The syncopation-groove relationship is not experience-dependent: Evidence from children and dancers

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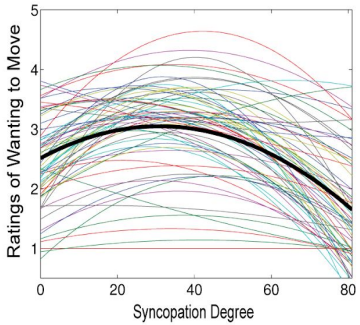
Background

Some, but not too much syncopation is optimal for groove (in adults)



Witek, 2014

Developmental:
Is the syncopation-groove relationship different in children?
- Children may prefer simpler rhythms for dancing OR have the same associations as adults

Does the relationship change with development?
- Stable or establish with age

Expertise:
Is the syncopation-groove relationship different in expert dancers and non-dancers?
- Extensive experience may increase groove and/or peak complexity for groove

Does the syncopation-groove relationship depend on dance style?
- Training in distinct styles may cause syncopation-groove differences in due to style-specific extent of syncopation in accompanying music, rhythmicity of movements, or extent of synchronization to music.

Developmental methods

3-6 year olds (n = 127)
Adults (n = 49; perceptual task only)

Each participant assigned to one of three syncopation-comparison conditions:
- Low vs. Medium (LvM)
- Medium vs. High (MvH)
- Low vs. High (LvH)

Stimuli
- 2-bar drum breaks (Witek et al. 2014)
- 4 each of Low, Medium, High Syncopation
- Controlled for event density, tempo

Lookit platform (record video of participation at home)

Tasks
- Perceptual 2AFC: "Which is better for dancing?"
  - Short rhythms (4 s)
  - DV: proportion of trials
- Behavioural: freely dancing
  - Long rhythms (16s)
  - DV: mean movement ratings (2 raters)

Screenshots of the perceptual task interface (left) and from video of the behaviour task (right).

Data Analyses
- Test difference scores between syncopation conditions for perceptual response proportions and mean movement ratings

Expertise methods

Adults, expert dancers (n = 66) & undergraduate students (n = 126)

Online rating task

- 50 drum breaks (MIDI) ranging from no syncopation to high syncopation (Witek, 2014)
- Dancers: "How much does this pattern make you want to...
  - move in a general way?"
  - dance in the style of your expertise?"
- Non-dancers: "How much does this pattern
  - *make you want to move*?"
  - *make you feel pleasure?"*

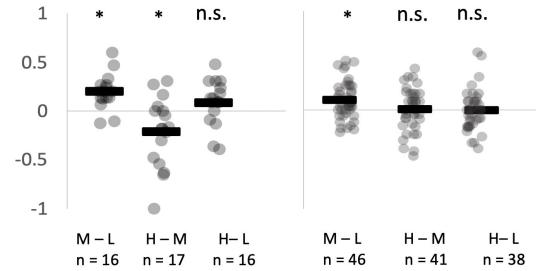
Questionnaires:
- Ten-item Personality Inventory
- Goldsmiths Dance Sophistication Index (GDSI)
  - Passive Dance
  - Active Dance
    - Body Awareness
    - Social Dancing
    - Urge to Dance
    - Dance Training

Data Analyses
- Quadratic fits for participant ratings x syncopation
- Compare mean ratings, optimal syncopation (peak), and r^2
- Compare dancers and non-dancers
- Compare ballet and hip-hop dancers

Developmental Results

Perceptual 2AFC task: which is better for dancing?

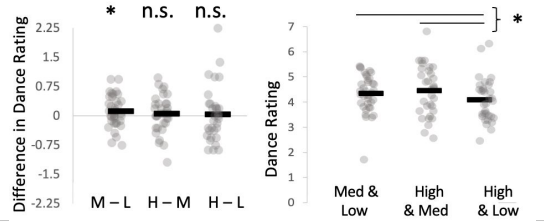
Adults (n = 49):



3-6 year olds (n =125):

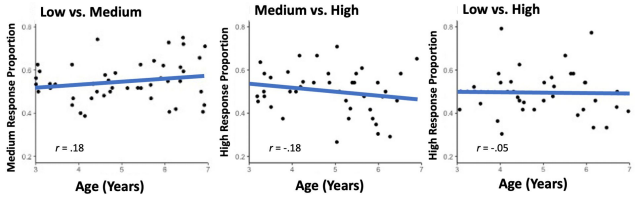
- Children and adults associate Medium > Low syncopation with groove
- Adults but *not* children associate M > H
- Children dance more for M > L
- Children in the M v L and M v H conditions dance more overall than those in the L v H condition

Behaviour: Freely dancing



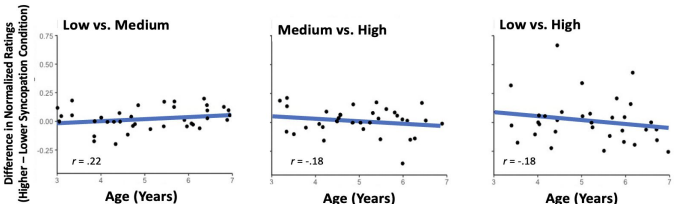
Developmental Summary:

- The syncopation-groove relationship is similar for children and adults:
- Medium > Low syncopation, no difference between Low and High syncopation in both tasks
- Children danced more when medium syncopation rhythms were part of the overall task context
- Older children tend to choose Medium over Low and High syncopation



Perceptual correlations with age:

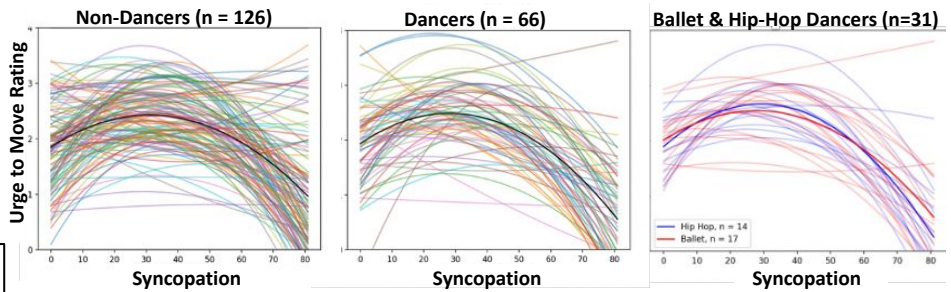
- M > L: r = 0.18
- H > M: r = -0.18
- H > L: r = -0.05
- p (Stouffer) < .05



Behavioural correlations with age:

- M > L: r = 0.22
- H > M: r = -0.18
- H > L: r = -0.18
- p (Stouffer) < .05

Expertise Results



- Substantial evidence that mean groove ratings and optimal (peak) syncopation are equivalent in dancers and non-dancers (Bayes Factors = 6.71, 9.48) but r^2 is higher for dancers than non-dancers (p < .01)
- No evidence of associations between the syncopation-groove relationship and dance sophistication (GDSI subscales) or personality measures (pFDR > .05) except between r^2 and Dance Training, Active Dance and Urge to Dance subscales (pFDR < .05)
- Substantial evidence that two highly contrasting dance styles (hip hop and ballet) show the same syncopation-groove relationships (Bayes Factors 3.28 - 5.15)

Expertise Summary

- The syncopation-groove relationship appears to be equivalent in dancers and non-dancers, besides being more robust (higher r^2) in dancers.
- The syncopation-groove relationship is not associated with dance sophistication or personality.

Overall Summary:

- Considering evidence from children (3-6 years old) and experts (dancers), **the quadratic relationship between syncopation-groove seems to be fundamental and not experience dependent.**
- Experience (age or training) appears to solidify the relationship.