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Biopsychosocial Correlates of Sleep Hygiene in Preschoolers

Rebecca Messnick, Lauren Evert, Cameron Everse, Micah Manthei, Abby Rakus
(Hope College, Dr. Andrew Gall, Dr. Sonja Trent-Brown, Faculty Sponsors)



Background

- Most preschool aged children are not getting enough sleep. Healthy sleep patterns are crucial at this age in order to promote health, education, brain development, physical growth, and quality of life.(1,2,3)
- It is reported that preschool aged children need between 11-12 hours of sleep per night. (4,5)
- Past results have shown that children who are more active will experience better sleep quality than children who show less activity.
- Good sleep hygiene was defined as consistent bedtimes and morning rising times, and avoiding large meals, caffeine, and light sources (e.g., night lights, smart phones, iPads, computers) before bedtime. (2)
- We hypothesize that more physically active children will experience better sleep quality, a later bedtime, and an earlier wake time than children who are less physically active.
- We also hypothesize that children who are most active in the evening will exhibit better sleep quality than children who are most active in the morning or afternoon.
- We expect that better sleep quality will be associated with higher scores on cognitive and socioemotional measures.

Methods

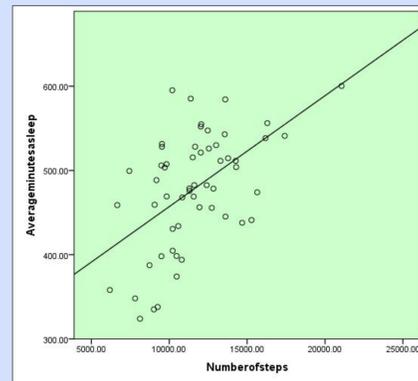
Participants

- 82 preschoolers ages 3-5 selected from FUN Preschool and Maplewood Preschool
- 44 girls and 38 boys; 6 unspecified
- Parents/Guardians of the Children

Materials and Procedure

- Fitbits® worn on the ankle for 12 weeks
- Activity patterns (day and night)
- Daily Record of sleep quantity and quality
- Children's Sleep Hygiene Scale (CSHS)
- Narrative Memory Test and Memory for Designs
- Missing Scan Test
- Demographic Items
- Sleep Journals

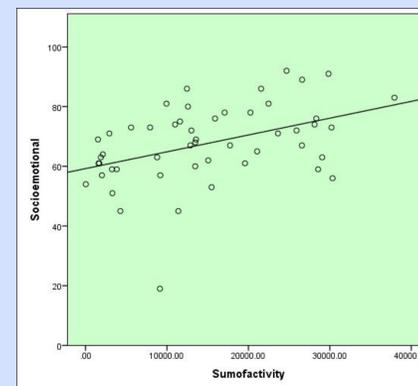
Results



This shows a positive correlation between a high amount of physical activity (number of steps) and minutes of sleep, $r(54) = .528, p < .001$.

| | CSHS Child | CSHS Parent | Average Bedtime | SD Bedtime | Average Wake-Time | SD Wake-Time | Total Amount of Sleep |
|-----------------------|------------|-------------|-----------------|------------|-------------------|--------------|-----------------------|
| CSHS Child | -- | | | | | | |
| CSHS Parent | .011 | -- | | | | | |
| Average Bedtime | .130 | -.316* | -- | | | | |
| SD Bedtime | -.281 | -.339* | .194 | -- | | | |
| Average Wake-Time | .219 | -.343* | .628** | -.063 | -- | | |
| SD Wake-Time | -.346* | -.130 | .065 | .272 | -.222 | -- | |
| Total Amount of Sleep | .154 | -.078 | -.366** | -.351* | .258 | -.125 | -- |

These results show that better sleep hygiene is correlated with better sleep habits, including earlier bedtimes, earlier wake times, and more consistent sleep-wake patterns. A higher child and parent CSHS were associated with a lower standard deviation, meaning their sleep patterns were more consistent.



This showed a positive correlation between socioemotional scores and total activity. $r(51) = .427, p < .002$

| | Narrative Memory Free Recall | Narrative Memory Free Cued | Narrative Memory Recognition | Missing Scan Test | Average time Fairly Active | CSHS Child | CSHS Parent |
|------------------------------|------------------------------|----------------------------|------------------------------|-------------------|----------------------------|------------|-------------|
| Narrative Memory Free Recall | -- | | | | | | |
| Narrative Memory Free Cued | .863** | -- | | | | | |
| Narrative Memory Recognition | .332** | .492** | -- | | | | |
| Missing Scan Test | .458** | .450** | .460** | -- | | | |
| Average time Fairly Active | .219 | .218 | .121 | .316* | -- | | |
| CSHS Child | .236* | .329** | .261* | .193 | .171 | -- | |
| CSHS Parent | -.158 | -.191 | -.063 | -.036 | .014 | .011 | -- |

A higher narrative memory score is positively correlated with a higher child CSHS. We also found that children that were fairly active showed better working memory capacity.

Conclusions

- A positive correlation was found between high amounts of physical activity, defined as number of steps, and average minutes of sleep.
- The more awareness the child and parent had of practicing good sleep hygiene, the more likely it would be for the child to practice better sleep habit, which included earlier bedtimes and earlier wake times.
- A positive correlation was also found between children who were fairly active and their working memory capacity. These children were utilizing their working memory in order to explore and experience their settings, such as playing with different toys or navigating the playground at school.
- Of the 82 preschoolers tested, only one slept close to the recommended 11-12 hours per night, while all others demonstrated poor sleep duration averages.

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