Cognate sound correspondences and cross-linguistic coactivation

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Cognate facilitation effects have consistently been reported for words sharing (visual) form–meaning overlap across languages. However, studies including an auditory component have found mixed results, ranging from facilitation to inhibition effects (e.g., [1]). To explore whether cognates hinder or facilitate L2 word recognition when phonological forms are activated, we conducted two cross-modal fragment priming ERP studies with German–English bilinguals.

We draw on insights from theoretical phonology and historical linguistics, highlighting the systematicity of cross-linguistic phonological correspondences in cognates: cf. E *wax*, *wine* [wæks, waɪn] – G *Wachs*, *Wein* [vaks, vaɪn]. These patterns result from historical sound change and often involve differences in a single phonological feature (e.g. [SONORANT] > [OBSTRUENT] in [w] > [v]; see also Table 1). Following the assumption that phonological form activation is dependent on underlying phonological features (rather than whole phonemes, cf. [2]), not all correspondences necessarily result in the same degree of L1 coactivation.

Both experiments organised conditions around particular types of correspondences. Experiment 1 explored the role of different degrees of consonantal featural overlap in form priming (see Table 2): does the phonological representation of *Zunge* affect the access of *tongue* for L1 G speakers with fluent L2 E (n=25)? That is, do L1 cognates' phonological representations (activated by auditory CV fragment primes, e.g. [tʰʌ]) hinder or facilitate the recognition of visually-presented L2 English words? Priming effects in lexical decision were significantly greater for noncognates than cognates with identical onsets. EEG results indicate that the coactivation of L1 cognate representations depends on the (mis)matching of underlying phonological features. Primes only elicited significant N400 effects (relative to control fragments) for phonologically MISMATCHING cognates and NONCOGNATES. No N400 effect was found for cognates with IDENTICAL or NON-MISMATCHING onsets (see Table 3). This suggests that auditory fragments coactivate both languages' representations (according to degree of phonological overlap), causing competition for selection and inhibition.

Experiment 2 is a work-in-progress, following the paradigm of the first experiment but exploring the role of vocalic phonological features, e.g. E–G h[aʊ]s–H[aʊ]s (MATCH), r[ɛ]d–r[oː]t (MISMATCH), h[ʌ]nt (NONCOGNATE). Unlike the first experiment which featured form priming, the visual target in Experiment 2 was semantically related to the prime. When the prime and target do not overlap in form, does L1 cognate coactivation still reduce the priming effect, or does the cognate effect run in the opposite direction (facilitation) where the relationship to the target is semantic?

Table 1. Summary of the effects of the relevant sound changes on initial consonants in German

	Proto-Germanic	English		German	
/p/ → /p͡f/	p	p	[pɑːθ] *path*	p͡f	[p͡fa:t] *Pfad*
/t/ → /t͡s/	t	t	[tɪn] *tin*	t͡s	[t͡sɪn] *Zinn*
/θ/ → /d/	θ	θ	[θɪk] *thick*	d	[dɪk] *dick*
—	f	f	[fɪʃ] *fish*	f	[fɪʃ] *Fisch*
—	m	m	[maʊ̯s] *mouse*	m	[maʊ̯s] *Maus*

Table 2. Predicted activation effect of the G cognate, depending on whether the initial consonant's feature specification is a match, mismatch or no-mismatch for those accessed from the E; [PLOSIVE] is underspecified and thus not stored in the lexical representation (but is present in the signal, cf. [2]).

	English	Extracted features	German cognate feature representation	Feature matching	Activation effect
(i) identical	***m**ild*	[NASAL]	[NASAL]	MATCH	Activated: competition (+)
(ii) tolerated	***th**ick*	[CONTINUANT]	[PLOSIVE] *UNDERSPECIFIED*	NO-MISMATCH	Activated: competition
(iii) mismatching	***t**in*	[PLOSIVE]	[STRIDENT]	MISMATCH	Not activated: no competition
(iv) non-existent	***p**ig*	[PLOSIVE]	—	—	Not activated: no competition

Table 3. Summary of experimental results

	English	German	Priming Effect	N400
(i) identical	*fish, mild*	*Fisch, mild*	21.3ms	—
(ii) tolerated	*thorn, thick*	*Dorn, dick*	42.3ms	—
(iii) mismatching	*path, tin*	*Pfad, Zinn*	50.7ms	attenuated
(iv) non-existent	*pig, thug*	N/A	57.1ms	attenuated

References

[1] Fritz, I., Lahiri, A. & Kotzor, S. 2023. Shared Loanword Recognition in German–English Bilinguals: The Role of Metrical Phonology. *Journal of Cognitive Neuroscience* 35(12), 2028–2048. doi: https://doi-org.ezproxy-prd.bodleian.ox.ac.uk/10.1162/jocn_a_02063

[2] Lahiri, A. & Reetz, H. (2010). Distinctive features: Phonological underspecification in representation and processing, *Journal of Phonetics*, *38*, 44–59.