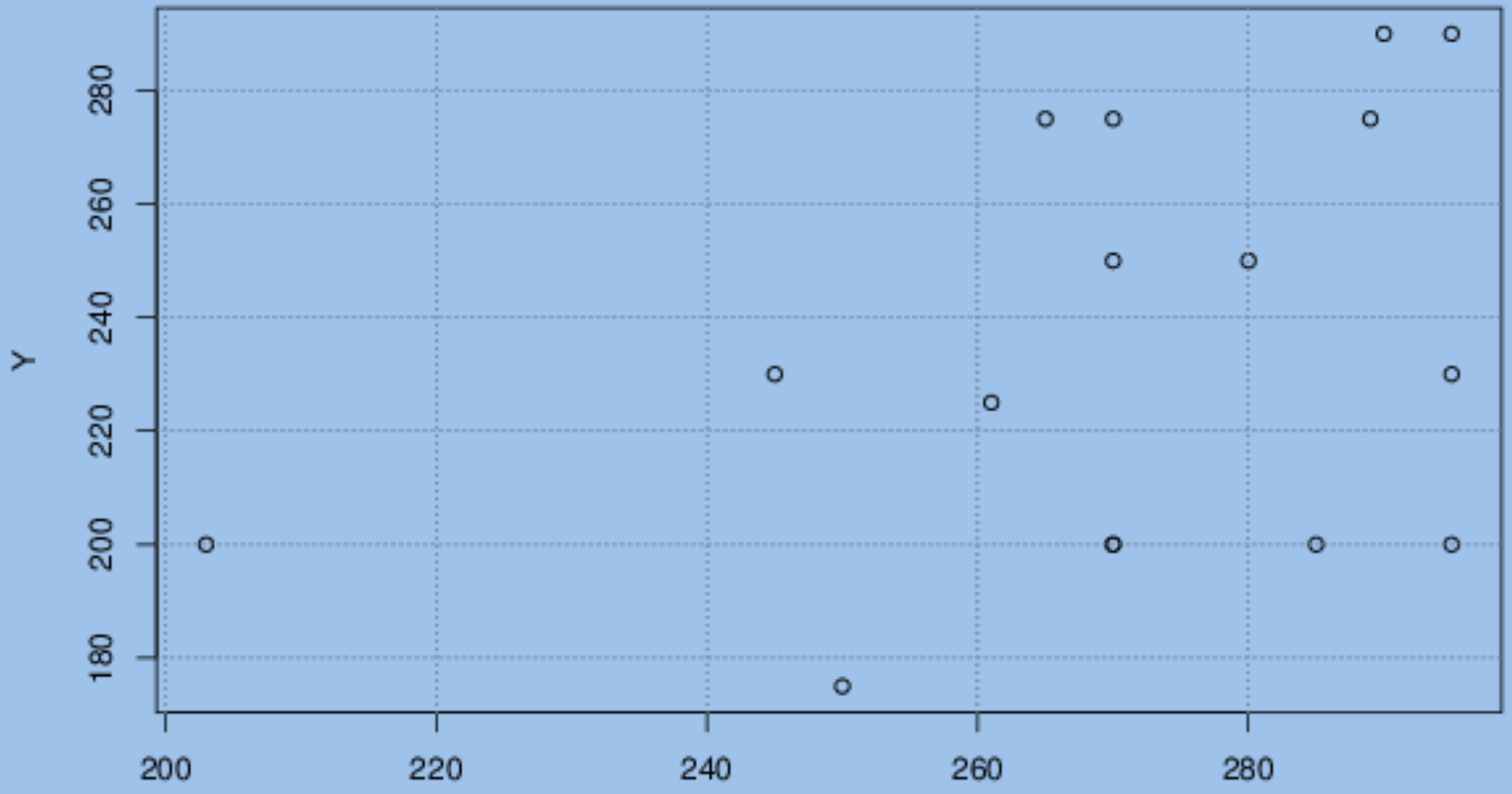


.37 correlation,
no significant

Scatterplot

Instructor Grade



X

Peer Grade

Paper and Project

- Initial Presentation
 - Oral Report
 - Issue, Hypotheses, and Storyboard
 - Week of May 14-16
 - Written Report
 - 300 Word Abstract, Due May 21
- Final Presentation
 - Oral Report
 - Week of May 28-30
 - Written Report
 - APA Format, Due June 5
- Last Day of Class, June 6
 - Absolutely NO late reports accepted

Evidence for Letters and their Spatial Position Sensitive Correspondences

- Baboon Study
- Homophone Words and Pseudowords
- Attention to Print Features
- Assessing Spelling in Kids
- Learning New Written Words
- Habituation to Letter Sequences
- Habituation to Spelling Patterns
- Proposed Example Study
 - ACR Words
 - My Matching Games

Can Toddlers Map Written Words to Objects or Events?

- 8-month-old infants and older
- Pseudowords and Novel Objects
- Association pairing
- Testing



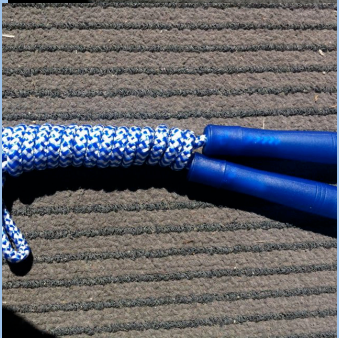
lum



bif



sop



tad

14 month-old-infants

Familiarization

Learning

Testing

Hypothetical Results

Table 2. Hypothetical results showing the number of correct choices (out of 8) across the 12 repetitions of learning and testing phases under the spoken and written tests.

Session	1	2	3	4	5	6	7	8	9	10	11	12
Spoken	1	2	2	3	4	5	6	6	7	8	8	8
Written	1	2	2	3	4	4	6	5	7	8	8	8

Can Preschoolers Learn and Use Written Words in Figural Sentences?

- Children 3-4 years old
- Learn Object Relations
- Test with New Objects



CBA



DEK



Two sentences with meaningful “word” order that can mean the apple is on top of the flower, and ring is behind the horse.

The experiment will consist of two phases: a learning phase and a testing phase. During the learning phase, 16 preschoolers age 3 to 4 will learn four pseudowords, each representing a spatial relation. In each learning trial, an experimenter will first show the child two different objects (e.g., a toy apple and a toy flower); the child will be encouraged to play with the objects for up to 15 s. Next, the experimenter will demonstrate the spatial relation by placing one object in front of, behind, on top of, or underneath another object. Finally, the child will be asked to look at a sentence shown on a monitor, composed of pictures of the two objects and the pseudoword; all of the three components will be presented simultaneously in a reading window (Figure 4). To lower the task demand, we will choose objects familiar to the child

Although the complete sentence will be displayed at once, the three components will be highlighted by a moving dot that glides from left to right and lands for 1 s underneath each component in the sentence. The pseudowords will be the same as those in Experiment 3 (i.e., BUM, LUT, MAB, and TAL), composed of letters that are seldom confused with one another. The sentence will remain on the screen for 10 s, and each learning trial will end when the child has looked at the sentence for 4 consecutive seconds or when 10 cumulative seconds have elapsed. We expect to administer four blocks of learning trials to children, with each block demonstrating three different examples of one pseudoword (i.e., three pairs of objects demonstrate BUM, meaning the relation behind). However, the number of learning trials will be determined by pilot studies. The order of each block will be counterbalanced across participants.

During the testing phase, the experimenter will present the child with two objects never shown during the learning phase. Two types of test trials will be administered. In “object-manipulation trials,” the child will see a sentence on the screen composed of the pictures of these two objects and one of the four pseudowords in a specific order. As in the learning phase, the three components will be highlighted by a moving dot that glides from left to right and lands for 1 s underneath each component in the sentence. Next, the child will be asked to arrange the objects to go with the sentence. In “sentence-composition trials,” the experimenter will demonstrate one of the four spatial relations using the two objects

Next, the child will be asked to arrange the pictures of the objects and the pseudoword in a sentence with the appropriate spatial sequence that represents the spatial relation. Each child will receive four object-manipulation trials and four sentence-composition trials. Half of the children will receive object-manipulation trials first, and half sentence-composition trials first. Within each type of test trials, the order of the pseudowords tested will be counterbalanced across participants. A separate group of children ($n = 16$) will be tested in a control condition and receive only the testing part of the experiment (i.e., no learning phase).

Reading

- Eye Movements in Reading
- 4 or 5 per second
- 6 to 8 characters
- About 250-300 words/minute
- Importance of Crowding
 - Lateral Masking
 - Advantage for first and last letters of a word

X
X K X
X B X S
X X X X
X X X X
X R X N
X G X
X O X
X

RSVP Reading

- Rapid Serial Visual Presentation
- Demonstration
- One word at a time in a fixed window
- Can Adjust Window Size, Rate of Presentation
 - Could have variable duration
 - Shorter durations for function words, for example
- Variations
 - Allow several words in fixed window

RSVP Reading

- Mean word length in English
 - 4.7 characters
 - 90.14% of words in text are less than 8 characters
 - (Legge, 2006).
- Reasonable Presentation
 - Bootstrap young kids into reading

Table 1

Mean age, visual acuity and gender ratio for participants

	3rd	5th	7th	Adult
Mean age (years)	9.14 (± 0.47) [*]	11.09 (± 0.5)	13.05 (± 0.51)	21.30 (± 3.20)
Near visual acuity (logMAR)	-0.06	-0.1	-0.05	-0.1
Gender ratio (male:female)	5:5	4:6	6:4	4:6

^{*} *Note.* The numbers in parenthesis are standard deviations.

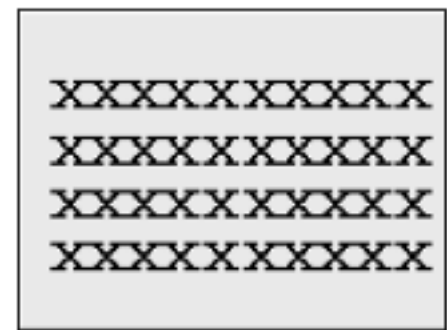
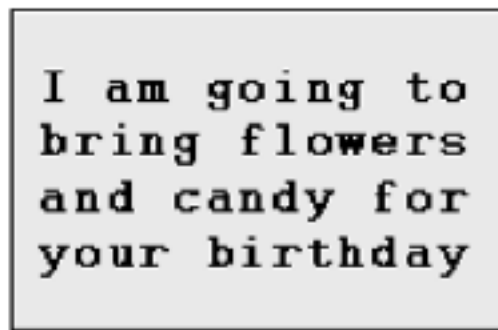
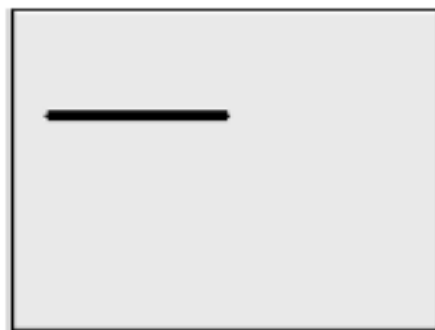
a RSVP



TIME



b FLASHCARD



C SAMPLE SENTENCES

My sister got
lost when she
walked to the
new toy store

She will tell
grandmother a
story about a
big black dog

He wanted the
last piece of
pizza but she
gave it to me

When I have a
birthday your
mother always
brings a cake

When our five
new books are
here I should
read them all

Most children
like to watch
the elephants
at the circus

RSVP vs Static Text

- method of constant stimuli
 - five exposure times (logarithmically spaced steps)
 - RSVP, one word at a time
 - Static Text, complete sentence
 - Two letter sizes, .25 or 1 degree
 - Derived psychometric functions
 - Kwon, M-Y., Legge, G.E. & Dubbels, B. (2007). Developmental changes in the visual span for reading. *Vision Research*, 47, 2889-2900.

RSVP vs Static Text

- psychometric functions
 - No effect of letter size
- Reading speed
 - Improves with Grade Level
 - RSVP faster than Static Text

Figure 3

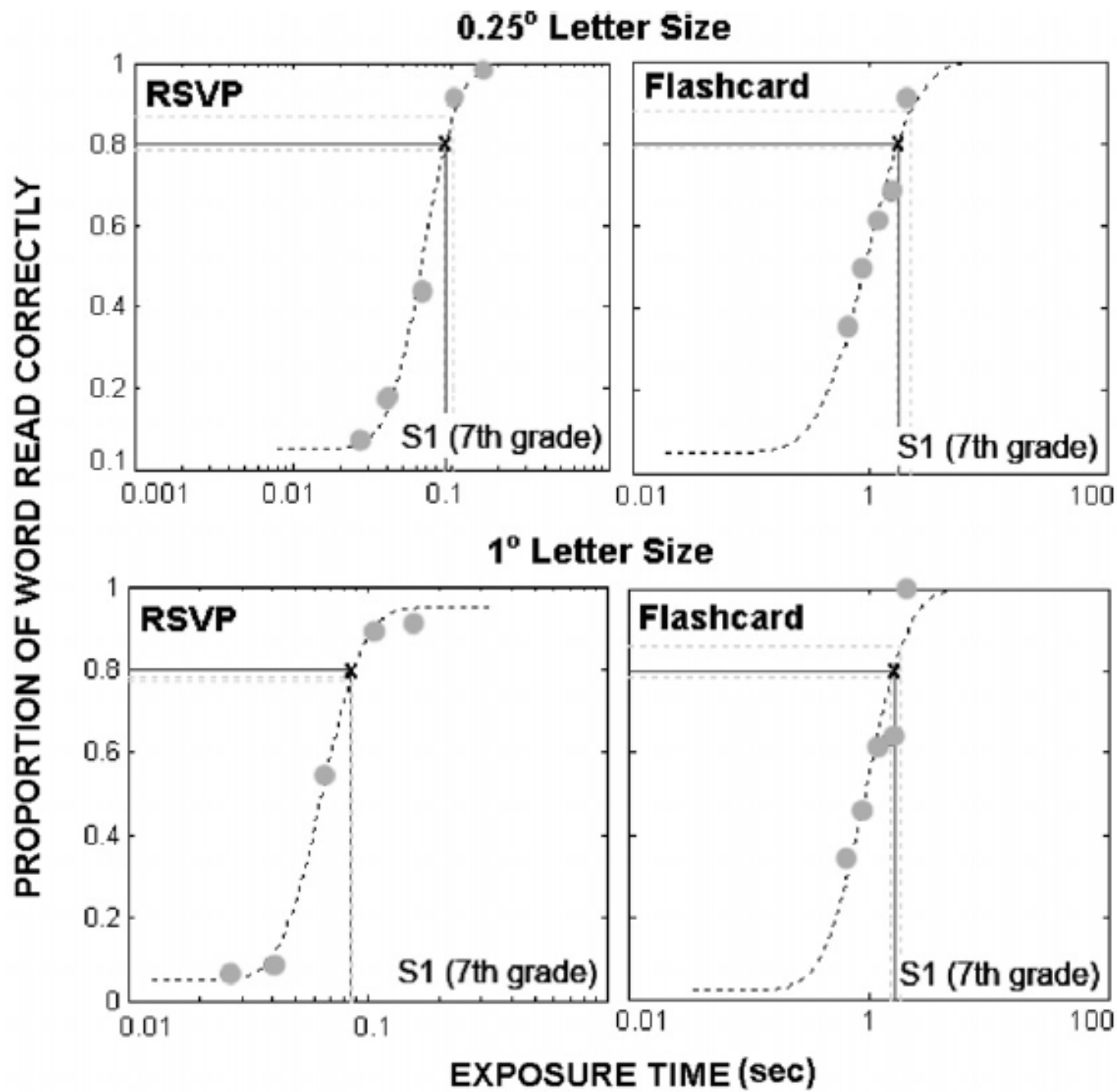


Fig. 3. Proportion of words read correctly is plotted as a function of exposure time in sec per word for RSVP and exposure time in sec per sentence for Flashcards (Participant S1, 7th grader). The top two panels show RSVP and Flashcard data for letter size 0.25 . The bottom two panels show RSVP and Flashcard data for letter size 1 . Each set of data was fit with a cumulative Gaussian function. From each psychometric function, the threshold exposure time was defined as the exposure time yielding 80% of words read correctly.

Psychometric functions, percent correct versus log RSVP or log Flashcard exposure times, were created by fitting these data with cumulative Gaussian functions (Wichmann & Hill, 2001a) as shown in Fig. 3. The four panels represent four sets of data from RSVP and Flashcard tasks at two letter sizes. Five data points in each panel represent percent words correct in a sentence for RSVP and for Flashcard. The threshold exposure time, for words of a given length was based on the 80% correct point on the psychometric function. For example, in RSVP, if an exposure time of 200 msec per word yielded 80% correct, the reading rate was 5 words per second, equals to 300 wpm. For Flashcard, if the exposure time was 2 sec and the participant read 8 words correctly out of ten, the corresponding reading speed was 4 words per second, equals to 240 wpm.

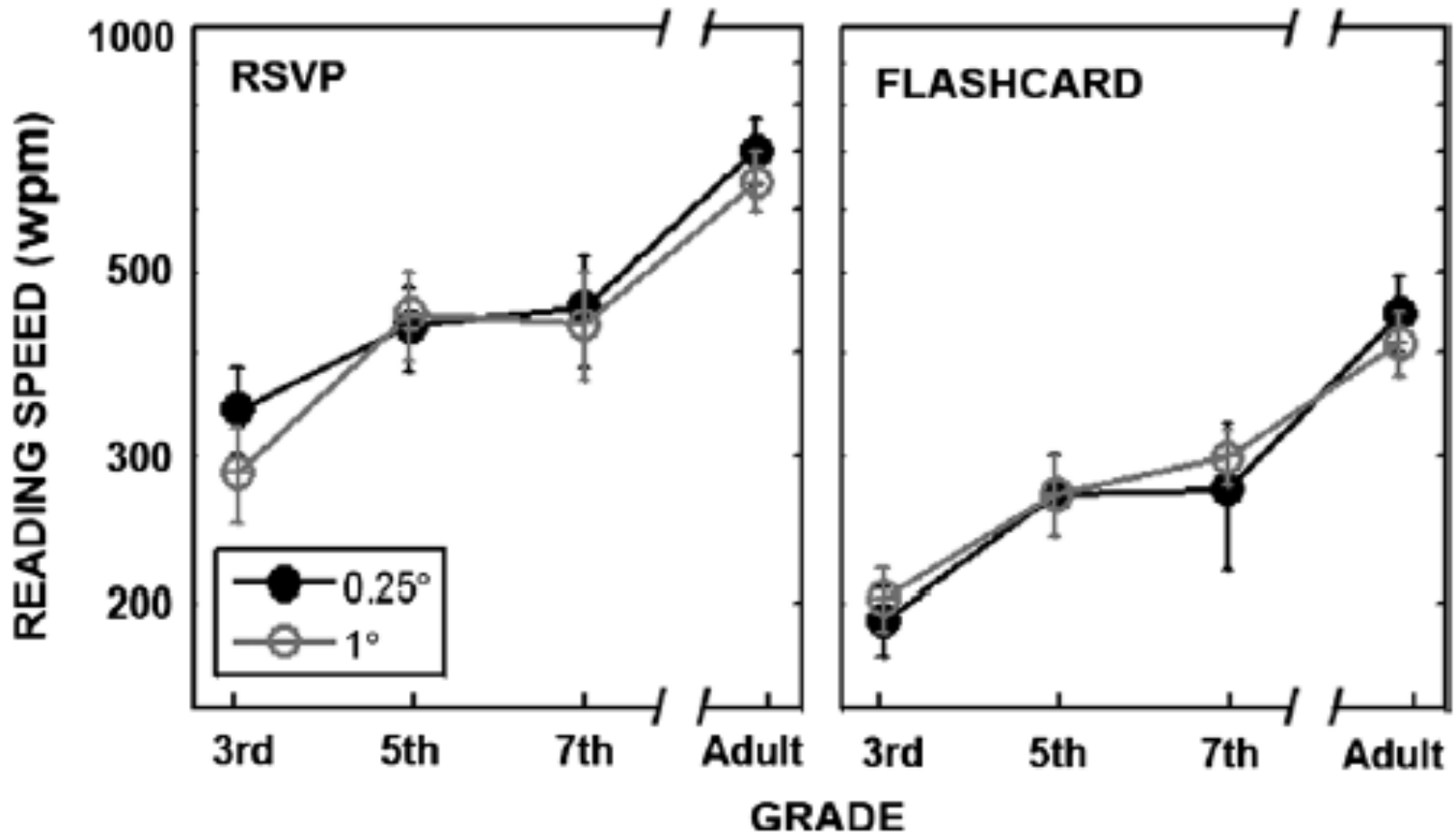


Fig. 5. Reading speed (wpm) as a function of grade level for two letter sizes. Each data point represents the average reading speed for 10 participants. Each error bar represents ± 1 standard error of the mean. Open circles in both panels represent reading speeds for 1 letters, and the closed circles for 0.25 letters. Left Panel: RSVP. Right Panel: Flashcard reading speed.

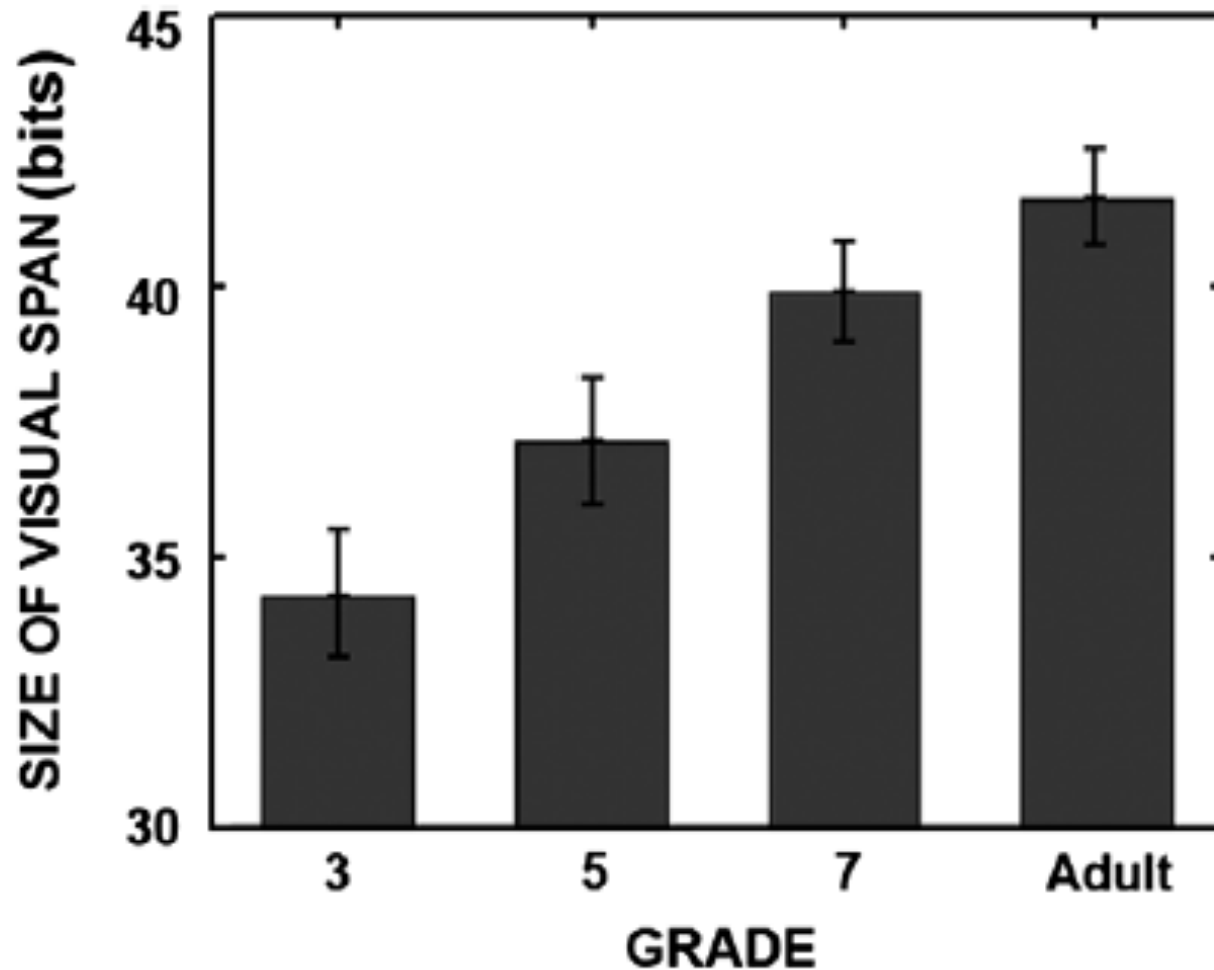


Fig. 4. The size of the visual span for students in three grades and for adults. Each bar indicates the average visual-span size for 10 participants collapsed across the two letter sizes. The error bars represent ± 1 standard error of the mean.

The average increment for Flashcard reading speed in our study was approximately 18 words per minute each year and its transformed value into Carver's metric is 14 wpm, equal to Carver's estimate.

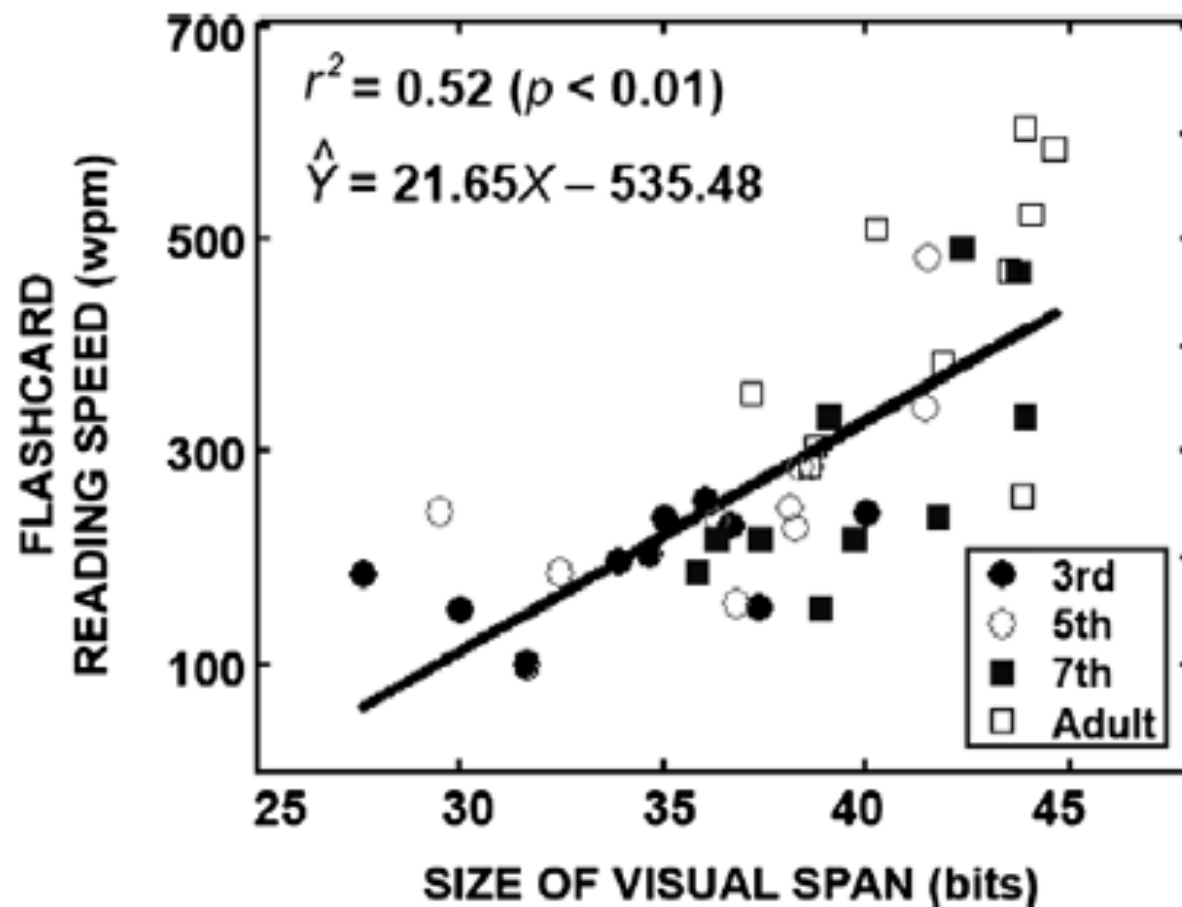


Fig. 6. Flashcard reading speed (wpm) as a function of the size of the visual span. The solid line represents a regression line. Each data point represents the average across two letter sizes for one participant. Closed circles, open circles, closed squares, and open squares represent data for 3rd, 5th, 7th grade, and adults respectively.

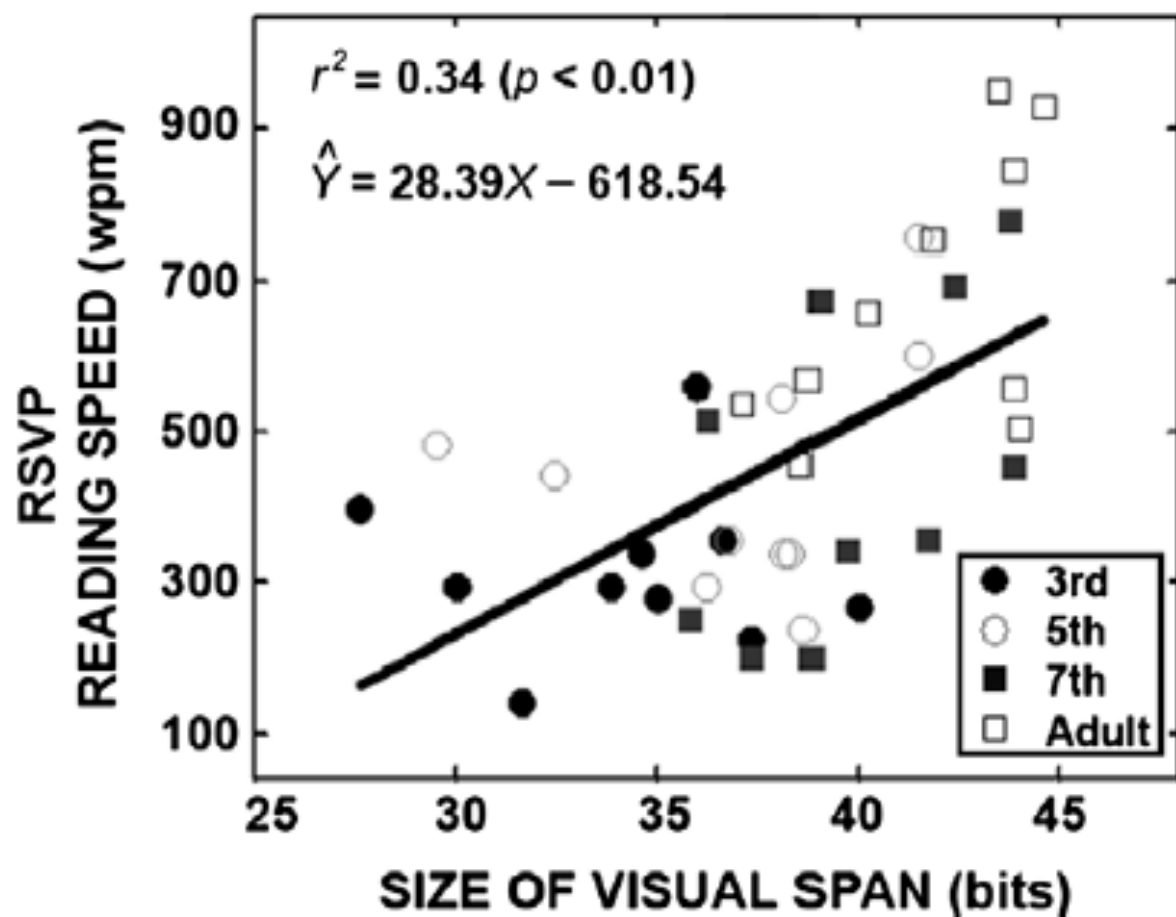


Fig. 7. RSVP reading speed (wpm) as a function of the size of the visual span. The solid line represents a regression line. Each data point represents the average across two letter sizes of one participant. Closed circles, open circles, closed squares, and open squares represent data for 3rd, 5th, 7th grade, and adults respectively.