

Learning from Apps and Objects: The Human Touch

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Background

- Touchscreen use among young children is almost universal¹ and educational applications (apps) are very popular.²
- Little research has examined how learning from apps and physical materials differs, or has manipulated the social context of app learning.
- In three studies, we examined children's geography learning about the 9 states and territories of Australia from either a Montessori puzzle or a Montessori app.

Research Questions

- Do children learn more from a lesson with a physical puzzle or from an app by itself?
- How does use of the material relate to learning?
- Does social interaction impact learning from an app?

Method

Participants:

Study 1: 32 five-year-olds ($M = 65.1$ months; 16 female)
Study 2: 32 five- & six-year-olds ($M = 66.3$ months; 14 female)
Study 3: 32 five- & six-year-olds ($M = 66.2$ months; 16 female)

General Procedure:

Random assignment to puzzle or app condition.

- In puzzle condition, experimenter led Montessori-style geography lesson for 10 min, then child had 10 min free play.
- In app condition, child was shown app on an iPad then had 20 min free play alone.

Children tested on recognition ("Which one is South Australia?") and recall ("What is this?") of each state.



Study 1 Results

- Children in the puzzle condition learned more Australian states ($M = 9.28$, $SD = 3.02$, range = 5-16) than children in the app condition ($M = 5.22$, $SD = 4.48$, range = 0-18): $t(30) = 3.01$, $p = .005$, Cohen's $d = 1.06$

Study 2

- In Study 1, children learned more from a lesson with a puzzle than from using an app alone in a controlled laboratory setting. How does this translate into real world?

Study 2 Method

- Children were randomly assigned to puzzle or app condition, underwent the same procedure as Study 1, and were tested on recognition and recall (Time 1).
- Then, children took home the material (puzzle or app on iPad) for one week.
- Parents recorded time spent with the material and level of engagement (1 = unengaged, 5 = very engaged).
- Children returned after one week for 2nd posttest (Time 2).

Study 2 Results

Learning

- **Time 1:** As in Study 1, children in the puzzle condition learned more Australian states ($M = 10.63$, $SD = 4.52$, range = 4.5-18) than children in the app condition ($M = 6.06$, $SD = 4.12$, range = 1-16): $t(30) = 2.98$, $p = .006$, $d = 1.06$
- **Time 2:** No difference between puzzle ($M = 13.71$, $SD = 3.90$, range = 6.5-18) & app ($M = 11.38$, $SD = 5.32$, range = 0-18) conditions after one week: $t(30) = 1.42$, $p = .165$, $d = 0.50$. although when examined by usage time, puzzle was more efficient.

Use, Engagement, and Relation to Learning

- Children used the app more than the puzzle over the week.
App = 79 min Puzzle = 33 min
- Children were equally engaged with puzzle and app.
- Children who used the puzzle more learned more ($r = .43$)
- Children who used the app showed no relation between usage time and learning.

Study 3

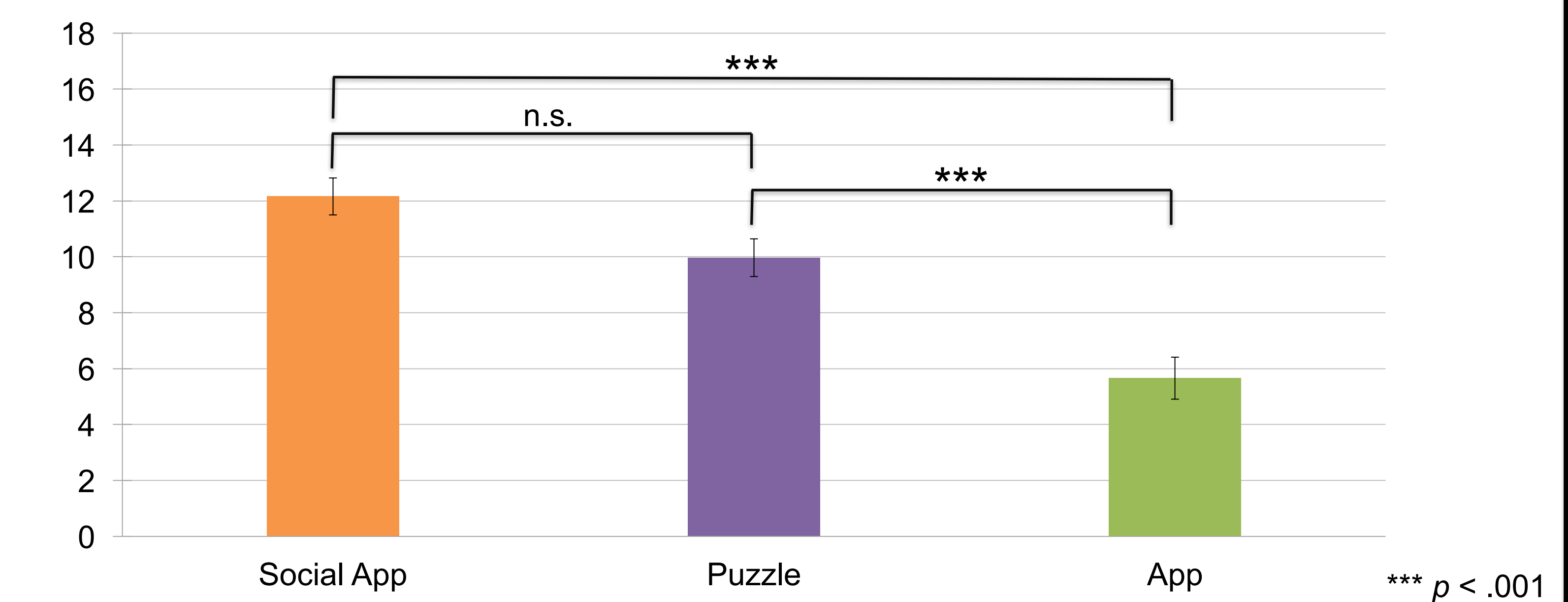
- In first two studies, experimenter provided lesson for puzzle condition but app provided lesson for app condition.
- Will children learn better from an app with similar lesson?

Study 3 Method

- Children were taught a Montessori-style lesson by the experimenter using the app, then had 10 min free play.
- Children from the "social app" condition were compared to puzzle and app conditions from Study 1 and 2 (Time 1 only)

Study 3 Results

Children in the social app ($M = 12.06$, $SE = 0.64$) and puzzle ($M = 10.31$, $SE = 0.64$) conditions learned more than children in the app condition ($M = 5.41$, $SE = 0.64$), $F(2, 93) = 28.99$, $p < .001$, $h_p^2 = 0.39$.

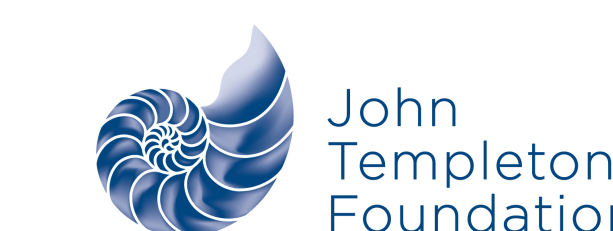


Summary and Conclusions

- Children learned more from a Montessori lesson with a physical puzzle or an app than from using the app alone.
- After a week of exposure, children learned equally from app and puzzle but puzzle was more efficient, and only time with the puzzle related to learning.
- Whether materials are physical or digital, social interaction is crucial for learning.
- Future research should examine aspects of social interaction that promote learning from physical objects and apps.

References

1. Rideout, V. J. (2017). *The common sense census: Media use by kids age zero to eight*. San Francisco, CA: Common Sense Media.
2. Shuler, C. (2012). *iLearn II: An analysis of the education category of Apple's app store*. New York, NY: The Joan Ganz Cooney Center at Sesame Workshop.



Questions or Comments?

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