Results - Cluster Analyses

Two k-means cluster analyses were conducted: one used FA and RD from left SLF, the other used FA and RD from right SLF. In left SLF, Cluster 1 showed increased FA and decreased RD, and fewer classroom behavior problems than Cluster 2. In right SLF, Cluster 1 showed increased FA and decreased RD and improved CAS Attention scores.

**K-means Cluster Analysis 1: Left SLF**

**FA vs. RD**

**Cluster 1**

**Cluster 2**

**Difference in left SLF FA (post – pre)**

**Difference in right SLF RD (post – pre)**

**K-means Cluster Analysis 2: Right SLF**

**FA vs. RD**

**Cluster 1**

**Cluster 2**

**Difference in right SLF RD (post – pre)**

Conclusions

- We found a dose-response effect of exercise *per se*, apart from other program elements.
- Attendance at an after-school exercise intervention improved white matter integrity; attendance at a sedentary after-school program did not.
- Heart rate and dose of exercise (heart rate x attendance) also correlated with improved WMI (increased FA, reduced RD, \(|r| = .71 - .93\)).
- Changes were found in FA and RD but not in other measures (axial diffusivity and mean diffusivity), suggesting that changes were more likely due to increased myelination than other microstructural changes.
- Overall, improved WMI was associated with improved attention and teacher ratings of cognitive control in the classroom.
- Improved WMI may underlie exercise-induced differences in cognitive control and brain activation that may affect classroom behavior.
- This work is in press at *Developmental Neuroscience*.

Acknowledgments & Contact information

- National Institutes of Health (R01 HL087923 & R01 DK070922)
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