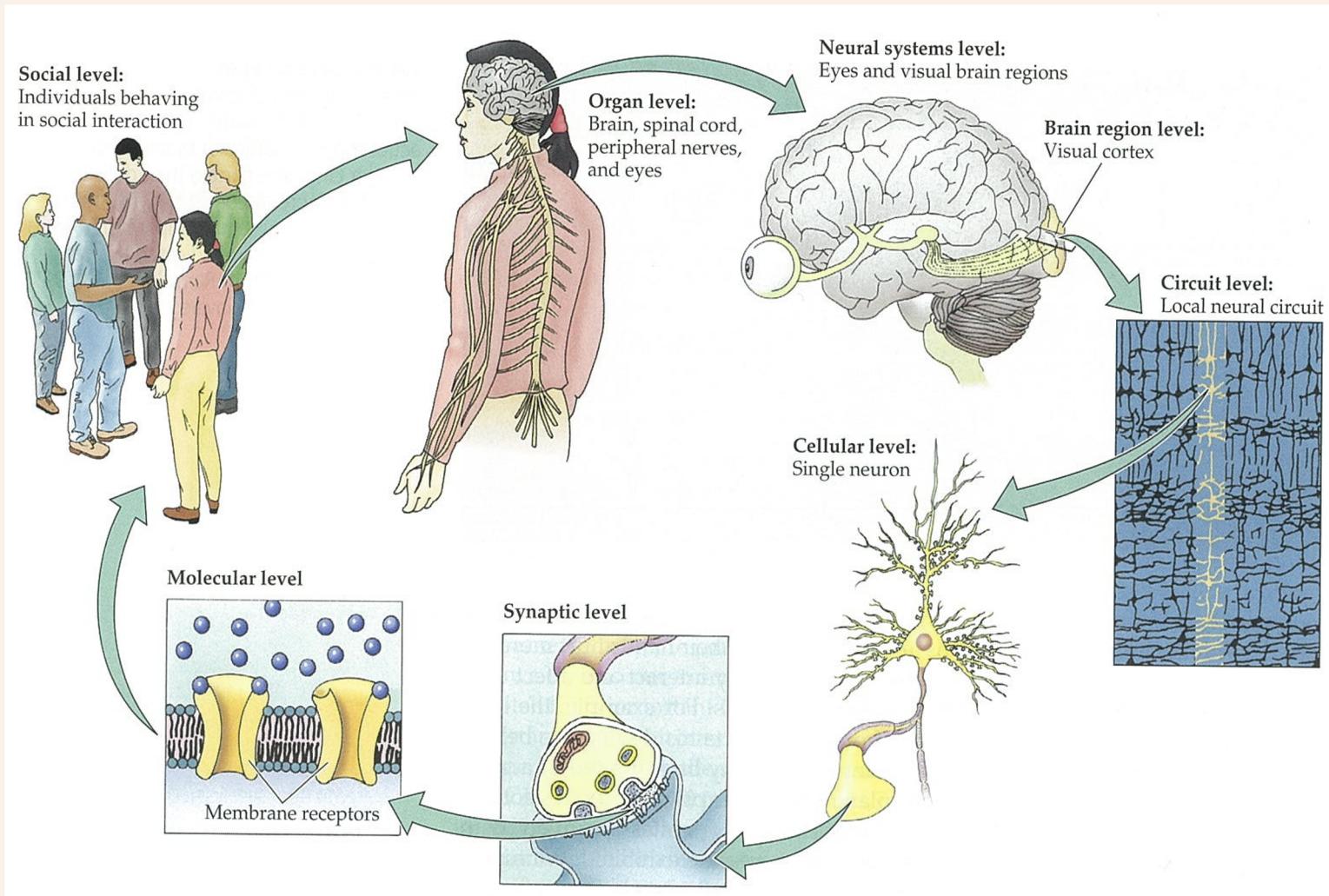


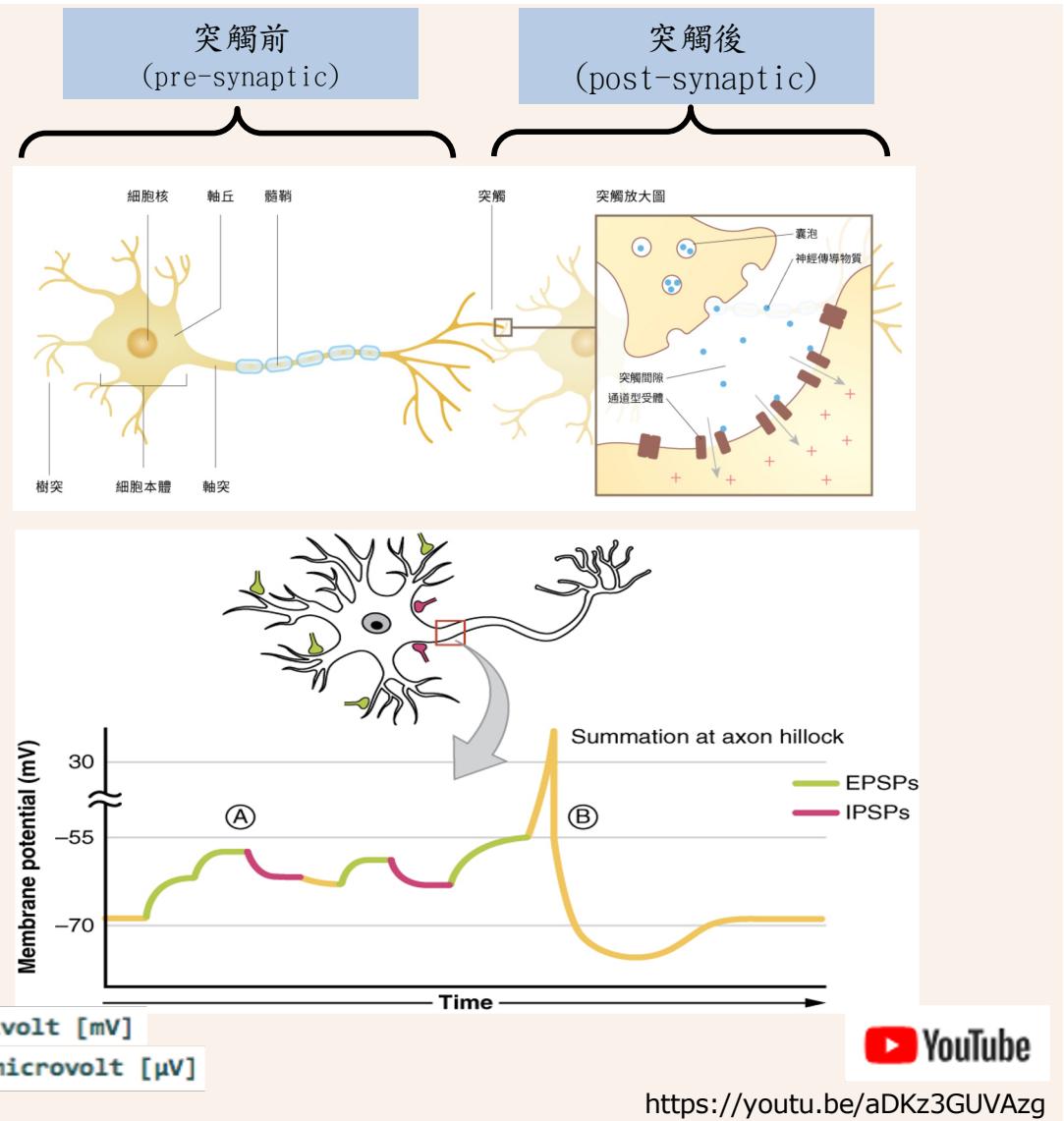
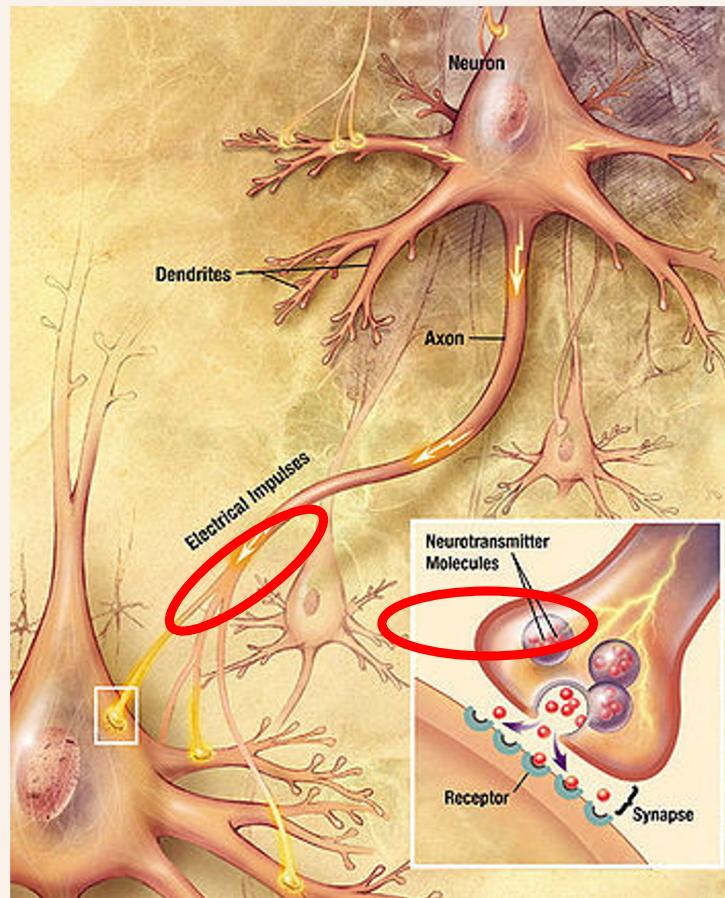
# Introducing EEG data

National Taiwan University  
Chia-lin Lee





# Neuronal communication



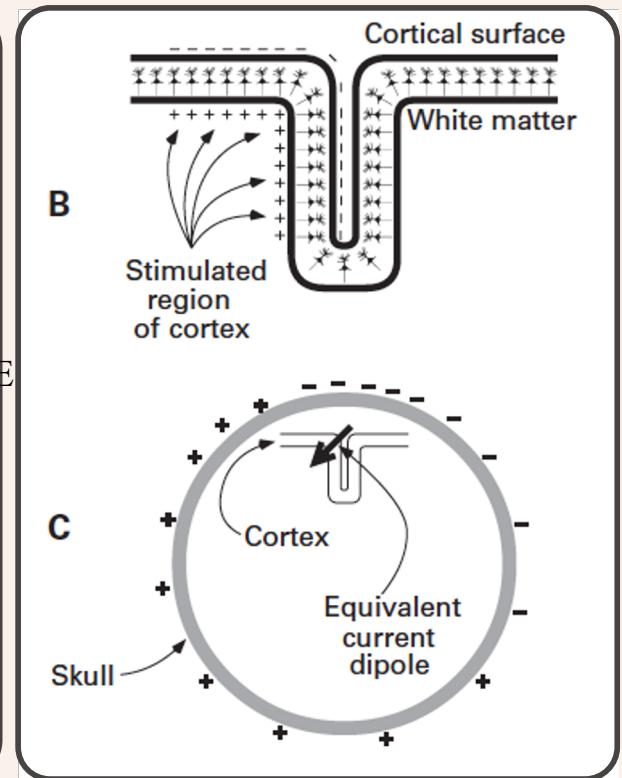
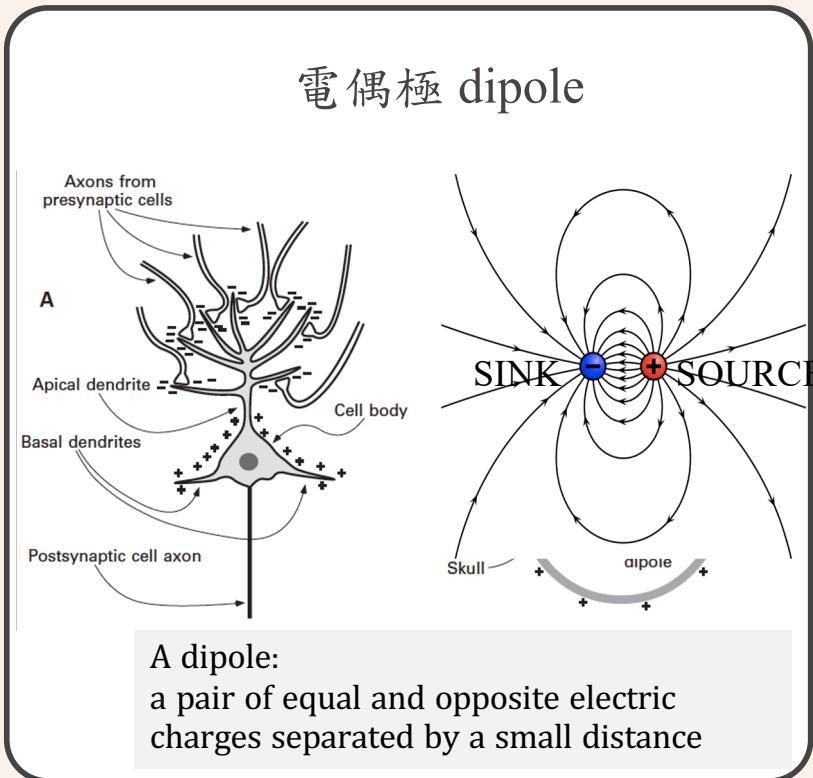
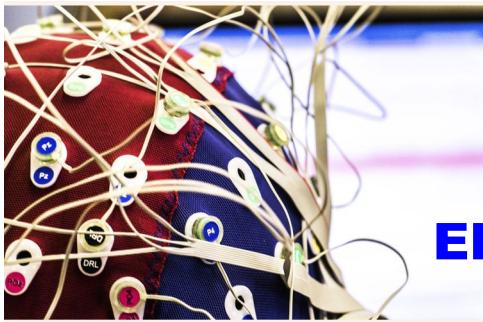
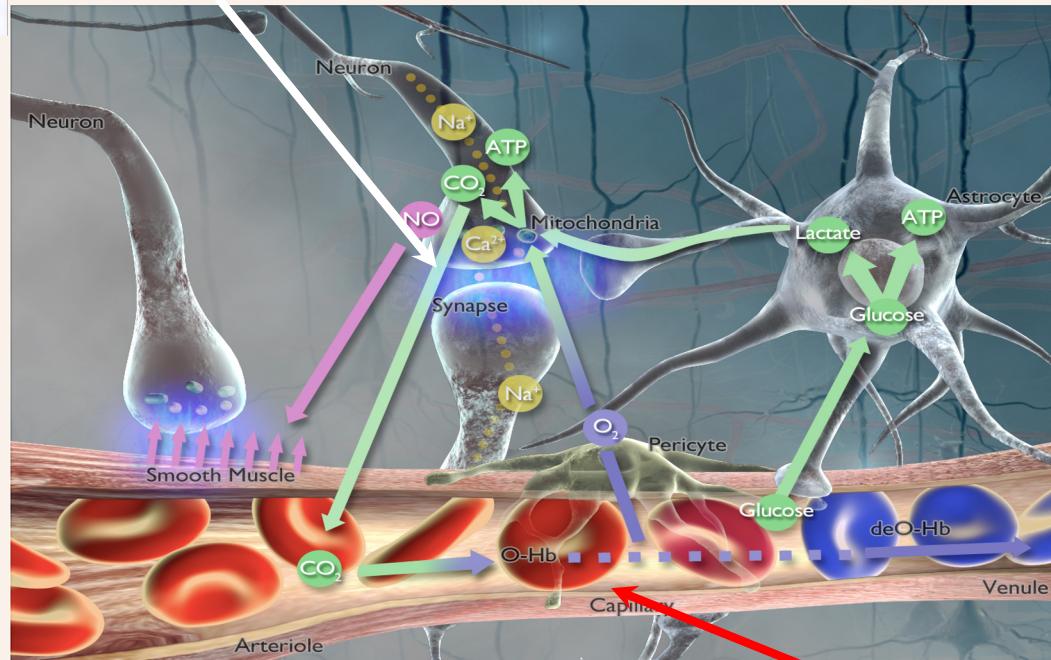


Fig. 2.2 (Luck, ch2)

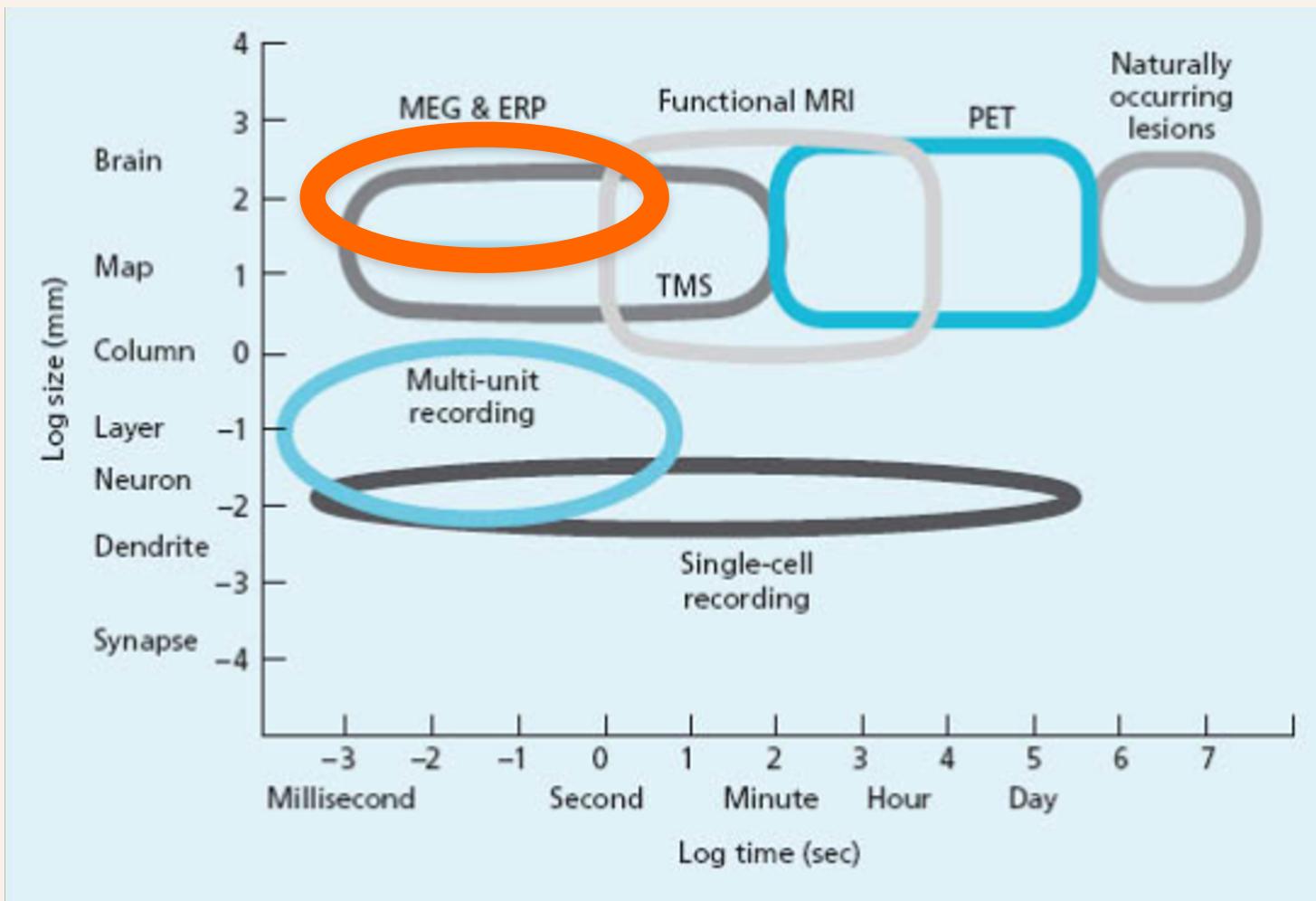


## EEG/ERP/MEG

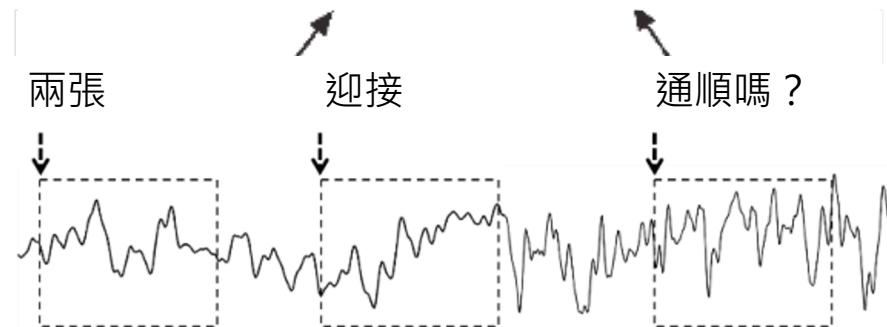
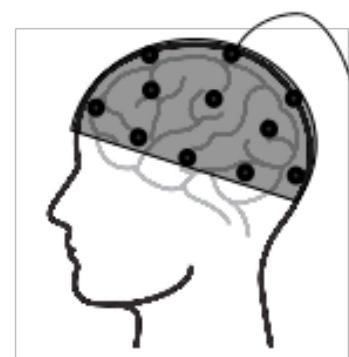
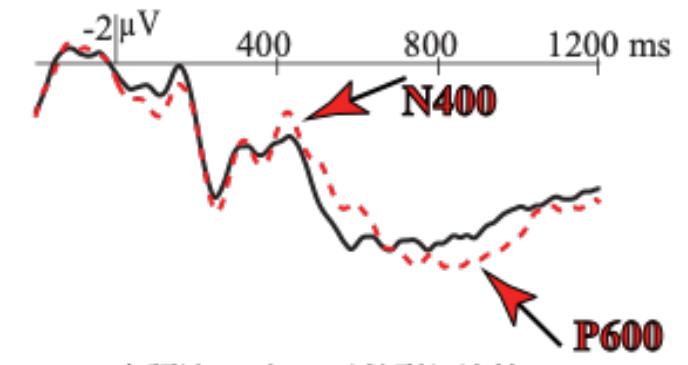
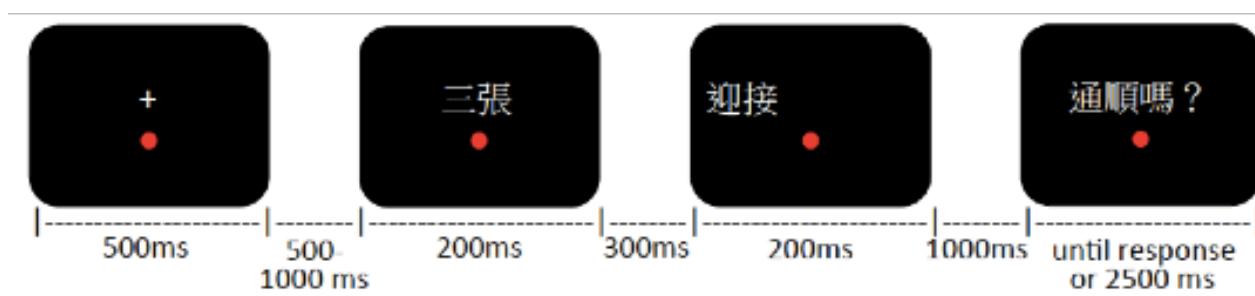


**BOLD fMRI**



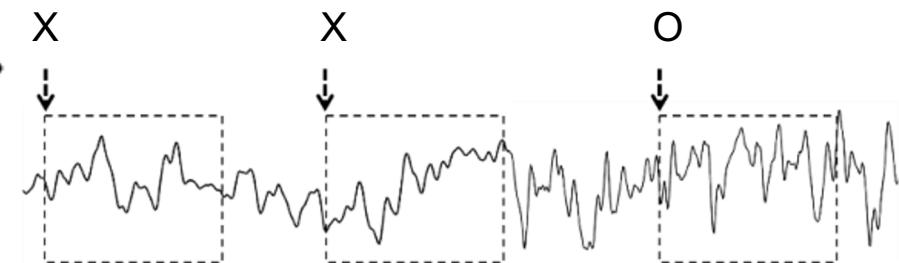
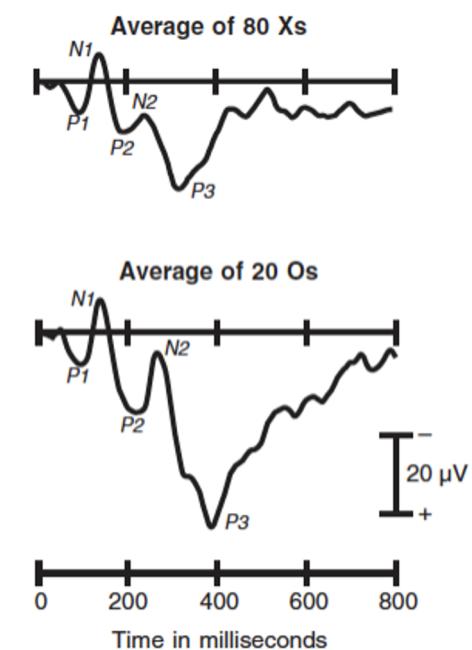
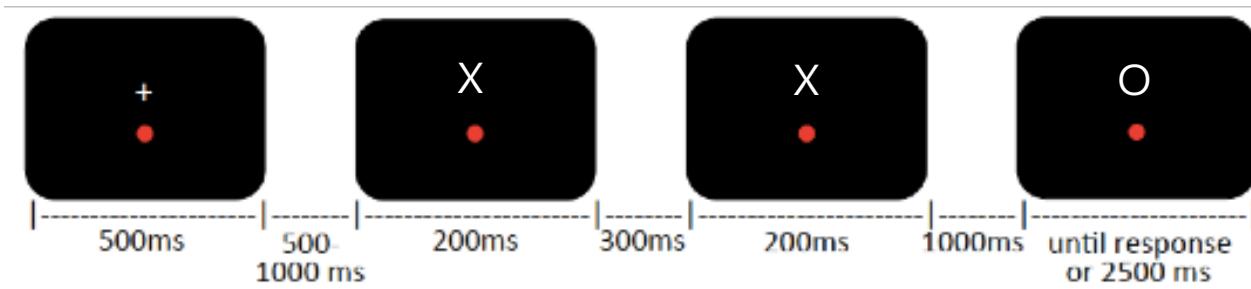


## Event-Related Potentials (ERPs)



On-going EEG (electroencephalogram)

## Event-Related Potentials (ERPs)



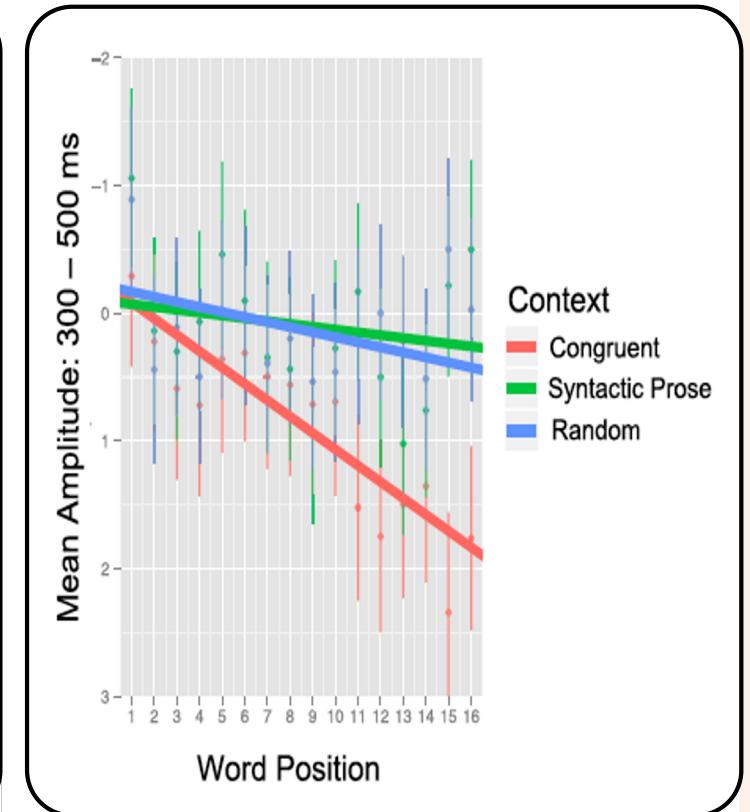
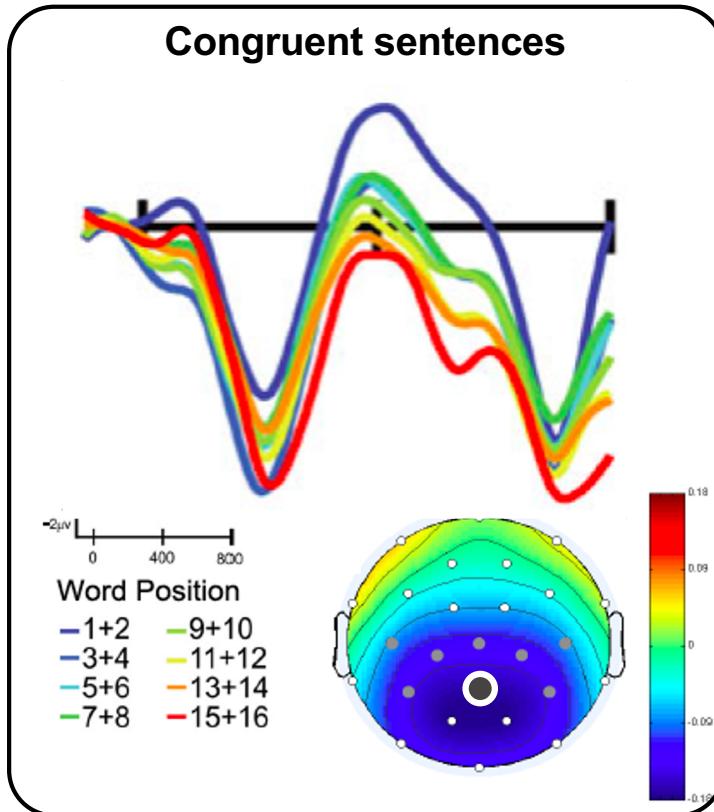
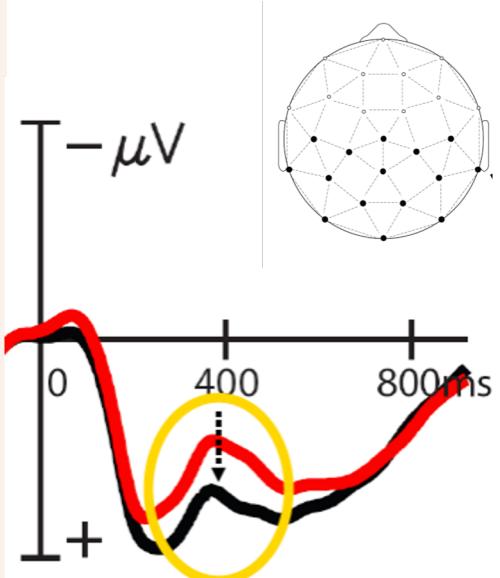
On-going EEG (electroencephalogram)

For most experiments, stimuli need to be carefully and painfully controlled for important psycholinguistic features



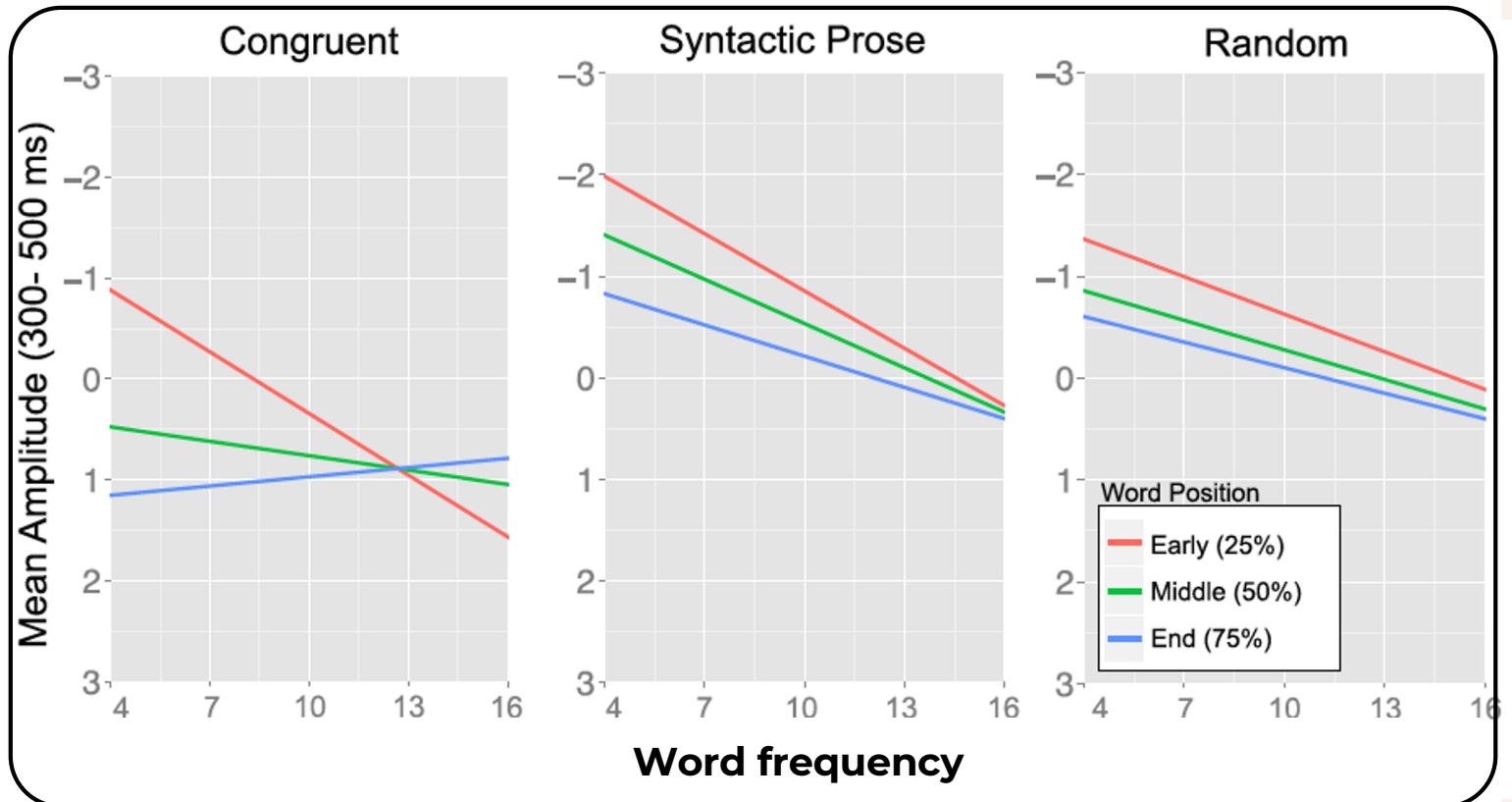
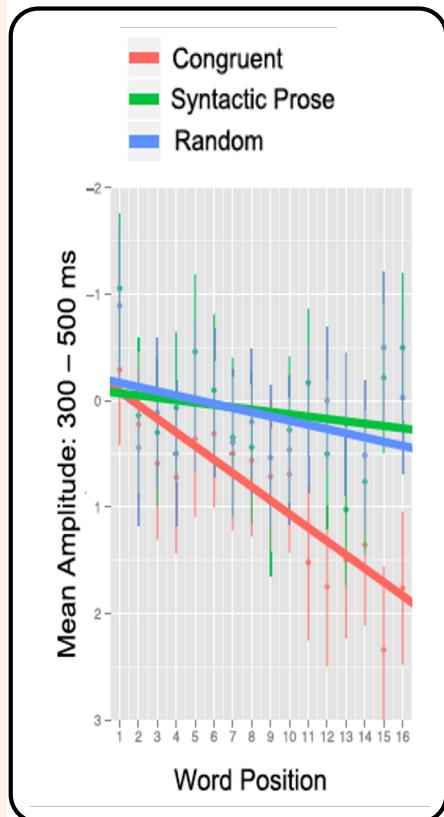
**Table 2** Mean values (with standard deviations in parentheses) of lexical and sentential features of the stimuli in each condition

Context		Emotionally biased (High valence constraint)			Emotionally unbiased (Low valence constraint)		
Target words		Positive	Negative	Neutral	Positive	Negative	Neutral
Number of trials in each list		13	13	26	13	13	26
Sentence frame	Valence constraint	Raw score [1: most negative; 9: most positive]	6.8 (0.4)	2.6 (0.4)	4.9 (2.0)	5.4 (0.4)	5.0 (0.5)
		Deviance from neutral [[Rated score - 5]; possible range 0-4]	1.8 (0.4)	2.4 (0.4)	1.9 (0.4)	0.5 (0.3)	0.4 (0.3)
Critical word	Valence	Semantic constraint (%) [1: most negative; 9: most positive]	62% (25%)	66% (19%)	58% (20%)	67% (24%)	55% (22%)
		Deviance from neutral [[Rated score - 5]; possible range 0-4]	7.1 (0.4)	2.4 (0.5)	5.0 (0.6)	6.9 (0.5)	2.7 (0.5)
	Arousal	Raw score [1: least arousing; 9: most arousing]	2.1 (0.4)	2.6 (0.5)	0.5 (0.3)	1.9 (0.5)	2.3 (0.5)
		5.2 (0.8)	5.4 (0.9)	3.8 (1.2)	4.8 (0.9)	4.8 (1.0)	3.1 (0.9)
	Cloze probability (%)	Plausibility [1: least plausible; 7: most plausible]	5% (4%)	4% (5%)	4% (7%)	3% (5%)	4% (6%)
		Familiarity [1: least familiar; 7: most familiar]	6.1 (0.7)	5.4 (0.8)	5.0 (1.1)	5.9 (0.6)	5.4 (0.7)
	Concreteness	Word length	6.1 (0.5)	6.0 (0.5)	6.3 (0.4)	6.3 (0.4)	6.1 (0.5)
	[1: least concrete; 7: most concrete]	4.1 (1.2)	3.8 (1.0)	3.7 (1.0)	4.2 (1.1)	4.4 (0.9)	4.1 (1.2)
	Number of strokes	2.1 (0.3)	2.0 (0.3)	2.0 (0.2)	2.0 (0.2)	2.0 (0.2)	2.0 (0.3)
		24.5 (7.3)	22.0 (6.1)	21.0 (7.5)	25.2 (7.4)	23.1 (5.0)	20.5 (6.3)



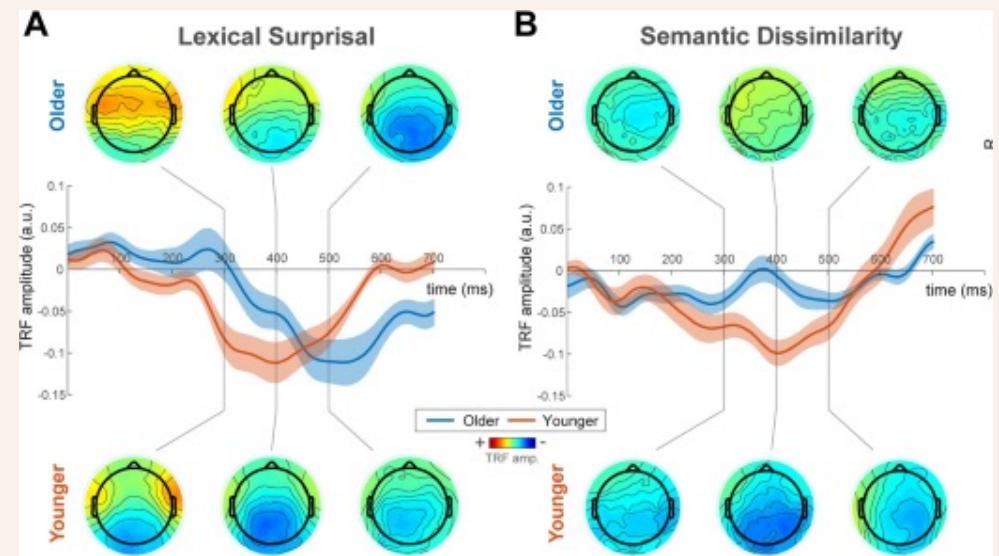
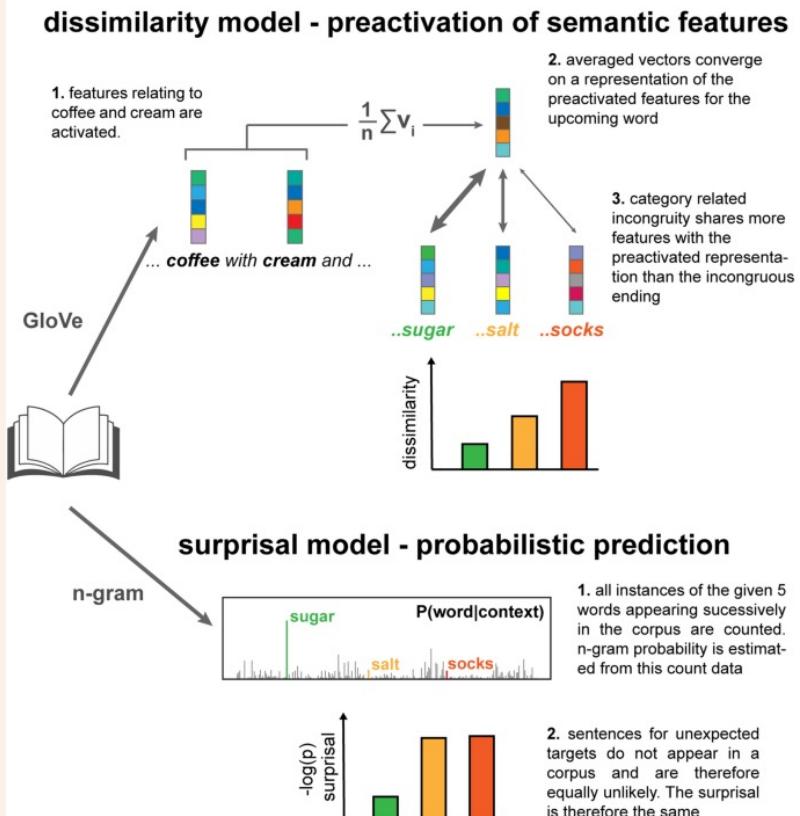
Payne, Lee, Federmeier (2015, Psychophysiology)

Reduced word frequency effect as congruent sentences unfold.



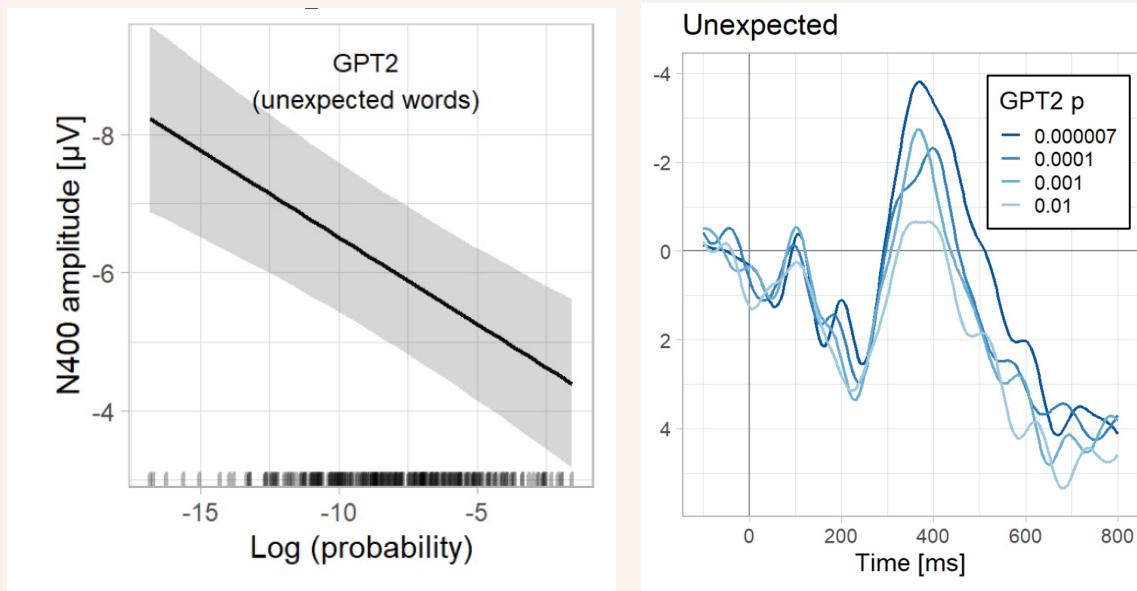
The Old Man and the Sea (Hemingway, 1952), read by a single male American speaker.

Example sentence: I take my coffee with cream and **sugar / salt / socks**



Broderick et al. (2021)

Output of a GAM model testing the relationship  
between GPT2 word pability and he N400 to  
unexpected sentence endings



Szewczyk & Federmeier (2021)

# Brain and Language Processing Lab @NTU

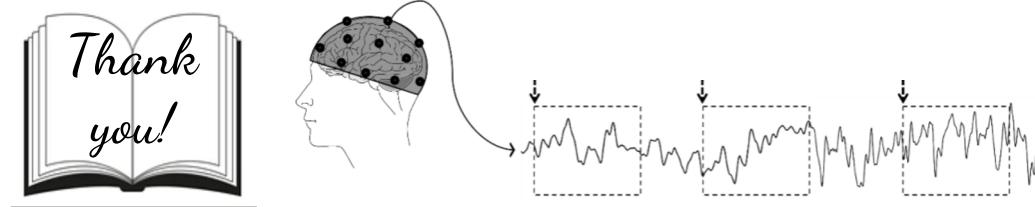
<http://blplab.linguistics.ntu.edu.tw/>

國立臺灣大學文學院



腦與心智科學研究所

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