

Fostering Children's Early Curiosity, Learning, and Motivation with Question-Asking: An Intervention Study

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Introduction

- Asking questions is a curiosity-driven behavior that essential to learning.^{1,2}
- Question-asking requires realization of the gaps in one's knowledge and motivation to resolve them.^{2,3}
- Previous studies have focused on enhancing curiosity, and subsequent learning, about specific ideas or situations.^{4,5} However, fostering children's desire for new information across broader educational contexts is less understood.

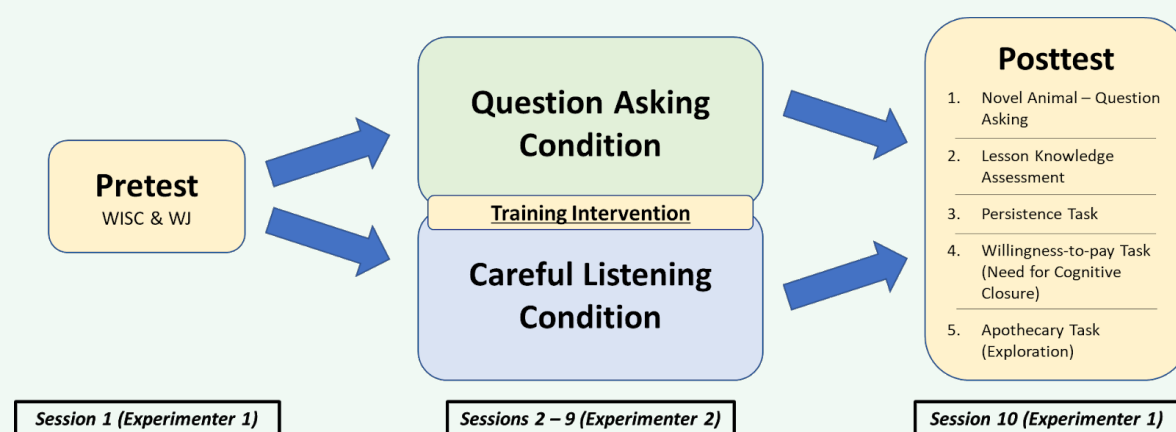
Study Goals

- Examine whether question-asking training condition enhances learning across contexts.
 - Examine whether individual differences moderates performance on post-test outcomes.
- H1: Children in **question-asking (QA) condition** will have **higher total scores** at post-test than children in the control-listening (CL) condition.
 - H2: Children with **lower baseline science knowledge** will **learn more** in either condition.

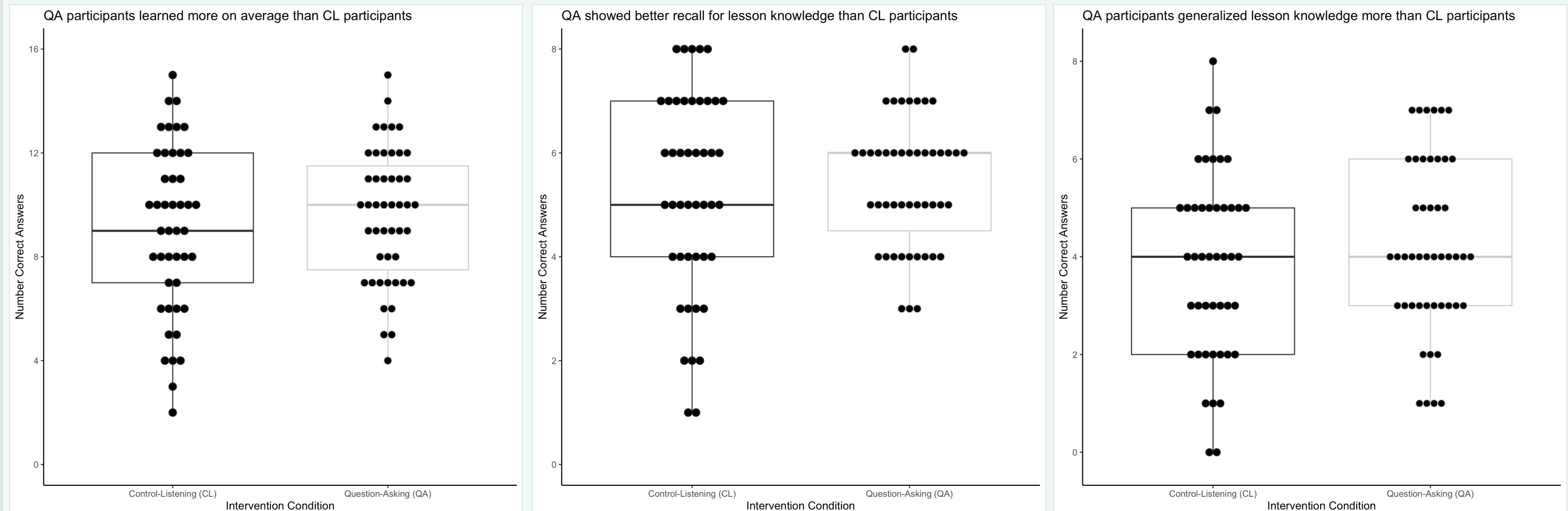
Methods

	QA (n=47)	CL (n=45)	
N = 92			
Age at time 2	6.58 (0.68)	6.22 (0.70)	• Mean age = 6.43 years
Gender	23 M, 24 F	26 M, 20 F	
Race	37 White	28 White	• 47.8% Female
I-type Curiosity ⁶	18.09 (2.23)	16.87 (2.57)	• 70.7% White
D-type Curiosity ⁶	14.55 (3.04)	13.85 (2.99)	
Test of Science Achievement ⁷	16.38 (3.74)	15.34 (3.51)	• Most recruited via Facebook
Median Household Income	\$112,966 (\$4662.96)	\$106,622 (\$9067.64)	

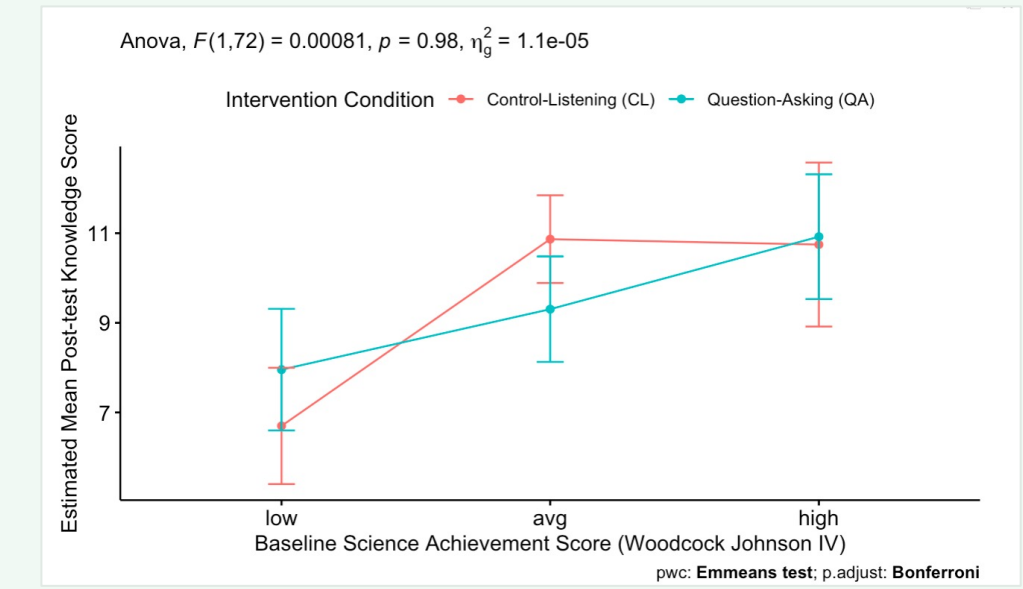
- 2-week intervention (10 sessions) conducted over Zoom
- 8 thirty-minute science lessons (story, video, activity)
- Interest and Deprivation type curiosity⁶
- Objective measure of prior science knowledge: Woodcock Johnson IV Test of Science Achievement⁷ (n= 73)
- Post-intervention Lesson Knowledge assessment
- 8 lesson concept questions, 8 broader knowledge questions



Consistent prompting to ask questions could stimulate curiosity and facilitate better learning.



- Children in the QA condition had a **higher average total score** on the science knowledge post-test (M= 9.6, SD= 2.5), compared to CL condition (M= 9.04, SD= 3.2), **but not significantly**, $t(90) = 0.94$, $p = .35$.
- QA participants had **better recall of lesson material** (M= 5.4, SD= 1.3), than CL (M= 5.2, SD= 2), $t(90) = 0.59$, $p = .55$.
- QA participants had **higher scores on broader knowledge** questions from post-test (M= 4.2, SD= 1.8), compared to CL group (M= 3.8, SD= 1.9), $t(90) = 0.97$, $p = .34$.
- Baseline science achievement predicted average score at posttest, but only for certain groups [$F(3, 83) = 3.77$, $p = 0.0014$]



Discussion

- QA training did not significantly enhance overall learning, however, scores on directly-taught and applied-knowledge questions reveal individual differences in outcomes⁸
- Controlling for age, children in the QA condition with lower science achievement at baseline had higher scores on lesson-specific questions ($p = .45$)
- Higher I-type curiosity at baseline predicted better performance on broader knowledge questions in both conditions ($p = .044$)
- Limitations:
 - Age effects on prior science knowledge
 - Wealthy and well-educated sample
 - Lack comparison data

Future Directions

- Relate to measures throughout intervention period (i.e. number of questions asked, immediate recall of lesson material)
- Recruit from less WEIRD, more diverse groups⁹
- Analyze other measures of individual differences in curiosity
- Who benefits most from asking questions?¹⁰
- How do other pedagogical practices impact different groups?

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