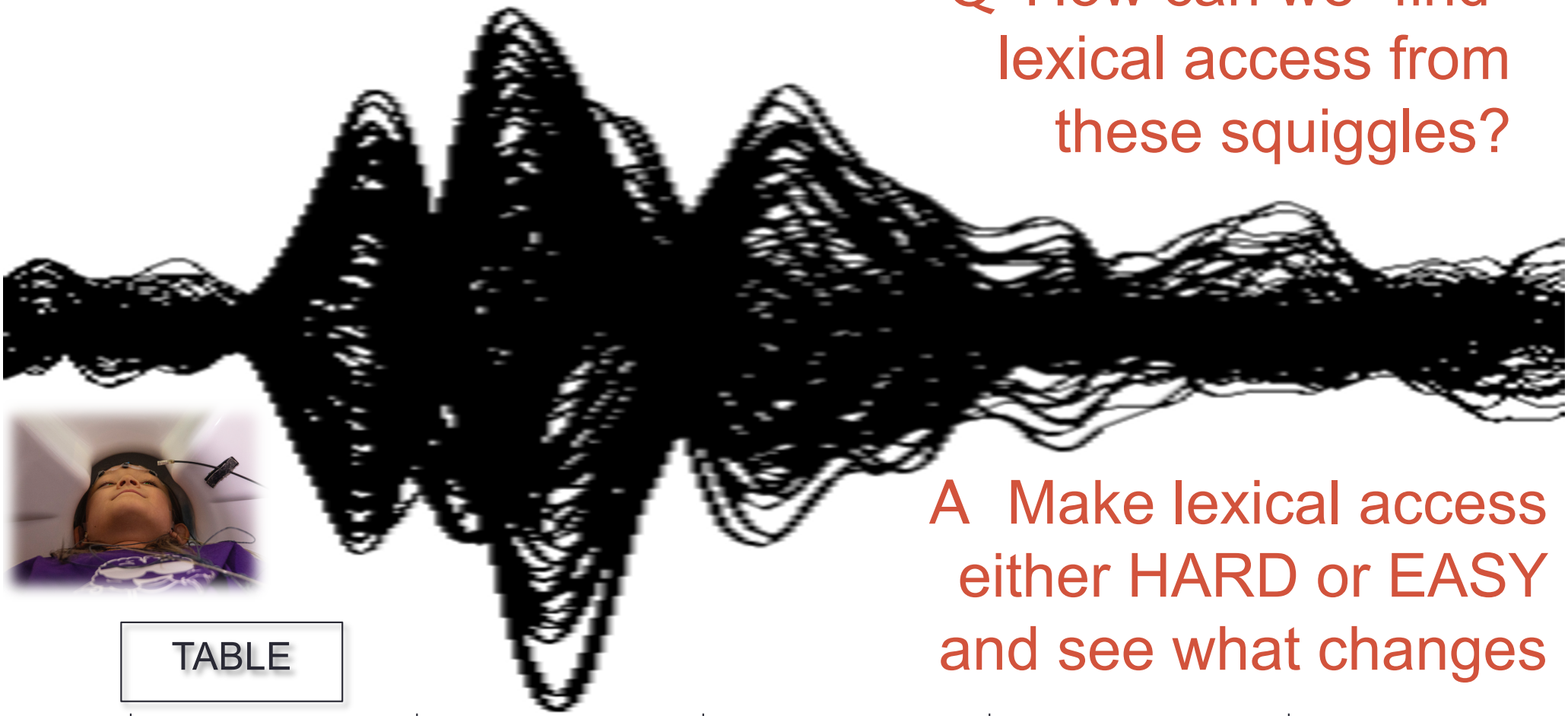
LEXICAL ACCESS IN HEALTHY BRAINS
Evidence from electrophysiology

Q How can we "find" lexical access from these squiggles?



TABLE

A Make lexical access either HARD or EASY and see what changes

0 100 200 400 500 [msec]

How can we make lexical access easy or hard?

- The “ease” of accessing a lexical entry always depends on the level of activation in that entry prior to access.
- If the word has not been used in a long time, its representation is “sleepy” and it will take longer to access it.

- If the word is used a lot, its representation is more active, and it is faster to access it.

How can we make lexical access easy or hard?

- The general alertness level of a lexical entry depends on how often we use it.
- This level is called the “resting level of activation”
- A word’s resting level of activation is largely determined by the frequency of the word in the language.

frequent word

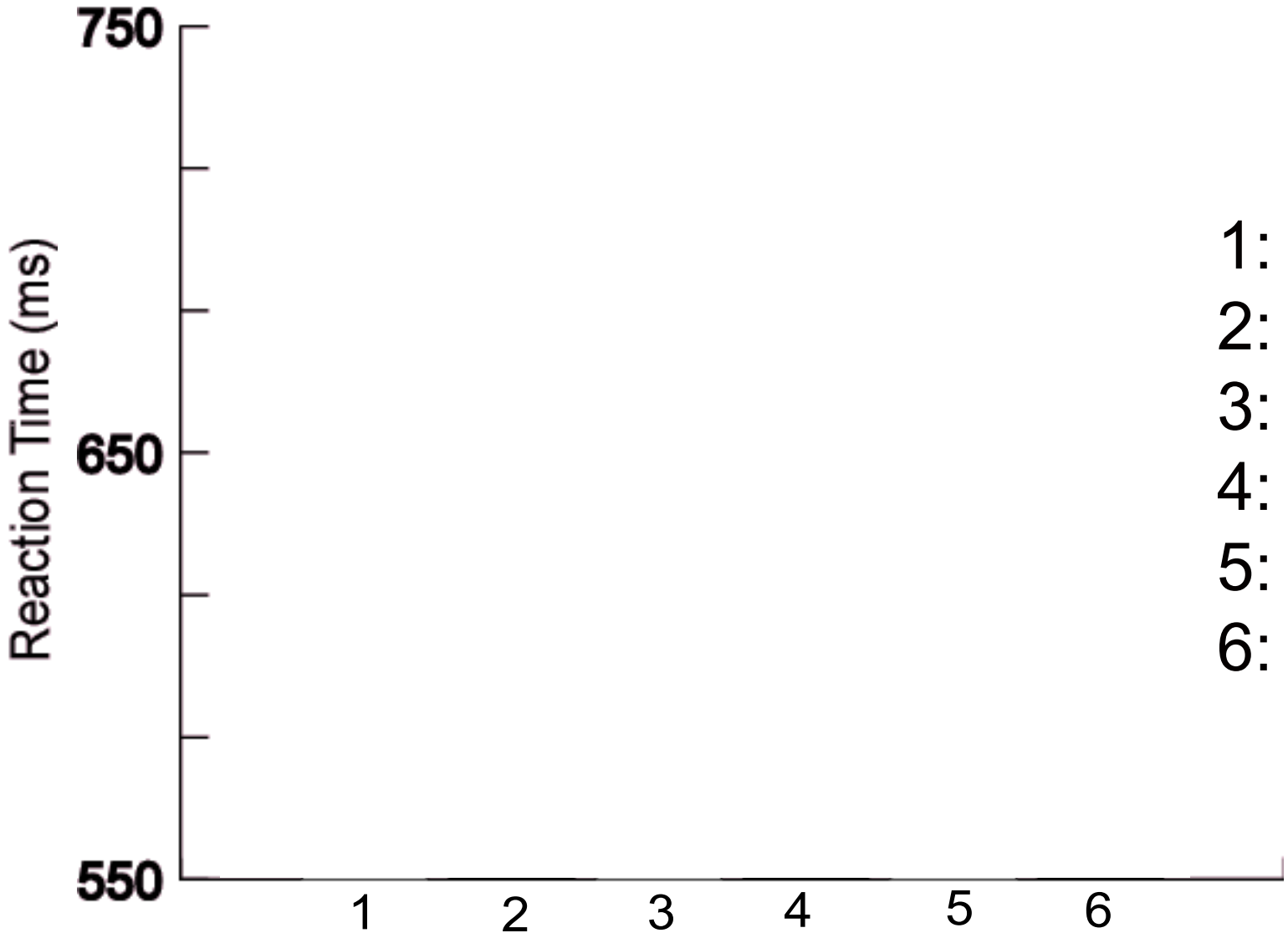
time

mar

infrequent word

Lexical Decision: Real word or not?

HOME LOME NAL STAND

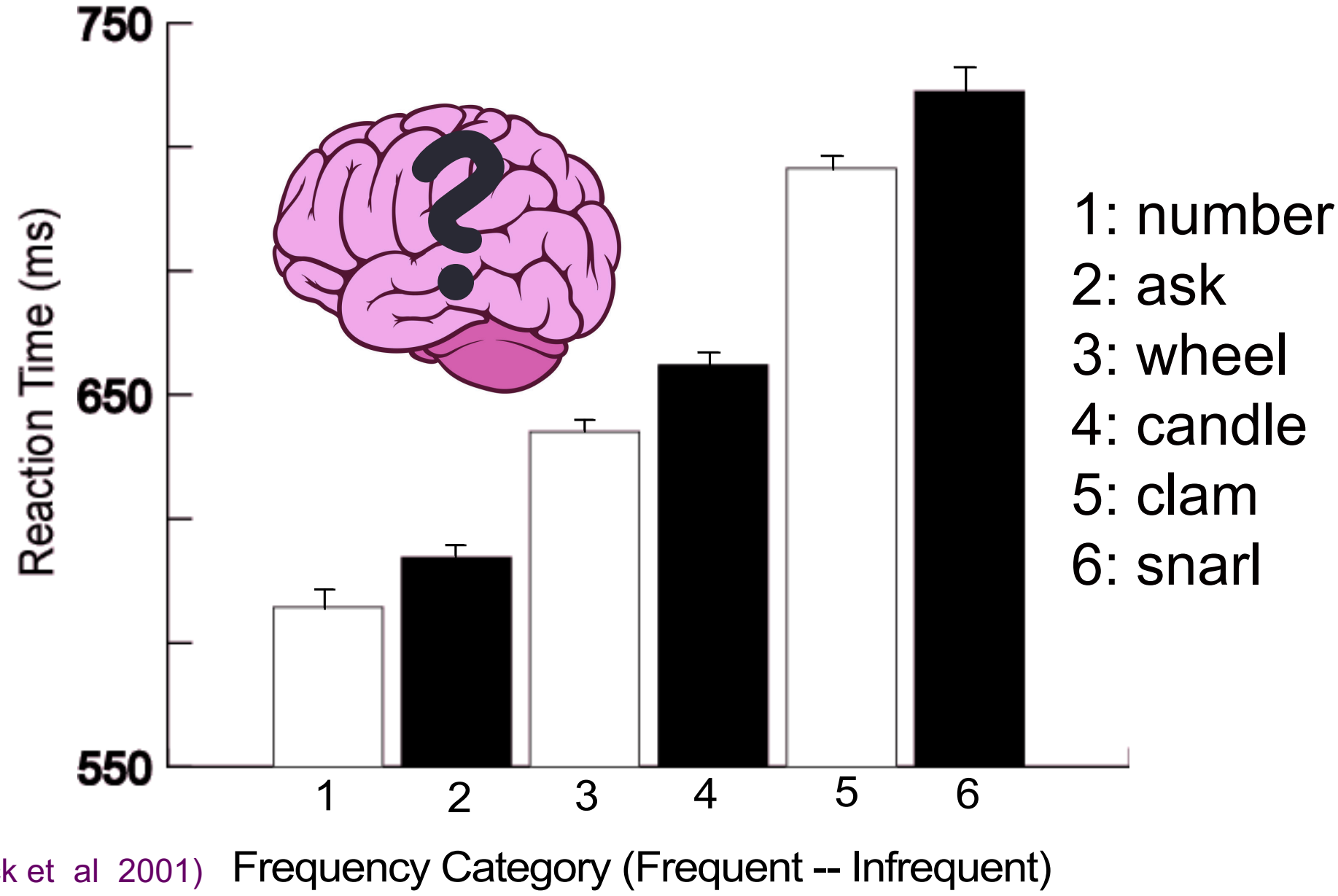


1: number
2: ask
3: wheel
4: candle
5: clam
6: snarl

(Embick et al 2001)

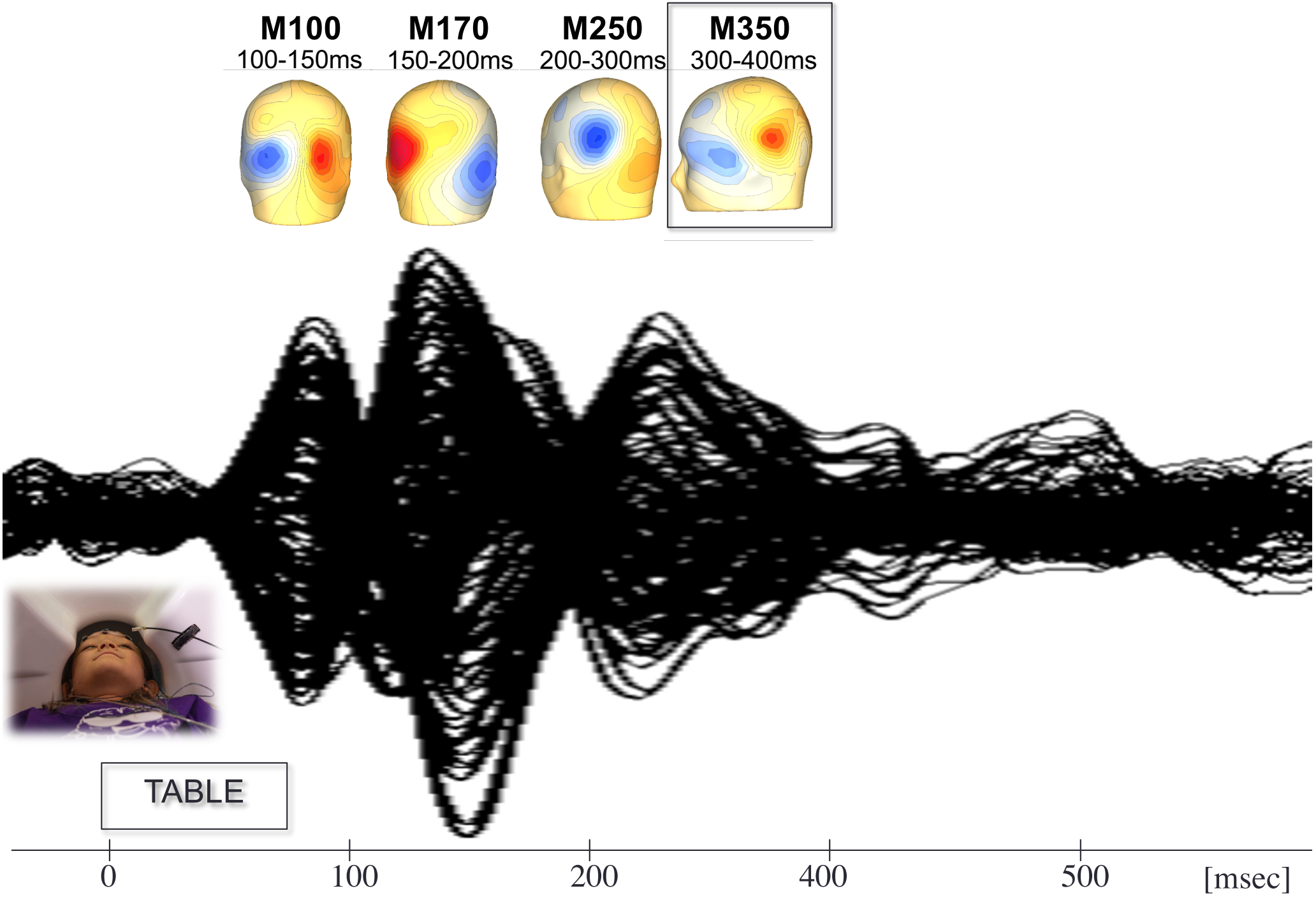
Lexical Decision: Real word or not?

HOME LOME NAL STAND

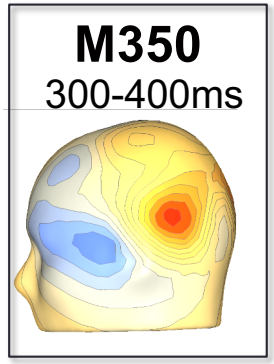


(Embick et al 2001)

MEG response to visual words: Effect of lexical frequency?



M350 peak latencies as a function of frequency



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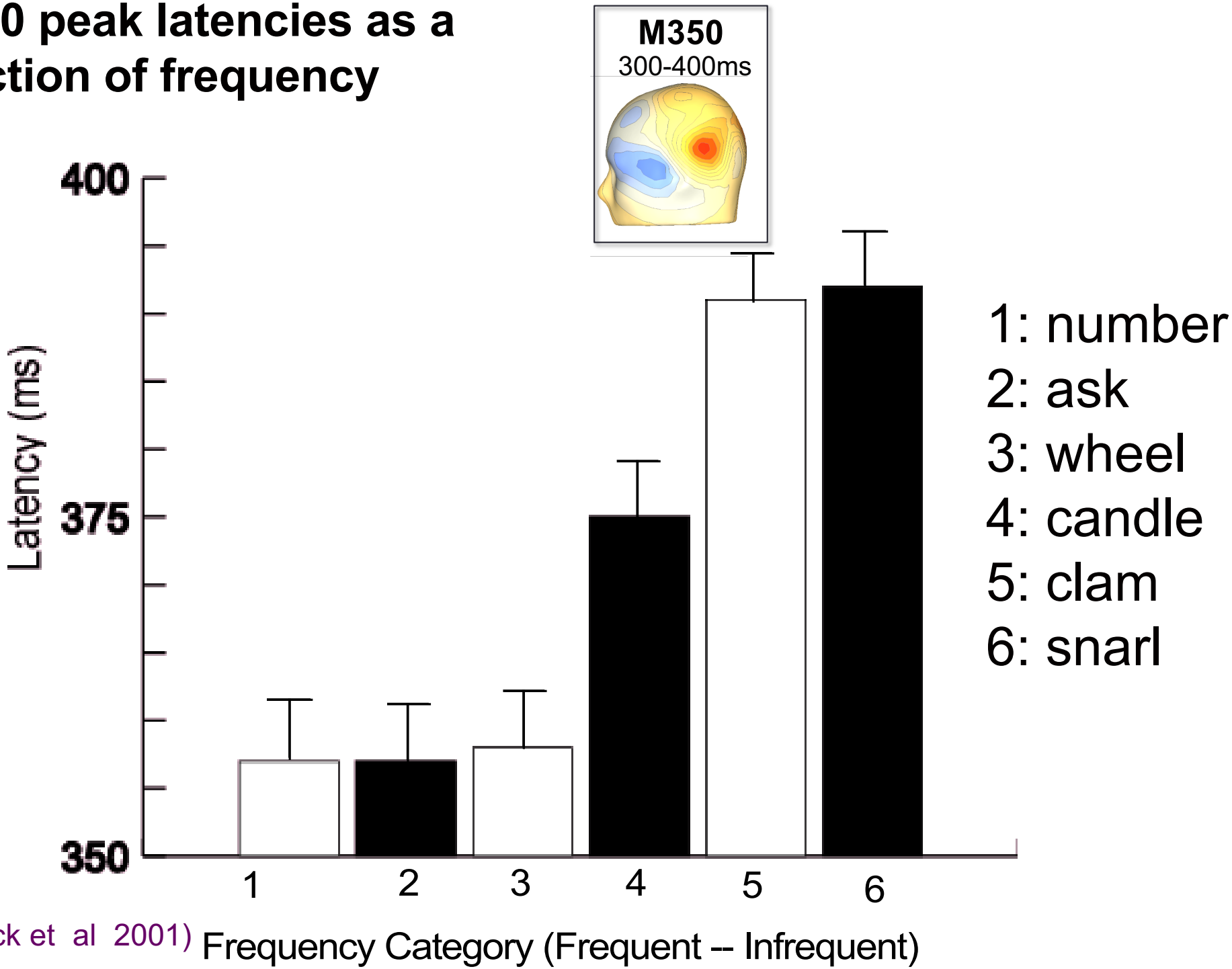

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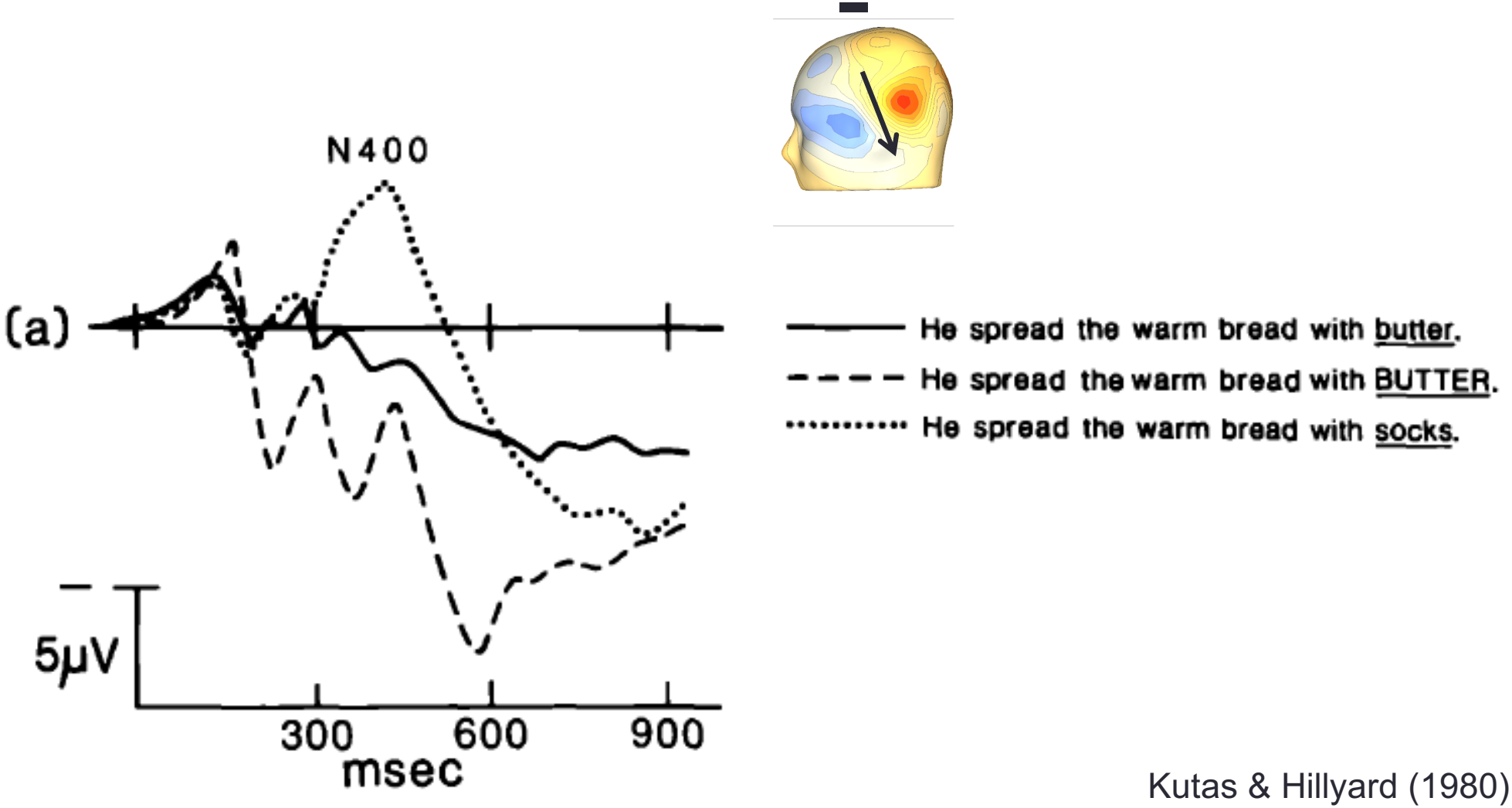
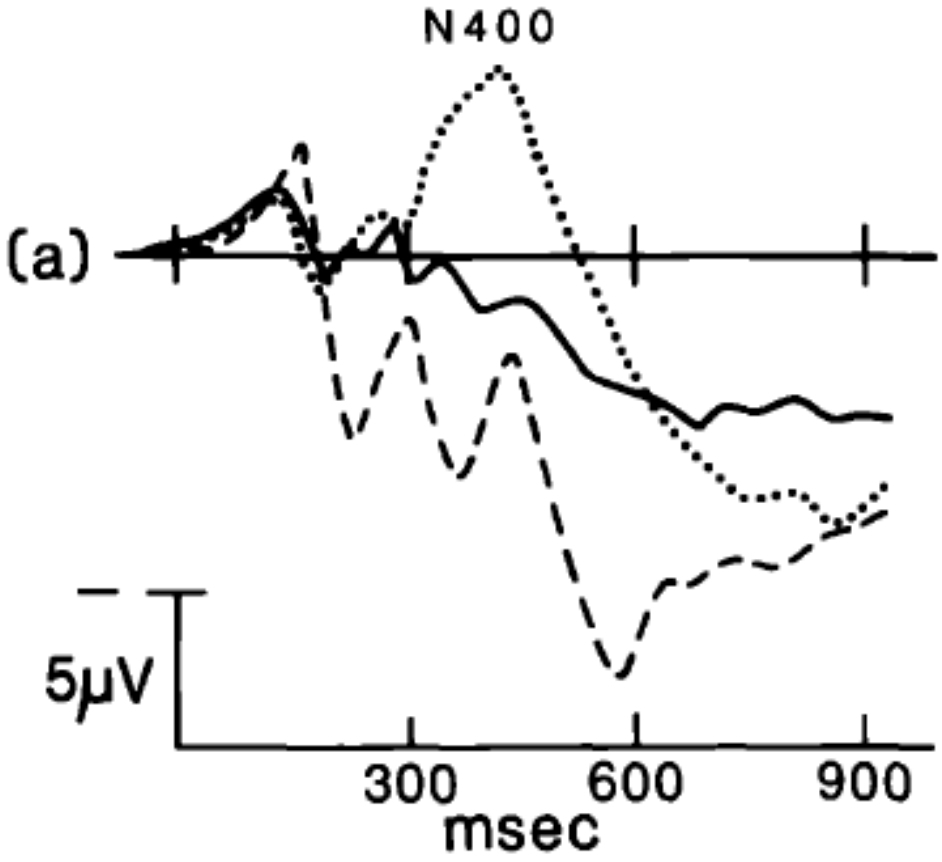
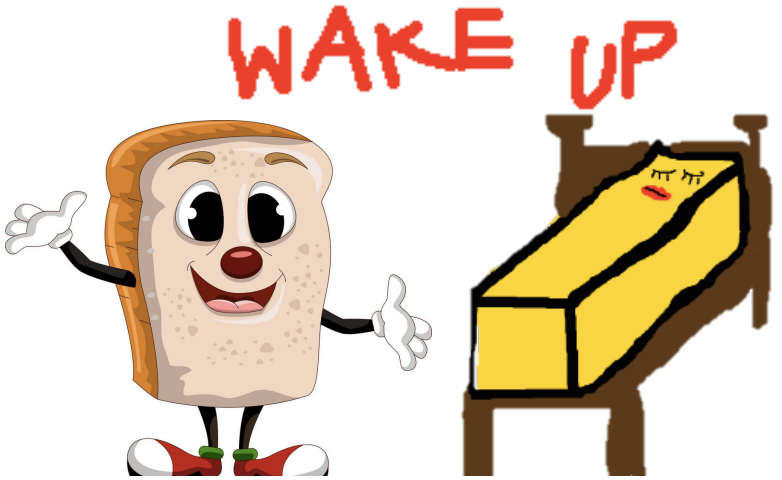


Kutas & Hillyard (1980)





He spread the warm bread with butter.

He spread the warm bread with BUTTER.

He spread the warm bread with socks.

Form control (BUTTER) shows that the N400 effect is elicited by semantic surprise but **not** by visual surprise.

Kutas & Hillyard (1980)

How can we make lexical access easy or hard?

- By varying **FREQUENCY**
- By varying **CONTEXT**
  - Each word activates other, similar, words.
  - Activation spreads both on the basis of meaning and sound.
  - We can affect the ease of lexical access by presenting similar words before the target word.
  - The effect of the context word on the targer word is called **PRIMING**.

prime	target
BREAD	BUTTER

Lexical access as evidenced by electrophysiology

- By 300-400ms (M350/N400), lexical entries are robustly activated.
- The corresponding neural activity localizes in middle/posterior left temporal cortex, consistent with aphasia evidence (transcortical sensory aphasia).
- Although this is most likely not the first pass of activation through lexical representations, this is the time-window and localization that multiple methods converge on.