Structured Sports Participation, Executive Function, and Early Math in Preschoolers

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Background
- Physical activity is linked to cognitive outcomes (e.g., academic skills and executive function [EF]) in grade school, middle childhood, and adolescence (Davis et al., 2011; Dyer et al., 2001).
- Fewer studies have explored these associations in preschool children, and evidence is mixed.
- In one study, moderate to vigorous physical activity was negatively related to EF (Wilkoughby et al., 2018). In another study, physical activity was positively associated with EF and math (Becker et al., 2014).
- One form of physical activity that may be positively associated with these outcomes is structured sport participation.
- There is evidence that sport participation is associated with academic performance in middle-childhood, adolescence, and adulthood (Becker et al., 2018; Gordon-Larsen et al., 2006).
- To date, there have been no studies examining relations among sport participation, EF, and math in preschool.

Research Question
Is structured sport participation related to early EF and math skills?

Participants
- Participants included 87 children (52% female) and one of their parents.
- On average, children were nearly 5 years old at the beginning of the study.
- Average monthly family income was $1,699.

Procedures
- Data for this study came from a larger evaluation of one state’s public preschool program.
- Data were collected in the fall and spring of the preschool year.
- Parents reported on demographic/family data and sport participation.
- Children participated in a direct assessments of EF and math.

Structured Sport Participation: “During the past year, did your child participate in any children’s sports or sports teams?” Yes = 1; No = 0

Executive Function Tasks:
- Applied Problems subtest Woodcock Johnson Tests IV (Shank et al., 2014)
- Mathematical Language Test (MALT; Purpura & Reid, 2015)
- Preschool Early Numeracy Skills Screener-Brief (PENS-4; Purpura et al., 2015)

Measures

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Note: *Child age measured in months; Parent education = 1 high school diploma or less; Parent education 2 = some college/trade school; Parent Education 3 = Associate’s/bachelor’s/master’s/doctoral/postgraduate degree

Results

Significant Findings:
- Analyses revealed that structured sport participation was associated with EF (β = .37, p = .027), but was not associated with math (β = .12, p = .220).
- This study contributes to emerging literature examining associations between physical activity, sport participation, and early learning skills by suggesting there may be an association between sport participation and EF.
- Sport participation may be more closely related to EF than math given the explicit use of EF components in sport (e.g., remembering rules, transitioning between changing contexts, goal-oriented tasks, inhibiting actions that are not goal-oriented).
- More research exploring the potential influences on school readiness are necessary in order to create interventions that bolster these abilities early in childhood.

References

Future Research
- This research could set the stage for the development of effective community and family-based interventions that target improving EF through sport participation.
- Researchers need to continue efforts to explore the extent to which early sport participation may impact EF, math skills, and other developmental outcomes in early childhood.