary beverages consumption</td>
<td>5.38 (0.17)</td>
<td>6.53 (0.56)</td>
<td>5.30 (0.19)</td>
<td>0.053</td>
</tr>
<tr>
<td>Dairy products consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>3.52 (0.19)</td>
<td>3.04 (0.74)</td>
<td>3.55 (0.19)</td>
<td>0.499</td>
</tr>
<tr>
<td>Flavored milk</td>
<td>0.74 (0.07)</td>
<td>1.43 (0.30)</td>
<td>0.68 (0.06)</td>
<td>0.015</td>
</tr>
<tr>
<td>Yoghurt</td>
<td>0.49 (0.06)</td>
<td>0.69 (0.22)</td>
<td>0.48 (0.06)</td>
<td>0.342</td>
</tr>
<tr>
<td>Cheese</td>
<td>0.89 (0.07)</td>
<td>0.60 (0.14)</td>
<td>0.90 (0.08)</td>
<td>0.035</td>
</tr>
<tr>
<td>Development of puberty</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menarche (girls only) (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>94.0</td>
<td>95.3</td>
<td>94.0</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>5.99</td>
<td>6.46</td>
<td>5.98</td>
<td></td>
</tr>
<tr>
<td>Beard growth (boys only) (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not yet</td>
<td>33.4</td>
<td>45.3</td>
<td>32.4</td>
<td></td>
</tr>
<tr>
<td>At first</td>
<td>31.4</td>
<td>36.9</td>
<td>30.9</td>
<td></td>
</tr>
<tr>
<td>In progress</td>
<td>33.8</td>
<td>13.2</td>
<td>35.4</td>
<td></td>
</tr>
<tr>
<td>Completed</td>
<td>1.48</td>
<td>4.54</td>
<td>1.23</td>
<td></td>
</tr>
<tr>
<td>Mean (SE) Body compositions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height (cm)</td>
<td>161 (0.25)</td>
<td>160 (1.20)</td>
<td>161 (0.26)</td>
<td>0.716</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>54.2 (0.49)</td>
<td>56.7 (1.70)</td>
<td>54.0 (0.51)</td>
<td>0.146</td>
</tr>
<tr>
<td>Body mass index (BMI, kg/m&lt;sup&gt;2&lt;/sup&gt;)</td>
<td>20.8 (0.15)</td>
<td>21.9 (0.48)</td>
<td>20.8 (0.16)</td>
<td>0.046</td>
</tr>
<tr>
<td>Triceps skin fold thickness (TSF, mm)</td>
<td>16.6 (0.42)</td>
<td>17.2 (0.89)</td>
<td>16.6 (0.42)</td>
<td>0.496</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Mid Arm Muscle Circumference</strong></td>
<td>20.0 (0.15)</td>
<td>21.5 (1.21)</td>
<td>19.9 (0.15)</td>
<td>0.221</td>
</tr>
<tr>
<td></td>
<td>74.2 (0.45)</td>
<td>76.2 (1.20)</td>
<td>74.1 (0.47)</td>
<td>0.114</td>
</tr>
<tr>
<td><strong>Waist Circumference</strong></td>
<td>74.2 (0.45)</td>
<td>76.2 (1.20)</td>
<td>74.1 (0.47)</td>
<td>0.114</td>
</tr>
<tr>
<td><strong>Mean (SE) Blood pressure (mmHg)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure (SBP)</td>
<td>105 (0.54)</td>
<td>106 (1.54)</td>
<td>105 (0.54)</td>
<td>0.520</td>
</tr>
<tr>
<td>Diastolic blood pressure (DBP)</td>
<td>60.5 (0.68)</td>
<td>61.5 (1.15)</td>
<td>60.4 (0.68)</td>
<td>0.301</td>
</tr>
<tr>
<td><strong>Mean (SE) Plasma metabolic analytes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fasting glucose (mg/dL)</td>
<td>95.4 (0.42)</td>
<td>95.2 (0.94)</td>
<td>95.4 (0.44)</td>
<td>0.835</td>
</tr>
<tr>
<td>Total cholesterol (mg/dL)</td>
<td>158 (1.40)</td>
<td>155 (3.32)</td>
<td>159 (1.38)</td>
<td>0.191</td>
</tr>
<tr>
<td>Triglycerides (mg/dL)</td>
<td>71.4 (1.76)</td>
<td>78.3 (5.48)</td>
<td>71.0 (1.67)</td>
<td>0.150</td>
</tr>
<tr>
<td>HDL cholesterol (mg/dL)</td>
<td>55.3 (0.66)</td>
<td>50.8 (1.86)</td>
<td>55.6 (0.68)</td>
<td>0.022</td>
</tr>
<tr>
<td>LDL cholesterol (mg/dL)</td>
<td>88.8 (1.19)</td>
<td>87.9 (3.18)</td>
<td>88.8 (1.18)</td>
<td>0.761</td>
</tr>
<tr>
<td>Uric acid (mg/dL)</td>
<td>5.76 (0.06)</td>
<td>6.15 (0.22)</td>
<td>5.74 (0.06)</td>
<td>0.063</td>
</tr>
</tbody>
</table>

a Students with an OC Z-score less than or equal to 6 were considered to have unfavorable overall school performance.

YHEI-TW, Youth Healthy Eating Index-Taiwan.

31. Consider adding a total or all participants column as well to both tables for ease of comparison.

Response:

Thanks. All participants are now shown in the columns added to Tables 1 and 2.
Table 2

32. Results are reported here for a number of variables (height, weight, triceps skin fold thickness, mid arm muscle circumference, waist circumference, blood pressure and plasma metabolic analytes) that have not been mentioned in the body of the paper. These variables and the methods of their measurement should be added to the methods section of the paper.

Response:

These variables are covered in Methodology under ‘covariates’, by reference to ‘laboratory’ methodology. We do not consider that more detail is required for these commonly performed assays. (lines 54-58 and 116-117)

Reviewer# 2

Abstract:

33. the background sentence included does not speak to the paper... this should be more reflective and introduce the paper / existing info, why this study is needed.

'have been' should be were its not clear what competence is referring to in the abstract this needs to be re written so its in context for the paper

Response:

Thank you.

This has been revised accordingly:

Background: Child school performance during puberty may be at increased risk through emotional disturbance. It is hypothesized that this may mitigated by dietary quality.

34. The title which currently includes ‘school performance’ does not accurately reflect the current paper which is about overall competence

Response:

We have modified the outcome measure nomenclature to be closer to that intended by SAED methodology. “school performance” is now referred to as “Overall Competence at School” (OCS)
The Title now reads:

“Dietary Quality linkage to Overall Competence at School and Emotional Disturbance in Representative Taiwanese Young Adolescents: dependence on Gender, Parental Characteristics and Personal Behaviors”

Introduction

35. lines 6/7 'optimising school performance' who says this researchers? presumable not teenagers, references needed

Response:

This has been changed to:

“Minimizing emotional disturbance (ED) [2, 3] and optimizing school performance [4] at this time is a desirable research and policy objective.” (lines 5-7)

36. Parents remain a key player...this section needs to better reflect adolescence where it would be more likely that children in this age group are starting to reflect more independence in their food choices and parents play less of a role?

Key references have been missed in this area including key reviews and papers by Goldman et al on diet and academic achievement

Response:

This section has been modified to read:

Parents have the potential to affect both ED and OC in many ways which reflect their continuing, if declining, role as providers of care, support and resources during their offspring’s adolescence [27]. This is likely to include pathways like diet [26, 28]. (lines 28-30)

37. line 38 are these interviews with students? please clarify?

Response:

Yes. (Lines 54-58)
38. The section on OC needs a lot more detail given this is a major outcome of the paper, are the components one question each or? particularly the part about academic achievement as this is currently in the title, were there any student grades reported or? is this OC a separate questionnaire? what’s favourable what’s not ? who determines this?

Response:

The references to the methodological detail for OC are provided and given in brief in the Methods section as follows:

“The questions for OC included (1) intellectual functioning, (2) family support for school, (3) overall level of academic functioning, (4) motivation for schoolwork, (5) level of peer support, (6) personal hygiene (e.g. grooming, dressing), and (7) interest in activities outside of school. Students with an OC Z-score less than or equal to 6 (fell below the 9th percentile) were considered to have an unfavorable overall school performance” (lines 89-96)

By’ favorable’ or ‘unfavorable’ we simply mean more or less good scores, respectively, as defined.

39. approximate the income in methods to US dollars as you have done in discussion line 99-102 is this the parents or the child’s? this also needs to be clarified at lines 122 onwards

Response:

The income is ‘household income’ which is unlikely to include that of the child or adolescent. (0-30,000, 30,000-50,000, 50,000-80,000, > 80,000 NTD/month). At present exchange rates of USD1= NTD30, these ranges would be 0-1000,1000-1,667, 1,667-2,667, >2,667. The exchange rates and amounts are now indicated by way of foot notes to the relevant Tables and Figures.

40. For diet quality the scores need to be put in context for the reader, what’s favorable what’s not?

Response:

Previous studies in Taiwan show a dose-response for food diversity scores and health outcomes in adults, but comparable data are not available for children [49]. There is a gradient across the range, so that the upper quartile probably constitutes a desirable goal for food diversity at all ages. UN system data for dietary diversity and household food security support this position [50, 51].

This point is now made in the Discussion (Lines 297-301)
41. line 141 - school performance it’s not clear how this has been measured in this study and this is utmost important given the title and what the authors are reporting

Overall the discussion is not well written and for this journal subheadings should not be included in the discussion

Response:

See above for response to the question about ‘school performance’ now changed to ‘Overall Competence at School’ (OCS).

In regard to subheadings in the Discussion, this is our preference and Reviewer 1 encourages their use. However, the authors accept Journal policy if that means sub-heading removal.

The Discussion has been significantly modified and references added as suggested.