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Reordering Letters Makes a Difference in Lexical Selection

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The decisions which lead to the identification of a word entry are the result of a forced selection process, which assigns as default the entry which best matches the available cues. This probabilistic approach means that the lexical selection of an entry depends on features which distinguish it from any other lexical entries competing for selection (Ziegler, & als, 2003) subject to attention, lexical activation and task demands.

Table 1: Stimulus sample in a migration error experiment

Cond	Subc	1Dist	Target	1st Dist	2nd Dist
LS	SUB	plano	llano	pleno	llamo
	ADD	pata	plata	lata	plana
LM	1-WS	persa	presa	tersa	fresa
	2-WS	negar	negra	regar	legra
	CC-BS	falta	fatal	malta	fetal
	VV-BS	sabor	sobar	saber	robar
OM	PA	notar	raton	votar	razon
	SM	queja	jaque	quema	saque
	FM	niego	genio	ciego	junio

Stimulus Set = 1Dist+Target; Response Set= Target + Distracters

Experiment

This design seeks to study how the brain uses distributional and relational letter information to single out a target from a two-word display in which both words share the same letters in different order. The contribution of letter- and whole-word cues to word selection is hypothesized to be the driving force in modulating feedback from lexical entries to the input.

A forced-choice migration error paradigm was used under time constraints; 12 adult readers were first presented with a target-distracter two-word display, and then required to chose a postcued visual target among a set of four stimuli while evoked-related brain responses were recorded, all stimulus displays varying according to three conditions (see Table 1): (1) in the lexical substitution (LS) condition, a letter is added, discarded or replaced by another.; (2) in the letter move condition (LM), targets and distracters differ just by a single letter, either consonant (CC) or vowel (VV), that changes position within a syllable (WS) or between syllables (BS); (3) in the order movement condition (OM), targets and distracters differ by the way letters are arranged: in palindromes (PA) a distracter is the reversed order of a target; in syllable-moves (SM) a distracter is the reversed order of constituent syllables; in free-moves (FM) a distracter is a random-like reordering of constituent letters.

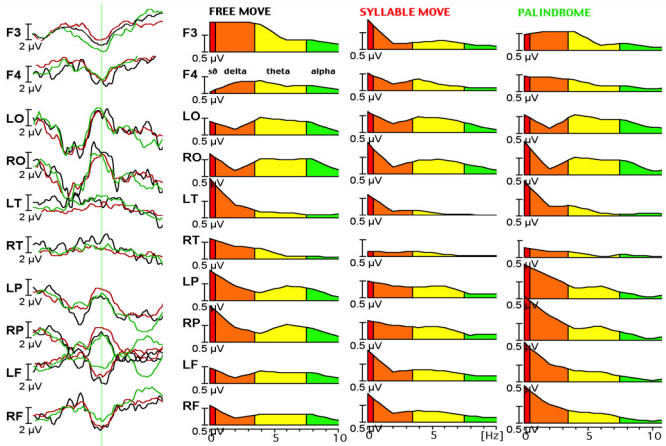
Results and Discussion

As seen in Table 2, consistent differences arise in exposure times between the three main conditions –LS, LM, and OM- ($F(2,10)= 4.558$, $p < .05$) and within each of these conditions.

Table 2: Mean Exposure Times

LS		LM		OM		
SUB	ADD	WS	BS	PA	SM	FM
136	162	152	170	157	173	178

Concerning time waveform functions in the ERP measures -on the left side in Figure 1-, differences arise involving the three conditions of OM:FM, OM:SM, OM:PA.



L/R=Left/Right; F=Frontal; T=Temporal; O=Occipital; P=Parietal

Figure 1: ERP time waveforms and ERP frequencies

The ERP frequency results -on the right side in Figure 1, subdelta, delta, theta and alfa activity- show that there is LH activation in OM:PA and OM:FM in frontal and temporal sites, revealing that whole-word recognition occurs. This fact allows to conclude that LH is specialized in the perception of whole words, whereas the RH focuses on the letters within a word (Pugh et als., 1996). Spatial attention may be involved in word recognition, but it is not sufficient to identify a target as whole-word recognition is required in OM:PA and OM:FM (a P200 component arises identifying categorizing operations). Subjects' performance depends on their having access to all the information relating to target words, and on their being familiar as unitary memory patterns.

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