NIEjr04A:

Effects of Music on Secondary School Students’ Experience and Performance During 800m Running

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Methodist Girls’ School
Presentation Outline

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1. Background Information
Inactivity

- very common among Singaporean youths
- national guidelines not met
- health complications
- obesity rates increasing
Wen-Yi Lee, "Adults Are Getting Fitter, but Children Are Increasingly Overweight: MOH Figures."
Linette Lai, "Singapore Risks Hitting Obesity Rates of 15% in Seven Years."
NAPFA

improve test experience

→ positive mindset

→ active lifestyle
Music and Exercise

Positive Effect

- Reduced rate of perceived exertion (RPE)

- Increased dissociation
  - Silva A.C. et al. (2016)
  - Terry, Peter C., & C.I. Karageorghis, “Music in Sport and Exercise” (2011)
Music and Exercise

Negative or No Effect

- **No effect / higher RPE**

- **Increased fatigue**

- **No effect on heart rate**
  - S. E. Schwartz, B. Fernhall, and S. Plowman (1990)
  - G. Tenenbaum et al. (2004)
Synchronous Music

the beats synchronise with participants’ repetitive running and movement patterns
Asynchronous Music
the beats do not synchronise with participants’ repetitive running and movement patterns
Music and Exercise: Synchronous Music

- Increased time to exhaustion

- Improved mood
  - P.C. Terry et al. (2012)

- Reduced RPE
  - P. C. Terry et al. (2012)
Music and Exercise

Asynchronous Music

- Reduced RPE
  - Brenda L. Copeland, and Brooke Franks, “Effects of Types and Intensities of Background Music on Treadmill Endurance.” (1991)

- Reduced heart rate

- Increased time to exhaustion
  - Brenda L. Copeland, and Brooke Franks (1991)
2. Aims and Objectives
To explore the effects of music on secondary school students’ experience and performance during 800m running.
Objectives

- **Review literature** concerning physical and psychological effect of music;
- **Investigate** how music affects attentional focus and enjoyment levels of runners;
- **Compare results** between various subject groups; and
- **Identify improvements** required to facilitate optimal running experience for secondary school students
Hypothesis

I
Synchronous music could induce more positive experiences and increase efficiency in running.

II
Female adolescents could gain tremendously from music application to enhance their exercise experience and performance.
3. Methodology
Participants

- 26 students from 3 schools
- physically healthy
- volunteers
- withdrawal permitted at any time
Process

Familiarisation session  Experiment  Analysis of data
Familiarisation Session

a. Attentional Focusing Questionnaire (AFQ)
Internal consistency measured with Cronbach alpha coefficients reported to be acceptable. (association – $\alpha = .84$; dissociation – $\alpha = .68$; and distress – $\alpha = .80$).

b. Brunel Music Rating Inventory-3 (BMRI-3)
Used to rate motivational qualities of 30 songs. Reliable instrument for exercise settings.
Experiment

- Physical Activity Readiness Questionnaire
- 2 minute warm-up
- 5 minute rest
- 3 sets of 800m run with 10 minute rest
# Measurements

<table>
<thead>
<tr>
<th>Variable</th>
<th>Instrument Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate</td>
<td>Heart Rate Monitor</td>
</tr>
<tr>
<td>Attentional Focus</td>
<td>Attentional Focus Scale</td>
</tr>
<tr>
<td>Perceived Exertion</td>
<td>Ratings of Perceived Exertion Scale</td>
</tr>
<tr>
<td>Enjoyment Level</td>
<td>Intrinsic Motivation Inventory</td>
</tr>
</tbody>
</table>
4. Results and Discussion
Table 1: Attentional Focus Means by Music Condition and Gender

<table>
<thead>
<tr>
<th>Music Condition</th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>No Music</td>
<td>4.20</td>
<td>2.37</td>
<td>4.73</td>
<td>1.85</td>
<td>4.42</td>
<td>2.14</td>
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<tr>
<td>Asynchronous Music</td>
<td>6.00</td>
<td>2.14</td>
<td>5.45</td>
<td>2.38</td>
<td>5.77</td>
<td>2.22</td>
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<tr>
<td>Synchronous Music</td>
<td>5.73</td>
<td>2.40</td>
<td>5.36</td>
<td>2.01</td>
<td>5.58</td>
<td>2.21</td>
</tr>
</tbody>
</table>

Note. Overall students $N = 26$, females $n = 15$, males $n = 11$
Table 2: Enjoyment Means by Music Condition and Gender

<table>
<thead>
<tr>
<th>Music Condition</th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
<th>Total</th>
<th></th>
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<td>SD</td>
<td>M</td>
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<tr>
<td>No Music</td>
<td>2.93</td>
<td>1.09</td>
<td>3.31</td>
<td>1.49</td>
<td>3.09</td>
<td>1.26</td>
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<tr>
<td>Asynchronous Music</td>
<td>4.26</td>
<td>1.35</td>
<td>4.19</td>
<td>1.35</td>
<td>4.23</td>
<td>1.33</td>
</tr>
<tr>
<td>Synchronous Music</td>
<td>3.84</td>
<td>1.14</td>
<td>4.47</td>
<td>1.53</td>
<td>4.10</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Note. Overall students N = 26, females n = 15, males n = 11
Table 3: Correlations between outcome variables in No Music condition

<table>
<thead>
<tr>
<th></th>
<th>No Music HR</th>
<th>No Music AFS</th>
<th>No Music RPE</th>
<th>No Music Enjoyment</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Music HR</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.064</td>
<td>.056</td>
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<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>-</td>
<td>.755</td>
<td>.787</td>
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<tr>
<td>No Music AFS</td>
<td>Pearson Correlation</td>
<td>-</td>
<td>1</td>
<td>-.115</td>
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<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>-</td>
<td>-</td>
<td>.574</td>
</tr>
<tr>
<td>No Music RPE</td>
<td>Pearson Correlation</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No Music Enjoyment</td>
<td>Pearson Correlation</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 (2-tailed)

Note. Overall students N = 26
Table 4: Correlations between outcome variables in Synchronous Music condition

<table>
<thead>
<tr>
<th>Synchronous HR</th>
<th>Pearson Correlation</th>
<th>Synchronous AFS</th>
<th>Synchronou s RPE</th>
<th>Synchronou s Enjoyment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronous HR</td>
<td>1</td>
<td>-.145</td>
<td>.494*</td>
<td>-.084</td>
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<tr>
<td>Sig. (2-tailed)</td>
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<td>.479</td>
<td>.010</td>
<td>.684</td>
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<td>Synchronous AFS</td>
<td>Pearson Correlation</td>
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<td>1</td>
<td>-.688**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
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<td>-</td>
<td>.000</td>
<td>.012</td>
</tr>
<tr>
<td>Synchronous RPE</td>
<td>Pearson Correlation</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.269</td>
</tr>
<tr>
<td>Synchronous Enjoyment</td>
<td>Pearson Correlation</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 (2-tailed)

Note. Overall students N = 26
Table 5: Correlations between outcome variables in Asynchronous Music condition

<table>
<thead>
<tr>
<th></th>
<th>Asynchronous HR</th>
<th>Asynchronous AFS</th>
<th>Asynchronous RPE</th>
<th>Asynchronous Enjoyment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asynchronous HR</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>-.001</td>
<td>.214</td>
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<tr>
<td></td>
<td>Sig. (2-tailed)</td>
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<td>.995</td>
<td>.294</td>
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<tr>
<td>Asynchronous AFS</td>
<td>Pearson Correlation</td>
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<td>1</td>
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<td>Sig. (2-tailed)</td>
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<tr>
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<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>-</td>
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</tr>
<tr>
<td>Asynchronous Enjoyment</td>
<td>Pearson Correlation</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 (2-tailed)

Note. Overall students N = 26
5. Conclusion
5.1

Results did not fully support hypothesis that synchronous music would induce more positive experiences and increase efficiency in running.

No significant difference in attentional focus ratings across music conditions.
5.2

Results indicate higher average enjoyment levels in the presence of music.

Highest average enjoyment level for Asynchronous Music condition, lowest for No Music condition.
Results did not support hypothesis that female adolescents can gain tremendously from music application to enhance exercise experience and performance. Interaction effect between music conditions and gender not significant.
A person’s response to music is highly individual.

Each person needs to find their own preference and optimal condition for themselves.
School-based intervention to permit the use of music during physical activity. Improve NAPFA test experience to cultivate positive mindset towards physical activity and encourage active lifestyle.
6. Limitations
6.1 Participants may have exercised harder in the presence of music, causing them to exert themselves and associate more, leading to a decrease in AFS ratings.
6.2

Participants who are physically not so fit may have gotten more tired with each run, leading to an decrease in AFS ratings in the later runs.
6.3

Participants may have been distracted by external stimuli as the experiment was conducted in a communal area, thus increasing AFS ratings.
7. 
Acknowledgements
Nanyang Technological University

Source: http://www.ntu.edu.sg/home/prem/images/ntu.png
Assistant Professor
Masato Kawabata

Source: http://merl.nie.edu.sg/researcherslocal.html
Edited by Lauren and Tricia
Ms Bern Bree Ashley
NTU
Mr Lim Lee (Teacher Coordinator)

Source: https://www.mgs.moe.edu.sg/secondary/staff/teachers/secondary-four
Participants
Thank You
8. References


Q & A