UNTETHERING SCIENCE INTEREST FROM READING FLUENCY
Pilot Results from a Microsoft HoloLens Science Reading Intervention

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Students in the United States struggle with science achievement (U.S. Department of Education, 2019). Research shows that reading ability is an important predictor of science achievement (Bigozzi et al., 2017; Reed et al., 2017; Zhu, 2022). Therefore, one way to explain low science achievement is the low level of reading fluency in the United States (National Center for Education Statistics, 2017).

Perhaps we could increase science achievement for struggling readers by increasing their science interest. Research has shown that interest is related to achievement in various areas of STEM. There is not only a strong connection to science achievement (Li et al., 2021) but math (Schiefele & Csikszentmihalyi, 1995) and engineering (Lawanto et al., 2012) as well.

Struggling readers report significantly lower interest in science (Torppa et al., 2020). Luckily, interest can be triggered in students who lack interest (Renninger & Hidi, 2016). Certain circumstances can trigger interest such as when a learner experiences something novel, challenging, or surprising (Jarvela & Renninger, 2014). Mixed reality reading offers this type of experience.
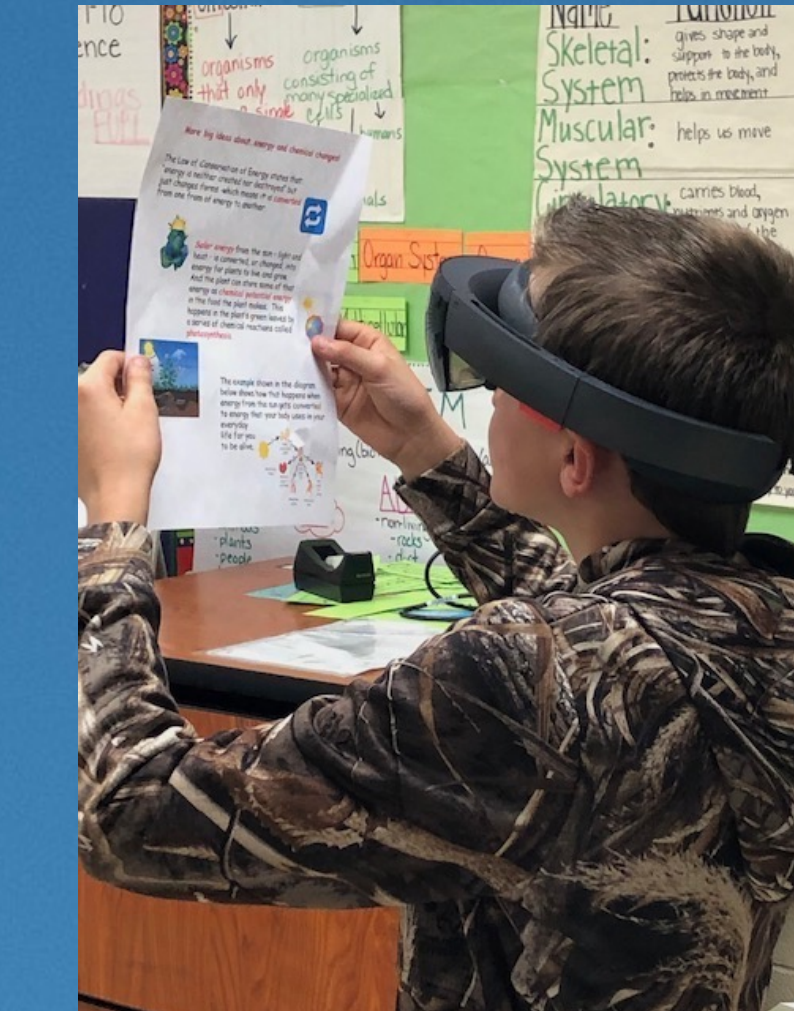
Fifteen fifth grade students participated in individual sessions lasting about five minutes in which they each wore the mixed reality HoloLens and read a one-page document. Several words and phrases could be selected if the reader wanted additional information. Examples included solar energy and photosynthesis. Triggered statements provided supplemental multimedia content to appear in the transparent lens.

Reading ability is an important predictor of science achievement. Therefore, science achievement is often difficult for struggling readers.

Fortunately, interest has a strong connection to science achievement. Unfortunately, struggling readers report low science interest. *What if we sparked their interest with a mixed reality science reading intervention?*

In our study, students with lower initial science interest (primarily the struggling readers) reported an increase in science interest after reading scientific text with mixed reality.
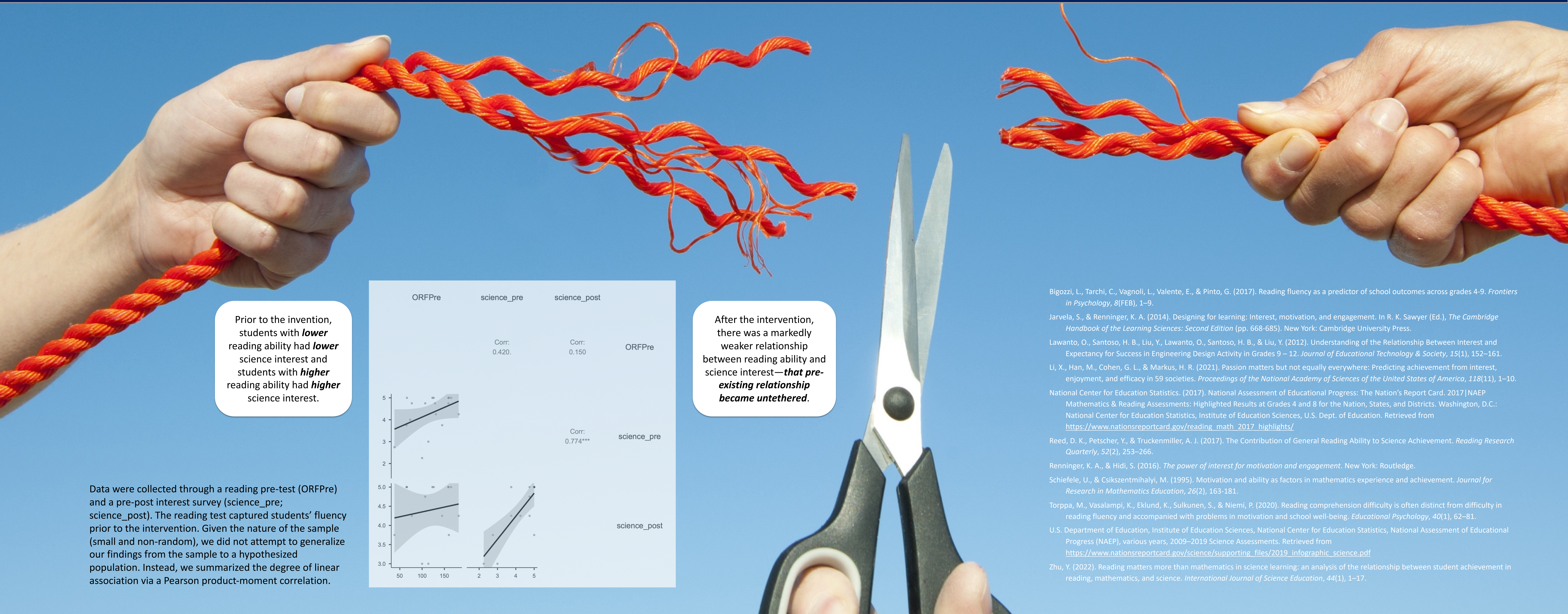
Prior to the invention, students with **lower** reading ability had **lower** science interest and students with **higher** reading ability had **higher** science interest.
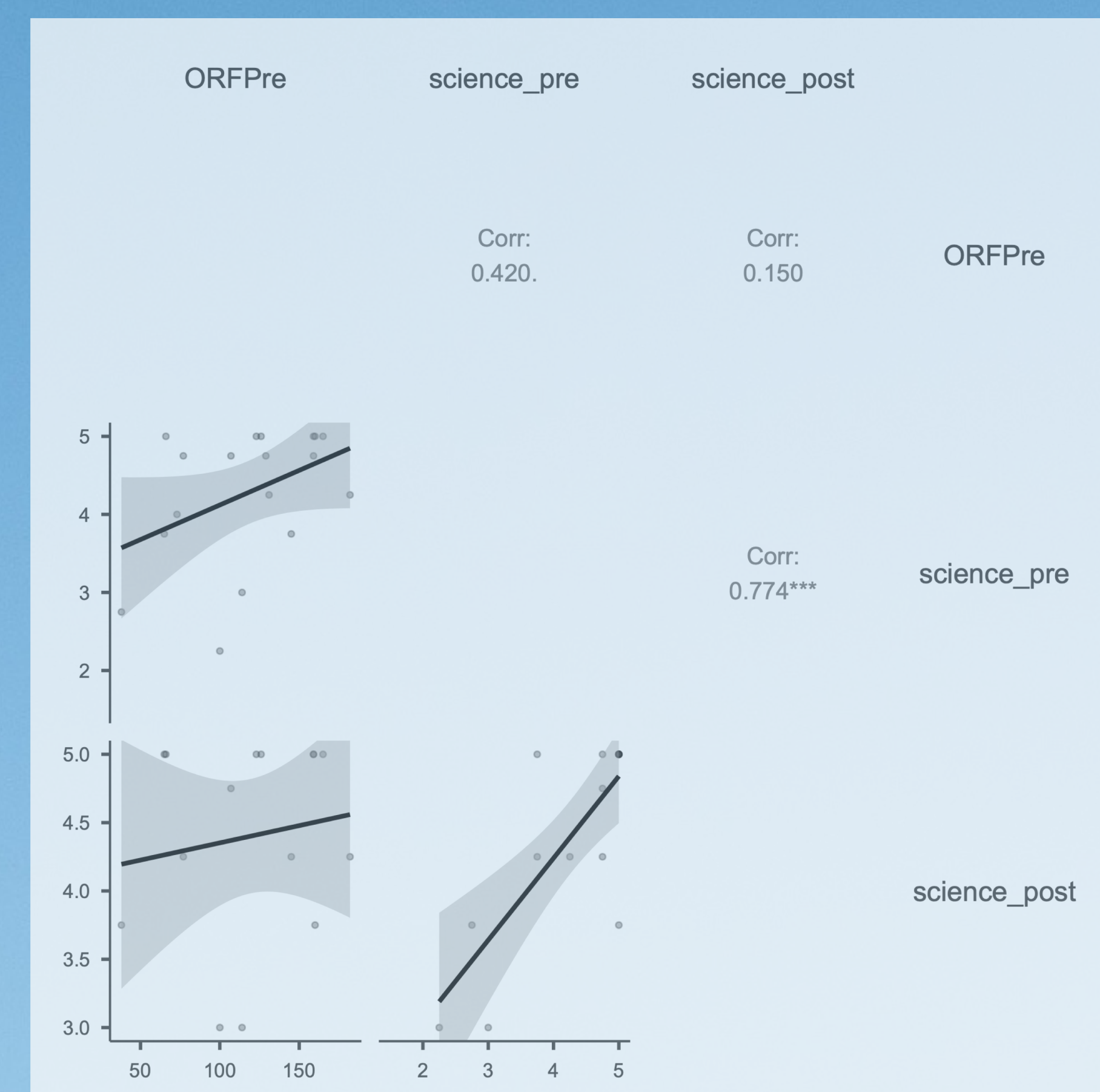
After the intervention, there was a markedly weaker relationship between reading ability and science interest—*that pre-existing relationship became untethered*.

ORFPre	science_pre	science_post	
	Corr: 0.420.	Corr: 0.150	ORFPre
		Corr: 0.774***	science_pre
			science_post

Data were collected through a reading pre-test (ORFPre) and a pre-post interest survey (science_pre; science_post). The reading test captured students' fluency prior to the intervention. Given the nature of the sample (small and non-random), we did not attempt to generalize our findings from the sample to a hypothesized population. Instead, we summarized the degree of linear association via a Pearson product-moment correlation.

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