Psychology of Language

20 Reading

Fall 2023
Tues/Thur 5:00-6:15pm

Emma Wing
Drop-in hours:
Wednesdays 3-4pm
& by appointment
Webex link

Road map

- Unit 3: Language, Brain, & Diversity
  - 19 Acquired aphasia (Review)
  - 20 Reading

Learning objectives

- Name 3 kinds of writing scripts
- Describe the dual-route model of reading
- Name two types of dyslexia and how the dual-route model of reading can explain their reading profiles
- Define *saccade, fixation,* and *perceptual span*
- Name 3+ things that can affect eye movements during reading

Writing systems

- Logograms

我們研究如何將人類心靈的語言處理

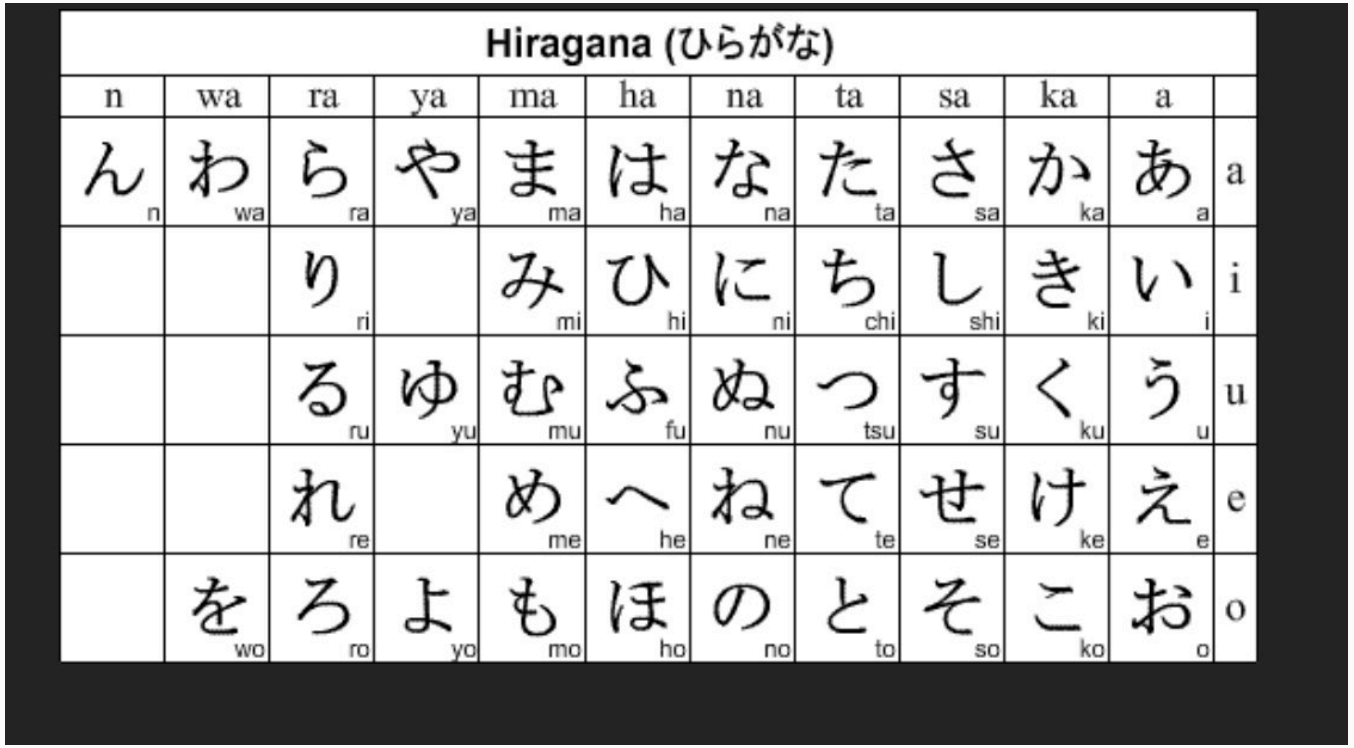
Chinese

私たちは、人間の心は、言語を処理する方法を学ぶ

Japanese kanji

Writing systems

- Syllable scripts



Hiragana (ひらがな)											
n	wa	ra	ya	ma	ha	na	ta	sa	ka	a	
ん n	わ wa	ら ra	や ya	ま ma	は ha	な na	た ta	さ sa	か ka	あ a	a
		り ri		み mi	ひ hi	に ni	ち chi	し shi	き ki	い i	i
		る ru	ゆ yu	む mu	ふ fu	ぬ nu	つ tsu	す su	く ku	う u	u
		れ re		め me	へ he	ね ne	て te	せ se	け ke	え e	e
	を wo	ろ ro	よ yo	も mo	ほ ho	の no	と to	そ so	こ ko	お o	o

Japanese

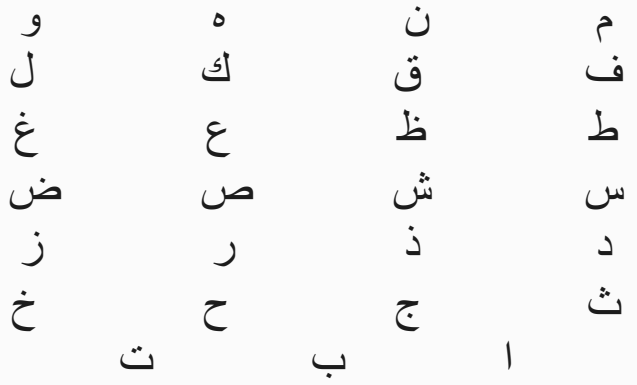
Writing systems

- Alphabetic scripts

abcdefghijklm
nopqrstuvwxyz

English

Hebrew



Arabic

Cyrillic

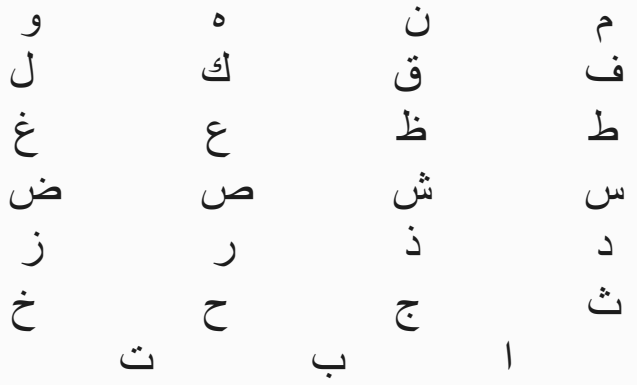
Writing systems

- Alphabetic scripts

abcdefghijklm
nopqrstuvwxyz

English

Hebrew



Arabic

Cyrillic

Writing systems

- What processes must be involved in reading? Can you draw a simple model?
- Consider previous classes and the different kinds of scripts

How do we pronounce this word in English?

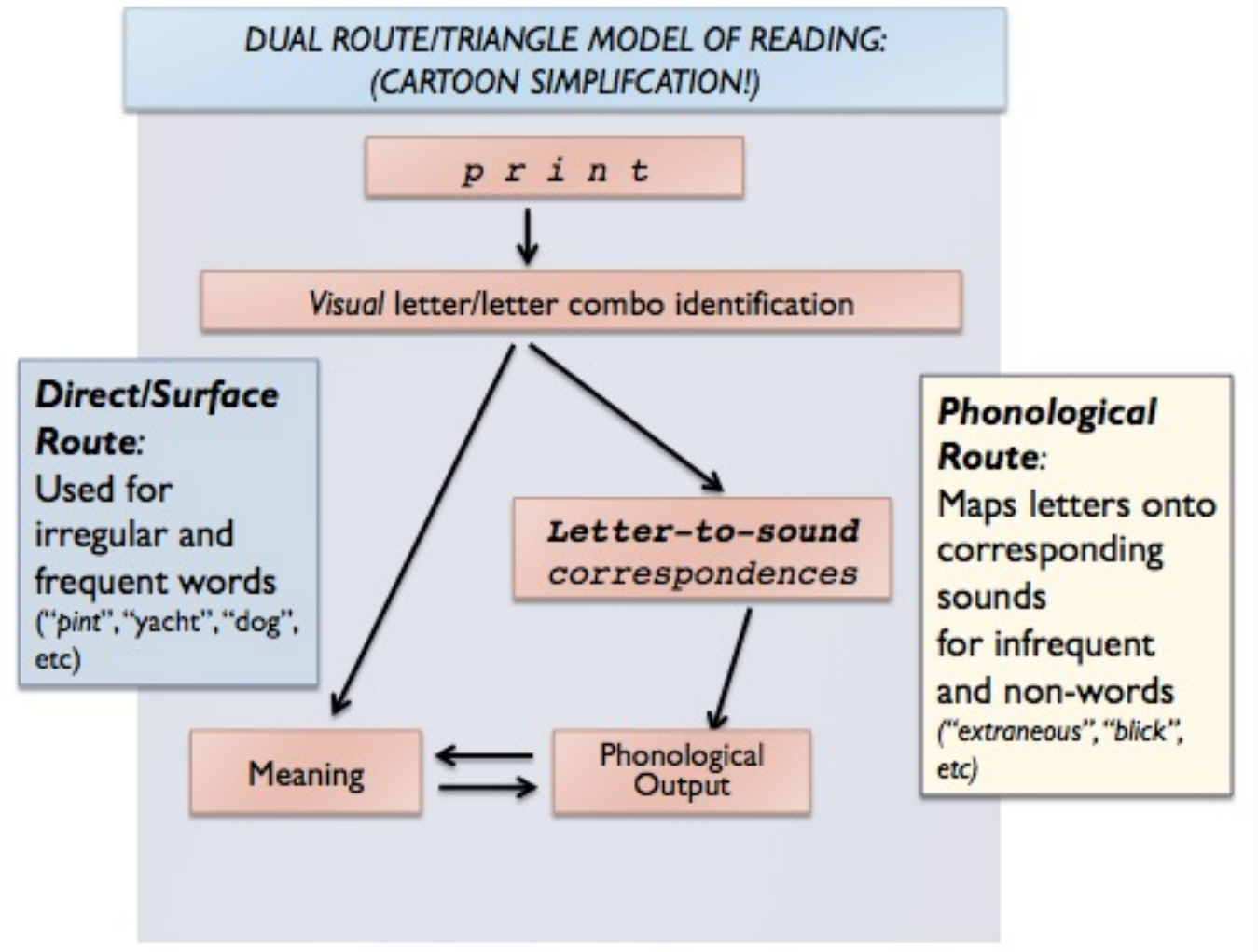
Ghoti

How do we pronounce this word in English?

Ghoti

“gh” from “enough”
”o” from “women”
“ti” from “nation”

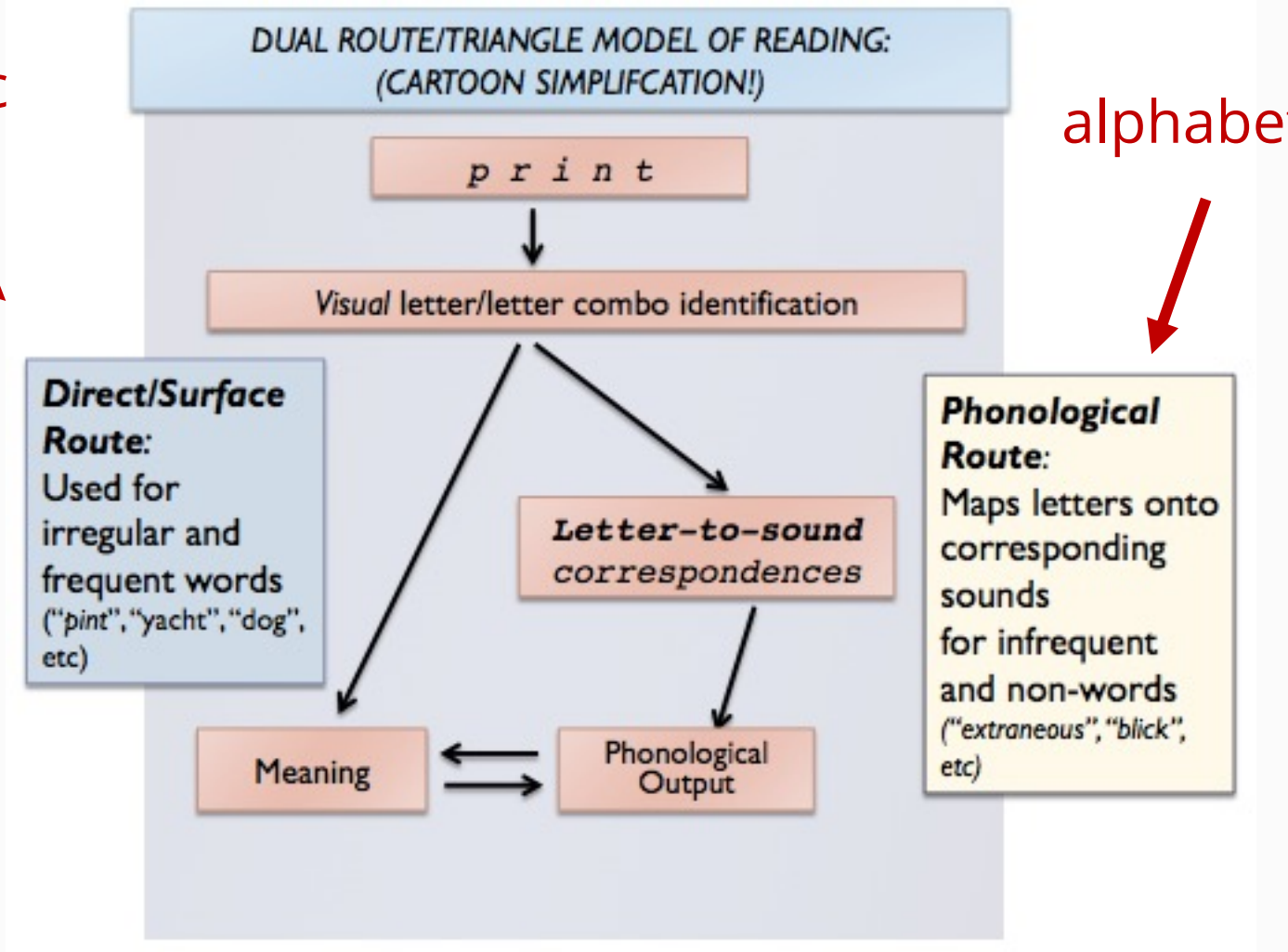
Dual-route model of reading



Dual-route model of reading

logographic

alphabetic

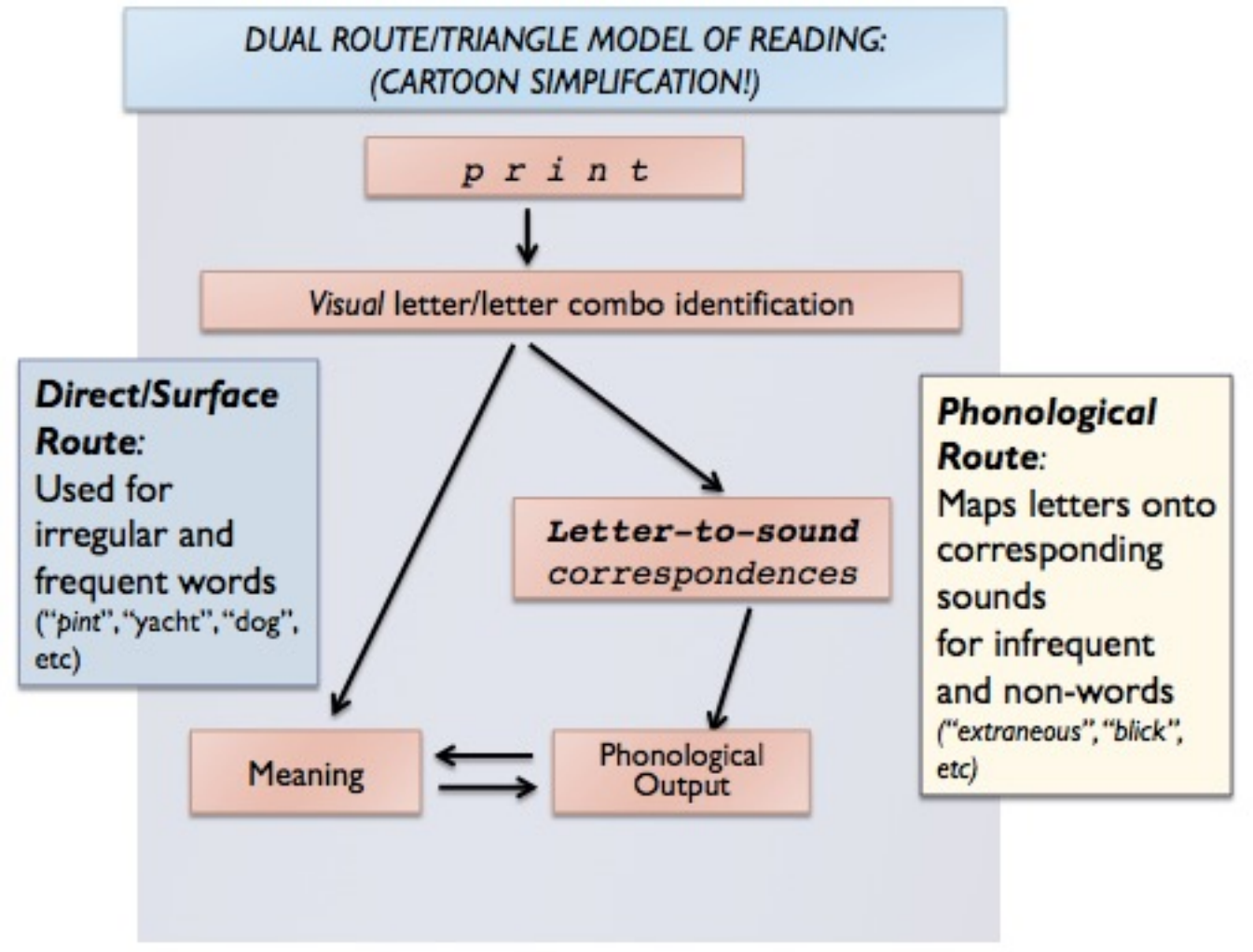


Developmental dyslexia: reading profiles

Model can be used to explain the "reading profiles" of people with developmental dyslexia.

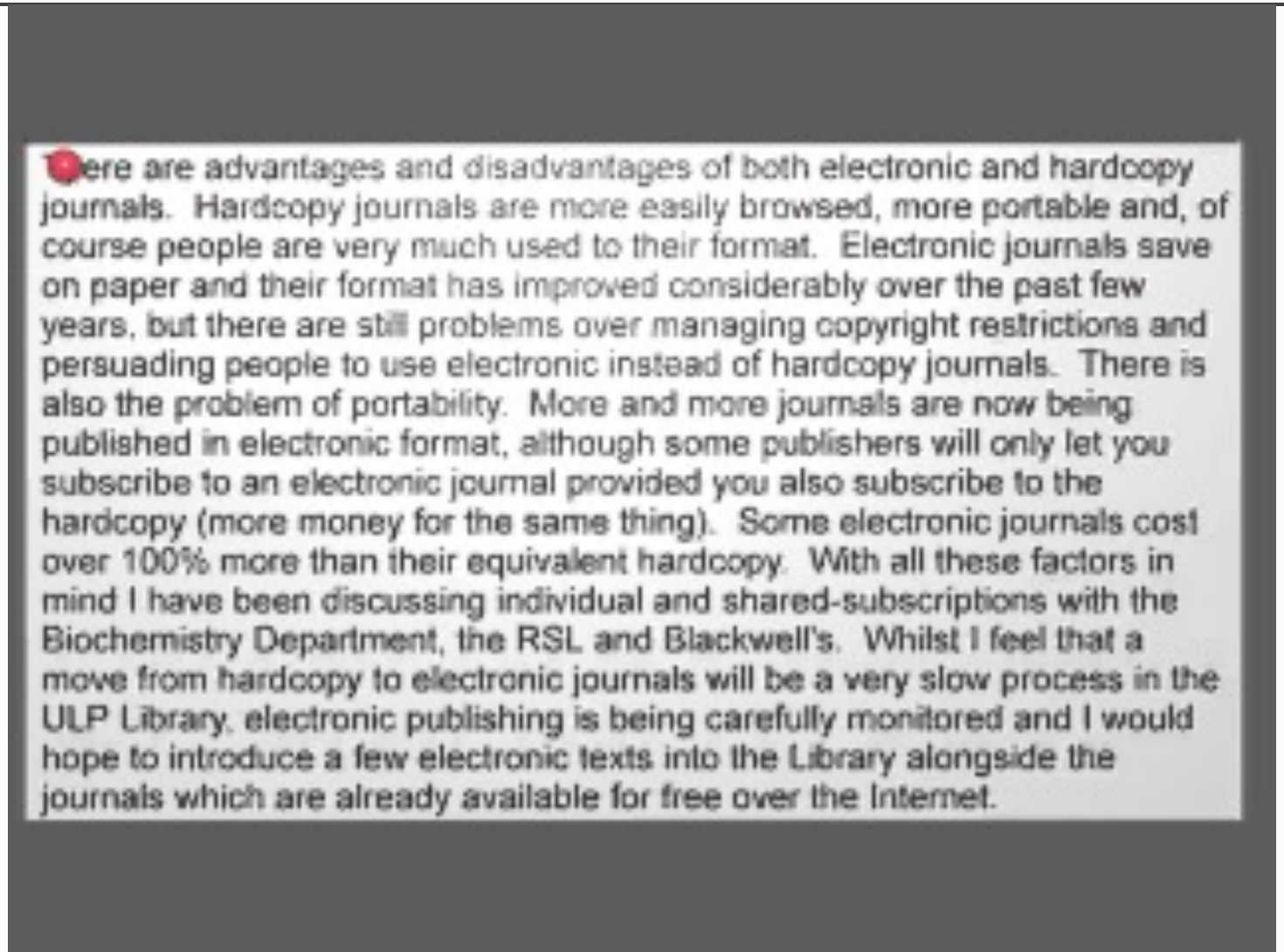
We can assign them to one subtype or another.

We'll come back to this next class!



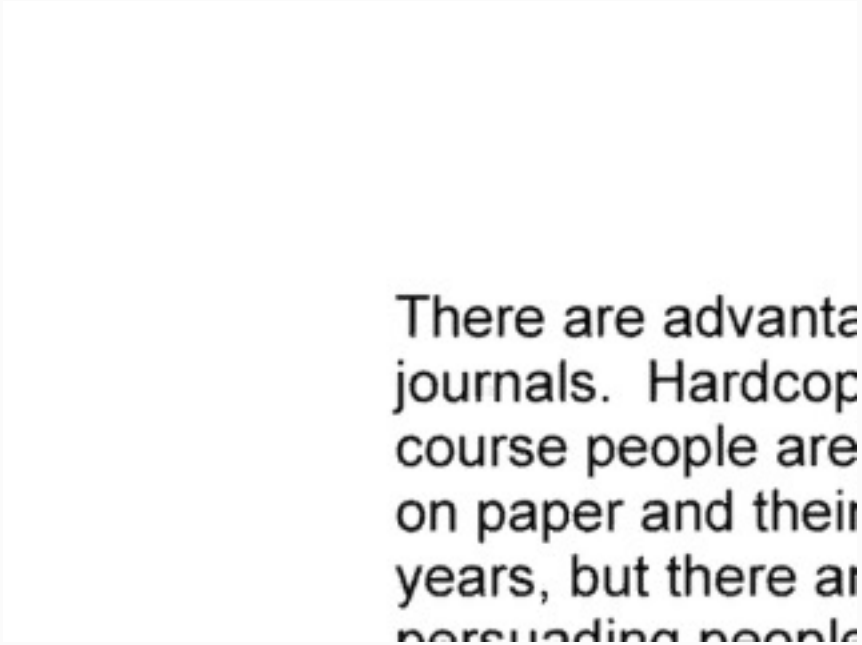
Eye movements during reading

Eye movements during reading



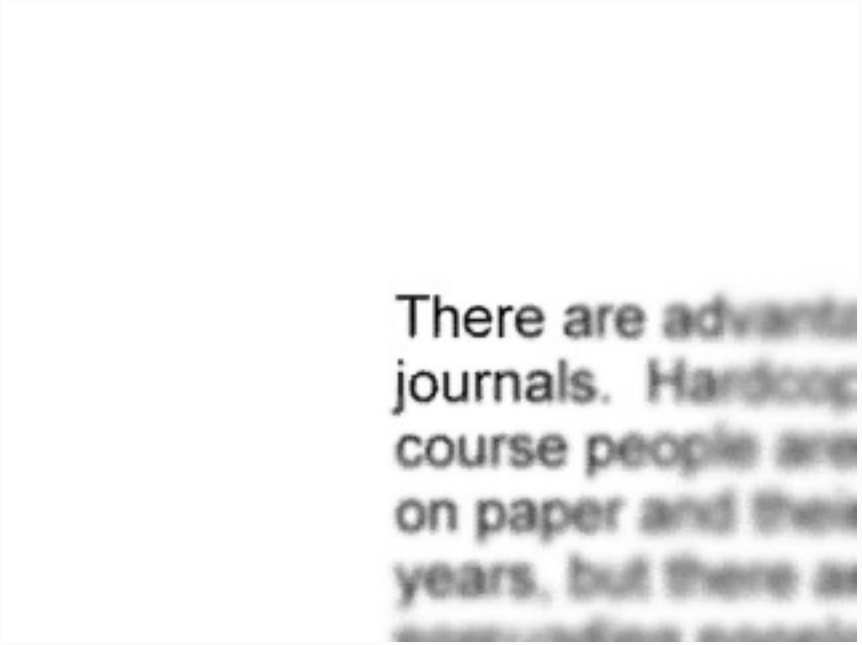
Eye movements during reading

- Eye-centric view of the text



Eye movements during reading

- What the eye sees



Eye movements during reading

- **Fixations**: when the eye is still
  - 200-250 milliseconds
- determined by...
  - length
  - frequency
  - syntactic category
  - predictability
  - cognitive load

Eye movements during reading

- **Saccades**: when the eye moves
  - 25-30 milliseconds
  - length is language (orthography)-specific
    - English: 8 characters
    - Hebrew: 5.5 characters
    - Japanese: 3.5 characters
    - Chinese: 2 characters

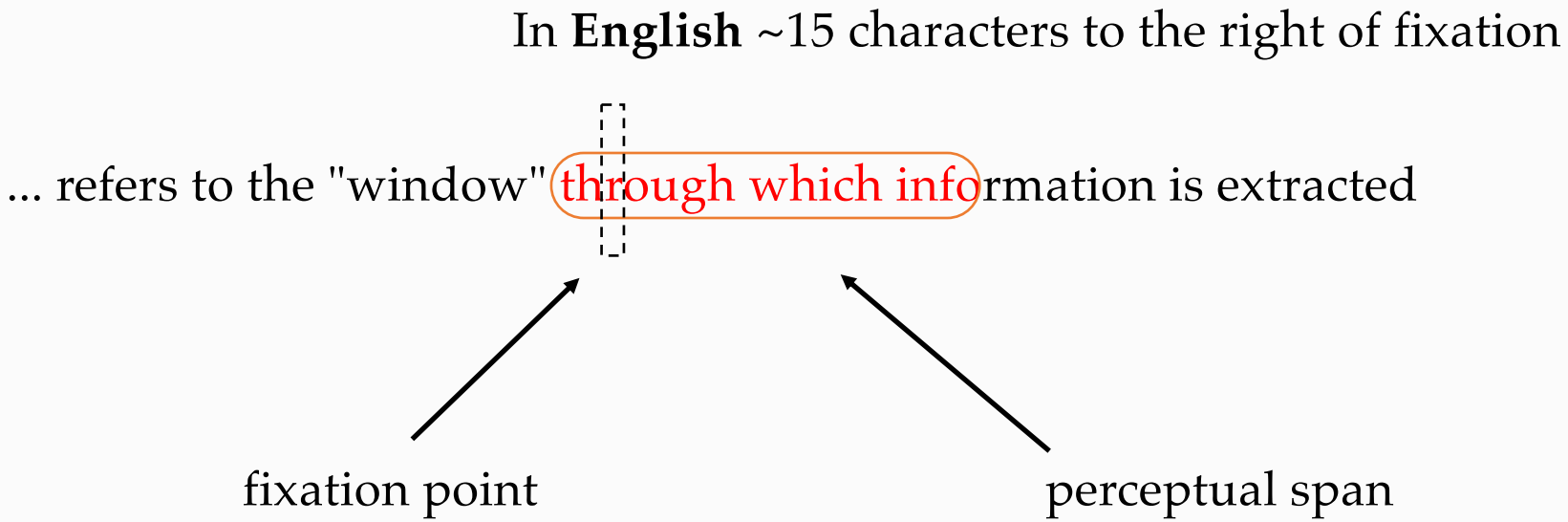
- The amount of information matters

Eye movements during reading

- How much information is extracted on each fixation?

Eye movements during reading

- How much information is extracted on each fixation?



- Perceptual span is the length of a saccade x2

Eye movements during reading

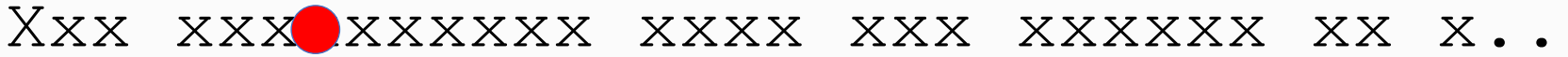
- How much information is extracted on each fixation? **Demo**

Eye movements during reading

- How much information is extracted on each fixation? **Demo**

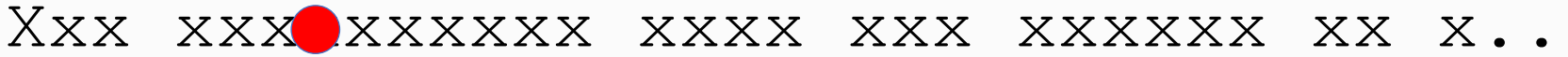
Eye movements during reading

- How much information is extracted on each fixation? **Demo**



Eye movements during reading

- How much information is extracted on each fixation? **Demo**



Eye movements during reading

- How much information is extracted on each fixation? **Demo**

Eye movements during reading

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Eye movements during reading

- How much information is extracted on each fixation? **Demo**

Eye movements during reading

- How much information is extracted on each fixation? **Demo**

The politician read the speech to a..

within ~7 characters, participants notice the change

Rayner (1975)

Eye movements during reading

- How much information is extracted on each fixation? **Demo**

```
The politician read the speech to a..
```

More than ~12 characters, participants don’t notice the change

Rayner (1975)

Eye movements during reading

- How much information is extracted on each fixation? **Demo**

The politician read the speech to a..

What do you think happens between 7-12 characters?

Rayner (1975)

Eye movements during reading

- How much information is extracted on each fixation? **Demo**

The politician read the speech to a..

participants still don't notice, but fixation durations change!

The more similar the original word to the final word, the shorter the fixation durations on the final word.

speech < spaach < blaach

Rayner (1975)

Eye movements during reading

- How much information is extracted on each fixation? **Demo**

The politician read the speech to a..

Participants (YOU!) still don't notice, but fixation durations change!

The more similar the original word to the final word, the shorter the fixation durations on the final word.

speech < spaach < blaach

Rayner (1975)

Eye movements during reading

- Misspelled words

Aoccdrnig to rscheearch at Cmabrigde uinervtisy, it deosn't mttaer waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteres are in the rghit pclae. The rset can be a tatol mses and you can sitll raed it wouthit a porbelm. Tihs is bcuseae we do not raed ervey lteter by it slef but the wrod as a wlohe.

Eye movements during reading

- Misspelled words

According to research at Cambridge university, it doesn’t matter what order the letters in a word are, the only important thing is that the first and last letters are in the right place. The rest can be a total mess and you can still read it without a problem. This is because we do not read every letter by itself but the world as a whole.

Eye movements during reading

- What drives eye movements?
  - physical properties of the stimulus
  - # of letters in word
  - linguistic properties of the stimulus
  - Frequency, syntactic category, predictability

- Why might they be important to measure?
  - they are useful as an experimental tool
  - they may be useful as a diagnostic tool
    - schizophrenia; Alzheimer-type dementia; Parkinson’s

Key concepts

- ✓Kinds of writing systems
  - ✓Logographic scripts, syllabic scripts, alphabetic scripts
- ✓Dual route model of reading
  - ✓Direct route = print to meaning
  - ✓Phonological route = print to sound to meaning
- ✓What the eyes do when we read
  - ✓Fixations
  - ✓Saccades
  - ✓Perceptual span
- ✓What affects eye movements when we read