Learning to write words

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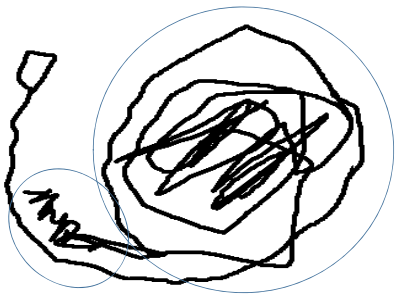
Outline

Tour of spelling development
- Early knowledge about visual aspects of writing
- Prephonological spelling
- Invented spelling
- More advanced spelling

Theories about spelling development and writing systems

Implications for instruction



Otake, Treiman, and Yin (2017)

88 US children aged 2; 0 (years; months) to 5; 5 were asked to write and draw 4 items

- sun
- fire
- water
- name/picture of self

Children's productions were shown to 16 adults who were not present when they were made and who did not know which productions were made under instructions to write and which were made under instructions to draw

Questions

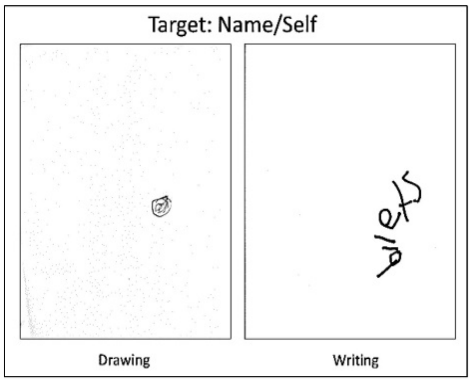
Do children make different sorts of marks when asked to write than when asked to draw?

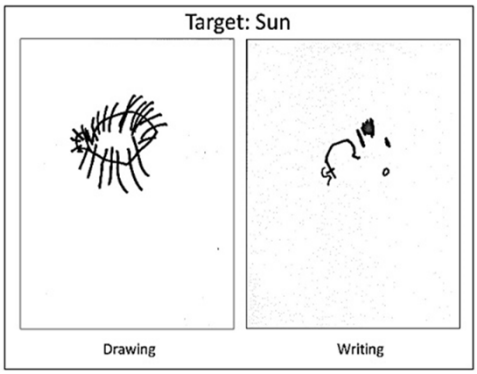
- If so, adults should be able to judge, beyond the level expected by chance, which productions were made under instructions to write and which were made under instructions to draw

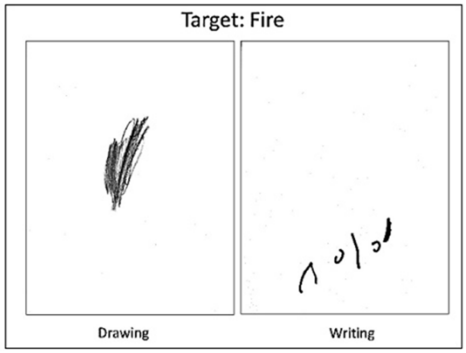
Do children write their name in a more advanced way than other words?

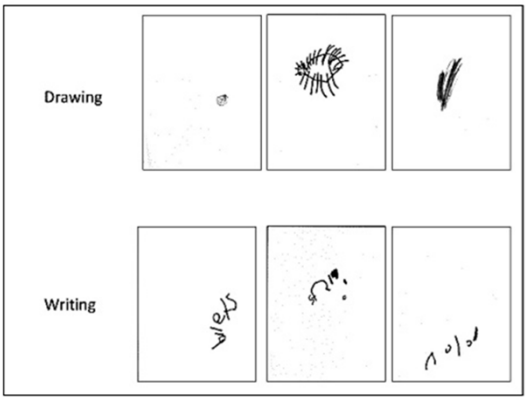
- If so, adults should do better at distinguishing writing and drawing with children's written names and self portraits than with other targets

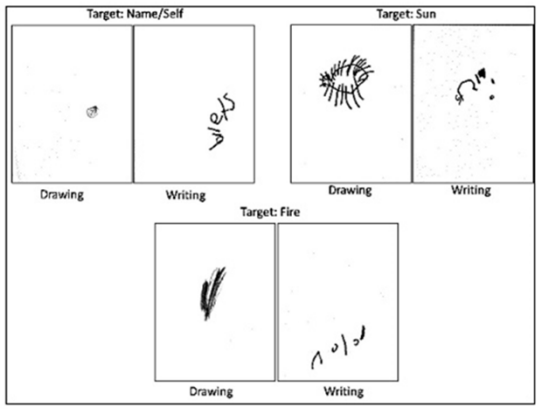
If children distinguish writing from drawing, how do they do so?

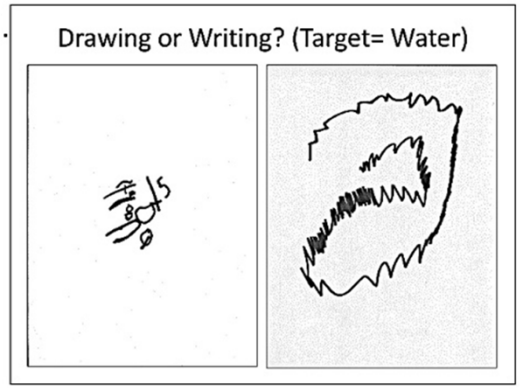



Target: Sun
Drawing
Writing


Target: Fire
Drawing
Writing


Drawing
Writing





Mean (and standard deviation) proportion of correct responses by adults in distinguishing children's writing from drawing (Otake et al., 2017)

Target	Age of children who made productions		
	Young (2;0–3;3)	Middle (3;4–4;2)	Old (4;3–5;5)
	n = 27	*n* = 30	*n* = 31
Water, fire, sun	.65 (.24)	.71 (.24)	.74 (.27)
Name/self- portrait	.74 (.33)	.91 (.20)	1.00 (.00)

Significantly above level of chance (.50) in all cases

Questions

Can adults tell which productions were made under instructions to write and instructions to draw?

- Better than random guessing even with productions of youngest children
- Children begin to differentiate writing from drawing at an early age

Do adults perform better with children's names and self-portraits than with other targets?

- Yes -- child's name plays a leading role in literacy development

Questions

How do young children differentiate drawing and writing?

- Smaller productions for writing
- Letter-like forms or recognizable letters for writing
- More use of colored implements for drawing
- More use of multiple implements in the same production for drawing

Early knowledge about visual characteristics of writing

Young children in the U.S. (e.g., Otake et al., 2017) and China (e.g., Treiman & Yin, 2011) have some knowledge about visual characteristics of writing

This knowledge is more advanced for their name than for other words

How do young children learn about the outer form of writing?

Parents and preschool teachers are unlikely to explain to a 2- or 3-year-old that, for example, the writing in books is usually smaller and darker than the pictures

Children observe writing around them and pick up its some of its visual characteristics on their own

Statistical learning

Implicit

Frequencies of items and combinations of items

Name, which is seen frequently and which is important to the child, is particular grist for the statistical learning mill

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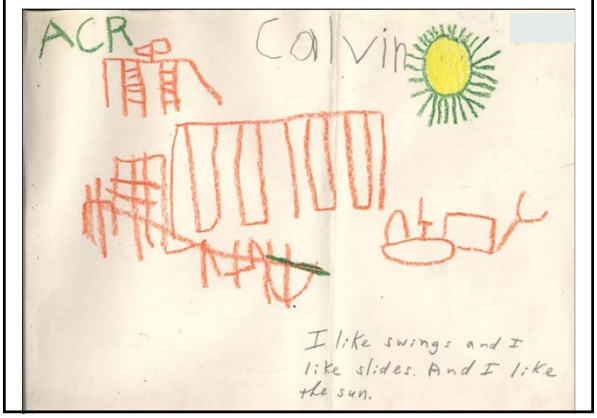

Prephonological spelling

gummi	QRV
light	GMEF
dice	LOVSL
blow	VSOR
pony	NSOP
try	NOP

Prephonological spellers' lack of knowledge about inner structure of writing: how it represents phonology

Don't use phonologically plausible letters more often than expected by chance

Don't write more letters for words with more phonemes or syllables than for words with fewer phonemes or syllables (e.g., Treiman, Pollo, Cardoso-Martins, & Kessler, 2013, for learners of Portuguese; Treiman, Kessler, Boland, Clocksin, and Chen, 2018, for learners of English)

Prephonological spellers' knowledge about outer form of writing

General visual characteristics of writing (e.g., size, color) and some conventional letter shapes

Beginning knowledge of which letters tend to occur together in their writing system: graphotactic knowledge

- Frequency with which these children use letters and two-letter sequences is related to frequency of the letters and sequences in the writing system (e.g., Pollo, Kessler, & Treiman, 2009)

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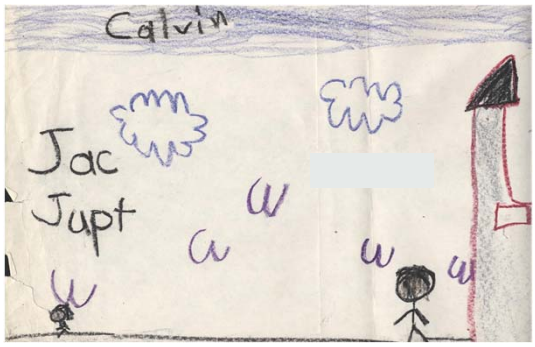
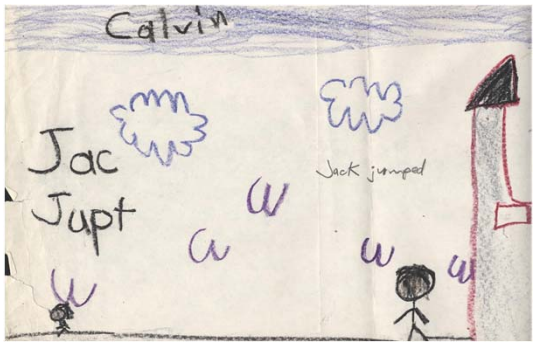


Invented spelling



Invented spelling

Children now use letters to symbolize at least some of the sounds in words

Knowledge of sound-symbolizing function of letters tends to emerge earlier for first letter of child's name than for other letters (e.g., Zhang & Treiman, 2020)

Children may use letters in unconventional ways that reflect sound properties of words

/t/ and /d/ before /r/

chrap	*trap*
jragin	*dragon*
jrad	*drowned*

Errors from Read (1975) and Treiman (1993)

Taps

wodr	*water*
nodesen	*noticing*

Sound-based influences on early spelling

Errors such as *ch* for *t* before *r* and *d* for tap

Many others

Morphological influences on early spelling

As early as 6 years, children are better at spelling tap of a word like *dirty*, where there is a stem (*dirt*) that can help, than tap of a word like *duty*, where there is no helpful stem (Treiman, Cassar, & Zukowski, 1994)

Spelling in English is not just a process of relating phonemes to letters – morphology also plays a role

Even beginning spellers are influenced by morphology

bbaf

baff

Graphotactic knowledge and spelling

By around 6 years, U.S. children perform above the level of chance at choosing nonwords with final consonant doublets over ones with initial consonant doublets (e.g., Cassar & Treiman, 1997)

Invented spellers of this age usually avoid producing spellings like *bbad* for *bad* (e.g., Treiman, 1993)

Children in the U.S. and other countries (e.g., Lehtonen & Bryant, 2005, Finland) show growing knowledge of graphotactic patterns, even when these patterns are not explicitly taught

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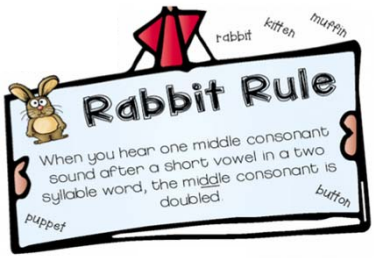
Medial consonant doubling

cabbage or cabage?

bacon or baccon?

Rule-based view of medial consonant doubling



Rule-based view

Regular words	Exception words
rabbit	*panic*
bacon	*adage*
lemming	*lemon*
kitten	*double*

What are the patterns related to doubling in English?

Analyses of spellings of English two-syllable words (Berg, 2016; Treiman & Boland, 2017)

In line with Rabbit Rule, phonological properties of first vowel are associated with doubling

Higher rate of medial consonant doubling if first-syllable vowel is short rather than long

rabbit (/æ/, short vowel)
rabies (/e/, long vowel)

But other influences as well

Graphotactic influences on medial consonant doubling: Spelling of first-syllable vowel

Doubling is rare if first-syllable vowel is spelled more than one letter, even if vowel is phonologically short

double
rubble

Graphotactic influences: Word ending

Doubling is more common before some endings than others

panic
valid
cabbage
trimmer

English writing system

Medial consonant doubling is more predictable than typically thought

Multiple probabilistic patterns rather than one all-or-none rule involving phonology

Do experienced spellers use untaught patterns?

Rabbit Rule is taught in some spelling programs

Graphotactic influences are not covered in existing spelling programs, to our knowledge

Have experienced spellers picked up these patterns?

Studies of adults' consonant doubling

Adults asked to spell made-up two-syllable words with stressed short or long vowels in first syllable and different endings (Treiman & Boland, 2017, Treiman & Wolter, 2018)

Similar to everyday situation in which people must spell a word whose conventional spelling is not firmly stored in memory

Spellings scored for whether participant used single or double medial consonant

Questions

Do adults show more medial consonant doubling after short vowels than after long vowels?

Do people avoid medial consonant doubling if they spell the first-syllable vowel with more than one letter?

Do people double more often before some endings than before others?

Results

Do adults show more medial consonant doubling after short vowels than after long vowels?

Yes, and better spellers show a larger difference than less good spellers

Do people avoid medial consonant doubling if they spell the first-syllable vowel with more than one letter?

Yes, few spellings like *daippin*

Do people double more often before some endings than before others?

Yes, more doubling before some endings, including *er* and *age,* than before endings, such as *ic* and *id*

Statistical learning and medial consonant doubling

Adults have picked up some patterns involving medial consonant doubling that are not explicitly taught, and they use them when spelling novel items

People do not only use all-or-none rules that relate sounds to spellings

They also use graphotactic patterns

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Theories about writing systems and spelling development

English writing system

Traditional rule-based view
- phonologically-based rules + exceptions

Our view
- multiple probabilistic patterns, nonphonological as well as phonological

Traditional theories of spelling development
(e.g., Ehri, 2015)

Spelling development begins when children start to use phonology

The scribbles or apparently random strings of letters that children produce before this point are of little theoretical or practical interest

Phonology is the major influence on early spelling; use of morphology and graphotactics emerges later

Integration of Multiple Patterns (IMP) theory of spelling development
(Treiman & Kessler, 2014)

Children use their statistical-learning skills to begin learning about outer form of writing before they learn that it represents language and how it does so

Even as children begin using spelling to represent the sounds in words, they also use other sources of information, including morphology and graphotactics

Different sources of information may cooperate or compete, and spelling performance reflects this

Implications for instruction and assessment

1. Children's scribbles and "random letter" spellings can reveal early knowledge

2. Although people learn about some aspects of writing without explicit instruction, using their statistical learning skills, they usually need systematic instruction to learn about writing's inner structure—how it symbolizes language (e.,g. Burton, Nunes, & Evangelou, 2021)

3. Understanding the language and the writing system can help teachers structure instruction and respond helpfully to children's errors

4. For English, basic phonics instruction lasting one or two years does not suffice for good spelling

Thank you!

Research studies cited in talk

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