DONDERS INSTITUTE

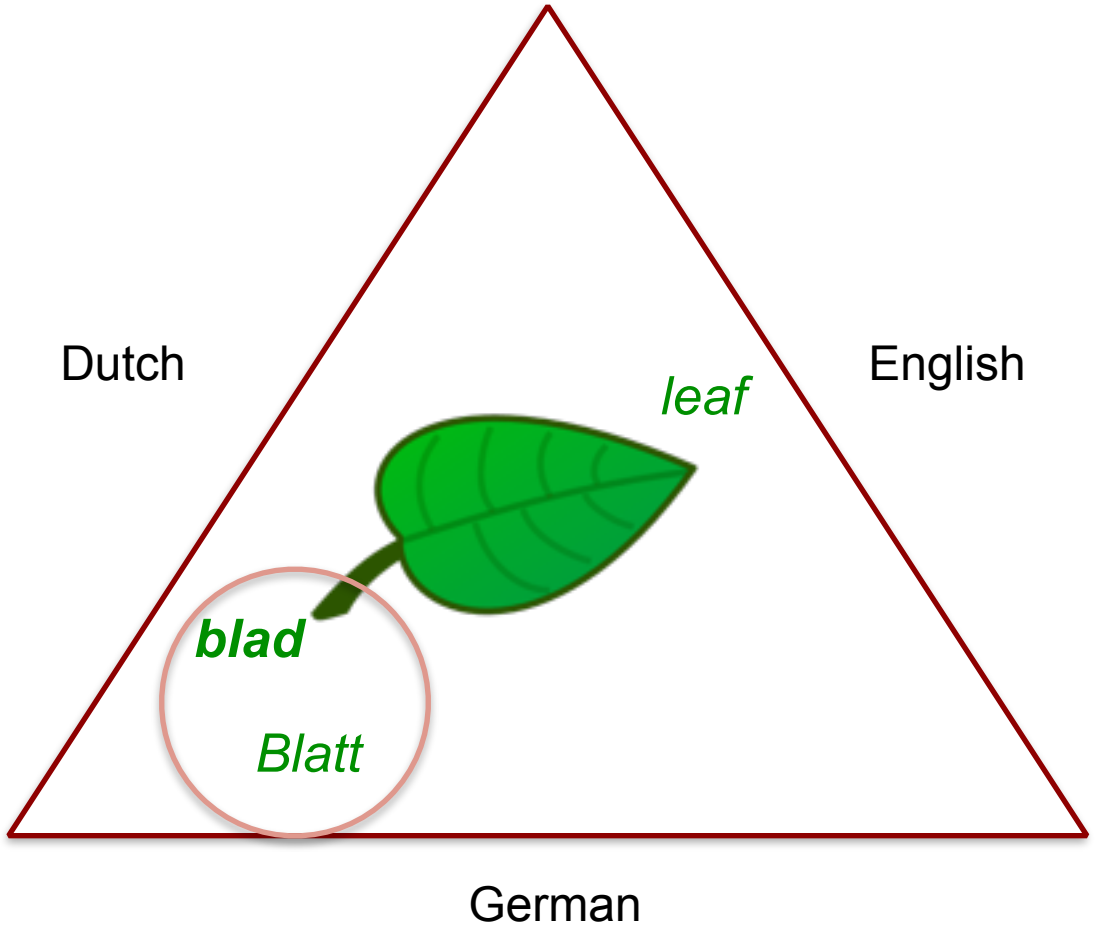
Cross-language influences in trilingual word processing

Kristin Lemhöfer

L3 workshop, Poznan 2017

Radboud University Radboudumc

Why study trilinguals?



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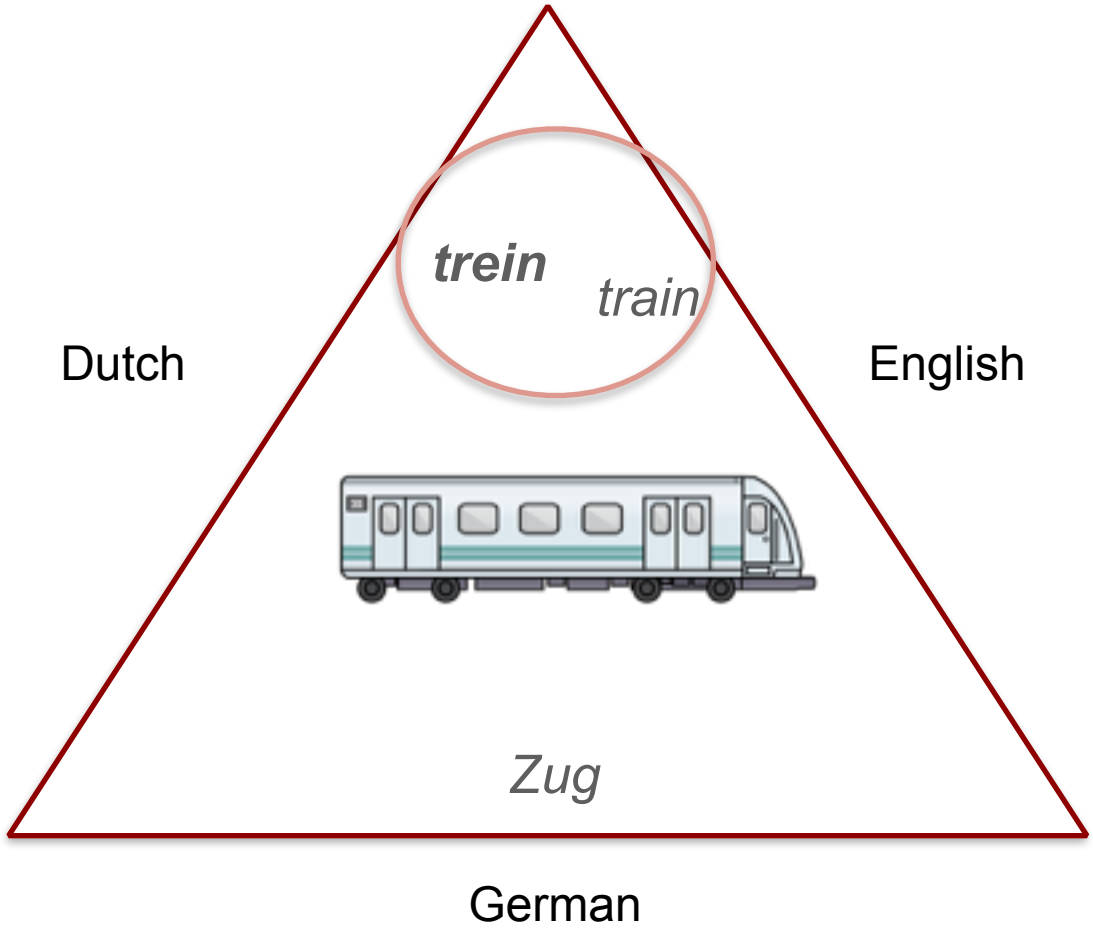

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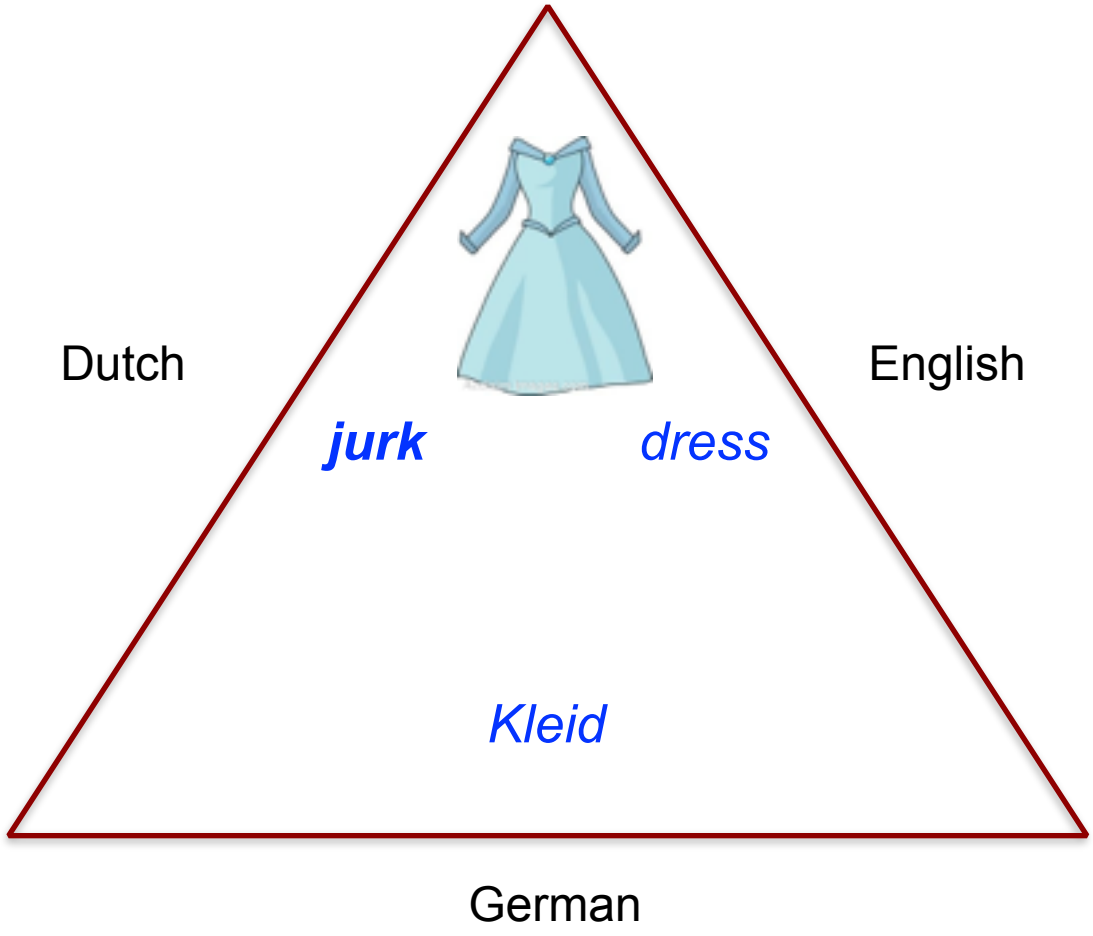

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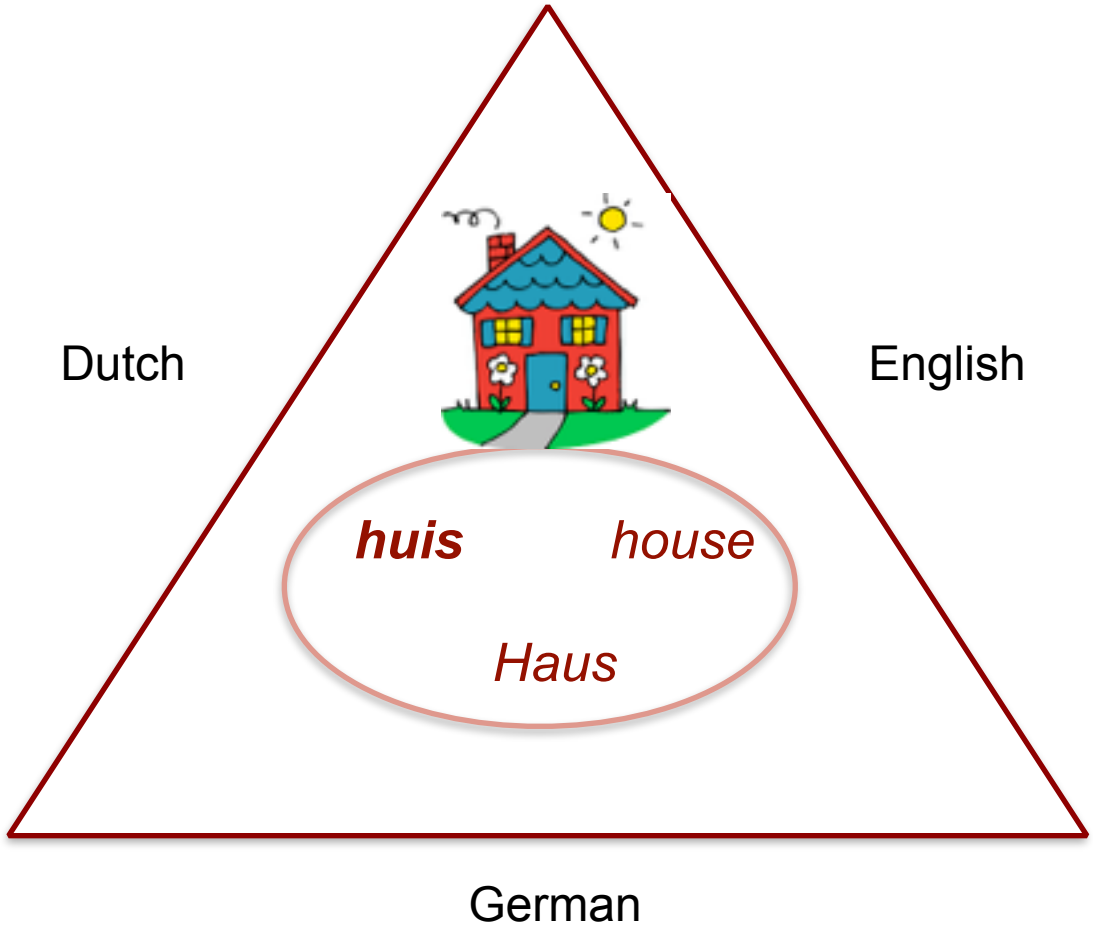

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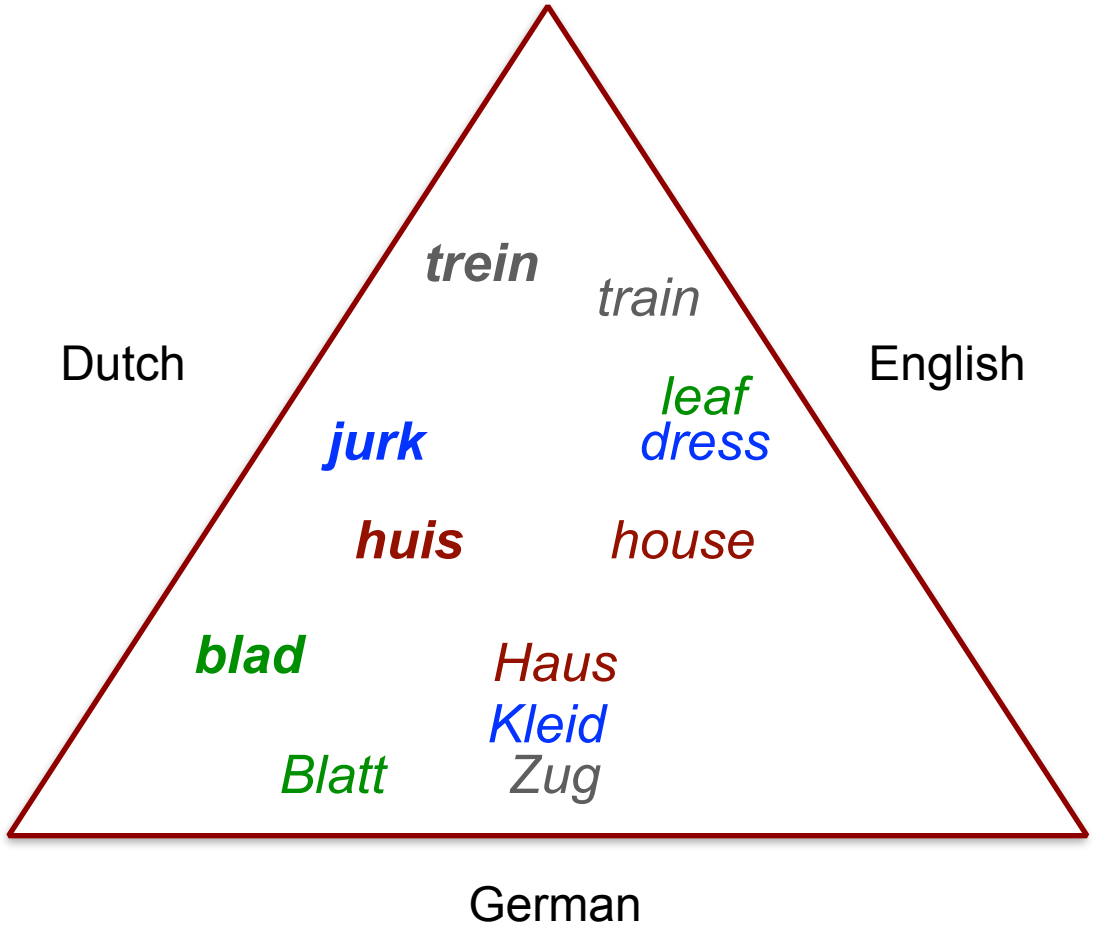
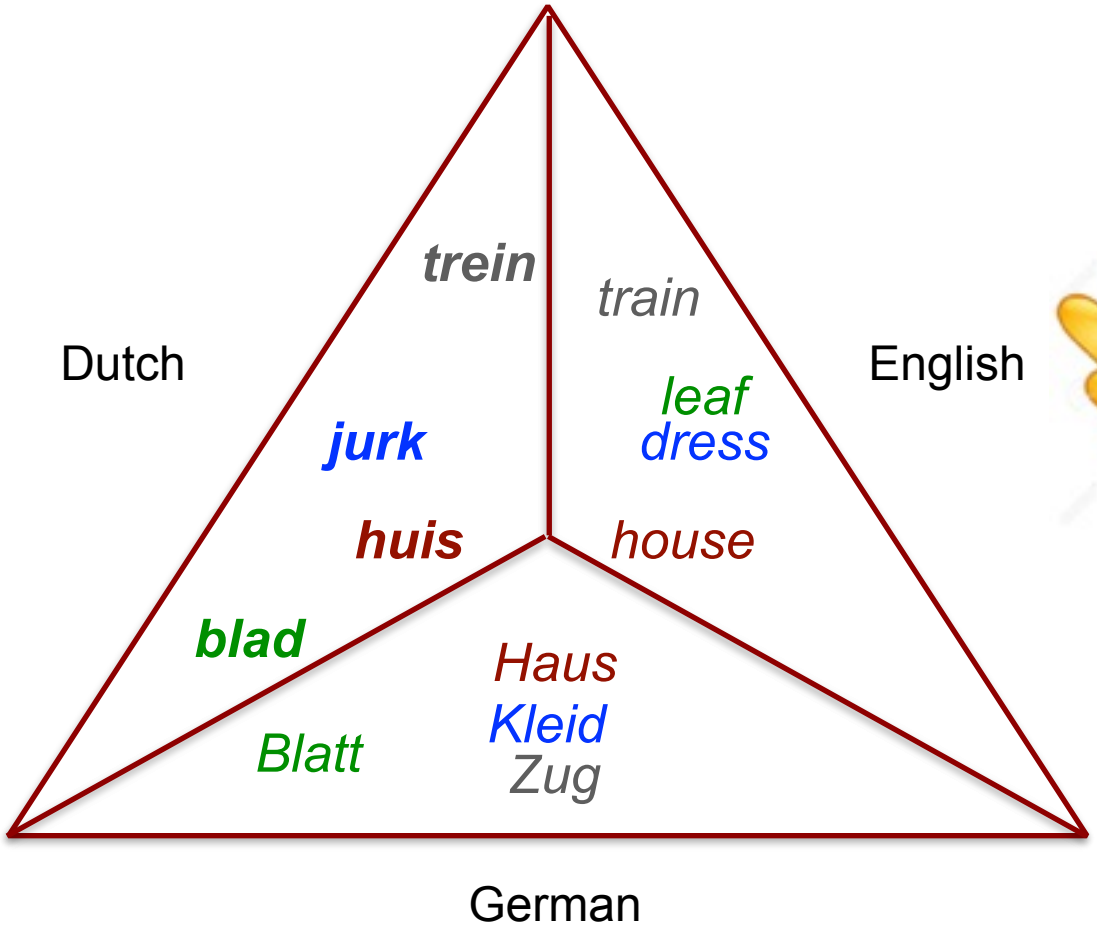


What to study about trilinguals?



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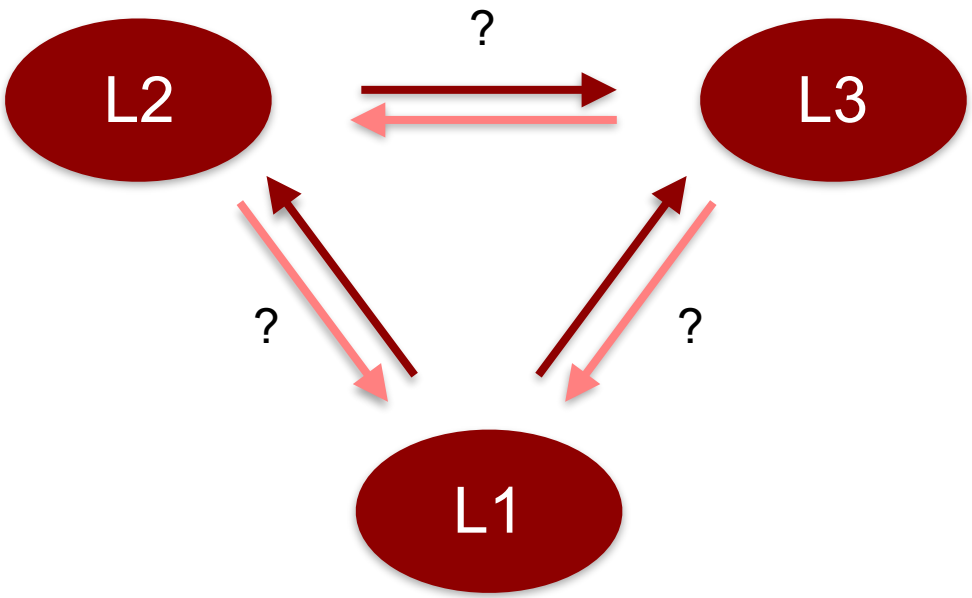


Kolers (1963)

JOURNAL OF VERBAL LEARNING AND VERBAL BEHAVIOR 2, 291-300 (1963)

Interlingual Word Associations[1]

PAUL A. KOLERS

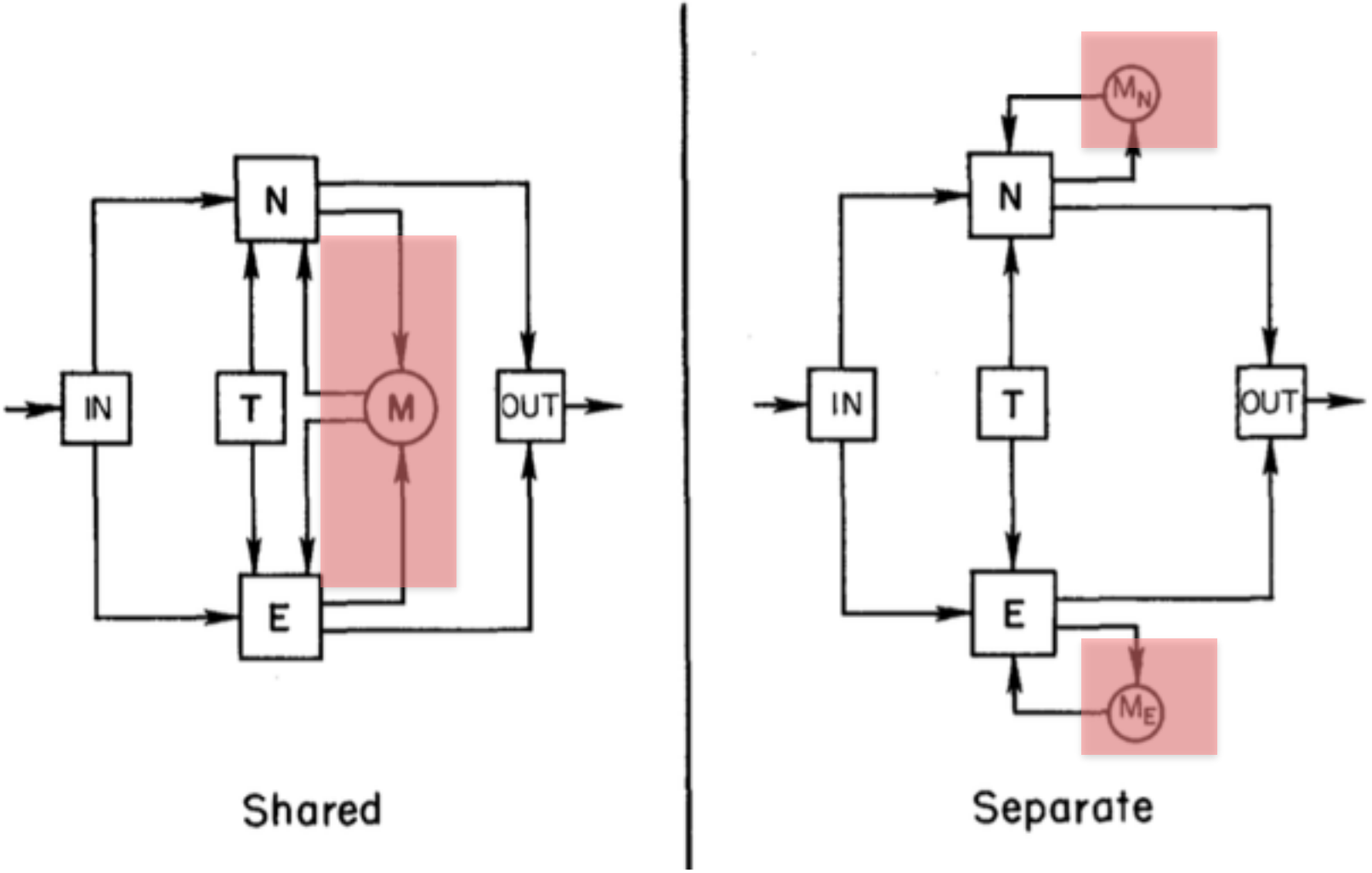
Harvard University, Cambridge, Massachusetts

It is the mark of a fluent bilingual individual that he manages to keep his language-generating essentially unilingual. Relatively few involuntary intrusions from one language occur when he is speaking the other, and of those that do occur, many seem to be syntactic units rather than random words (Diebold, in press; Weinreich, 1954). Such observations point to some major organizing principle underlying the psychological separation of the bilingual's two languages, but it is not known what that is. Several hypotheses can be listed to account for it; this paper the description limited only by the rules of the language (Chomsky, 1957; Miller, Galanter, and Pribram, 1960) in which the experience is being recalled. The fact that a bilingual responds differently to a set of "standard" stimuli depending upon which of his two languages he is speaking (Ervin, 1961; Lambert, Havelka, and Crosby, 1958; Lenneberg and Roberts, 1956) can in fact be interpreted in this way. We will call this the shared hypothesis.

Alternatively, if verbally defined past experiences were tagged and stored in a form

Kolers (1963)

N = native language
E = English (L2)
T = translation
M = memory



Kolers (1963)

TABLE 1
AN ILLUSTRATIVE CASE OF INTRALINGUAL AND INTERLINGUAL TESTS

E-E		E-N		
table	dish	table	silla	(a)
boy	girl	boy	niña	(b)
king	queen	king	reina	(c)
house	window	house	blanco	(d)
N-N		**N-E**		
mesa	silla	mesa	chair	(e)
muchacho	hombre	muchacho	trousers	(f)
rey	reina	rey	queen	(g)
casa	madre	casa	mother	(h)

Kolers (1963)

"… experiences and memories of various kinds are not stored in common in some supralinguistic form but are tagged and stored separately in the language S [the subject] used to define the experience to himself." (p. 300)

Kolers (1963)

N = native language
E = English (L2)
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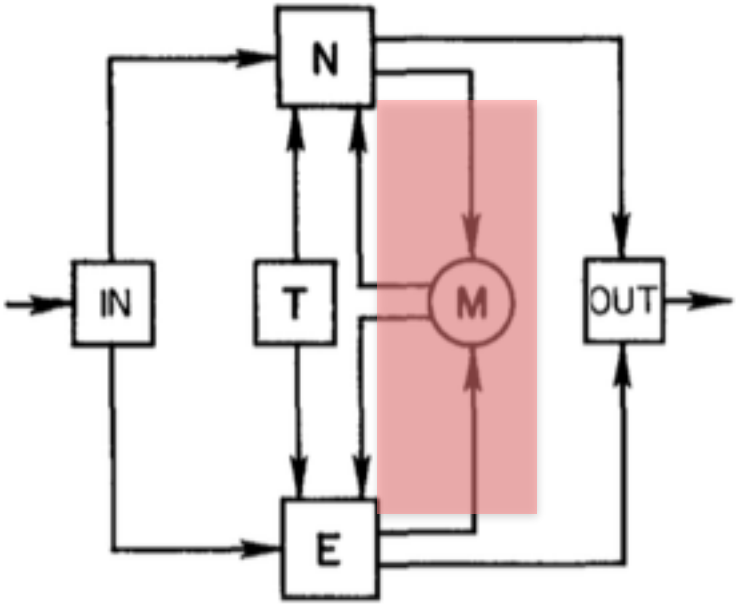
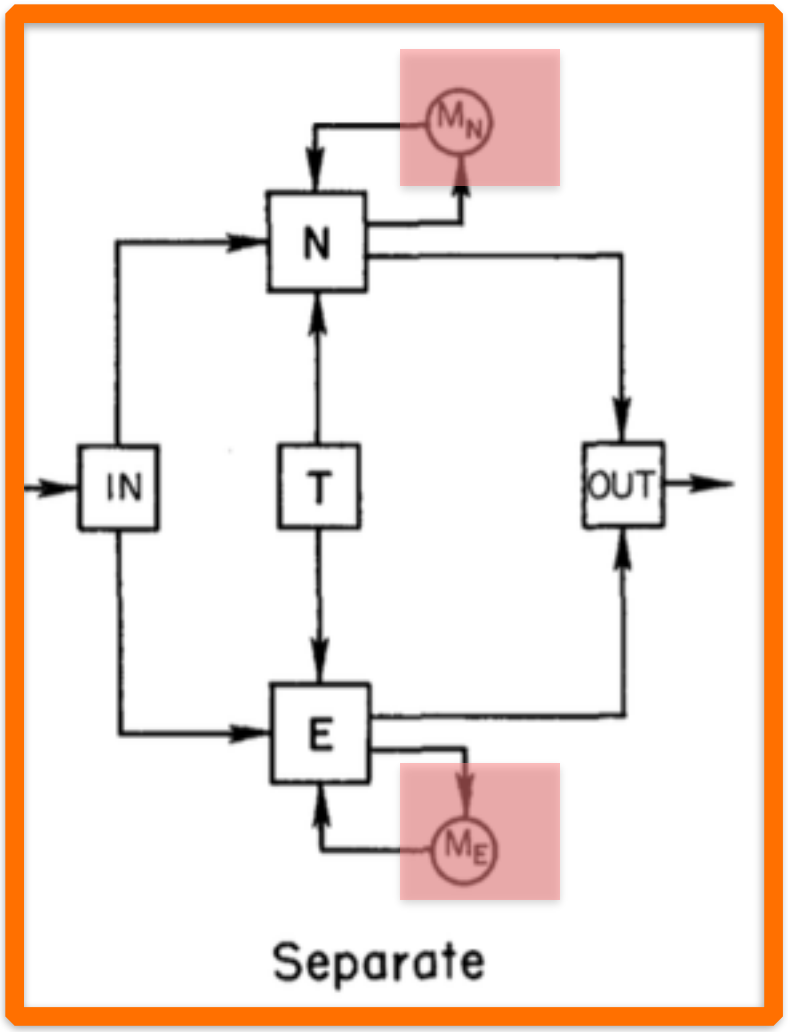


Shared



Separate

L3 WORKSHOP Poznań Saturday 06th May 2017

8:00-9:00	**Registration**
9:00-9.15	**Conference opening –** C1, Collegium Novum UAM, al. Niepodległości 4
9:15-10:15 **Plenary lecture** Chair: Katarzyna Dziubalska-Kołaczyk	**Marit Kristine Westergaard** Third language acquisition in bilingual learners: The importance of linguistic proximity
10:15-11:15 **Session 1**	**Jeanne McGill** Verb Placement in the Initial Stages of L3 Swedish
	Gvantsa Jichoshvili and Maria Juncal Gutierrez Mangado Cross Linguistic Influence at the level of word order in L3 English by monolingual L1 Georgian and bilingual L1 Georgian/L2 Russian speakers
11:15-11:45	**Coffee break**
11:45-13:15 **Session 2** Chair: Jennifer Cabrelli Amaro	**Anika Lloyd-Smith, Marieke Einfeldt, Tanja Kupisch and Stefano Quaglia** The role of language dominance for syntactic and phonological transfer into L3 English
	Raquel Llama, Walcir Cardoso and Laura Collins (Non-)Native influence in the acquisition of VOT patterns: The case of advanced L3 Spanish
	Marta Marecka, Magdalena Wrembel, Romana Kopeckova and Ulrike Gut Speech perception in young multilinguals
13:15-14:30	**Lunch**
14:30-15:30 **Plenary lecture** Chair: Ulrike Gut	**Joan C. Mora** Assessing cross-linguistic influence in L3 phonology through language switching tasks: the role of L1 dominance and individual differences in attention and inhibitory control
15:30-16:30 **Session 3**	**Carrie Pichan and Jennifer Cabrelli Amaro** Phonological Transfer in L3 Initial Stages Italian and Portuguese
	Anna Balas Experience with second language vowels determines foreign language vowel perception
16:30-16:45	**Coffee break**
16:45-17:45 **Plenary lecture** Chair: Agnieszka Chmiel	**Kristin Lemhöfer** Cross-language influences in trilingual word processing
19:30	**Conference Dinner –** Brovaria Restaurant, Stary Rynek 73

‘cross-linguistic influence’

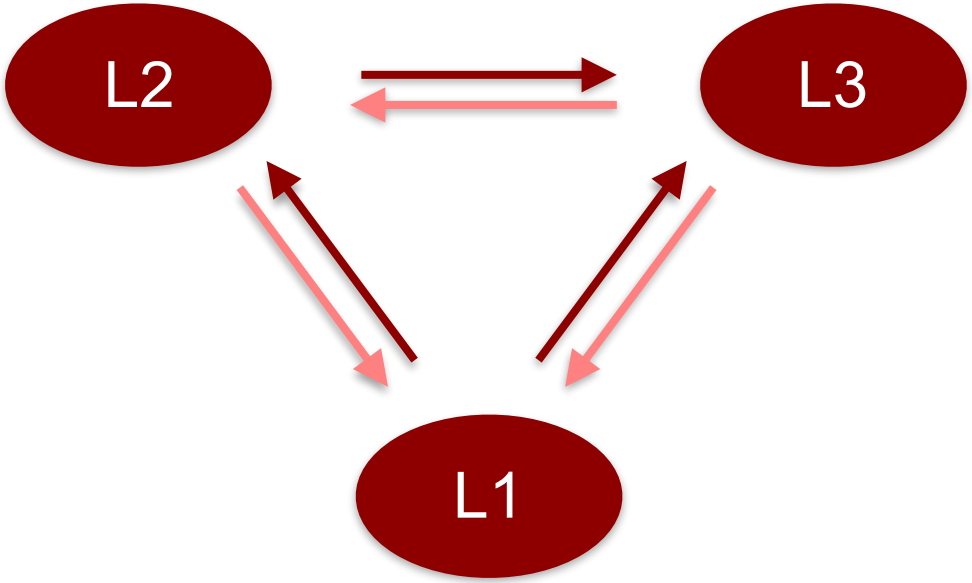
‘transfer’

Population:

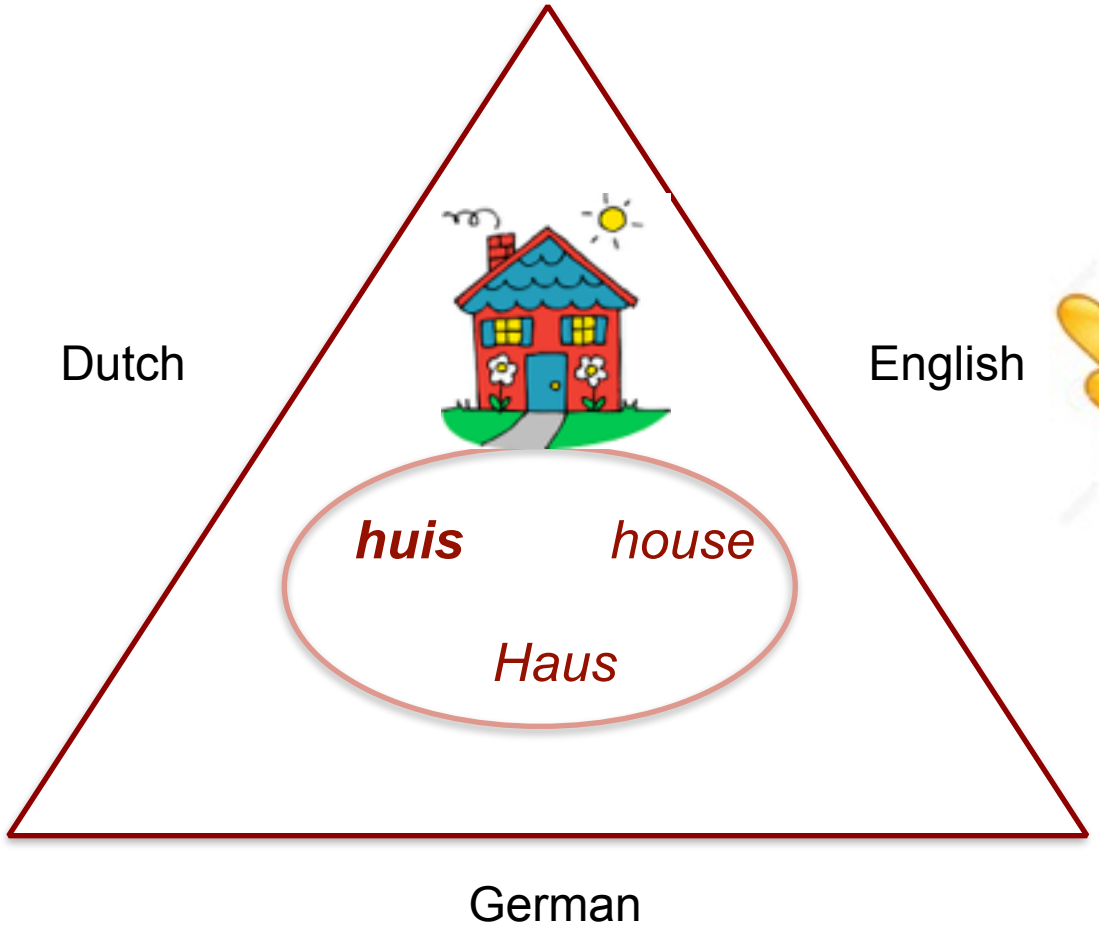
- healthy adults (mostly university students)
- with one dominant native language
- and one or more foreign language they use regularly

Cross-linguistic interactions in the lexicon:

good or bad?



Good: facilitation



The good news:
Cross-linguistic facilitation in multilingual word processing

Cognate effects: the bilingual case

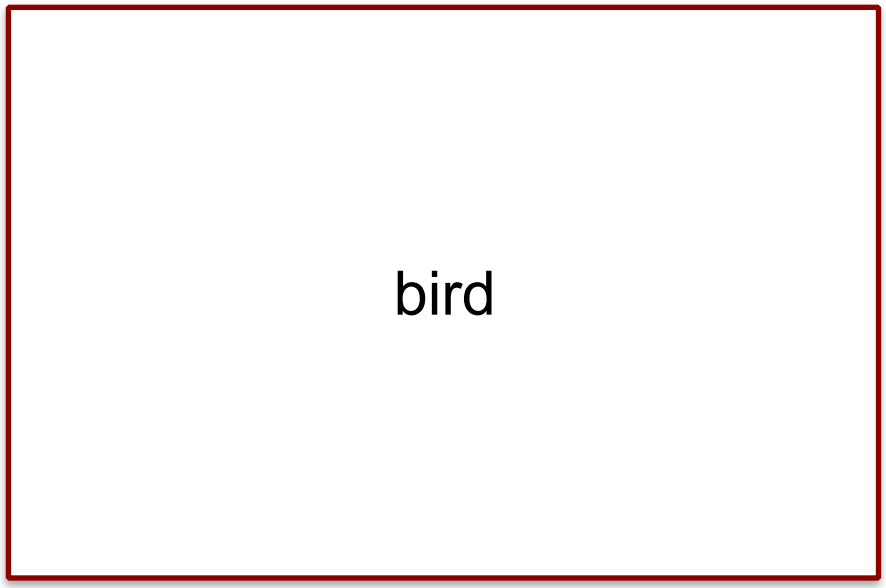
English (L2) lexical decision

Is this letter string an English word?

Lemhöfer & Dijkstra, 2004, M&C

Cognate effects: the bilingual case

English (L2) lexical decision



Lemhöfer & Dijkstra, 2004

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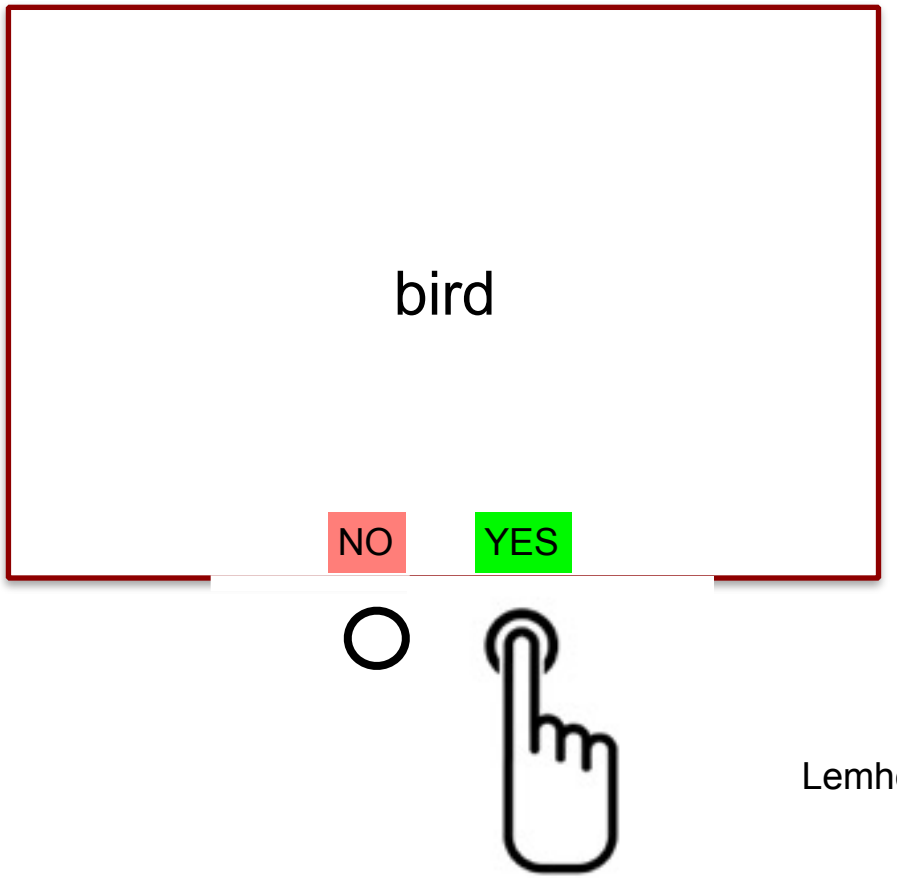

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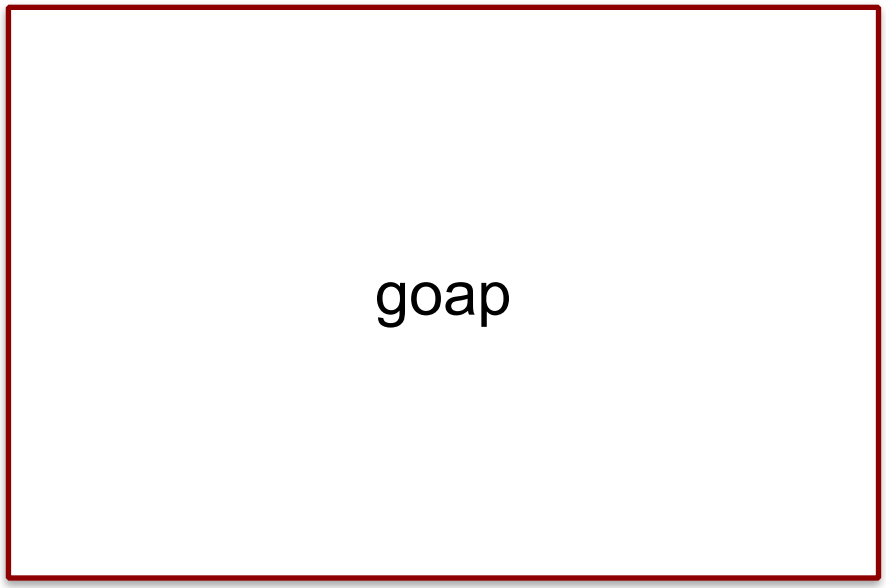

Lemhöfer & Dijkstra, 2004

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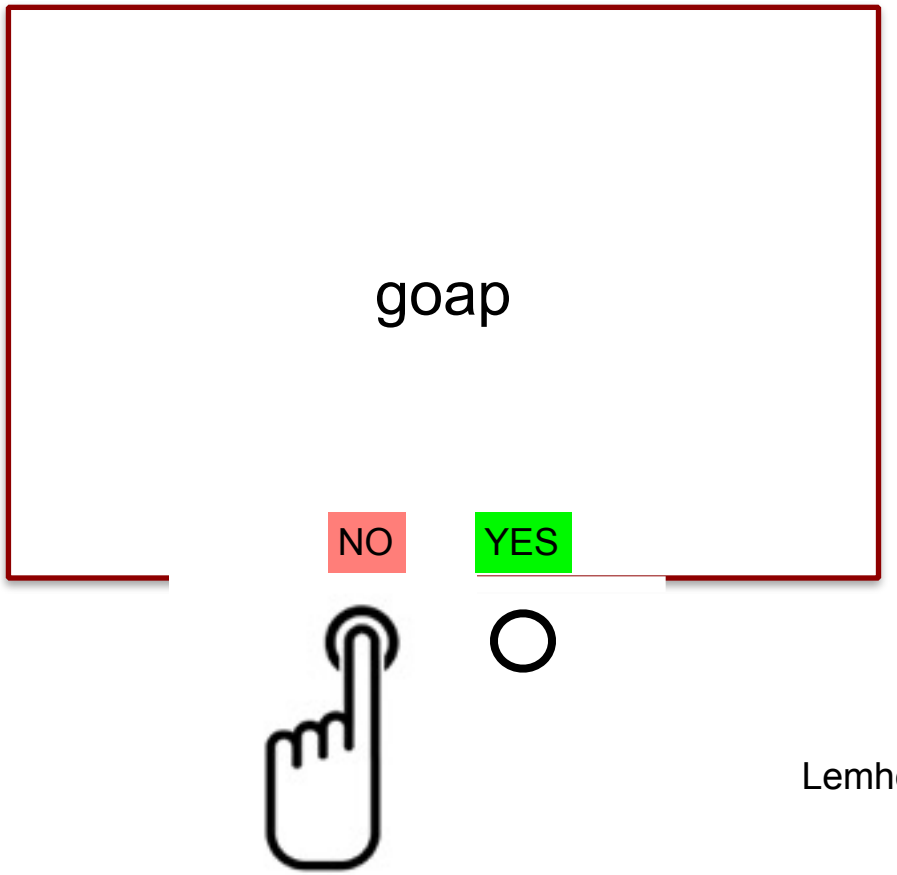
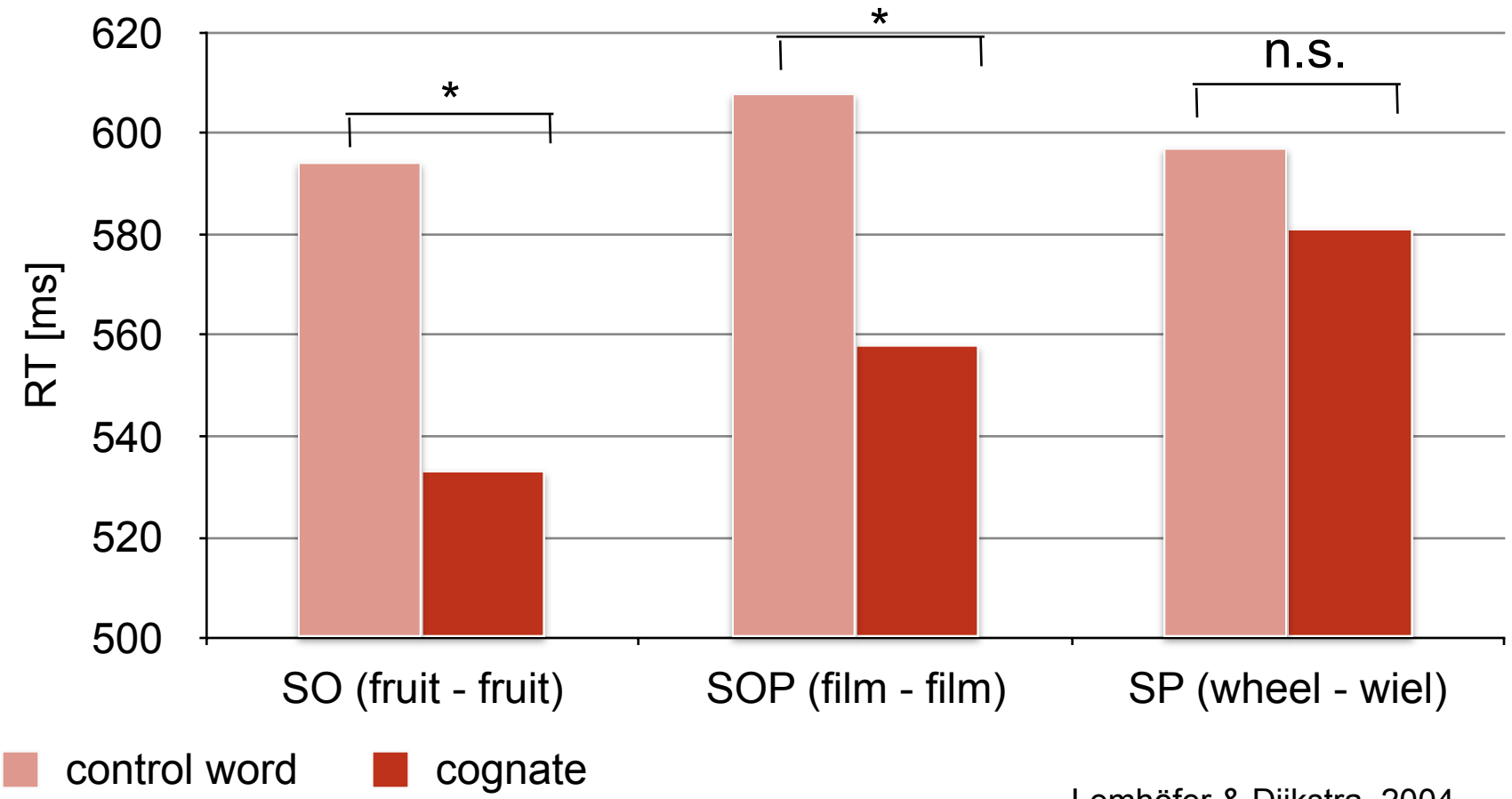


Lemhöfer & Dijkstra, 2004

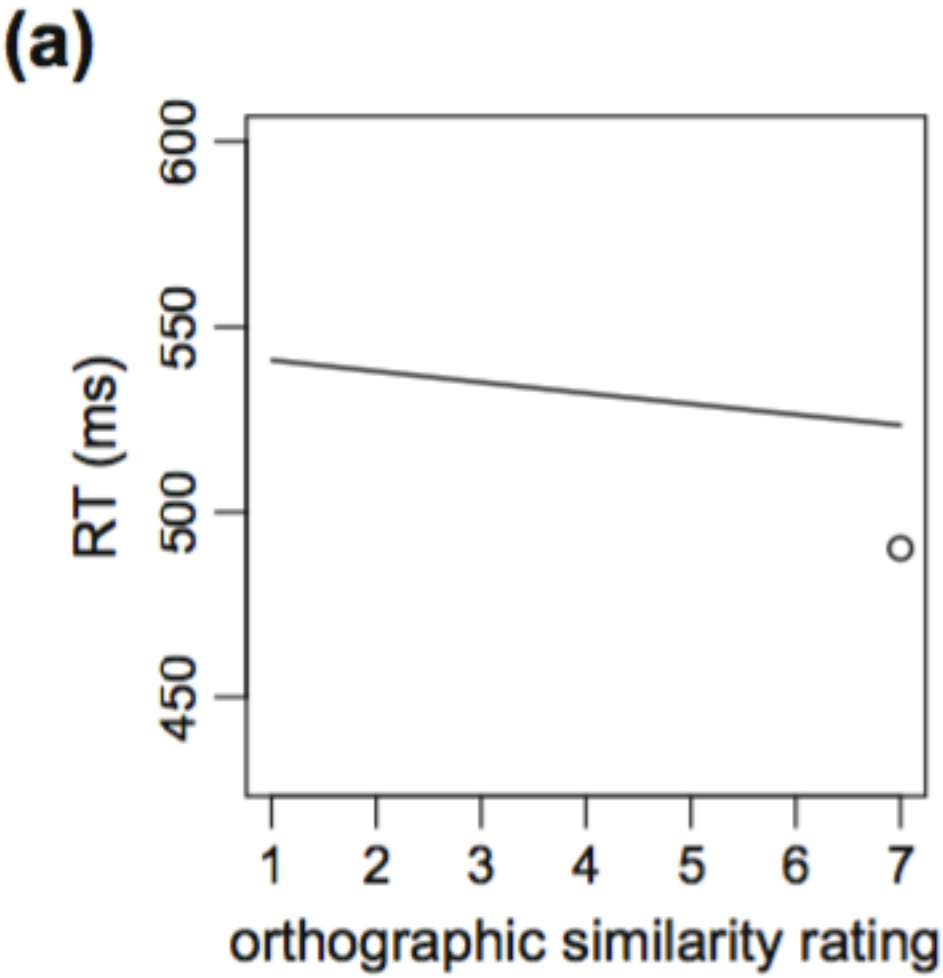
L2 lexical decision

Dutch - English bilinguals



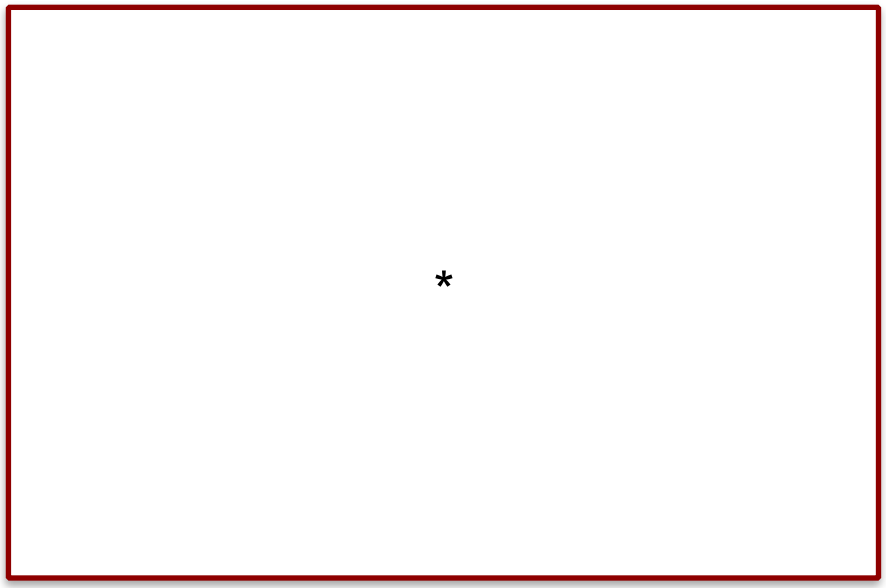
Lemhöfer & Dijkstra, 2004

The more similar, the faster



Dijkstra et al., 2010

Sentence reading in L2 (RSVP)



Duyck et al, 2007

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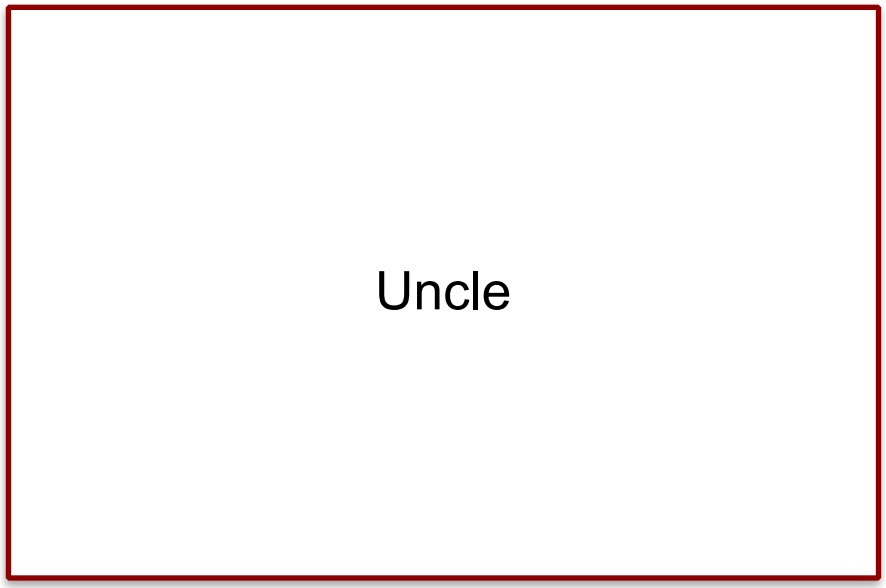

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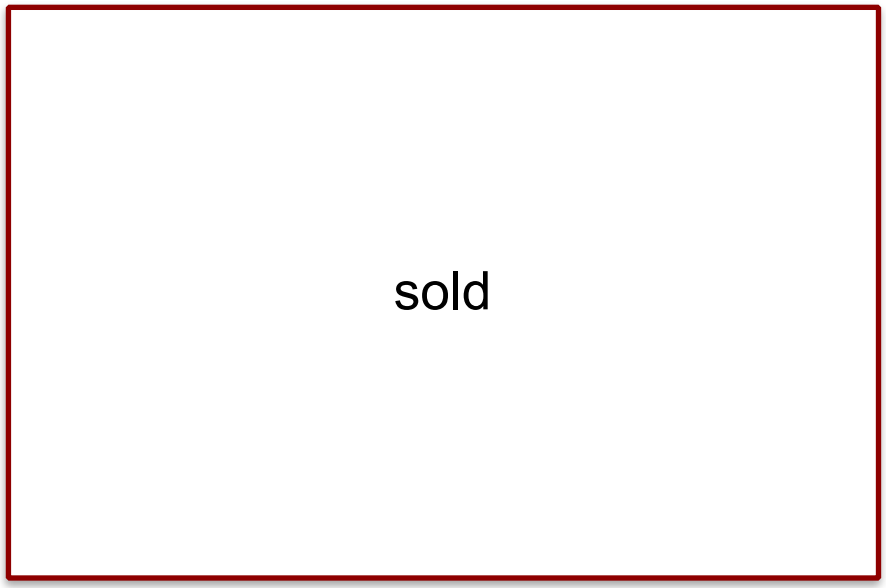

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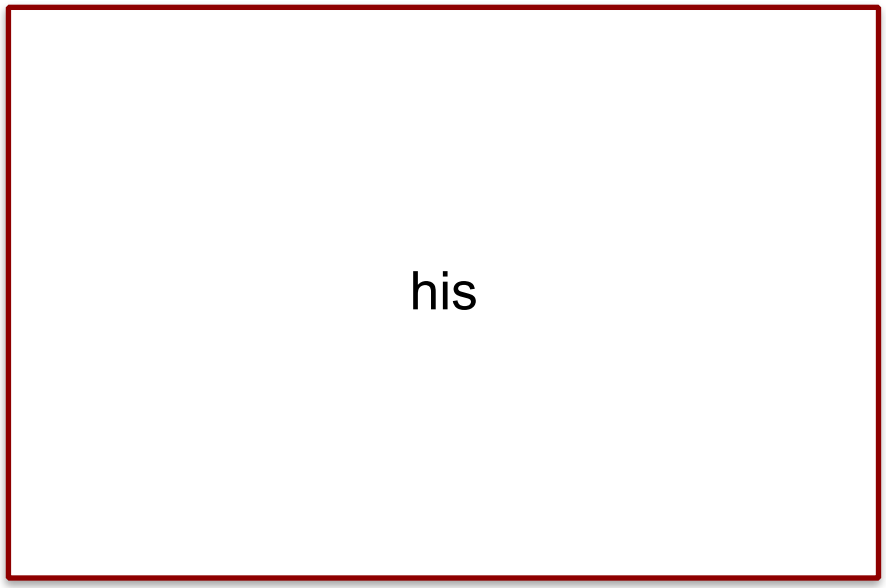

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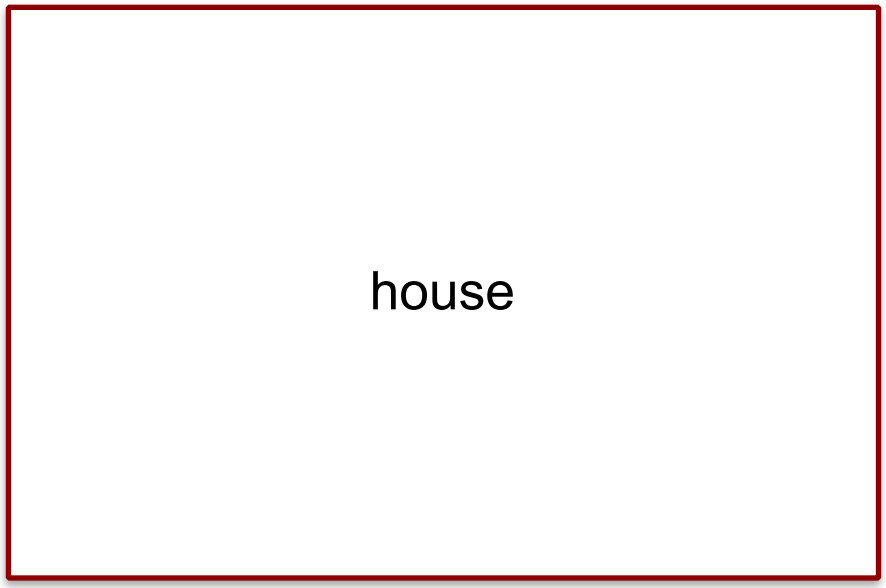

Duyck et al, 2007

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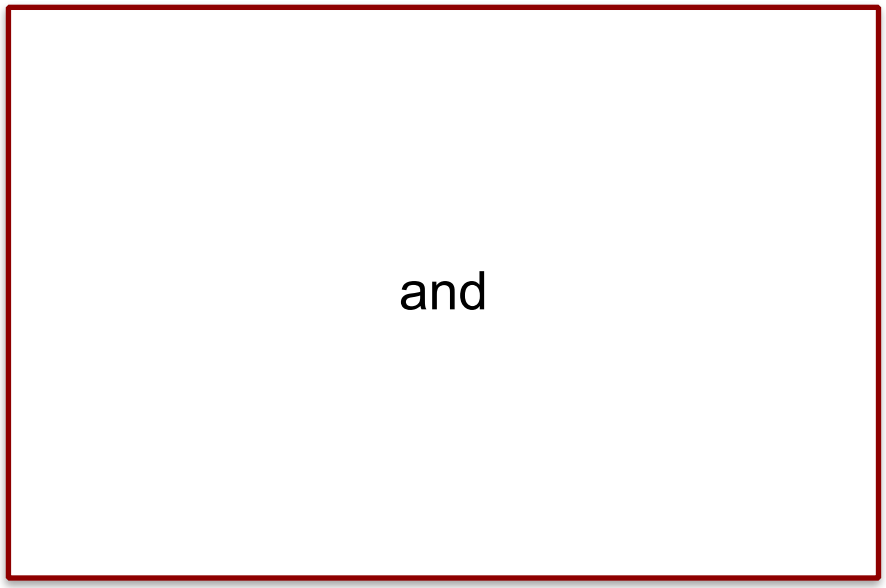

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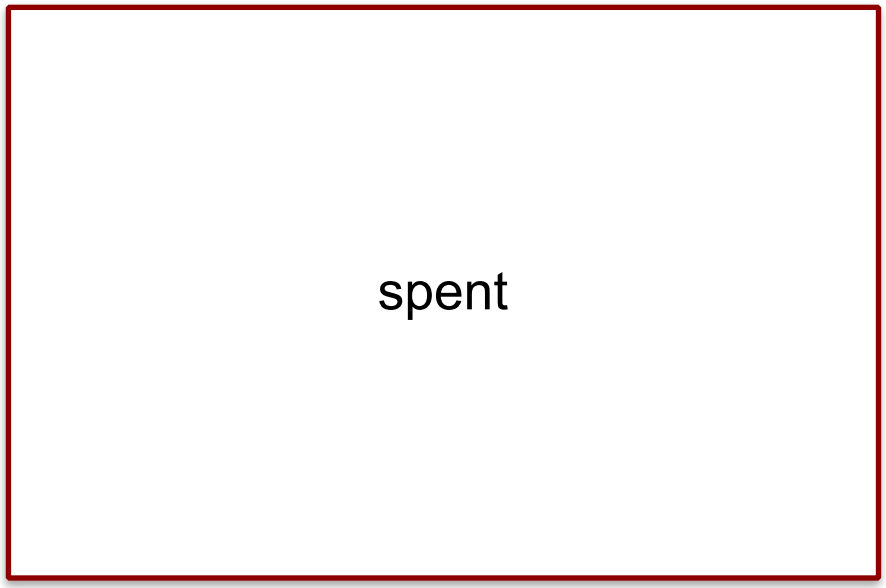

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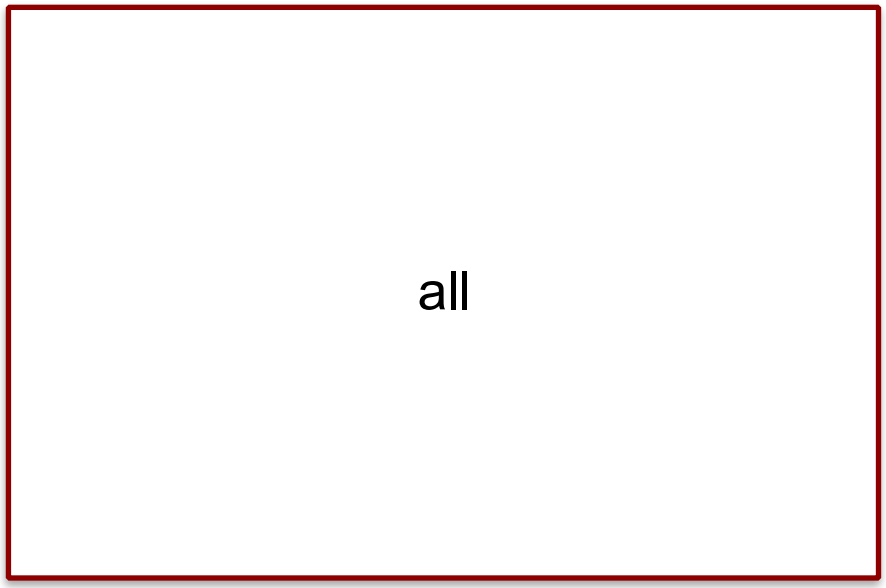

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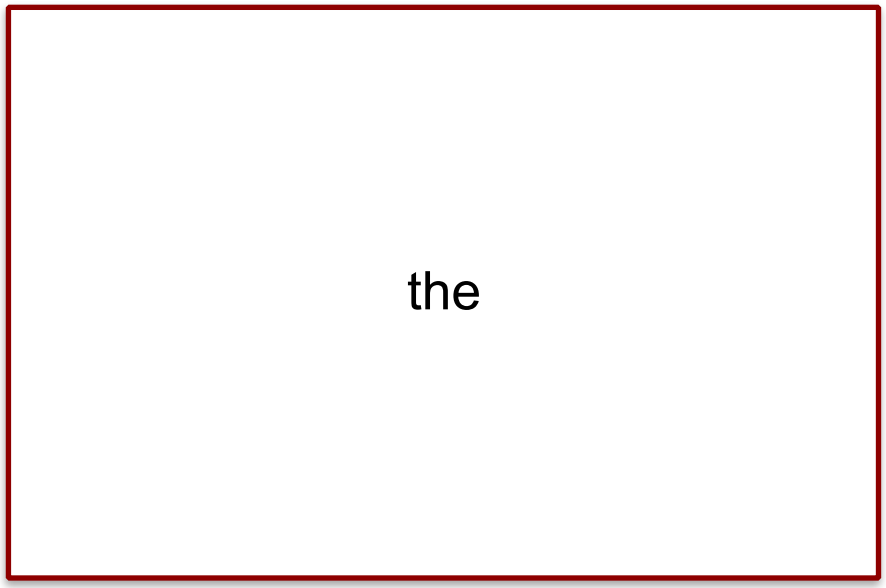

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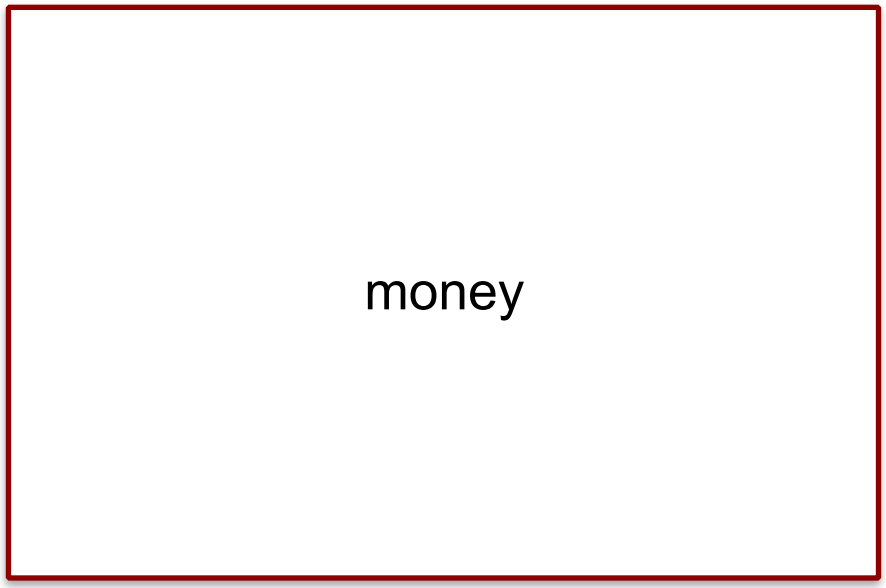

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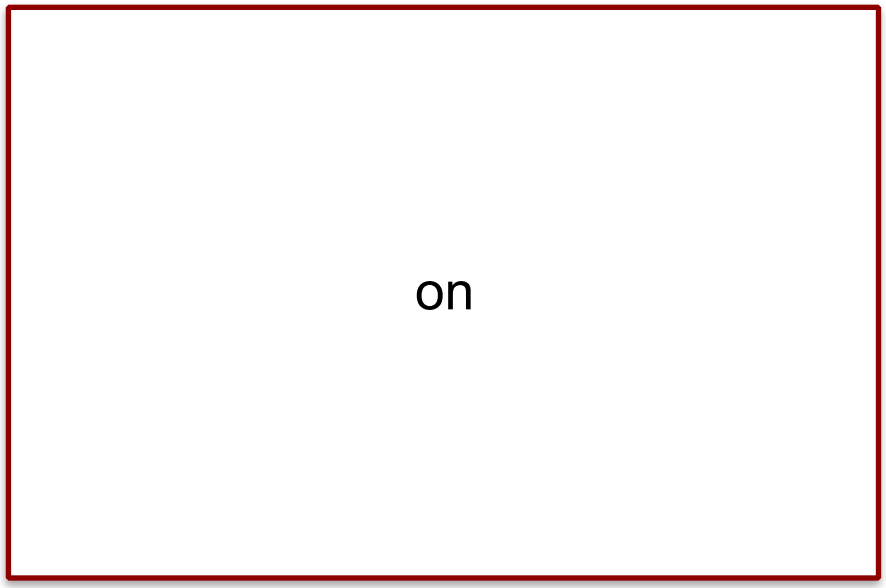

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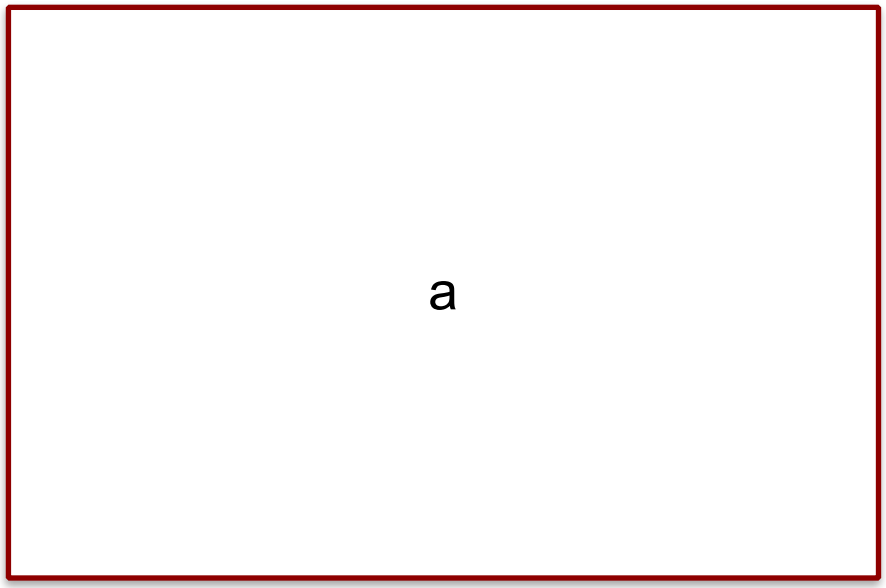

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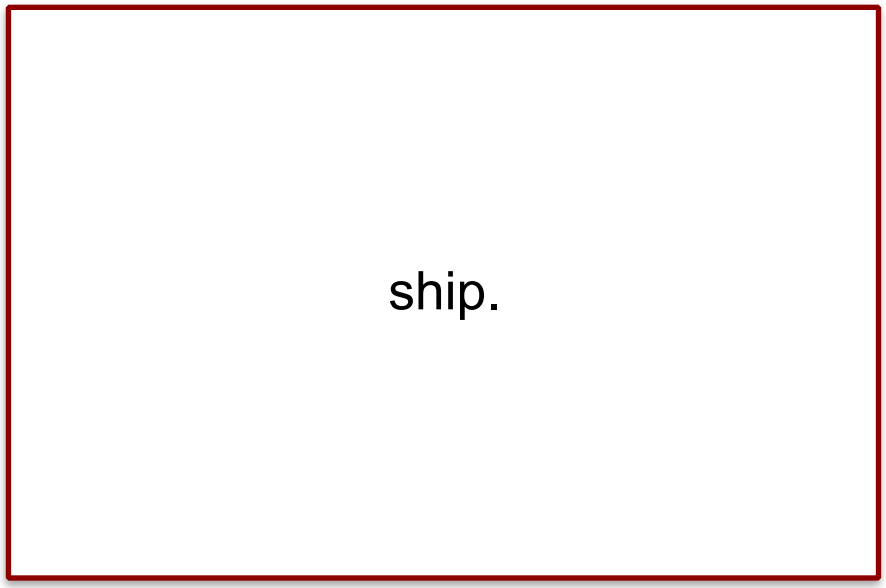
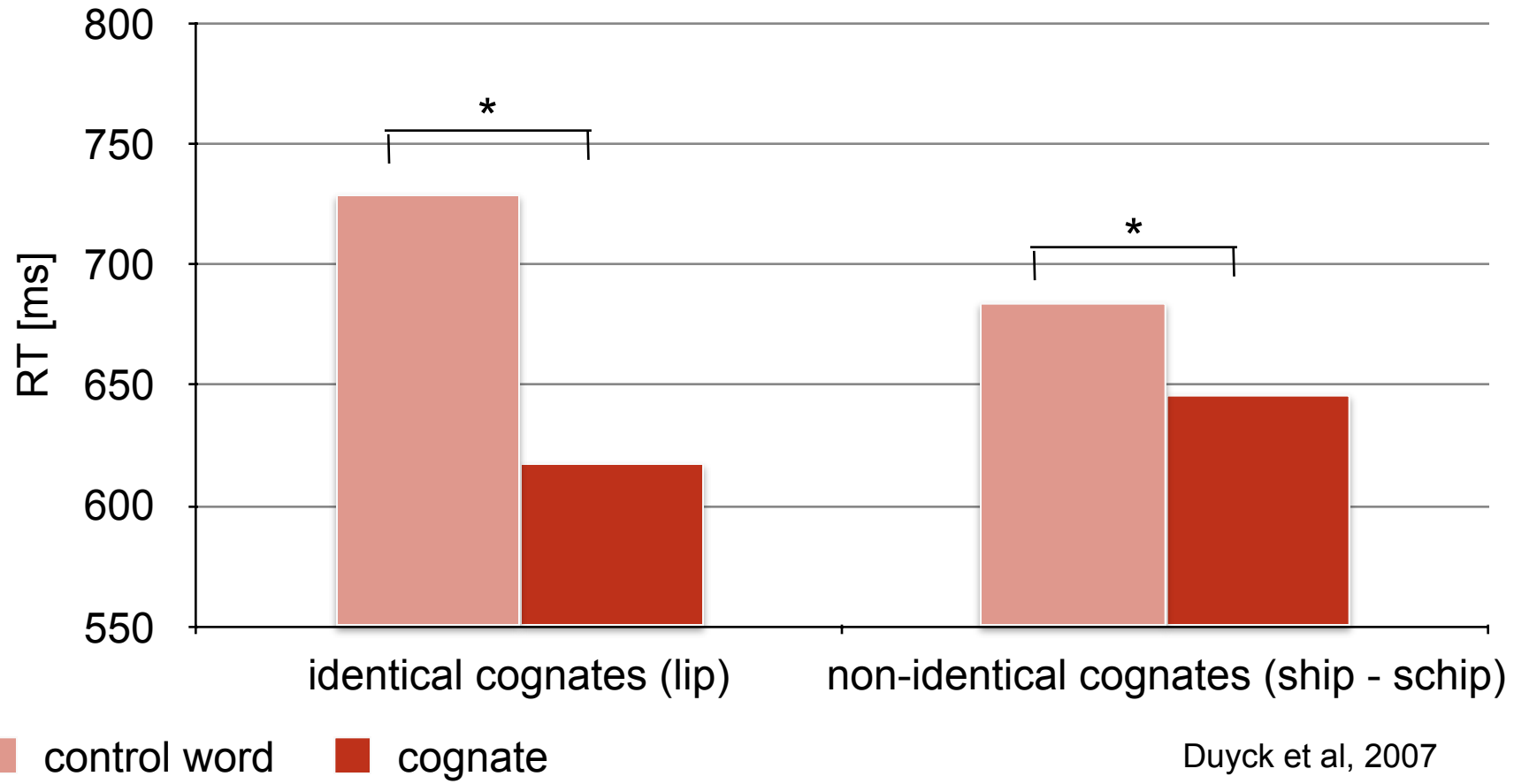


ship = cognate (Dutch: schip), non-cognate control word: *farm*

Duyck et al, 2007

L2 sentence reading (RSVP)

Dutch - English bilinguals

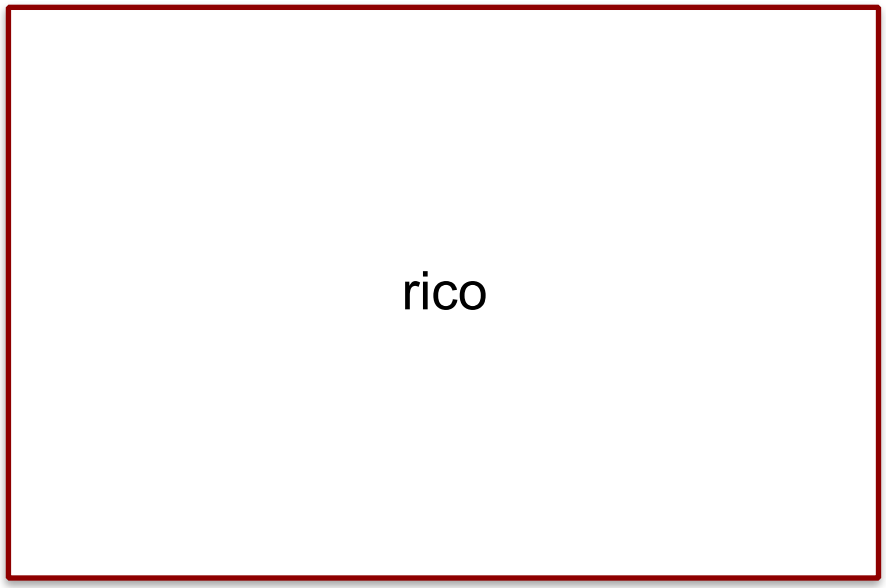


Duyck et al, 2007

Masked priming with lexical decision in L1 or L2

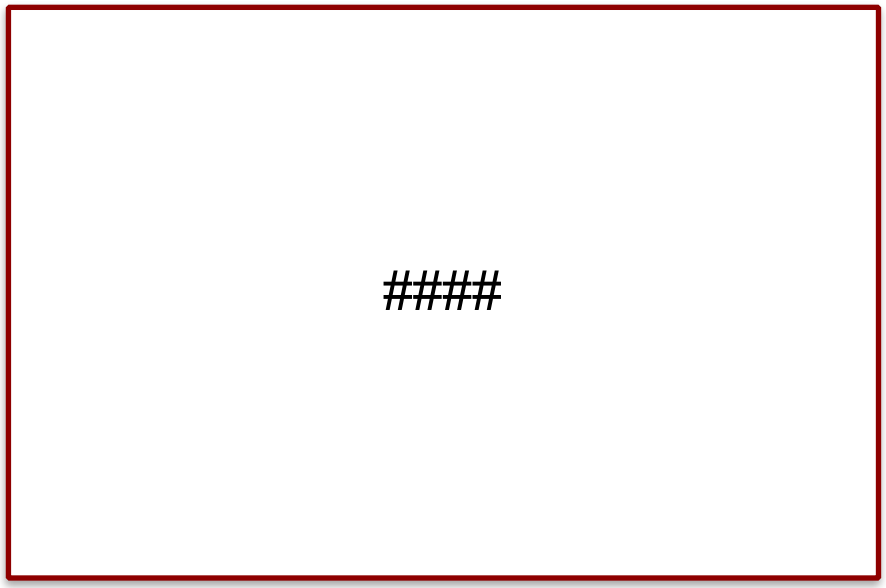
Is this letter string an English word?

Masked priming with lexical decision in L1 (Spanish) or L2 (English)



Davis et al, 2010

Masked priming with lexical decision in L1 or L2



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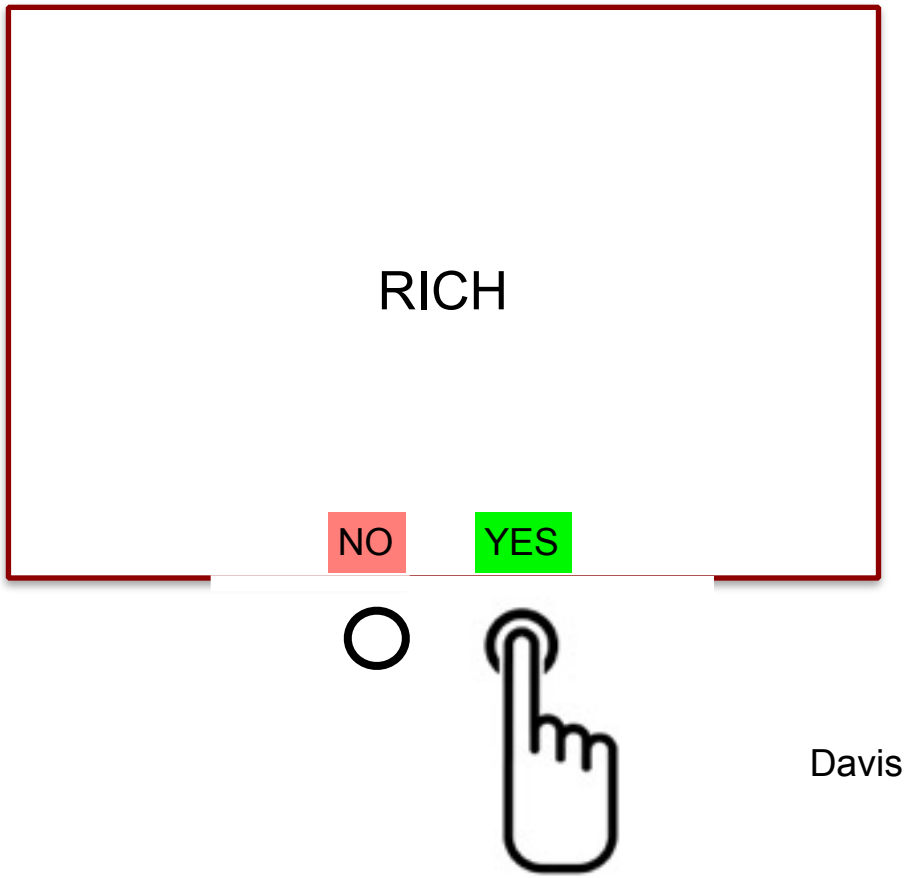

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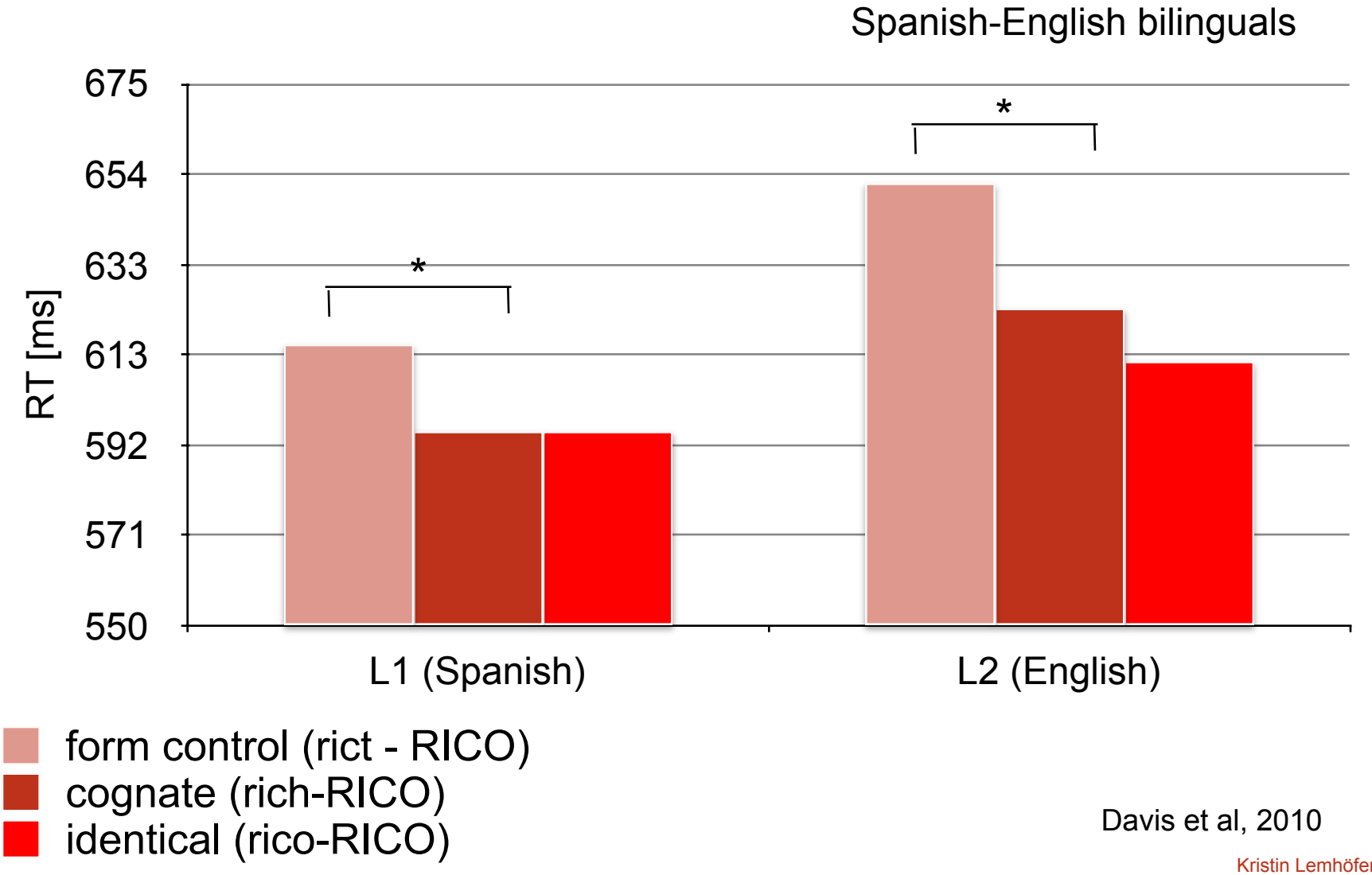

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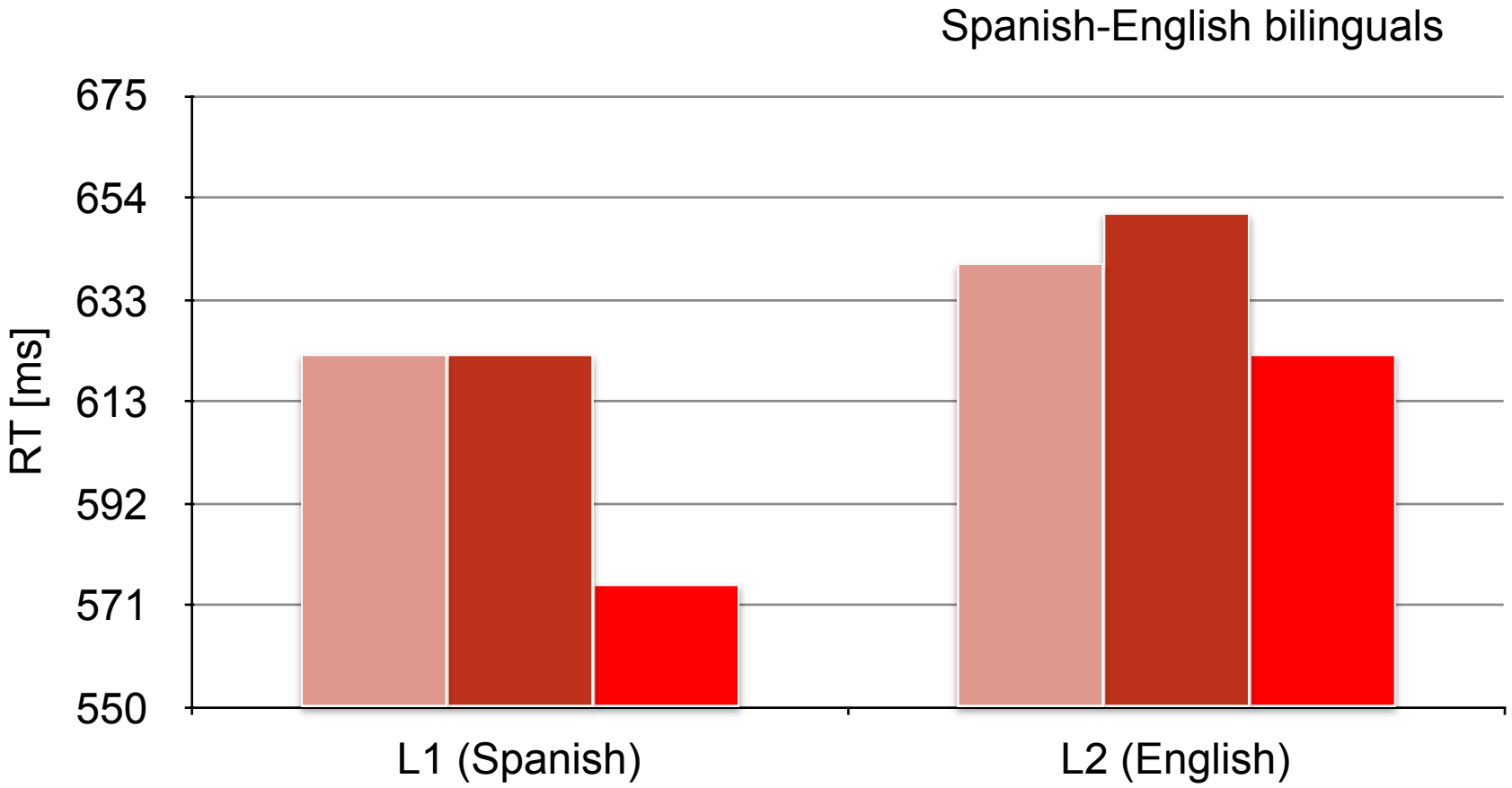


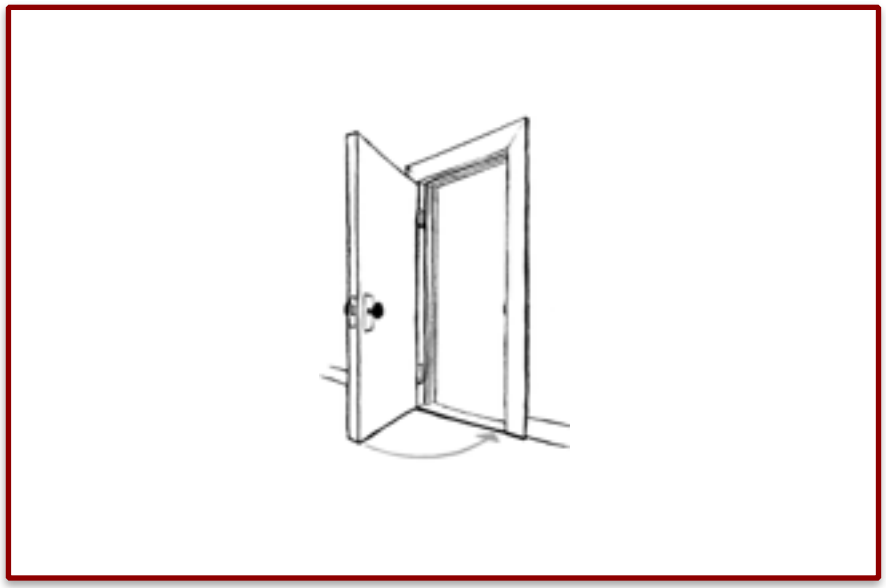
Davis et al, 2010

Picture Naming in L2

Name the picture as quickly as possible in Spanish

Costa et al., 2000

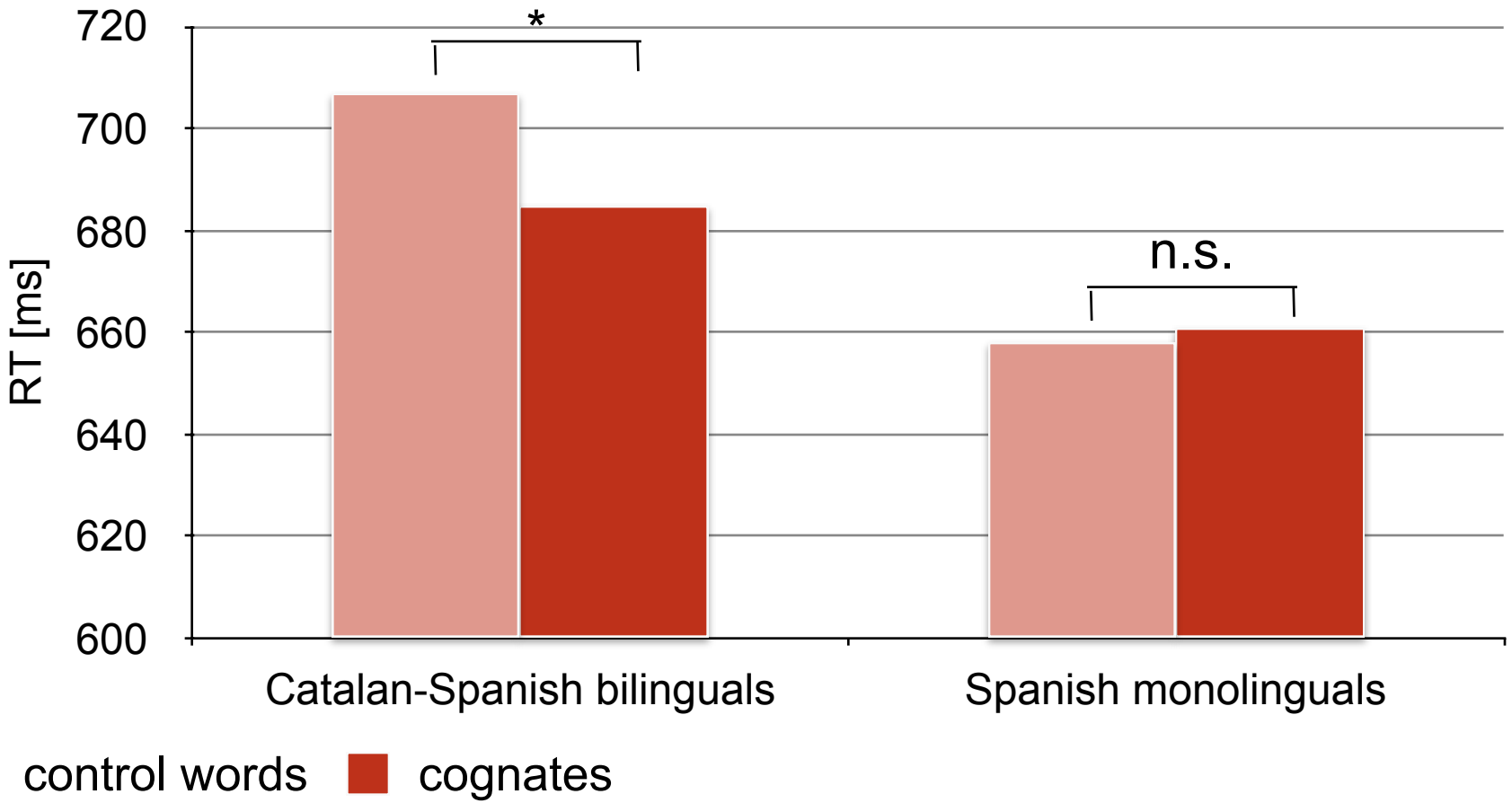
Picture Naming in L2



“puerta” (door)

Costa et al., 2000

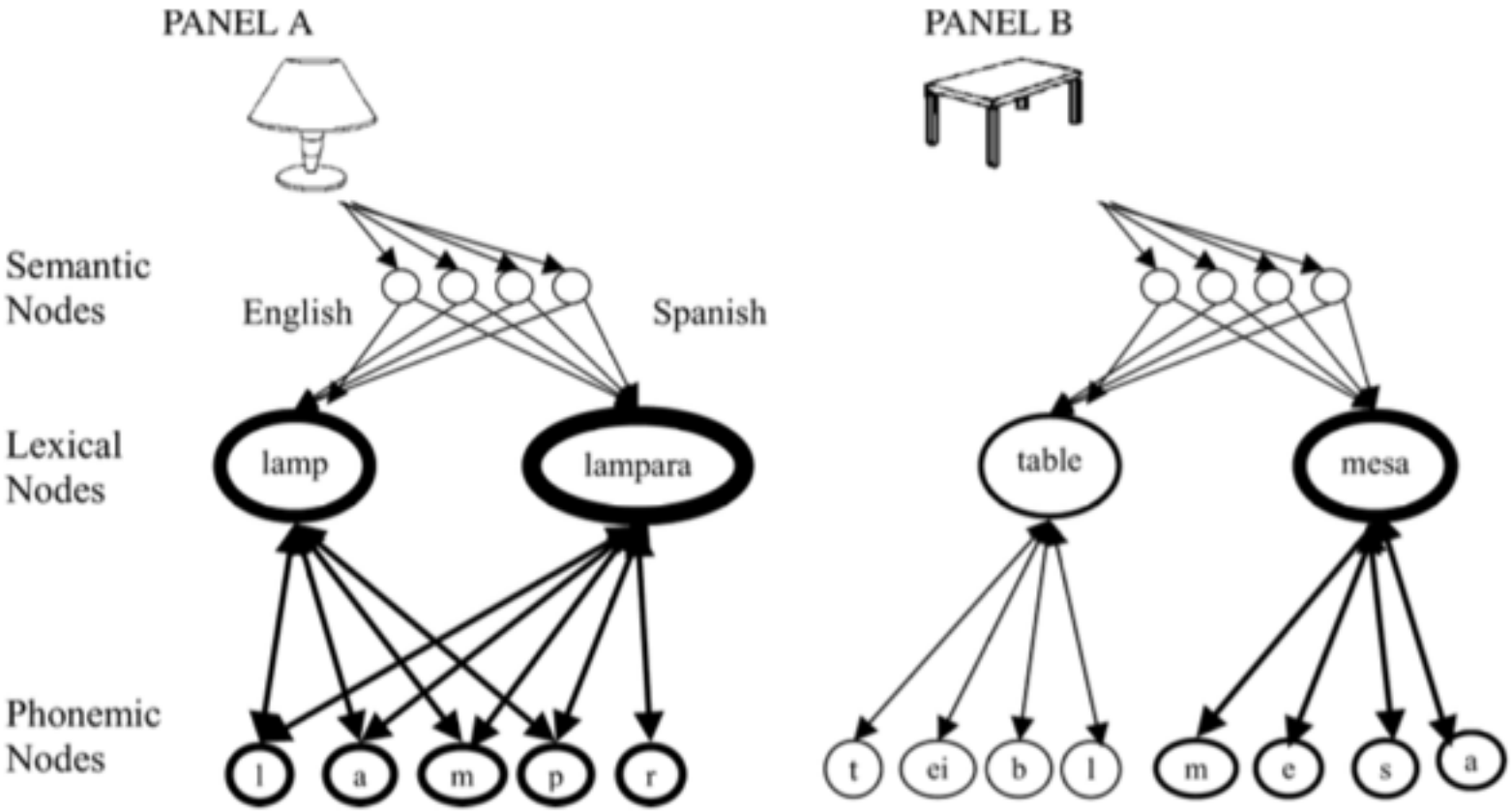
Picture Naming in Spanish (L2)



Costa et al., 2000

Cognate facilitation in bilinguals

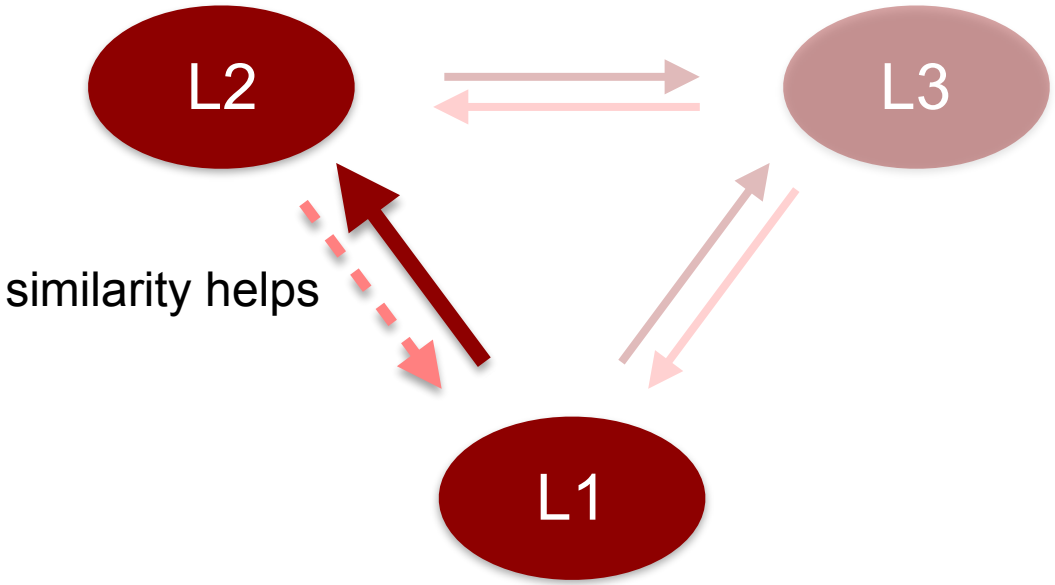
Costa et al., 2005



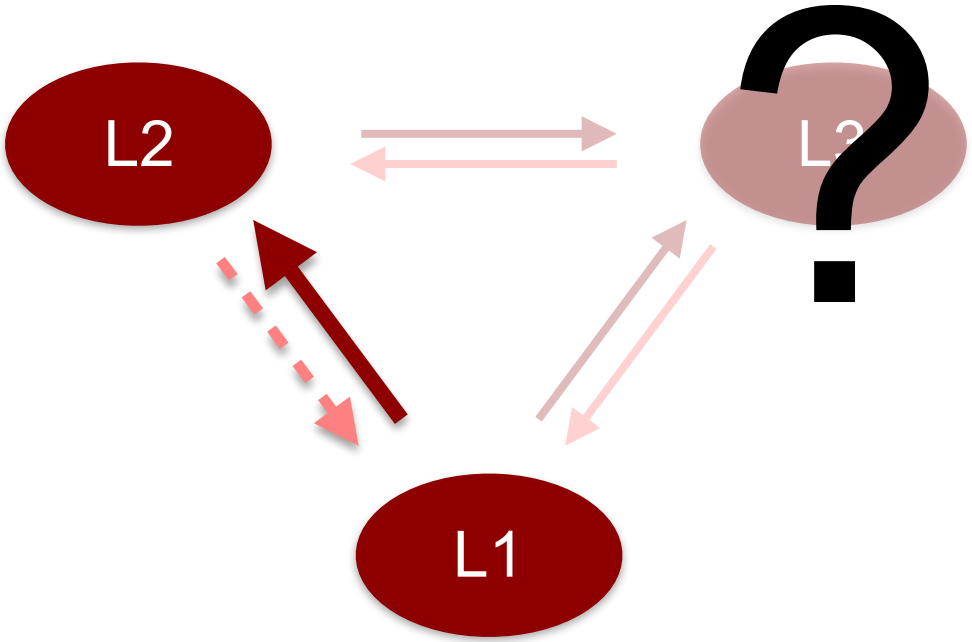
cognate

non-cognate

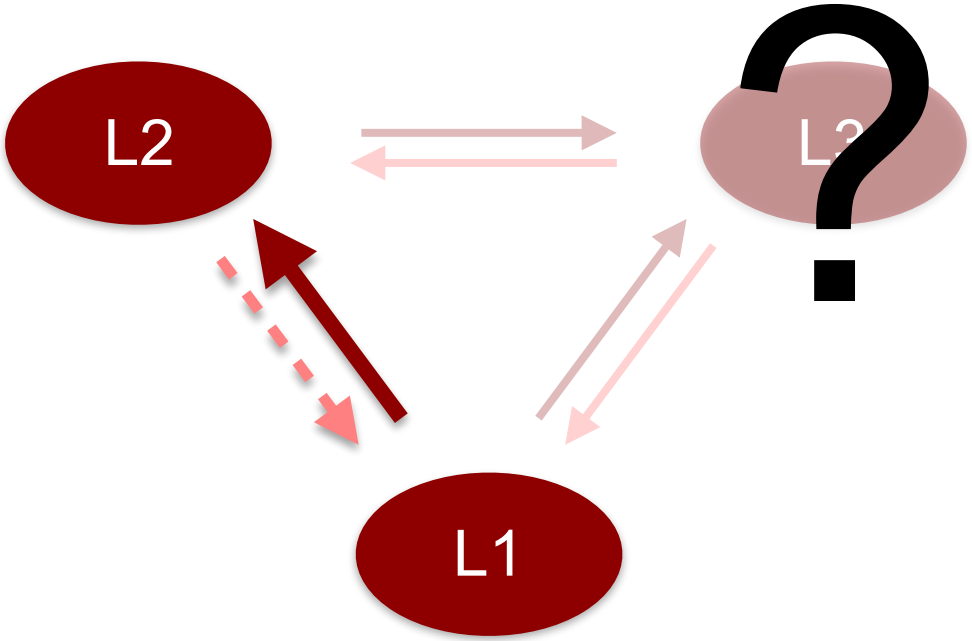
Cognate facilitation in bilinguals



But how about trilinguals?

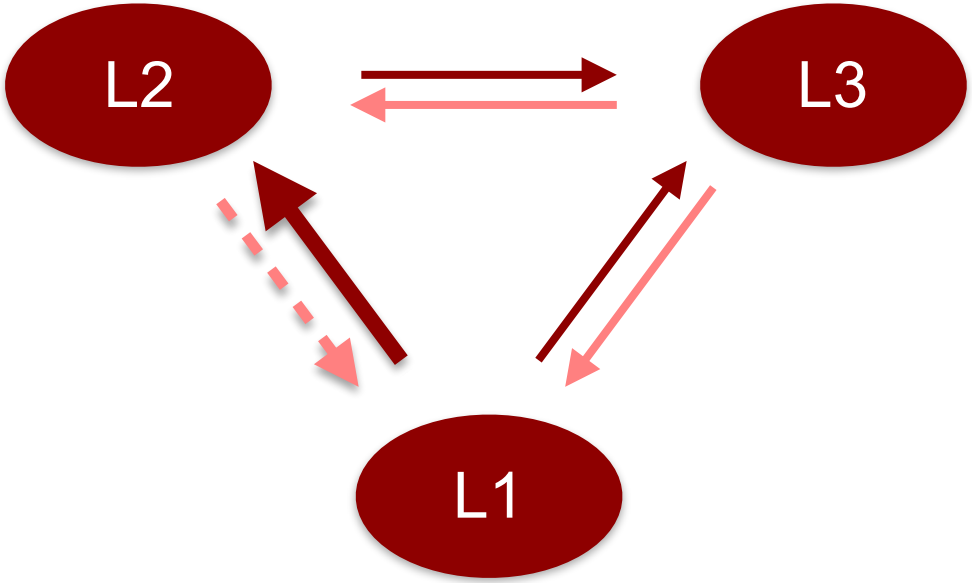


Why should three languages be different from two?



"With respect to specific issues relating to the processing of more than two languages, (…) there is no need to develop a specific model for such multilingual processing" (de Bot, 2004)

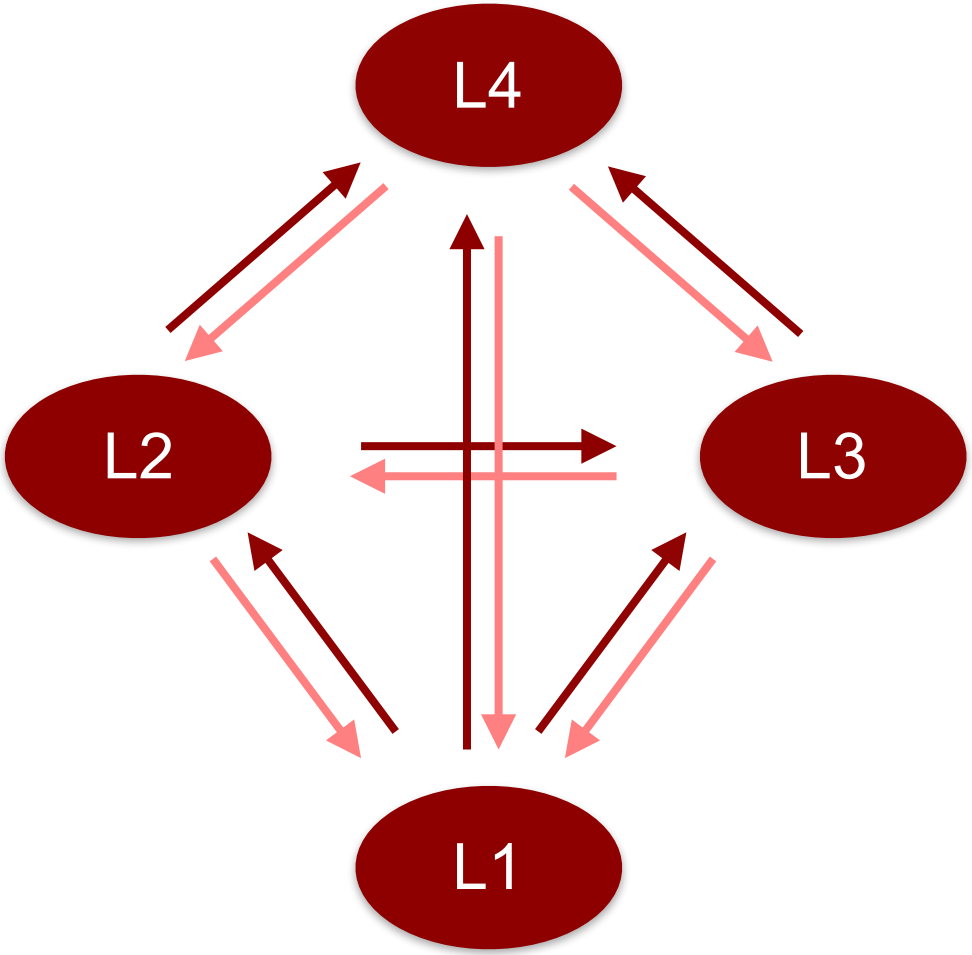
Why should three languages be different from two?



"With respect to specific issues relating to the processing of more than two languages, (…) there is no need to develop a specific model for such multilingual processing" (de Bot, 2004)

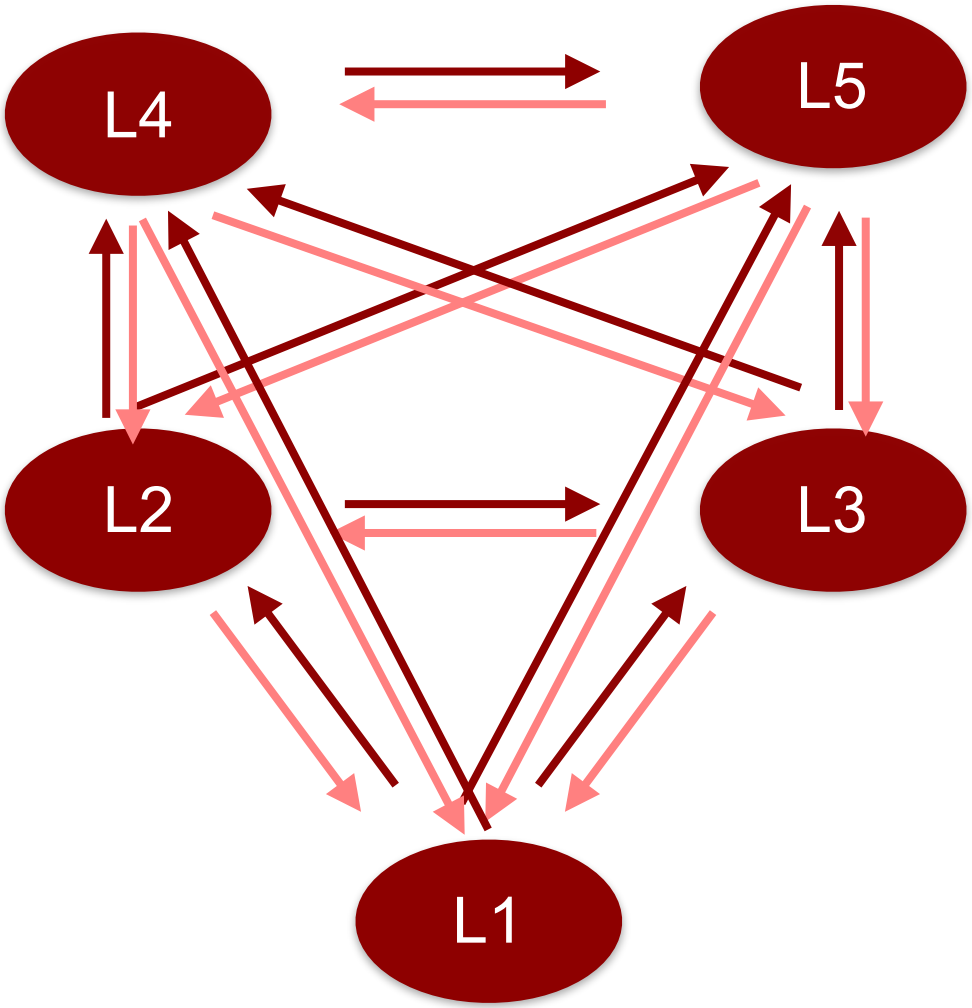
Why should many languages be different from two?

e.g., three foreign languages at school (English, German, French) + 1 native language

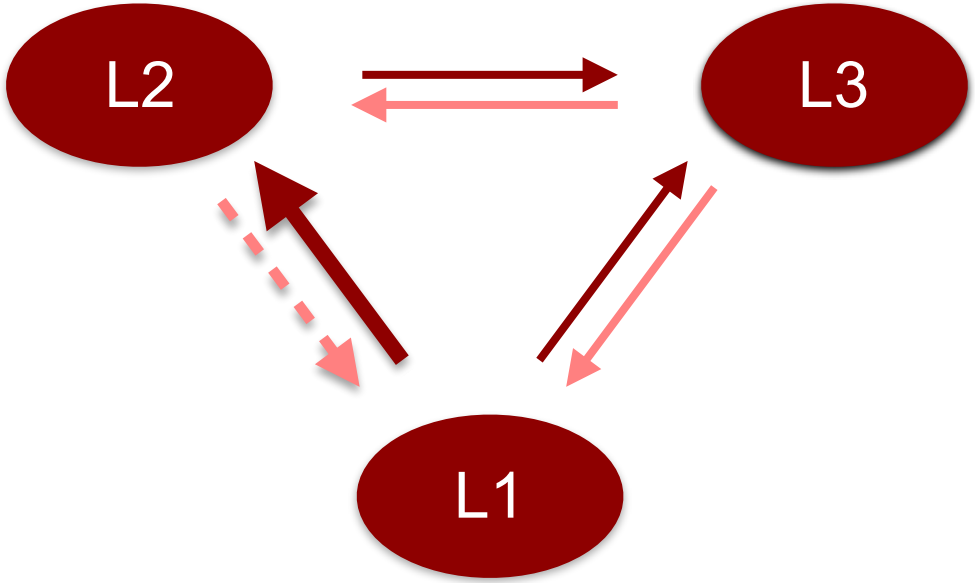


Why should many languages be different from two?

e.g., three foreign languages at school (English, German, French), one new language later (Spanish) + 1 native language

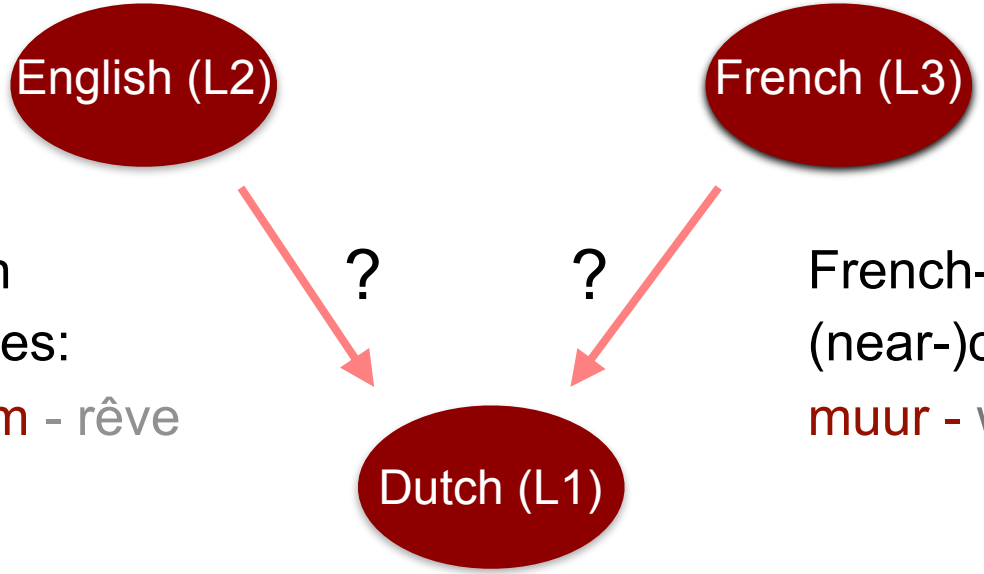


But how about trilinguals?



Trilingual cognate effects

van Hell & Dijkstra, 2002

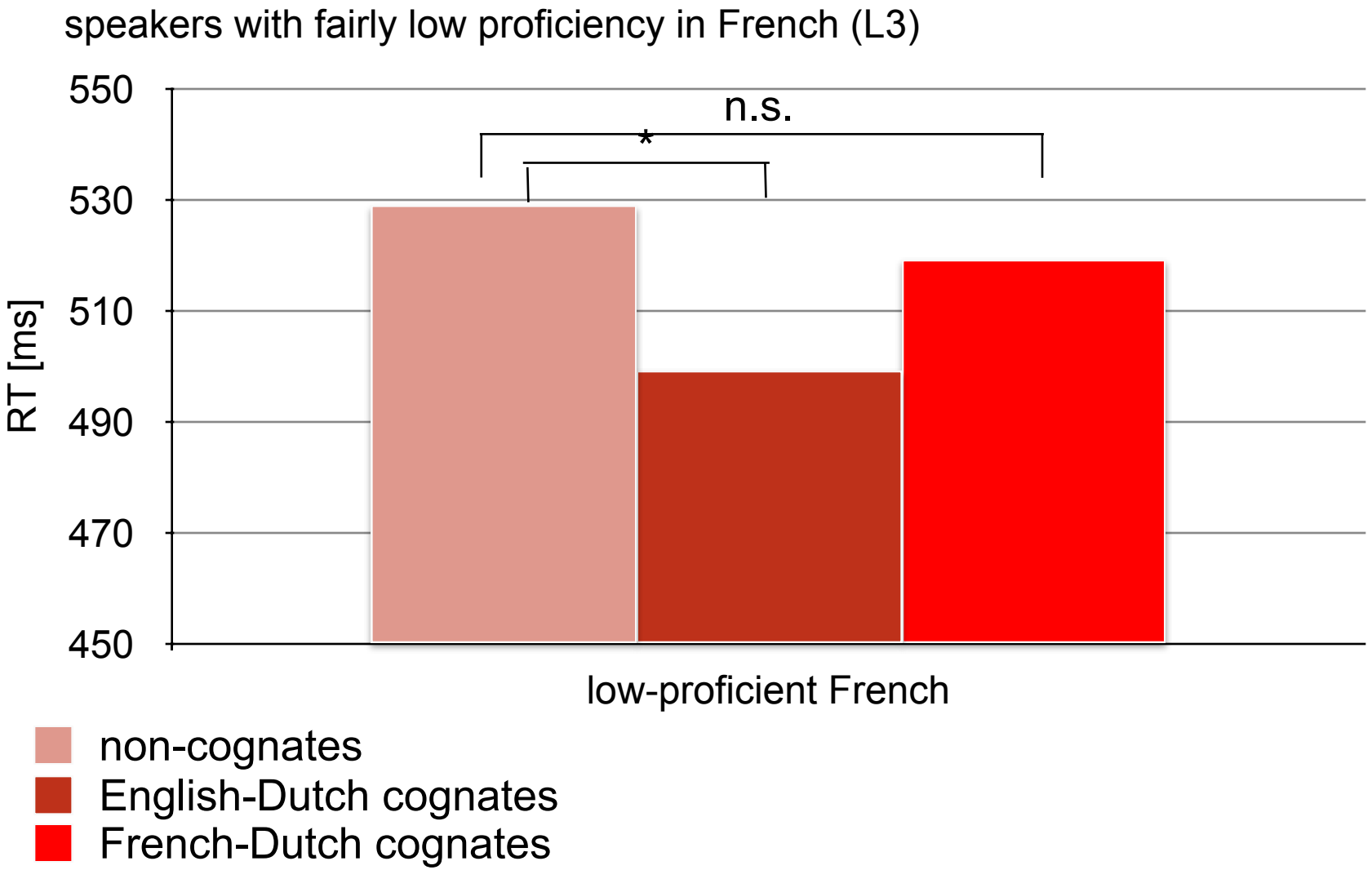


English-Dutch
(near-)cognates:
droom - dream - rêve

French-Dutch
(near-)cognates:
muur - wall - mur

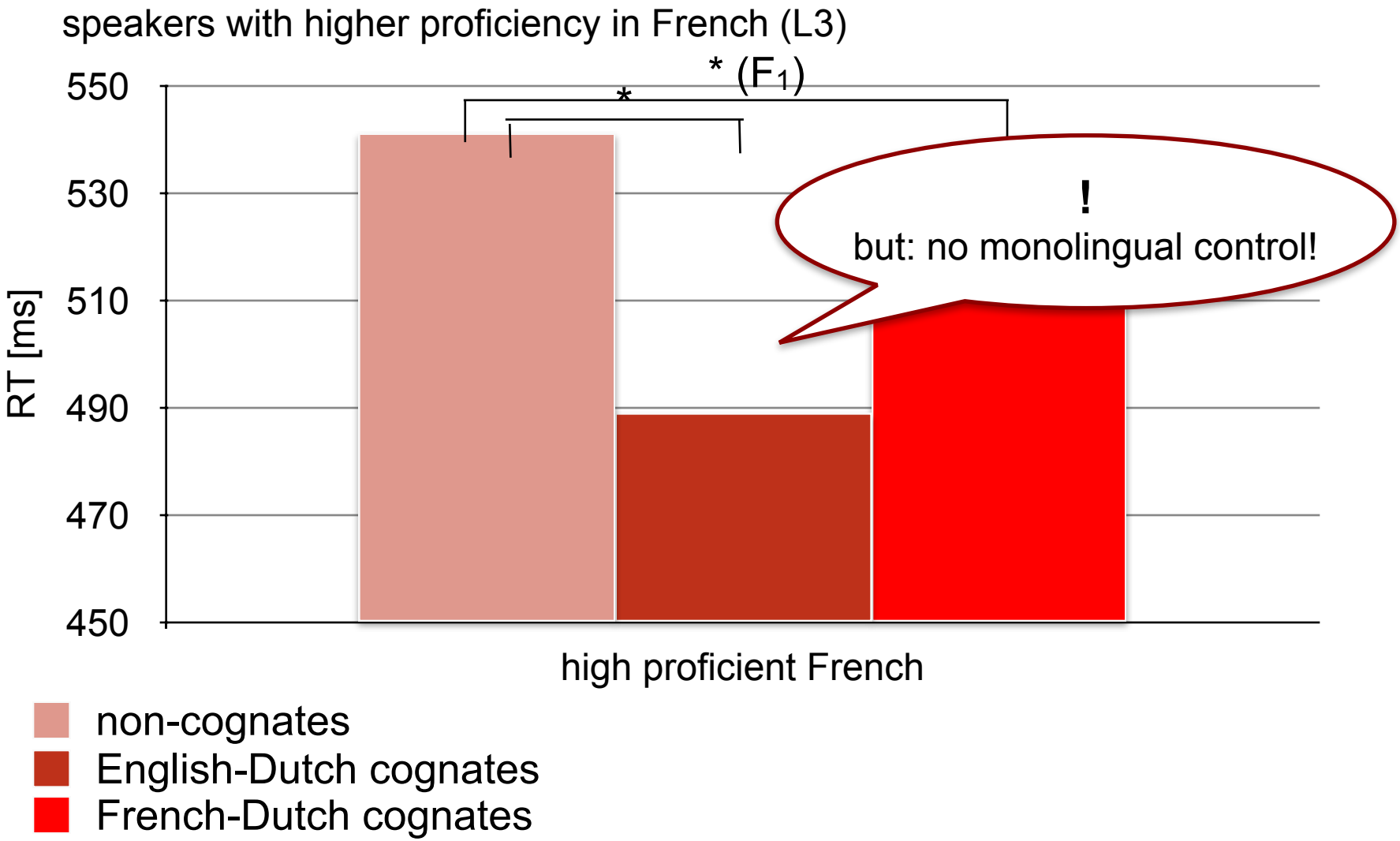
Trilingual cognate effects

van Hell & Dijkstra, 2002: Exp. 2



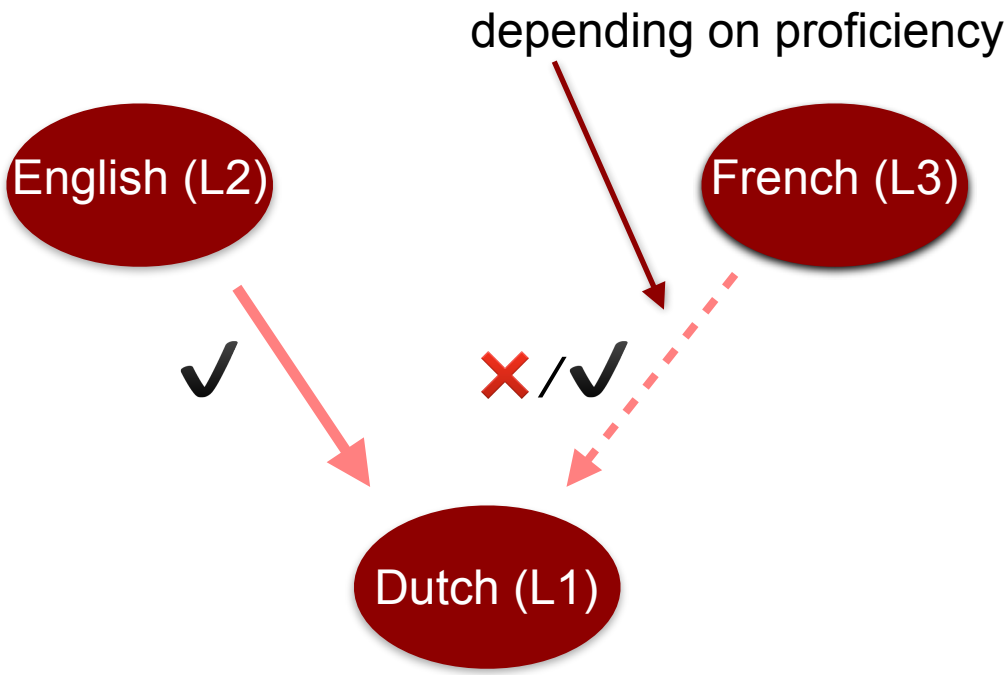
Trilingual cognate effects

van Hell & Dijkstra, 2002: Exp. 3



Trilingual cognate effects

van Hell & Dijkstra, 2002



Trilingual cognate effects

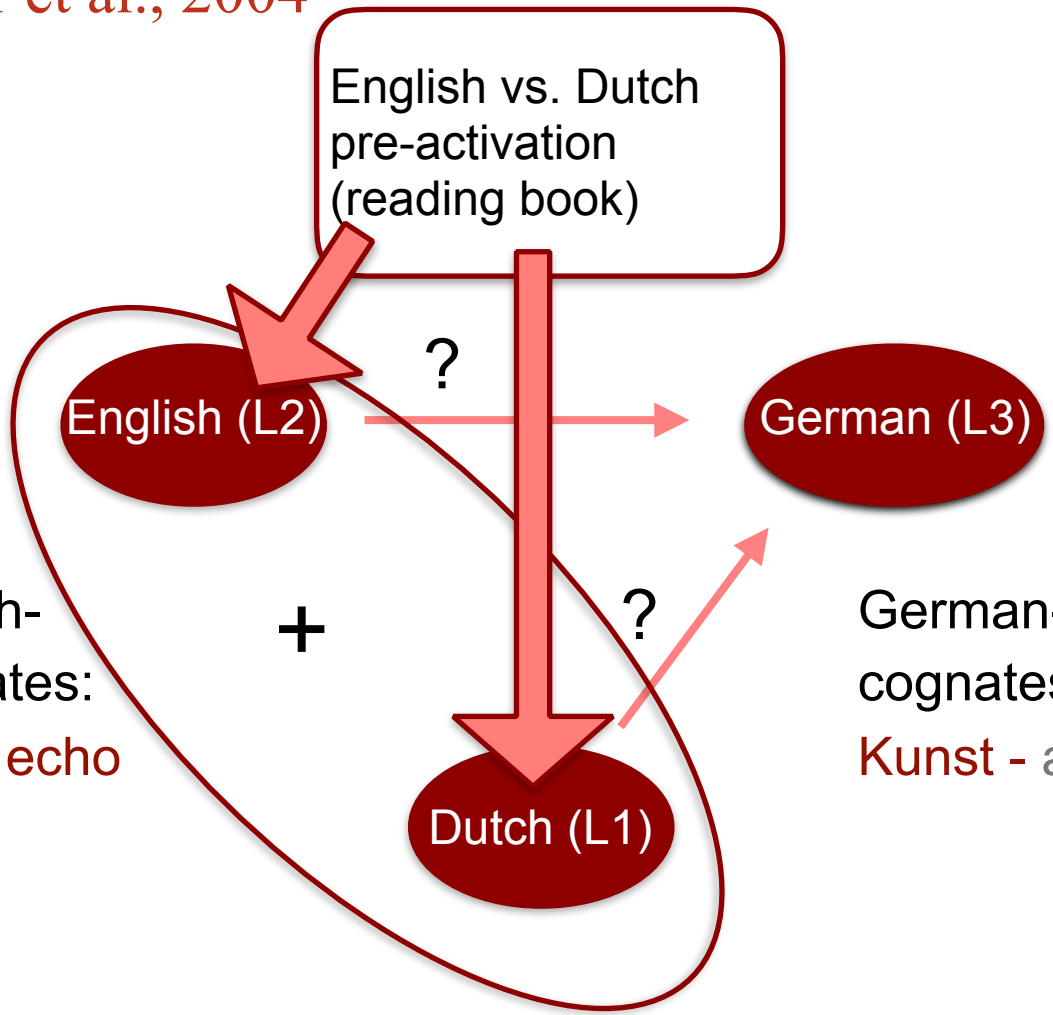
Lemhöfer, Michel, & Dijkstra, 2004

Marije Michel

Ton Dijkstra

Trilingual cognate effects

Lemhöfer et al., 2004



German-Dutch-English cognates:
Echo - echo - echo

German-Dutch cognates:
Kunst - art - kunst

Trilingual cognate effects

Lemhöfer et al., 2004

Participants (students of German in the Netherlands)

TABLE 1
Results of the language experience questionnaire of trilingual participants in Experiment 1

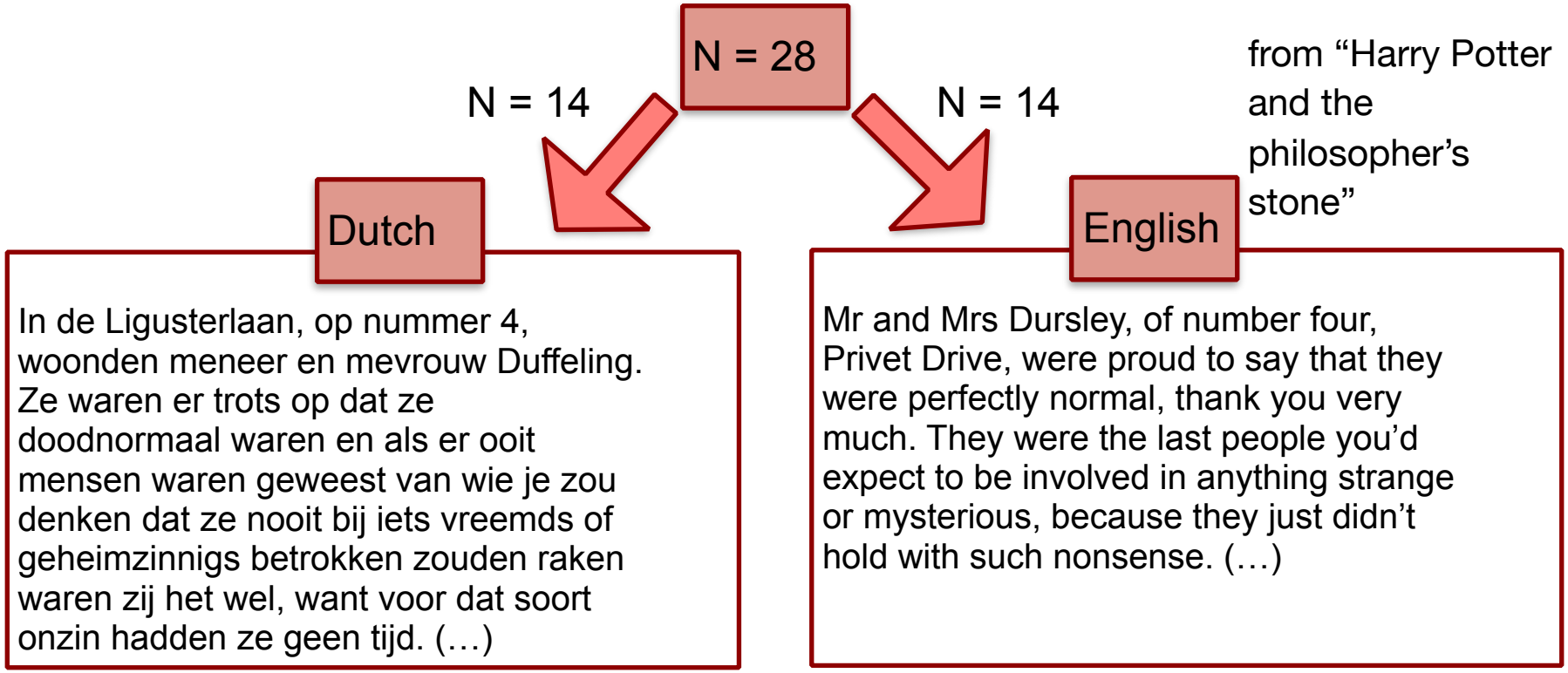
	English		*German*	
	Mean	*SD*	*Mean*	*SD*
Number of years of experience with the language	12.8	6.3	11.0	5.4
Frequency of reading literature in that language (1–7)	4.0	2.1	3.7	1.5
Frequency of speaking that language (1–7)	3.5	1.9	4.2	1.5
Self-rated reading experience in that language (1–7)	5.2	1.5	5.4	1.4
Self-rated writing experience in that language (1–7)	4.1	2.0	5.0	1.6
Self-rated speaking experience in that language (1–7)	4.2	2.0	4.9	1.6
'LexTALE' score	81.0	8.4	78.0	8.7

→ comparable proficiency in English and German

Trilingual cognate effects

Lemhöfer et al., 2004

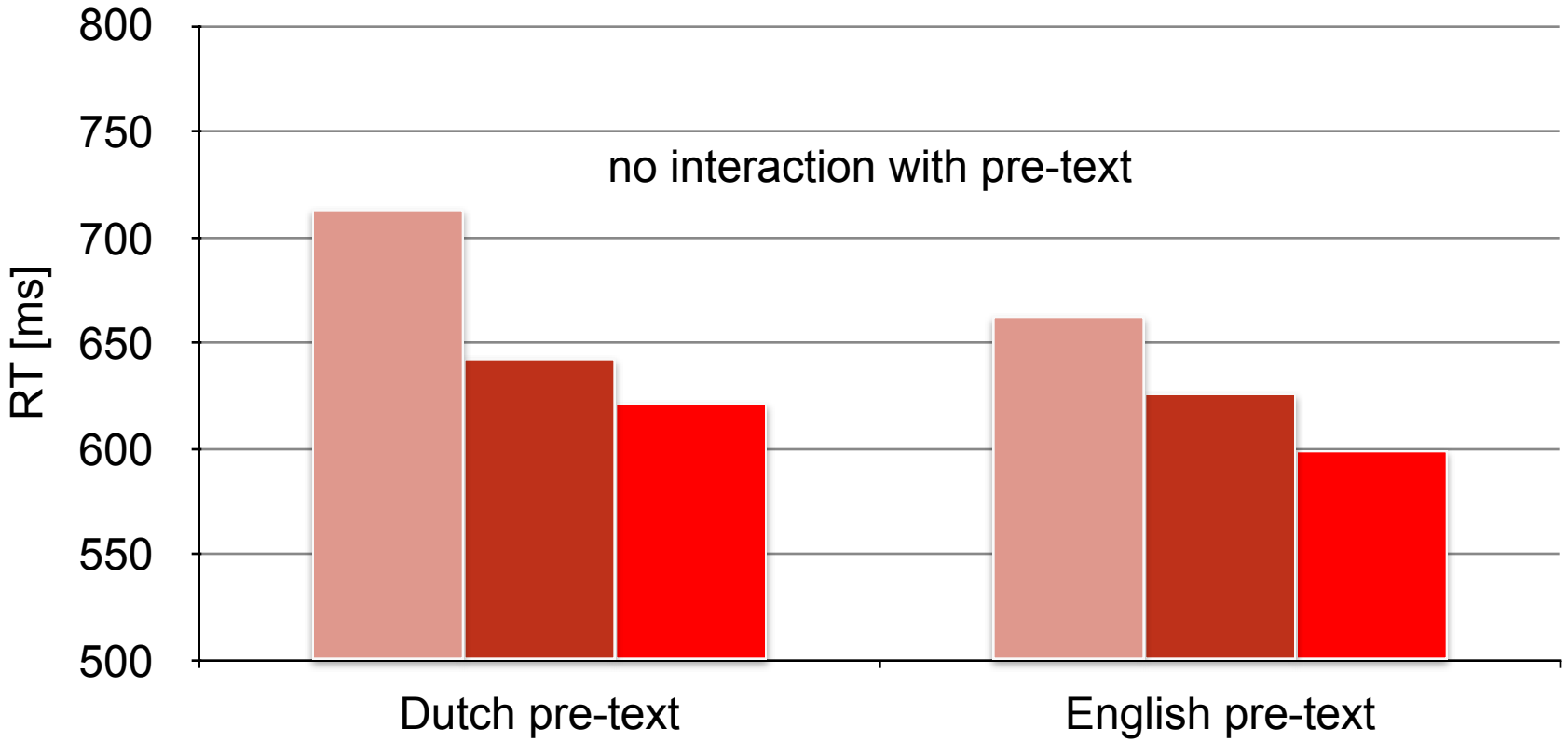
Language pre-activation (Dutch vs. English reading)



did the following words occur in the text?

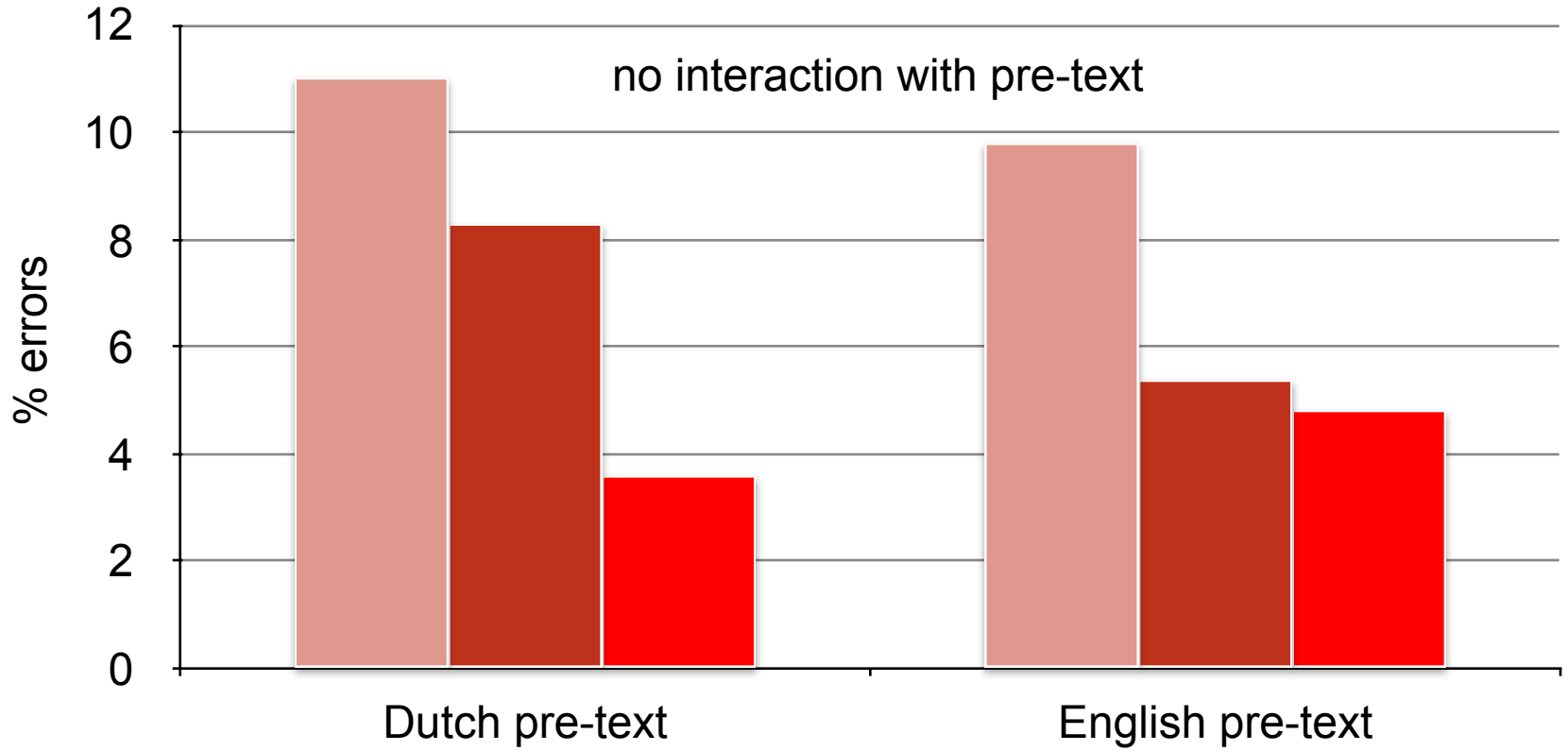
trots	proud
nek	neck
…	…

Results: RTs



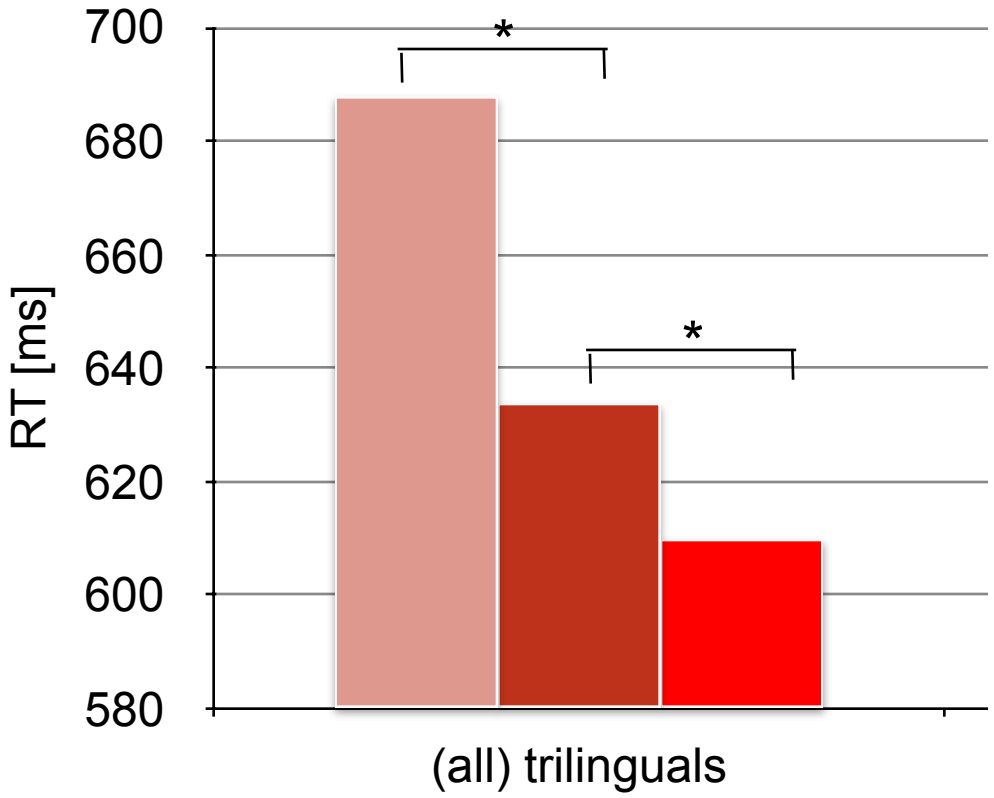
Lemhöfer et al., 2004

Results: errors



Lemhöfer et al., 2004

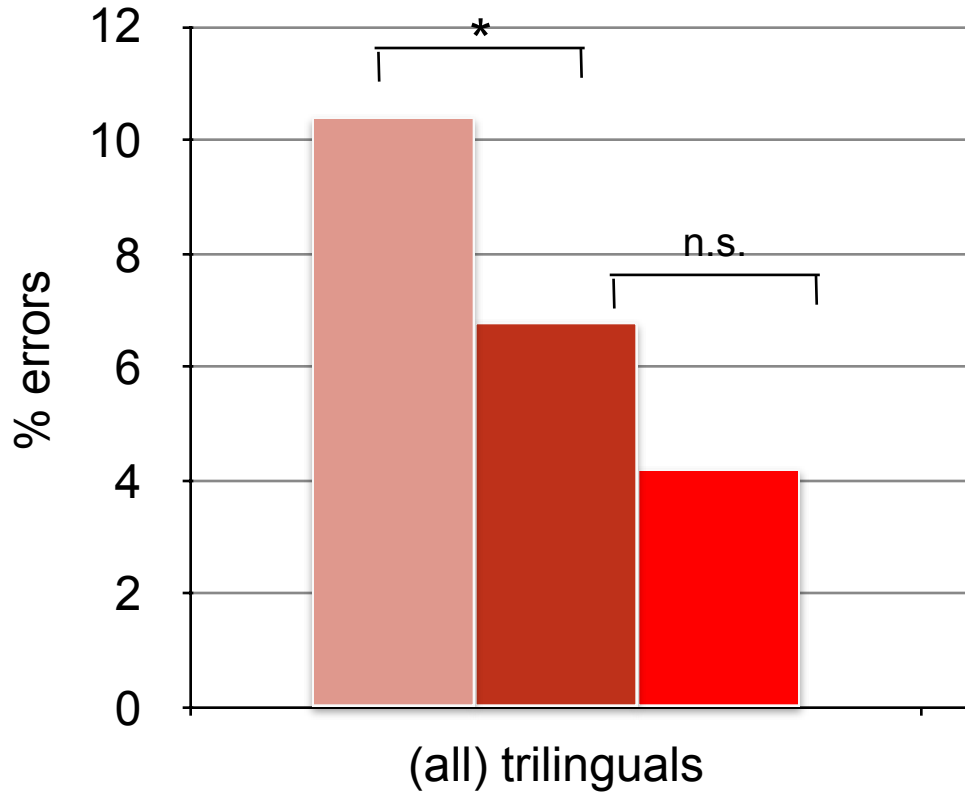
Results: RTs



German control words (ZELT)
G-D cognates (KUNST)
G-D-E cognates (ECHO)

Lemhöfer et al., 2004

Results: errors



German control words (ZELT)
G-D cognates (KUNST)
G-D-E cognates (ECHO)

Lemhöfer et al., 2004

but….

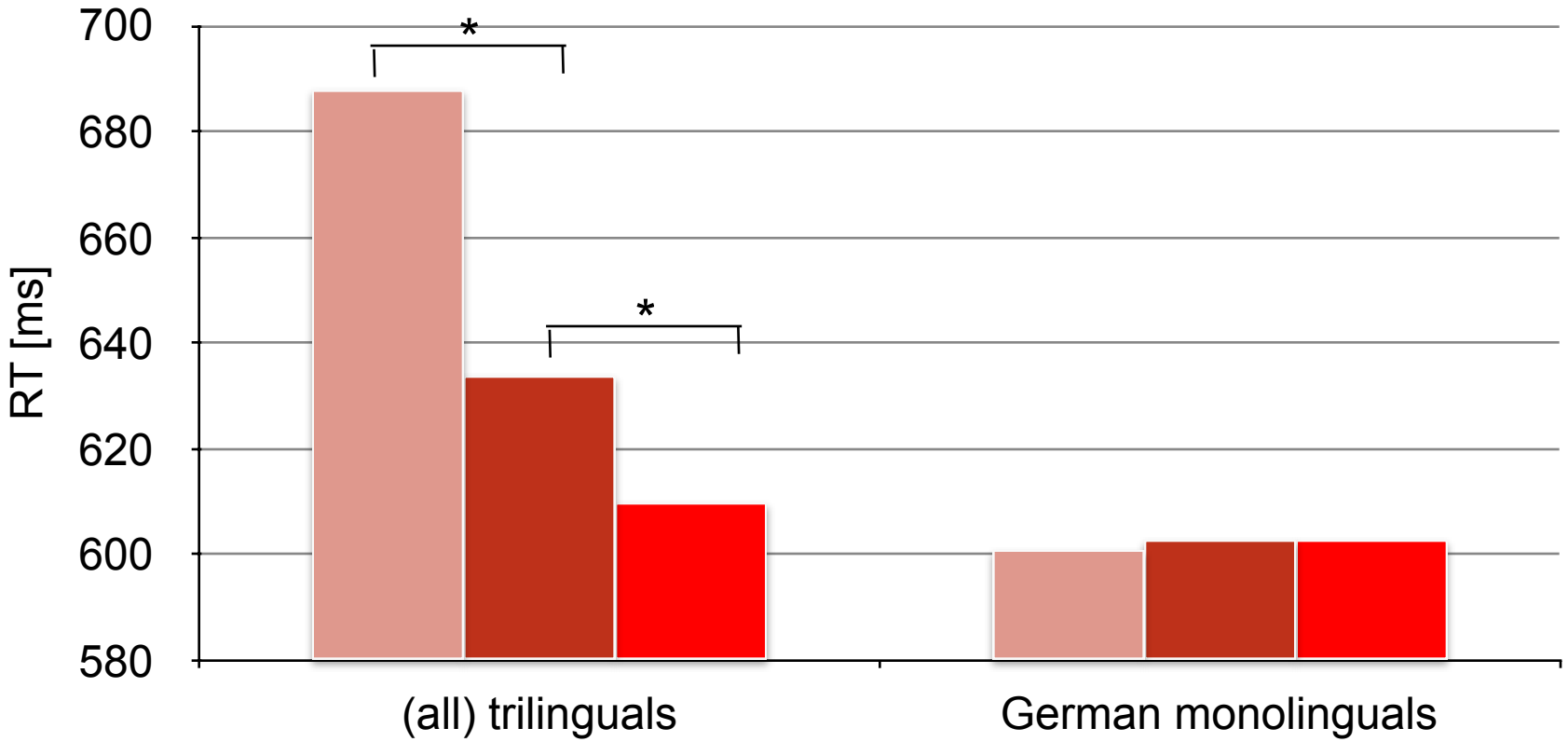
could the effects possibly be due to between-item differences?

➞ better include a monolingual German control group

TABLE 5
Results of the language experience questionnaire of monolingual participants in Experiment 2

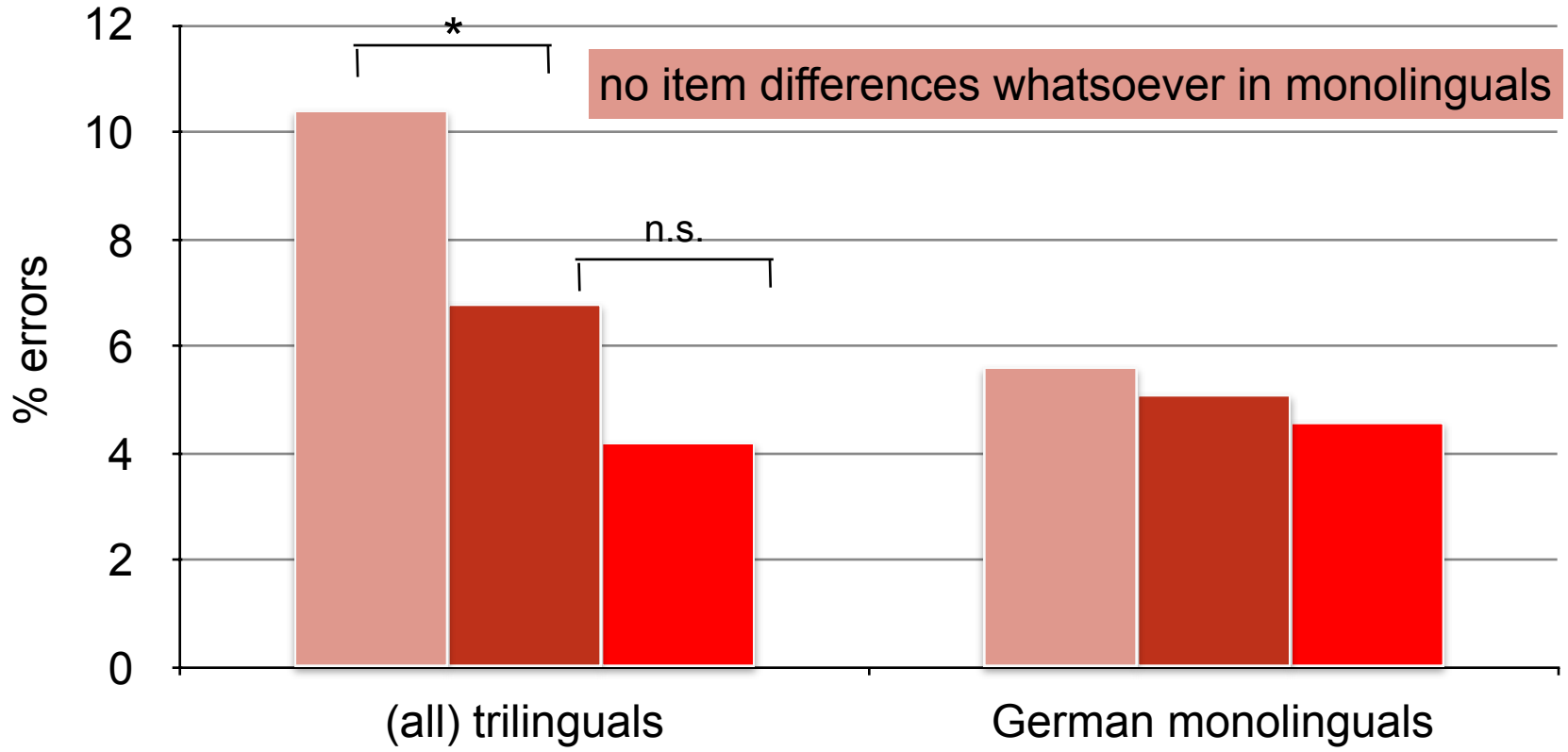
	Mean	*SD*
Number of years of experience with English	1.3	3.2
Frequency of reading literature in English (1–7)	1.0	0.0
Frequency of speaking English (1–7)	1.1	0.5
Self-rated reading experience in English (1–7)	1.3	0.7
Self-rated writing experience in English (1–7)	1.2	0.5
Self-rated speaking experience in English (1–7)	1.2	0.6
'LexTALE' score (half of items)	59.0	7.5

Results: RTs



Lemhöfer et al., 2004

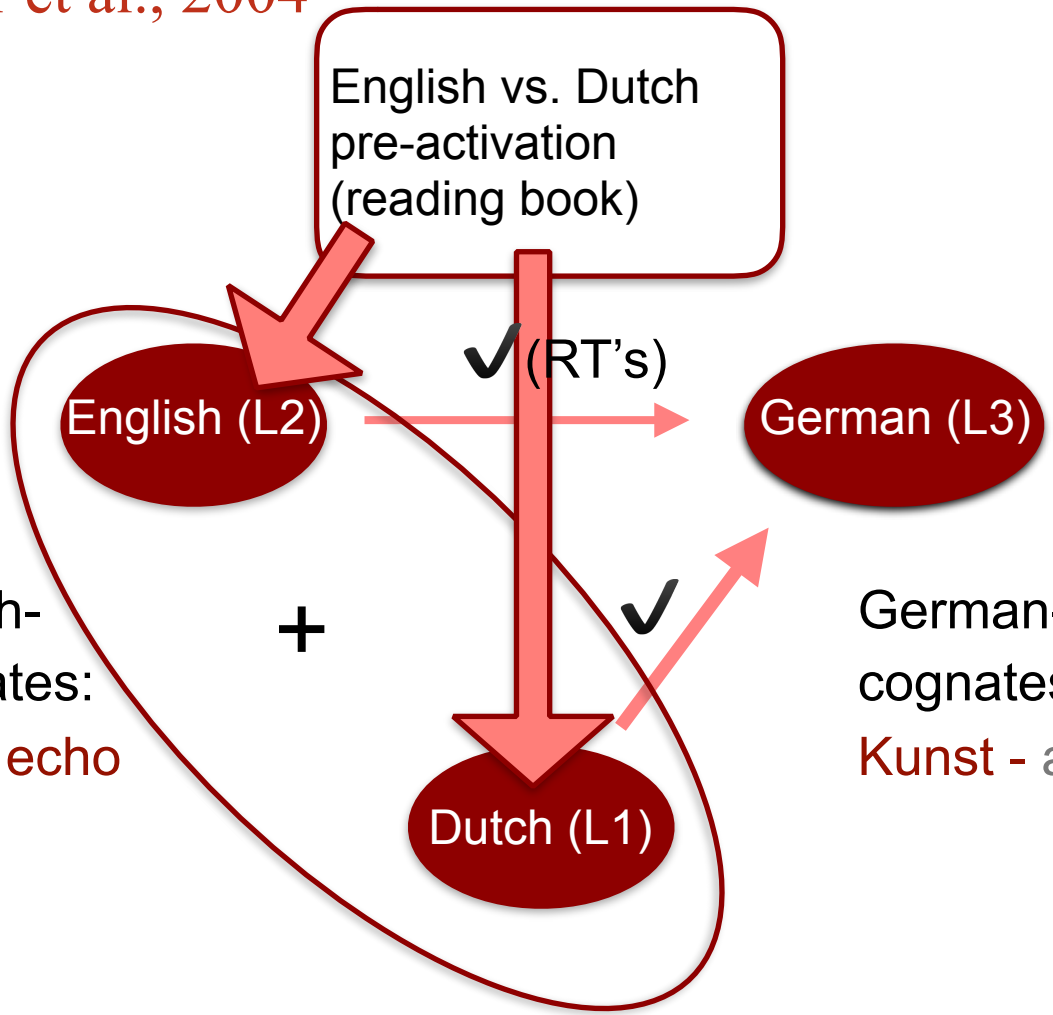
Results: errors



Lemhöfer et al., 2004

Trilingual cognate effects

Lemhöfer et al., 2004



German-Dutch-English cognates:
Echo - echo - echo

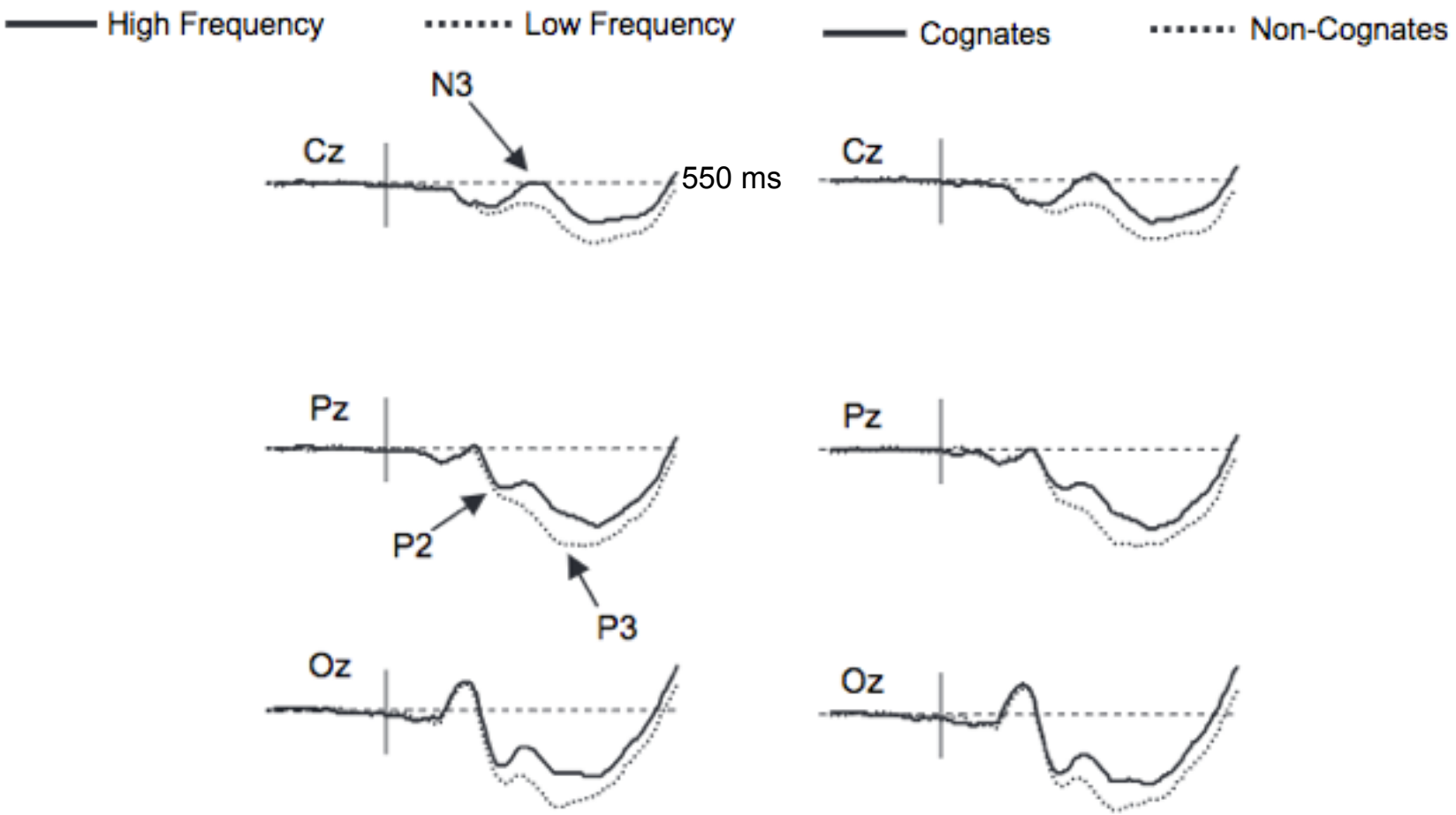
German-Dutch cognates:
Kunst - art - kunst

But what ARE cognate effects?

	Cognate	Non-cognate
High Frequency	 libro / llibre	 mesa / taula
Low Frequency	 patin / pati	 calcetin / mitjo

Strijkers et al., 2010

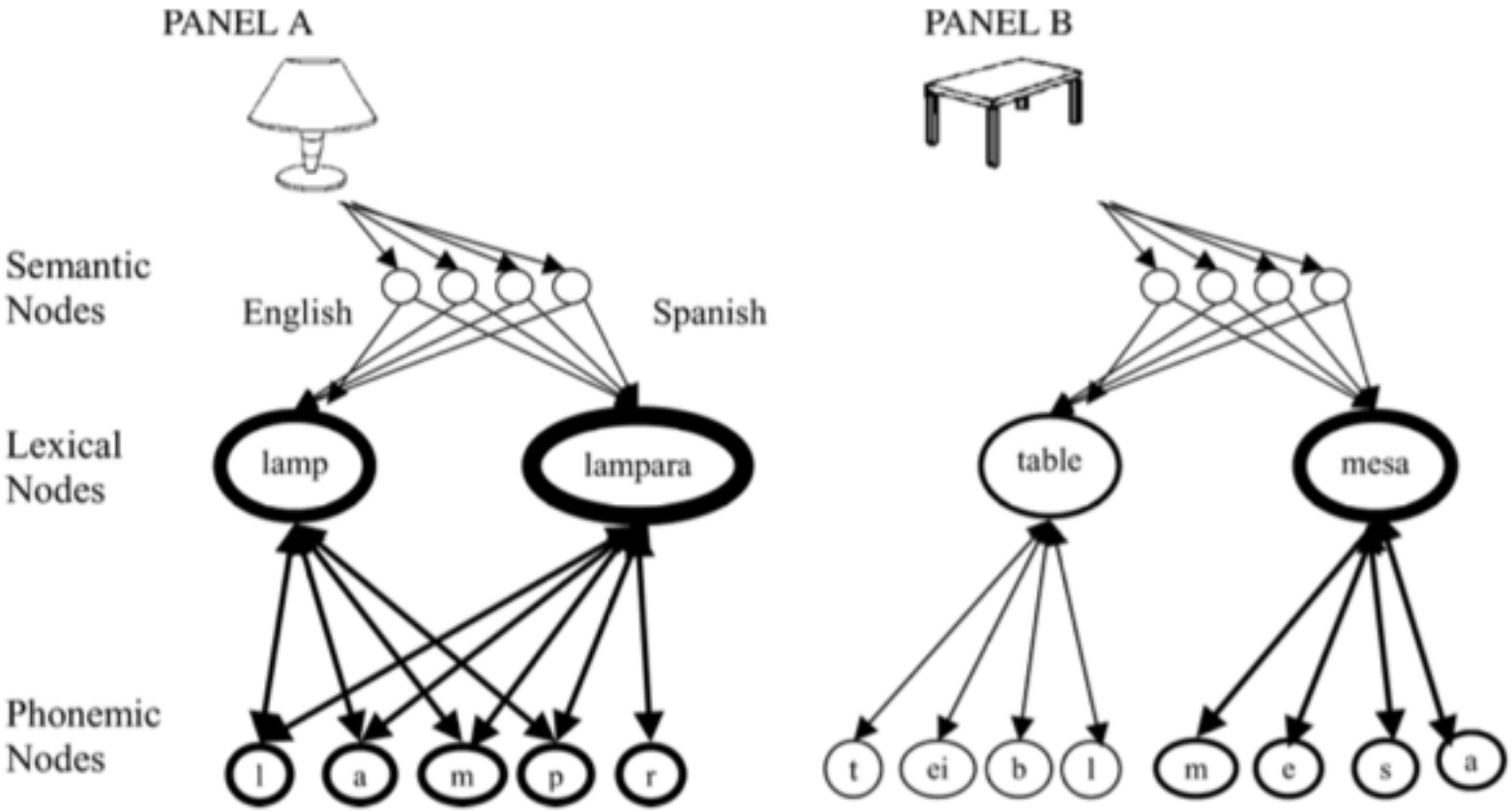
But what ARE cognate effects?



"The cognate effect may reflect a word frequency effect in disguise"

Strijkers et al., 2010

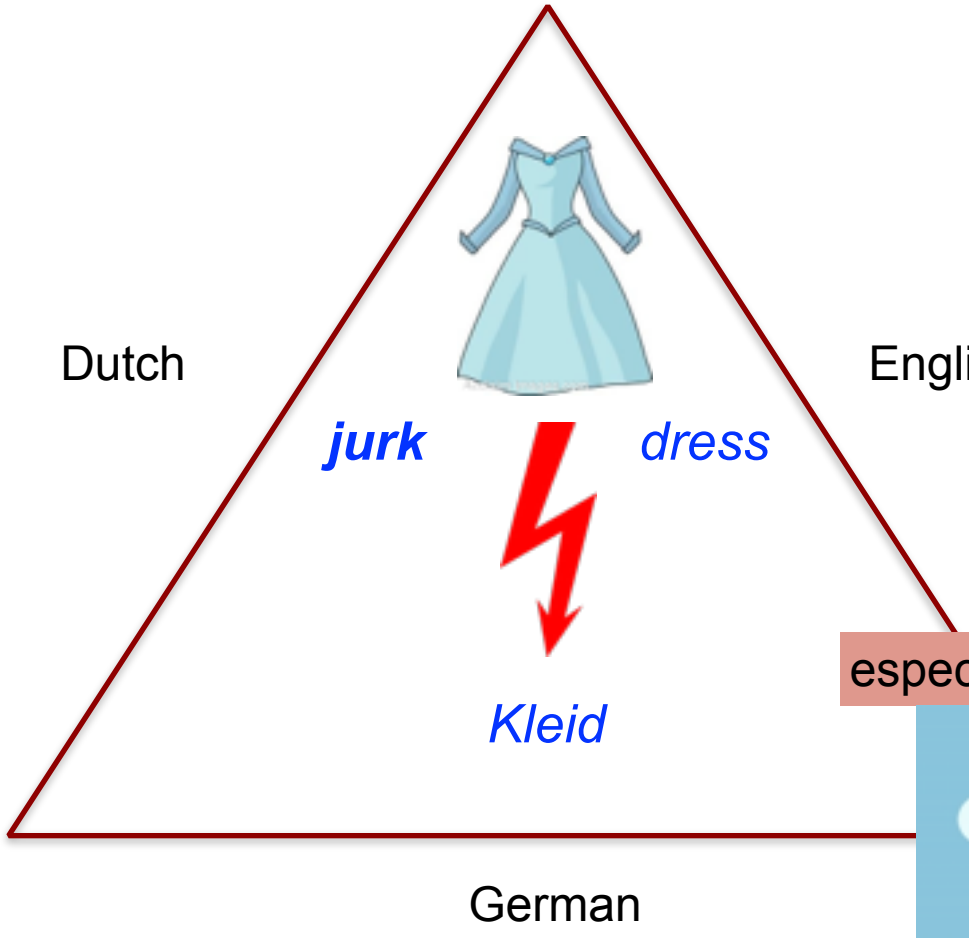
Costa et al., 2005



cognate

non-cognate

Bad cross-language effects: interference



especially during speaking

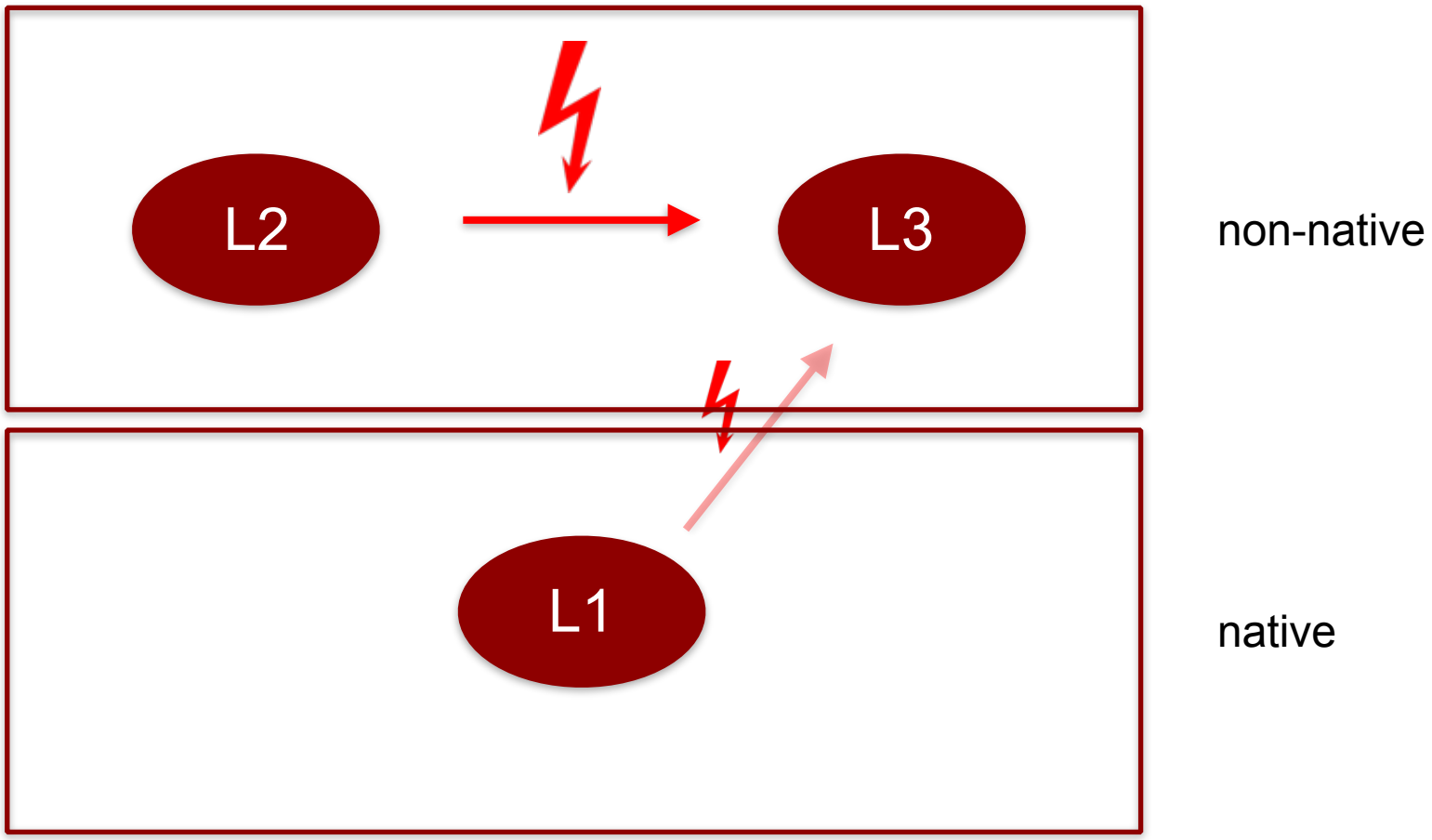
cross-language interference

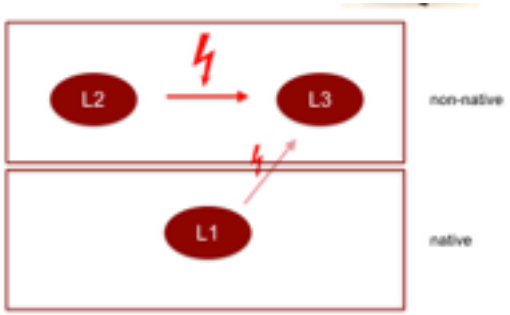
Trilinguals in trouble

kamer — Dutch (L2)

room — English (L3)

Zimmer — German (L1)


L2
L3
L1
non-native
native



- Some linguistic case studies support this supposition (e.g. Williams & Hammarberg, 1998; De Angelis, 2005; Dewaele, 1998)
- However, no **experimental** evidence
- Experimental psycholinguistic literature: almost exclusively **bilingual** studies
- "**Relative strength**" assumption in (bilingual) literature (L1 ➔ L2 vs. L2 ➔ L1):

> "Languages that are used often and have therefore a high default level of activation are difficult to suppress or inhibit, ..." de Bot, 2004

This account might predict the **opposite** (stronger L1 ➔ L2 than L3 ➔ L2 effects)

How do we study this question experimentally?

Trilingual cross-language interference

a little experiment….

NAME THIS PICTURE QUICKLY IN YOUR L3 (French / German / Spanish / Russian ….)

🇩🇪 “Huhn”

🇫🇷 “poule”

Trilingual cross-language interference

a little experiment….

NAME THIS PICTURE QUICKLY IN YOUR L3 (French / German / Spanish / Russian ….)

🇩🇪 “Baum”

🇫🇷 “arbre”

Trilingual cross-language interference

a little experiment….

NAME THIS PICTURE QUICKLY IN YOUR L3 (French / German / Spanish / Russian ….)

"Flugzeug"

"avion"

Trilingual cross-language interference

a little experiment….

NAME THIS PICTURE QUICKLY IN YOUR L3 (French / German / Spanish / Russian ….)

“Pferd”

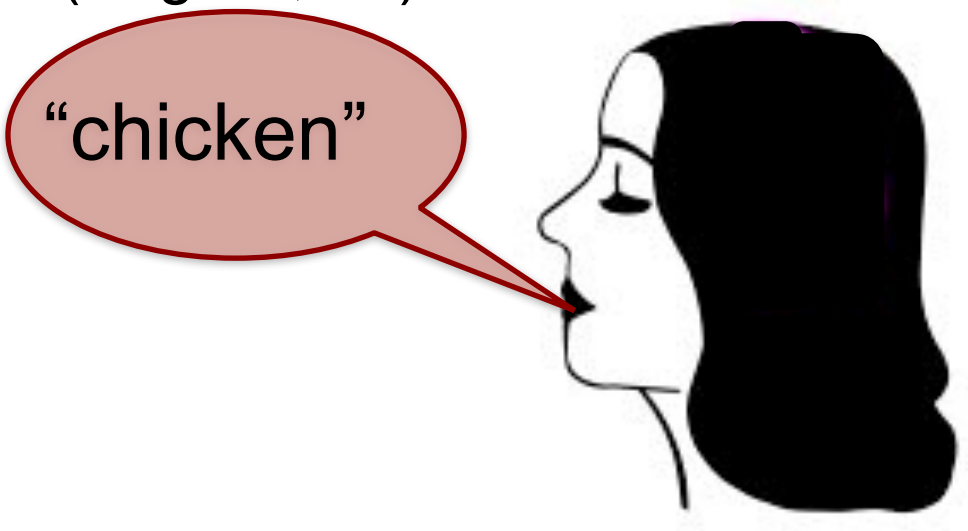
“cheval”

Phono-translation effect (in bilinguals)

Dutch word
for ‘chicken’:
‘kip’

(Dutch, L1)

(English, L2)



Hermans et al., 1998; Costa et al., 2003

Phono-translation effect (in bilinguals)

Dutch word
for ‘chicken’:
‘kip’

(English, L2)

“chicken”

(Dutch, L1)

“kin”(chin)

takes longer than…

Hermans et al., 1998; Costa et al., 2003

Phono-translation effect (in bilinguals)

Dutch word for 'chicken': 'kip'

(English, L2)

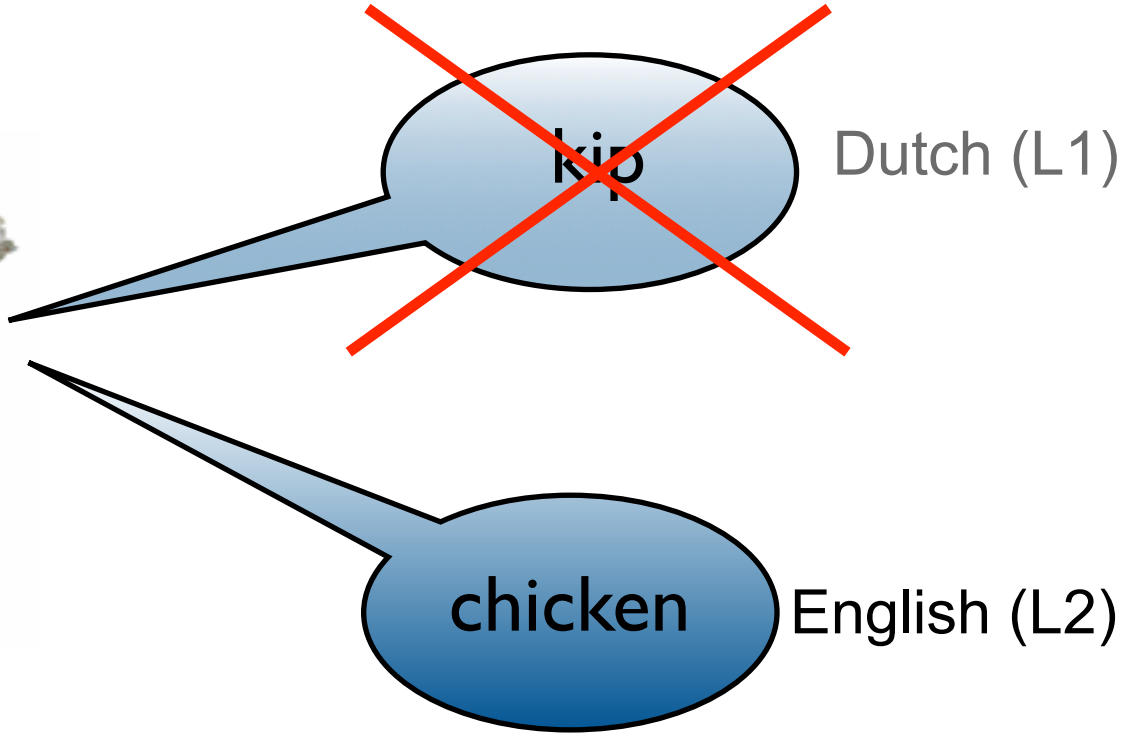
"chicken"

(Dutch, L1)

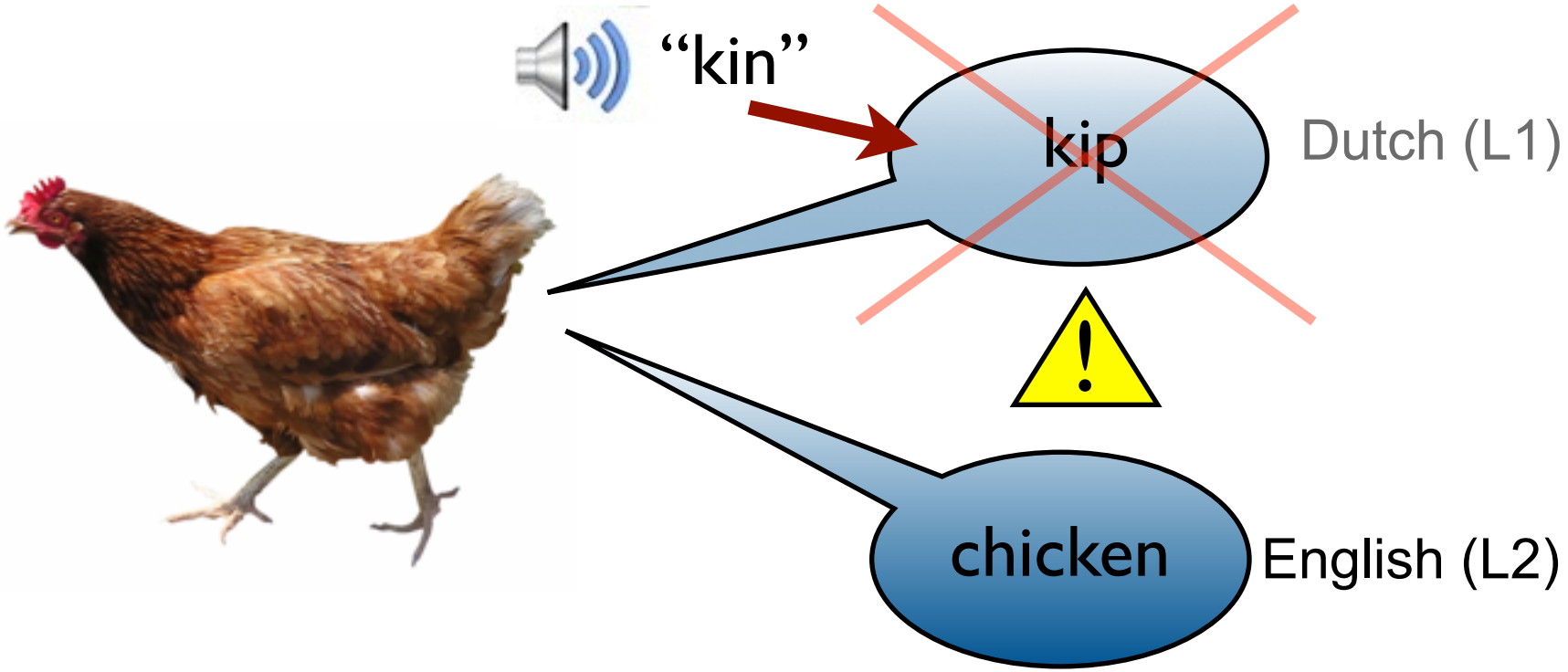
"juf" (teacher)

Hermans et al., 1998; Costa et al., 2003

Explanation of phono-translation effect: cross-language interference

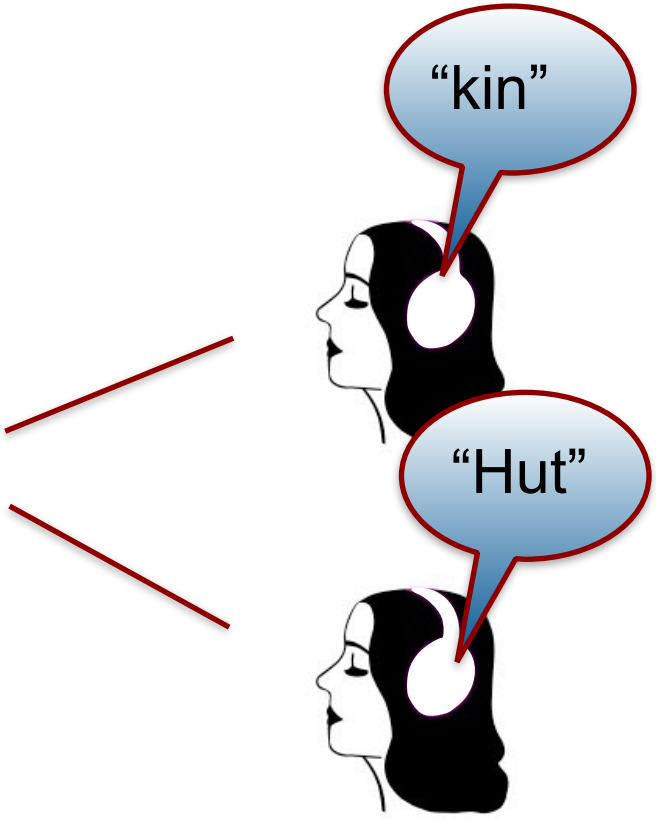


Explanation of phono-translation effect: cross-language interference



A trilingual version of the phono-translation effect

"chicken" (English, L2)



Dutch (L3) word for 'chicken': '**kip**'

German (L1) word for 'chicken': '**Huhn**'

Experiment 1

"chicken" (English, L2)

German (L1), related:
Hut 'hat' (Huhn = chicken)

German (L1), unrelated:
Wand 'wall'

Dutch (L3), related:
kin 'chin' (kip = chicken)

Dutch (L3), unrelated:
juf 'teacher'

conditions within-subjects (mixed, not blocked);
distractors spoken by same balanced-bilingual speaker

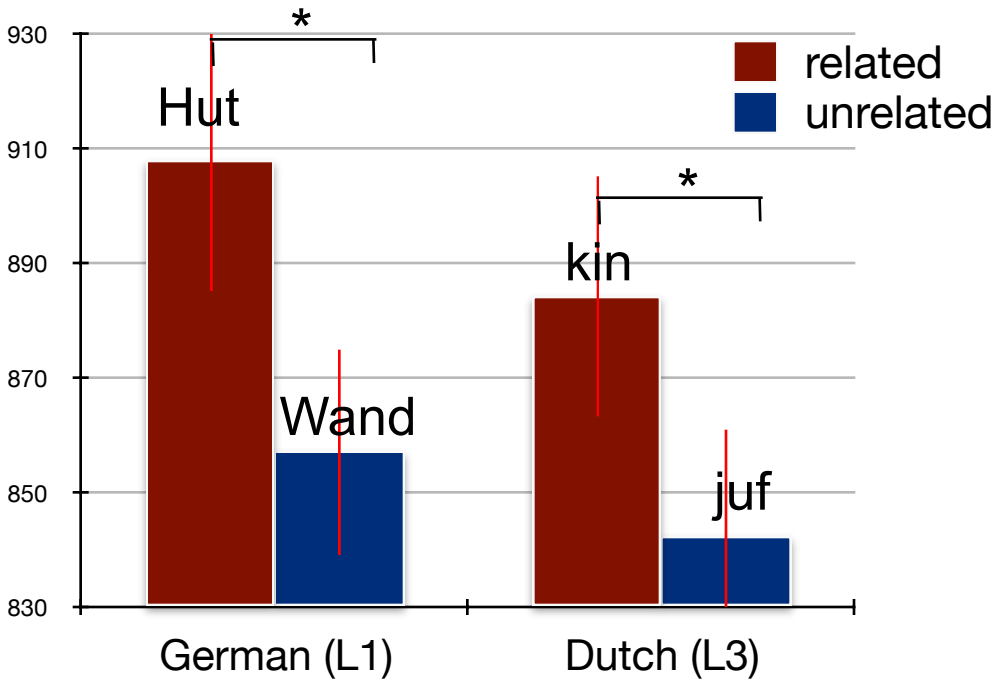
Participants

60 German students / staff at University of Nijmegen (NL): **German** = L1; **English** at school = L2; **Dutch** language of current study / life = L3

	Dutch	English
yrs. experience	3.9	**14**
frq. of speaking (1-7)	**6.2**	4.2
speaking experience (1-7)	**5.6**	4.9
higher proficient in...	**26**	19

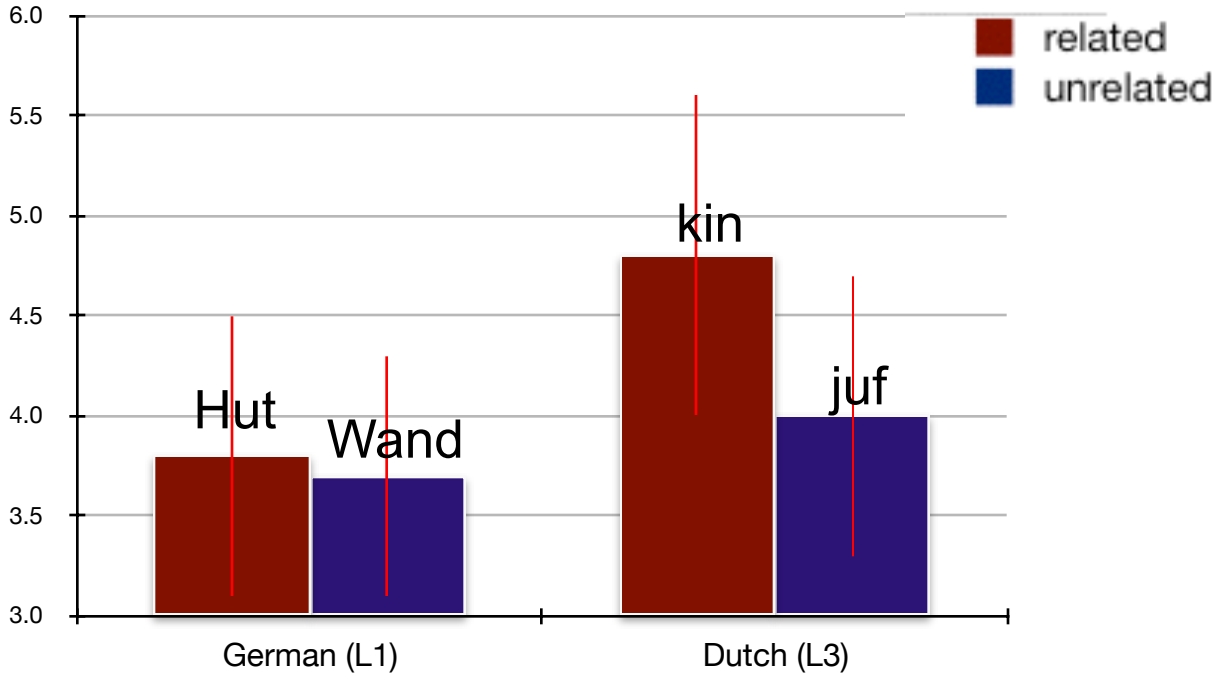
➞ Dutch as the currently more active and proficient foreign language

Results Exp. 1 (RTs)



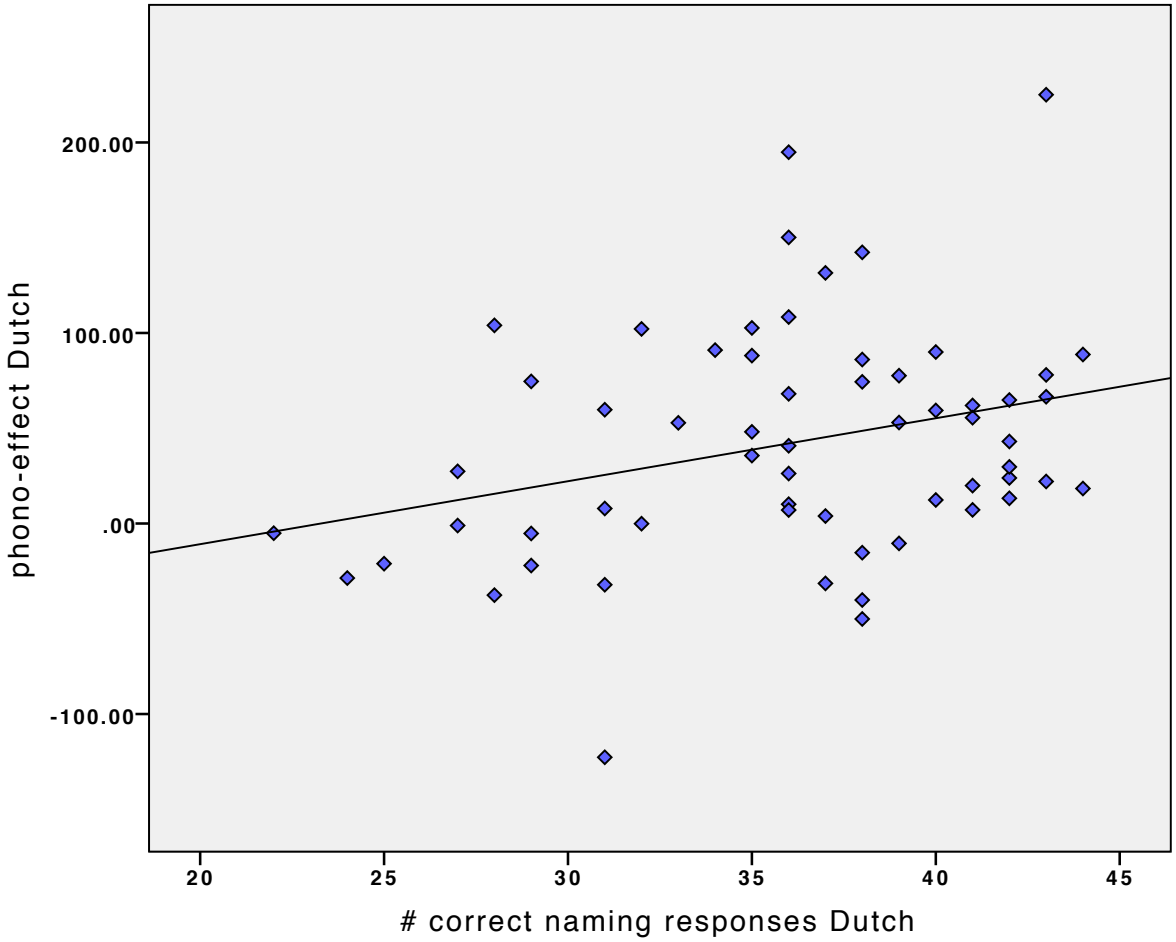
- significant inhibitory effect of phono-translations
- no interaction between distractor language and relatedness

Results Exp. 1 (error rates)



- no significant effects

RTs: role of Dutch proficiency for Dutch effect

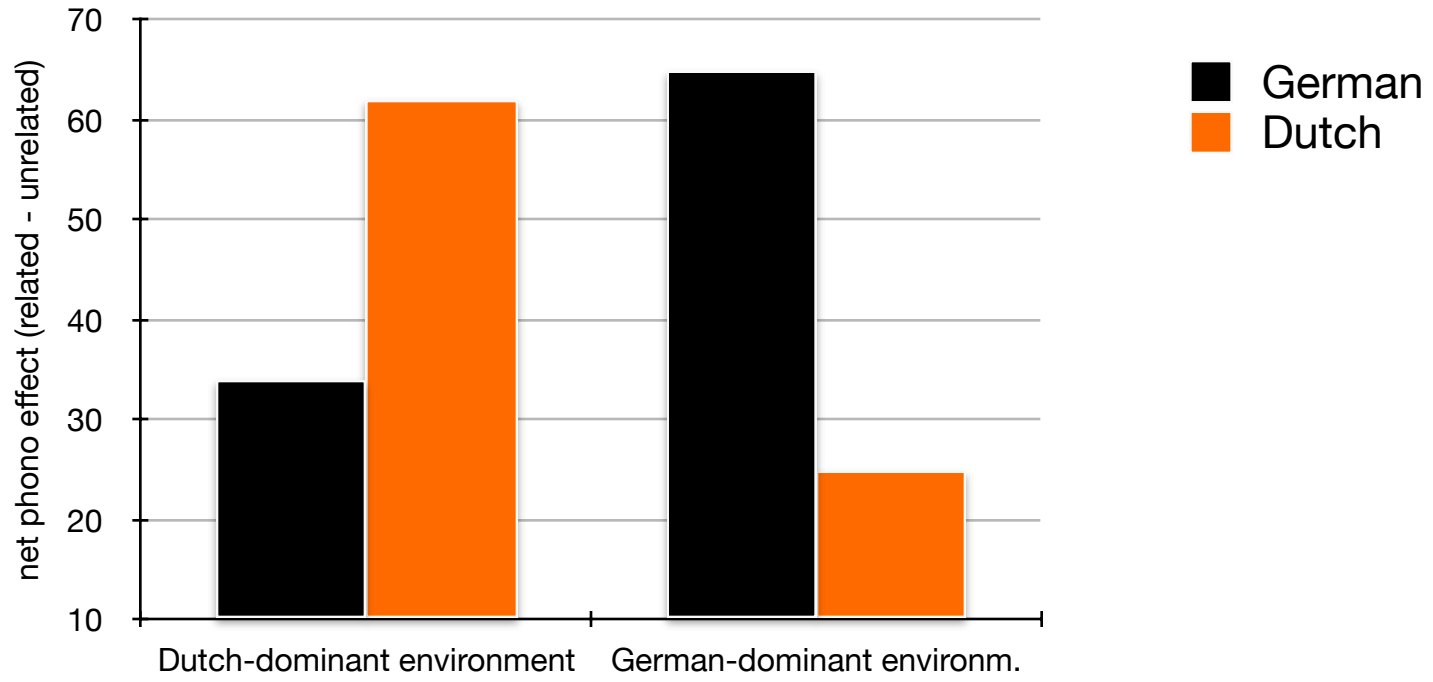


significant correlation of Dutch effect with proficiency (performance when naming objects in Dutch)

$r = .30$, $p = .02$

more important than proficiency: Dutch- vs. German-dominant environment

linear regressions show that strongest modulating factor for effects is environment



Lemhöfer et al., yet unpublished 😕

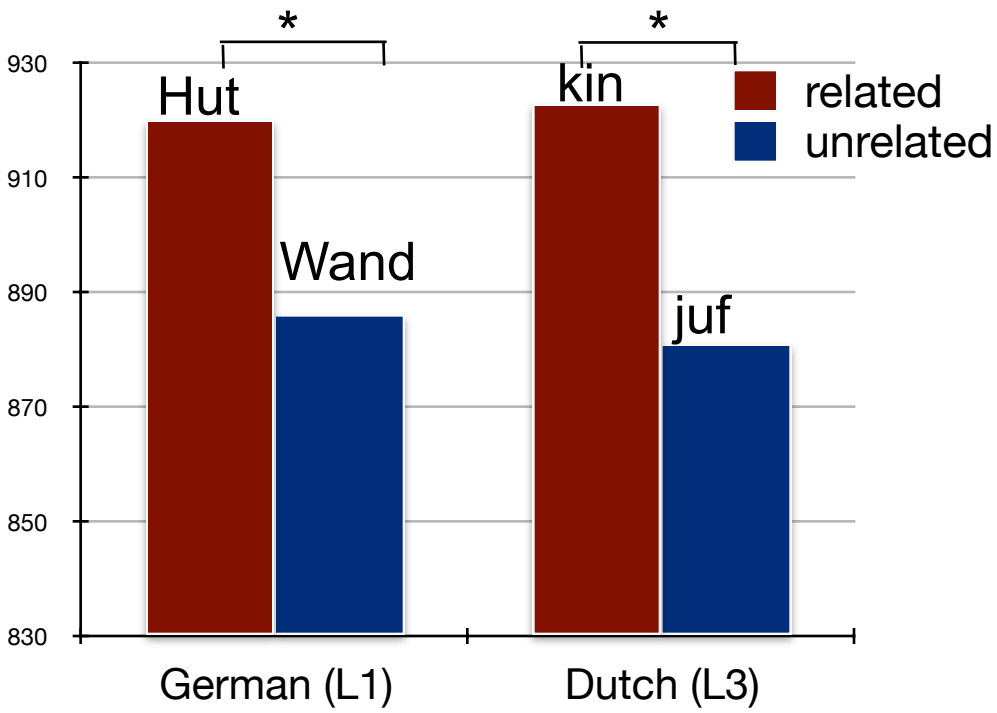
Replication attempt

N = 42 (one excluded); German students at University of Nijmegen (NL)

	Dutch		English	
	new	**old**	**new**	**old**
yrs. experience	3.2	3.9	**13.1**	**14.0**
frq. of speaking (1-7)	**6.0**	**6.2**	3.8	4.2
speaking experience (1-7)	**4.9**	**5.6**	4.5	4.9
higher proficient in...	**15**	**26**	14	19

➞ Dutch as the currently more active and proficient foreign language in both samples, but this sample is somewhat less experienced in Dutch (and English)

Results Exp. 2 (RTs)



- significant inhibitory effect of phono-translations
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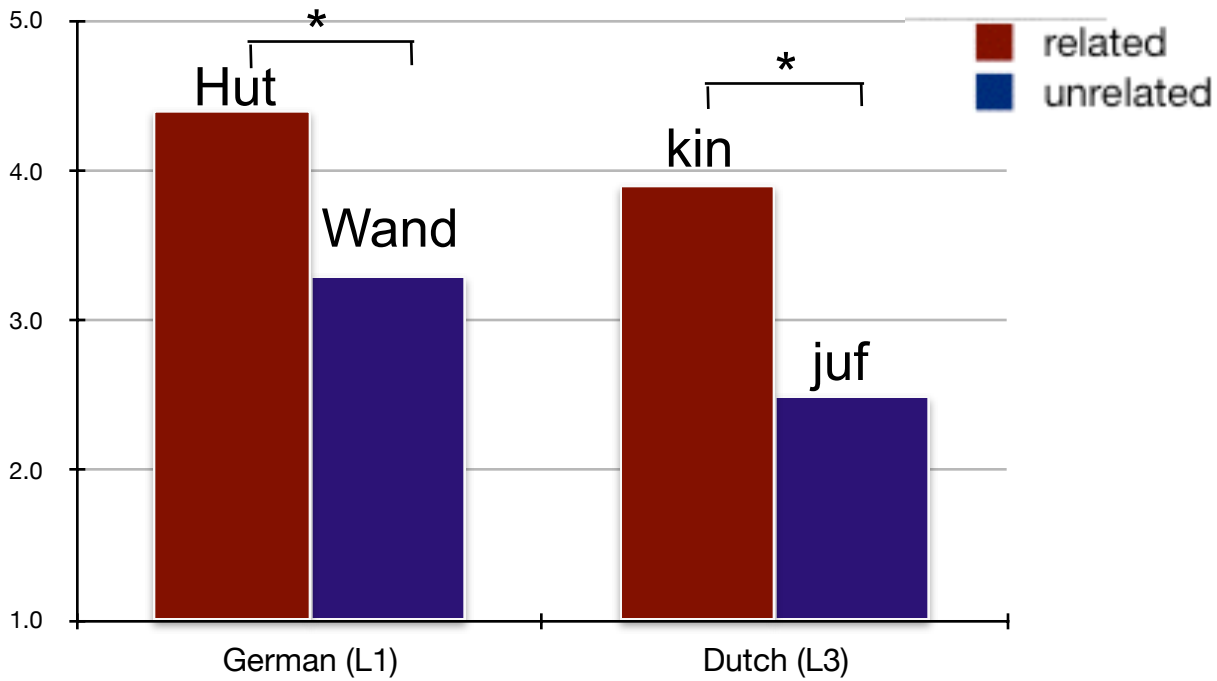
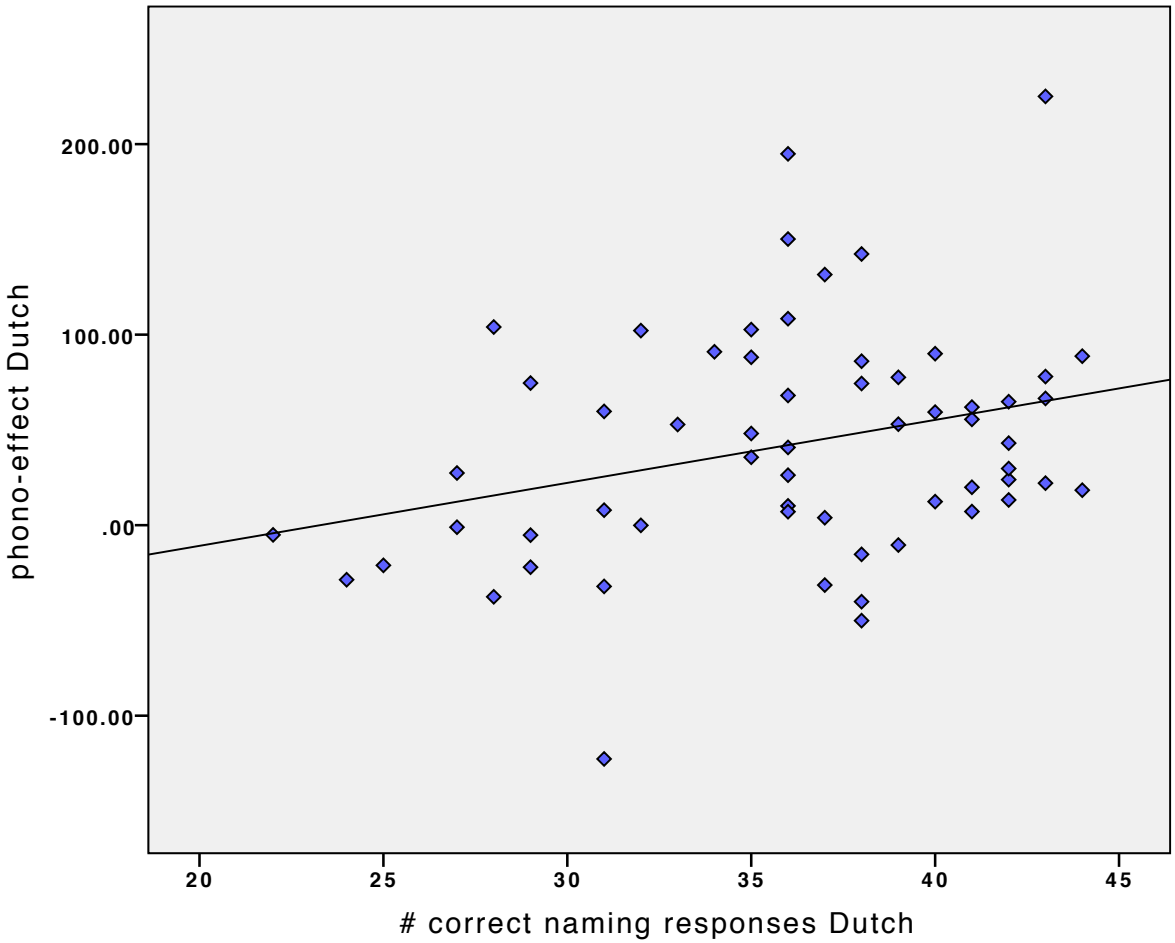
Results Exp. 2 (error rates)



- significant inhibitory effect of phono-translations
- no interaction between distractor language and relatedness

BUT….

RTs: role of Dutch proficiency for Dutch effect

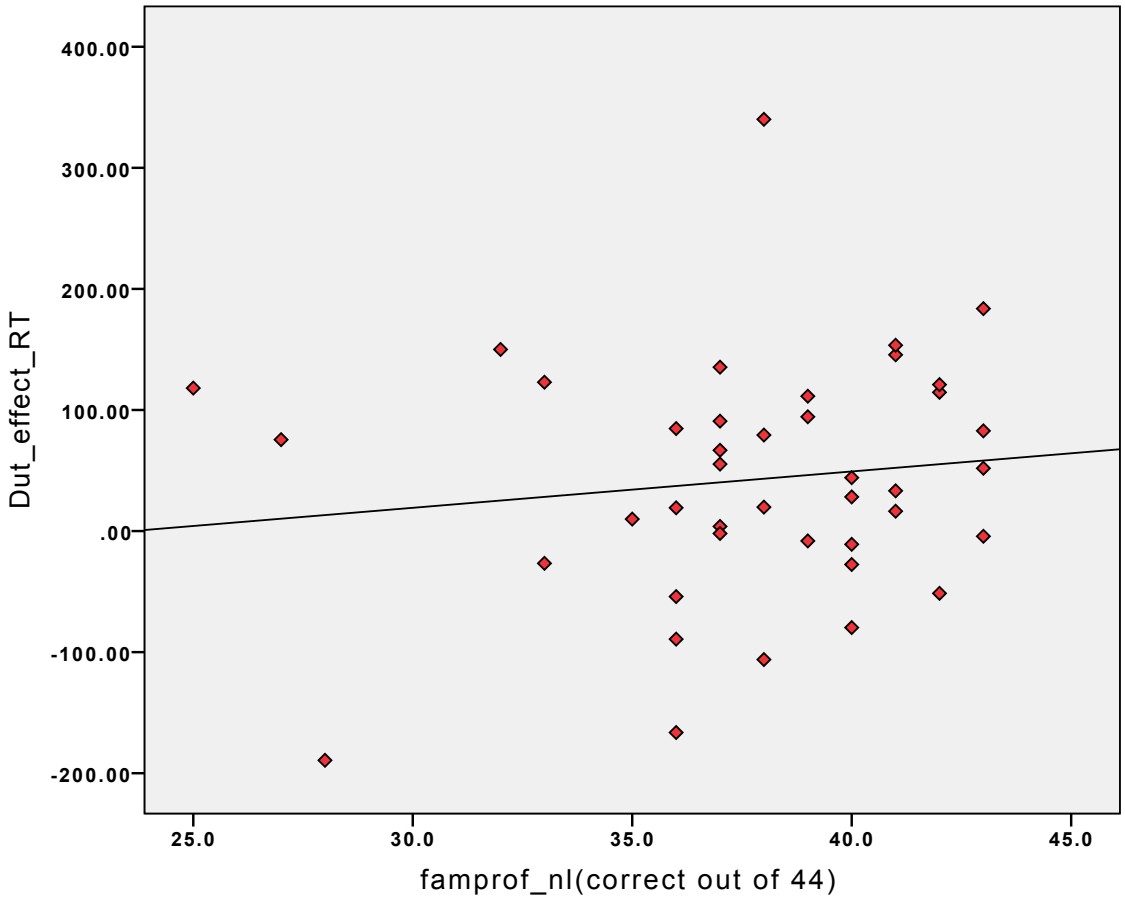


significant correlation of Dutch effect with proficiency (performance when naming objects in Dutch)

$r = .30$, $p = .02$

BUT….

bad news (1): role of Dutch proficiency for Dutch effect

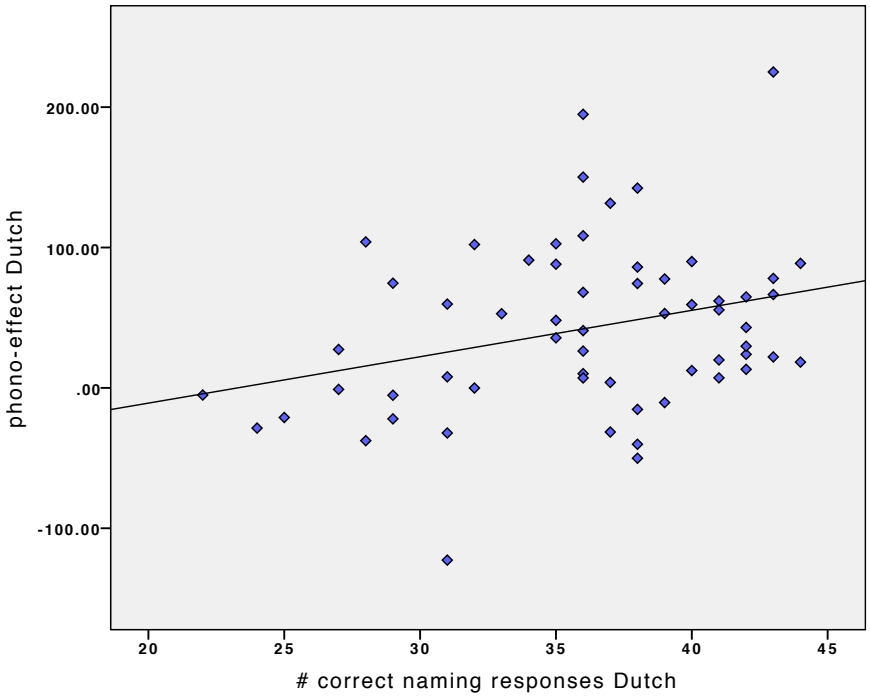


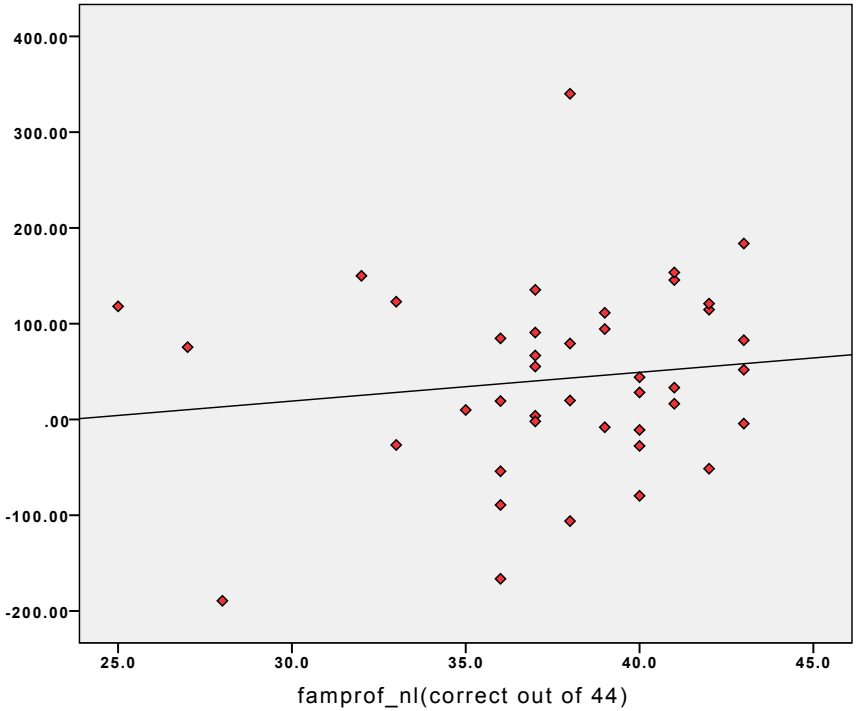
NO significant correlation of Dutch effect with proficiency (performance when naming objects in Dutch)

$r = .13$, $p = .42$

BUT….

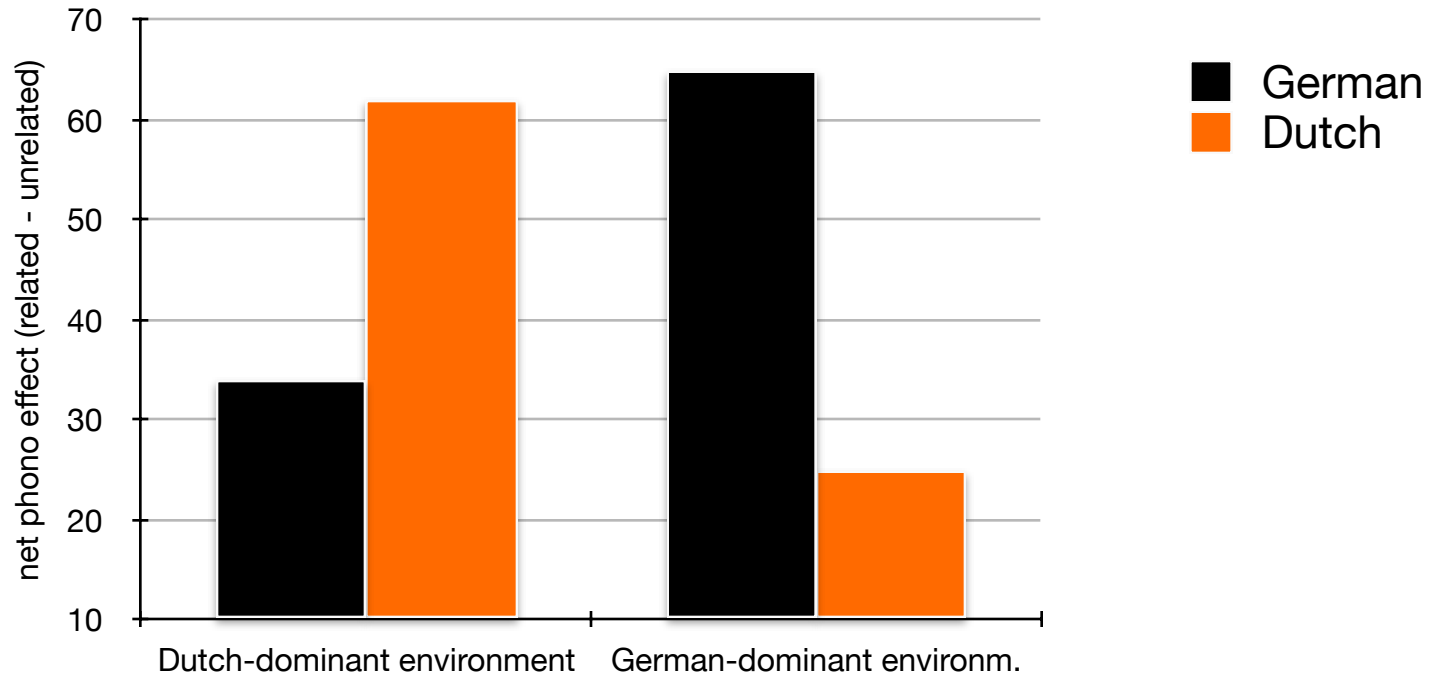
RTs: role of Dutch proficiency for Dutch effect





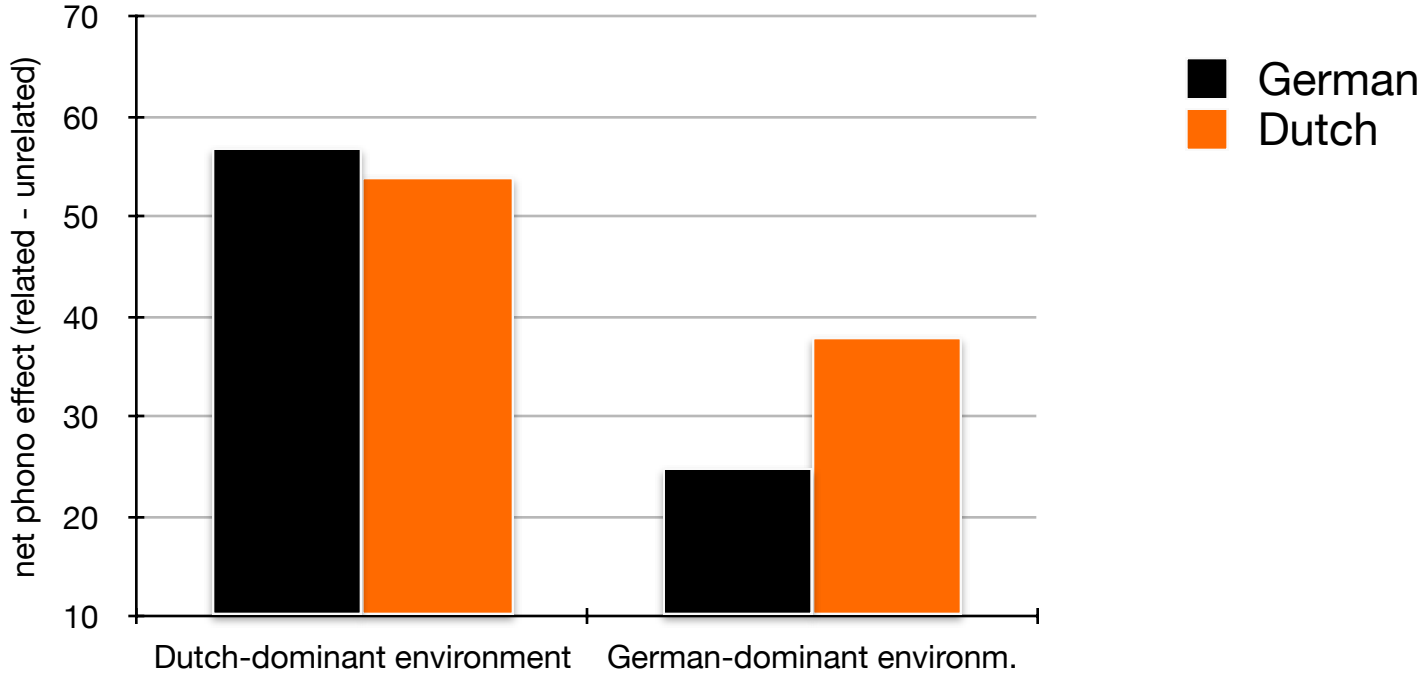
more important than proficiency: Dutch- vs. German-dominant environment

linear regressions show that strongest modulating factor for effects is environment



Lemhöfer et al., yet unpublished 😕

bad news (2):
Dutch- vs. German-dominant environment



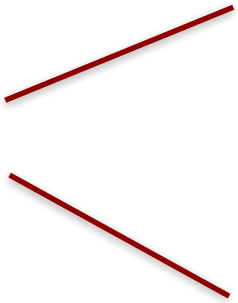
Lemhöfer et al., yet unpublished 😕

Discussion of phono-translation effects

- lexical **competition between all three languages** during L2 production
- effect equally large for Dutch (L3) and German (L1), overall
- **in Exp. 1 only,** largest interference from language which is **dominant** in environment

But what if the distractors are the direct translations?

“chicken” (English, L2)



Dutch (L3) word for ‘chicken’: ‘**kip**’

German (L1) word for ‘chicken’: ‘**Huhn**’

But what if the distractors are the direct translations?

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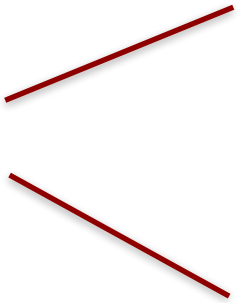

Dutch (L3) word for ‘chicken’: ‘**kip**’

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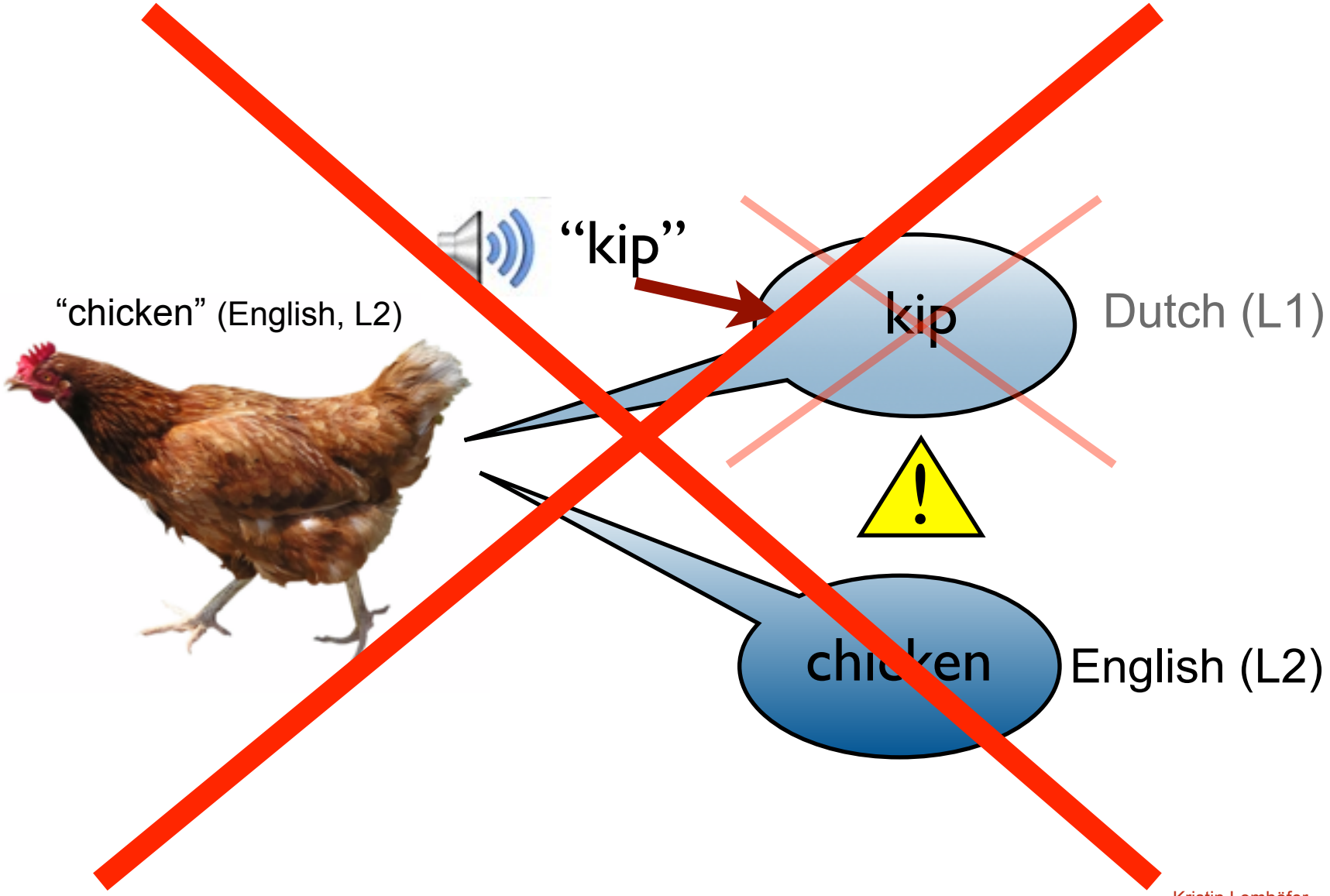
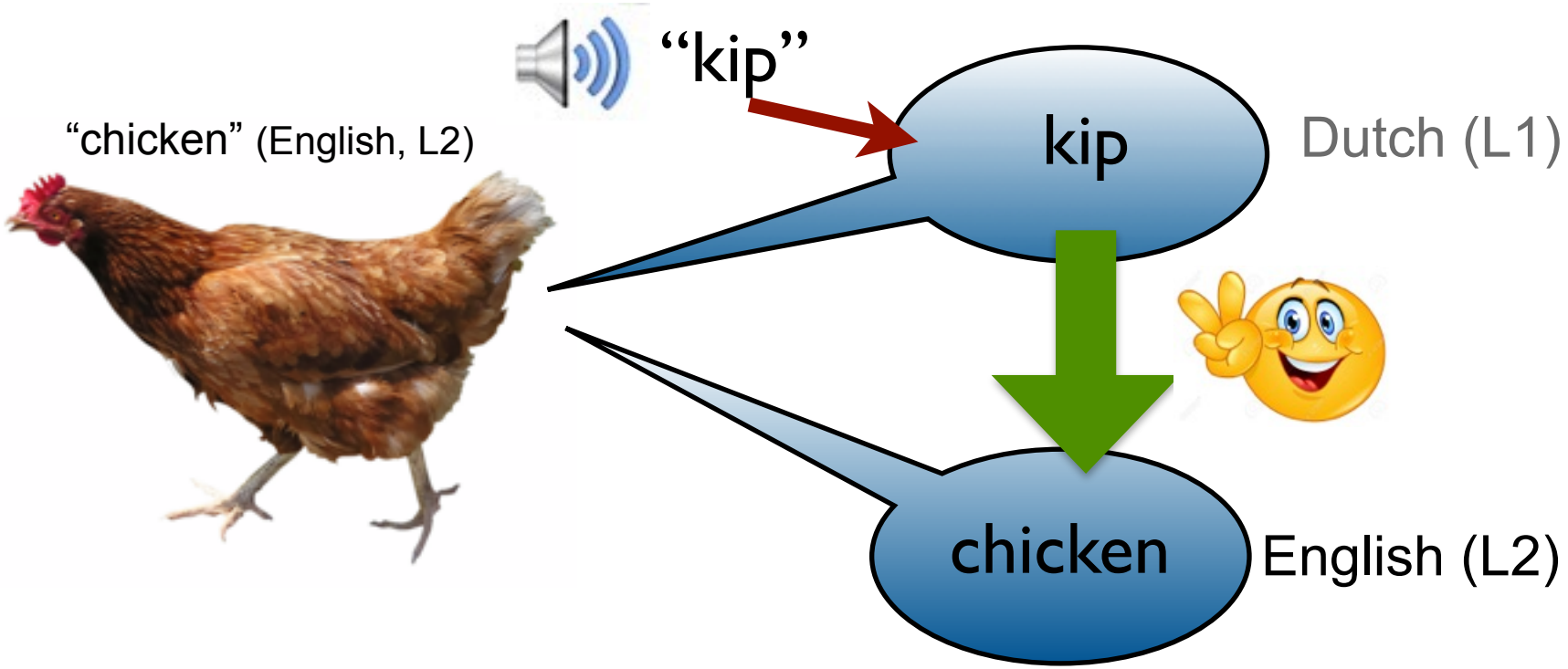

“kip”
“chicken” (English, L2)
kip
Dutch (L1)
chicken
English (L2)



faster naming of ‘chicken’ with ‘kip’ than with ‘juf’ as distractor
(Costa et al., 1999; Hermans, 2000; Roelofs et al., 2011)

Experiments 3 & 4 (translation distractors)

"chicken" (English, L2)

German (L1), related:
Huhn (Huhn = chicken)

German (L1), unrelated:
Wand 'wall'

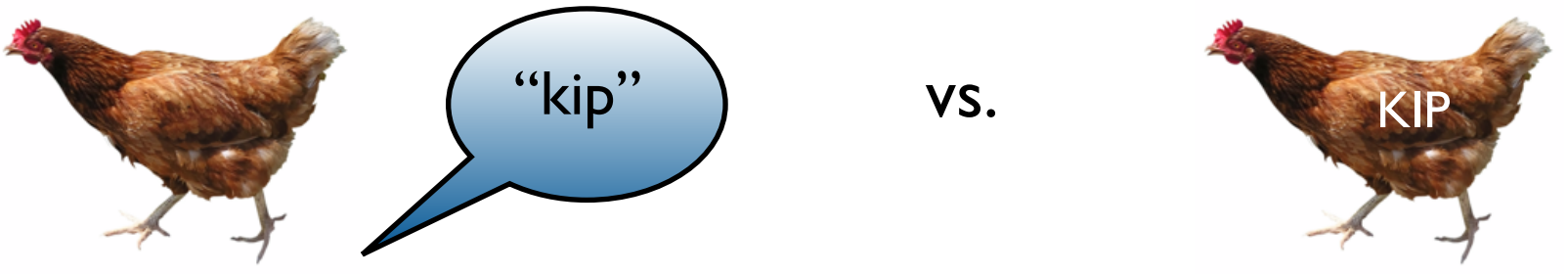
Dutch (L3), related:
kip (kip = chicken)

Dutch (L3), unrelated:
juf 'teacher'

conditions within-subjects (mixed, not blocked);
distractors spoken by same balanced-bilingual speaker

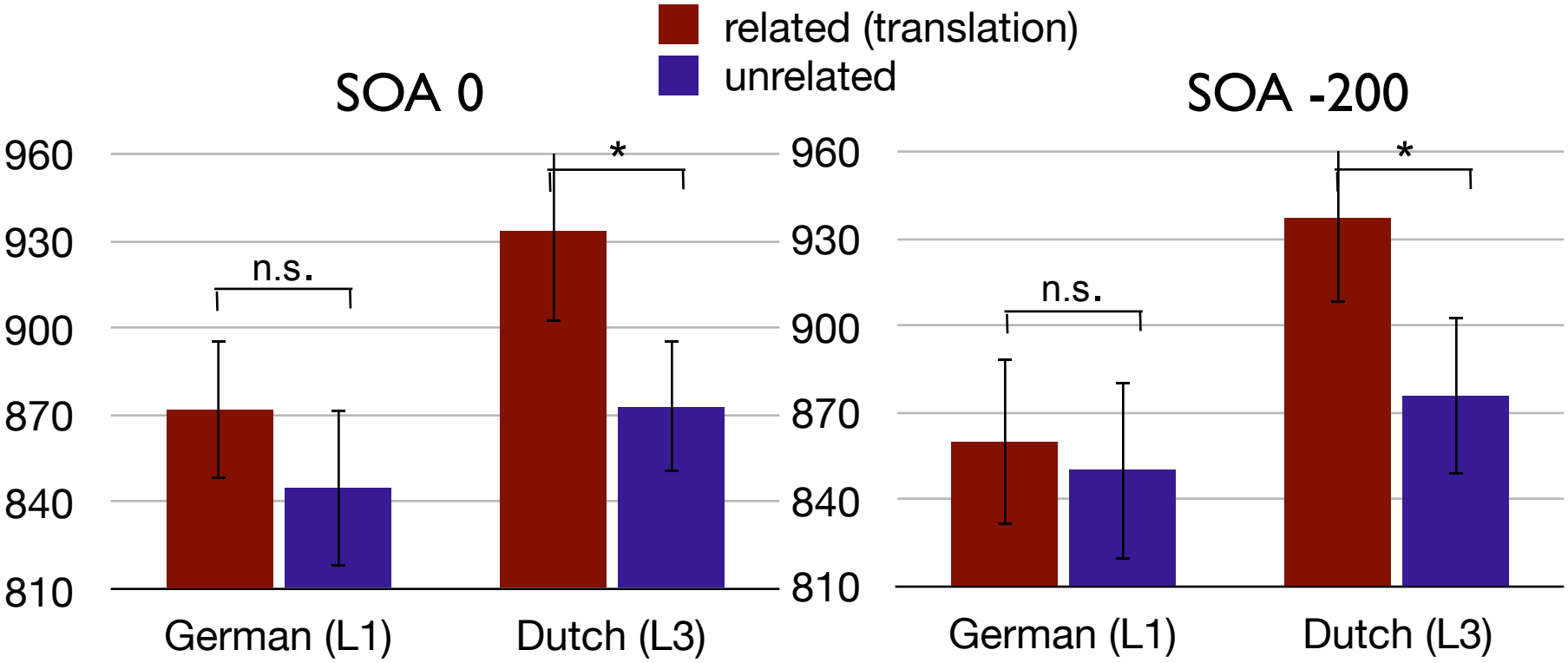
Method

- same population, less variance in proficiency (mean 2.5 yrs experience with Dutch, 88% correct naming responses in Dutch)
- SOA manipulation between participants: SOA = 0 and -200 ms
- modality manipulation of distractors: auditory vs. visual (previous studies)



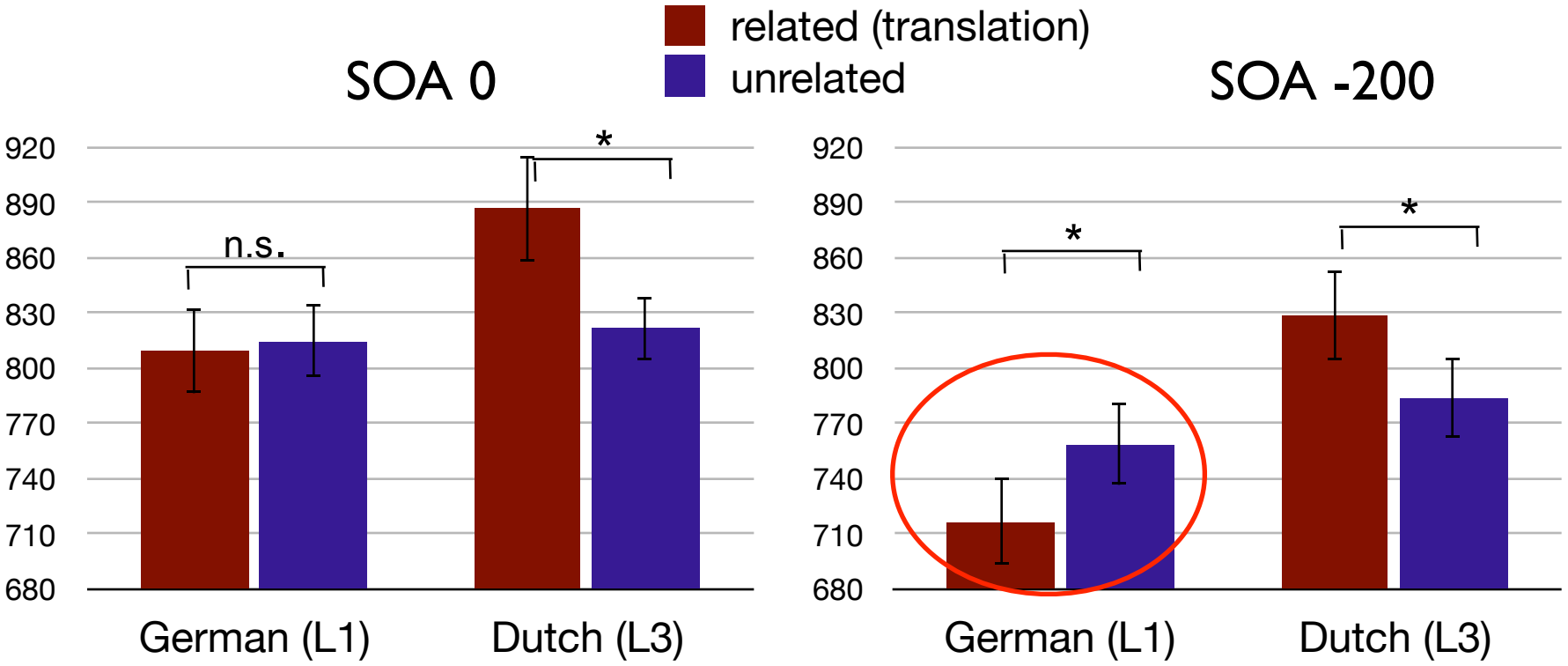
- same picture stimuli (n = 20) as before
- n = about 20 participants per SOA condition

RT results, auditory distractors (Exp. 3)



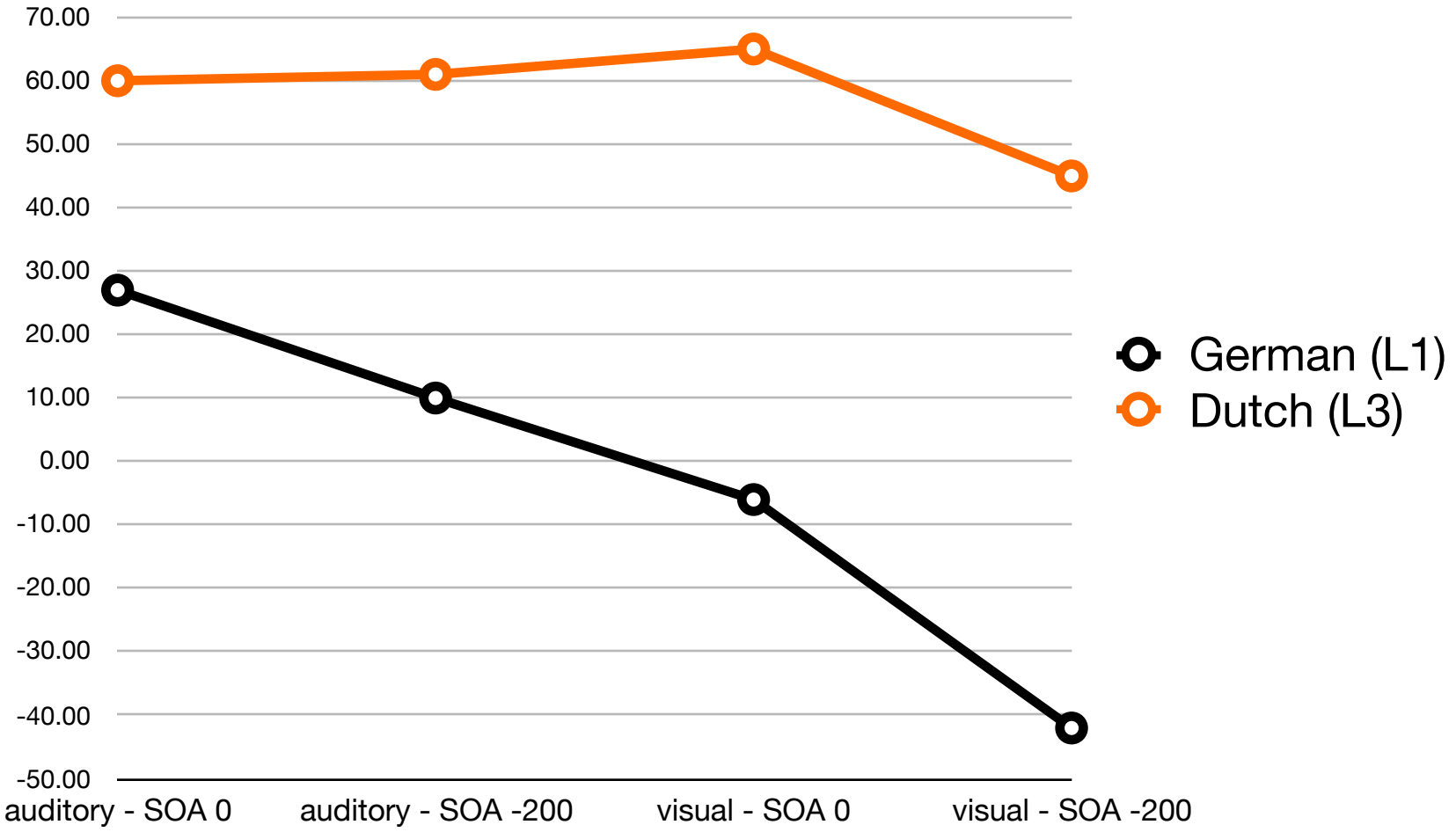
- **inhibition** rather than facilitation by translation distractors
- significant effect **only for Dutch**, not for German distractors
- no interaction SOA x relatedness (x distractor language)

RT results, visual distractors (Exp. 4)



- **inhibition** for Dutch translation remains
- BUT: German translations give null-effect (SOA 0) and facilitation (SOA -200)!
- This is perfectly in line with previous bilingual studies

overview translation effects



So, what is happening?

- Difference between phono-experiments and translation experiments: Translation distractor can be used to **predict upcoming target**

HUHN ⟶  related (translation)

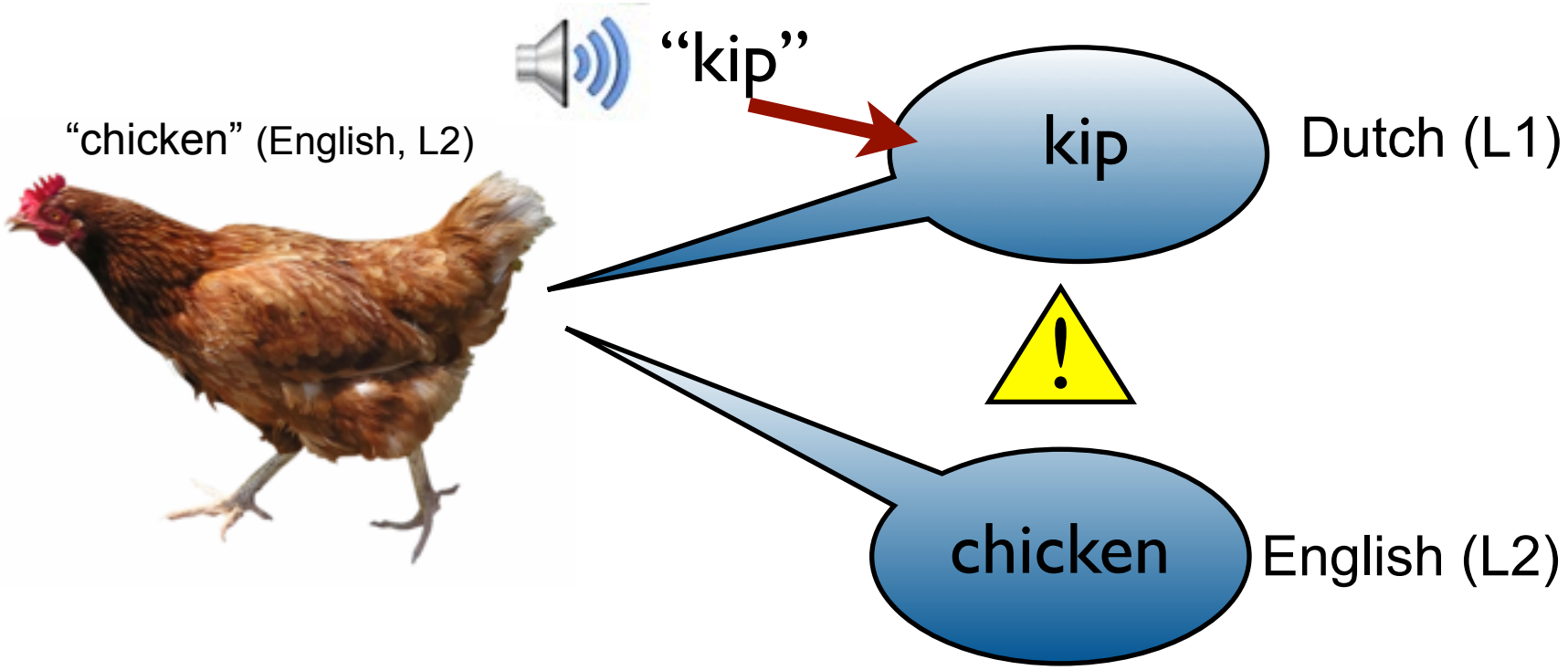
VS.

SPRUNG ⟶  unrelated

- This prediction **works better** (faster) for **L1 (**German), for **visual distractors,** and for a **negative SOA** (distractor before picture)

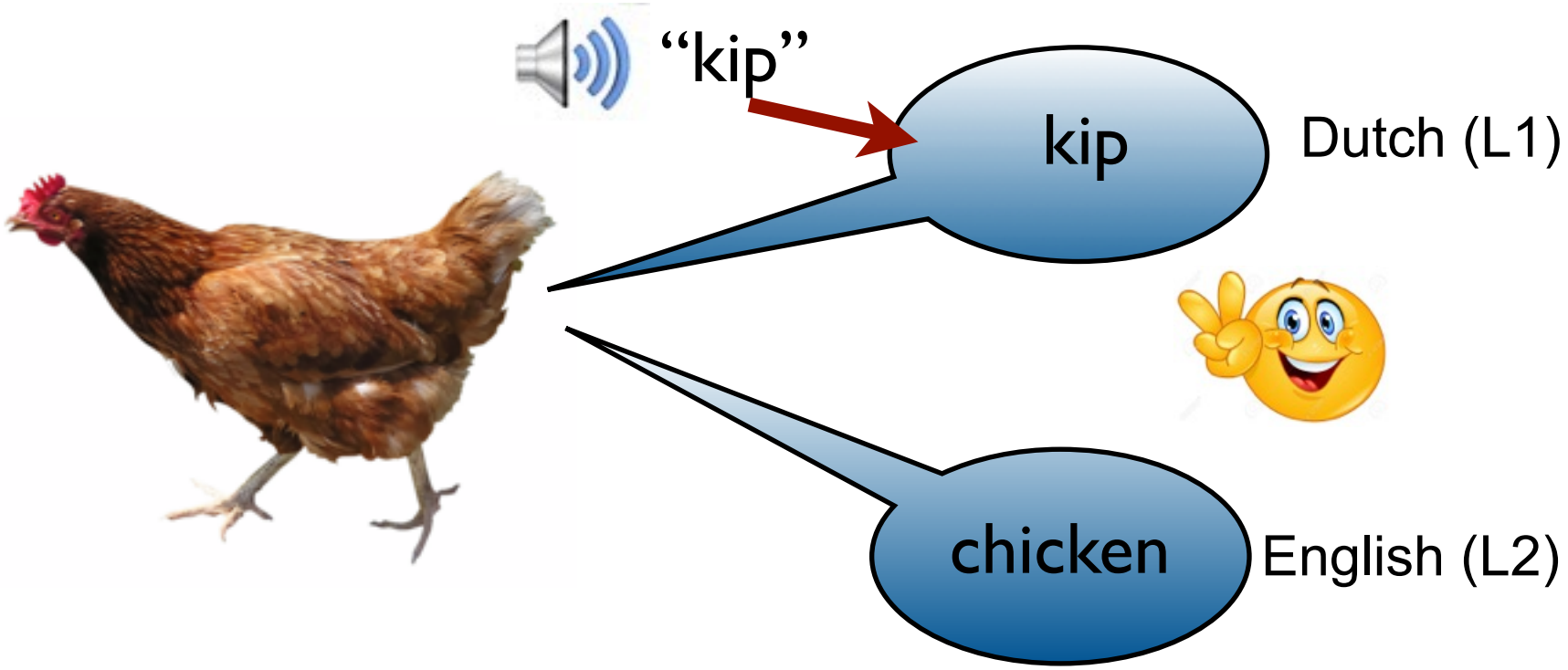
So, what is happening?

→ translation effect is a mix of **lexical inhibition…**



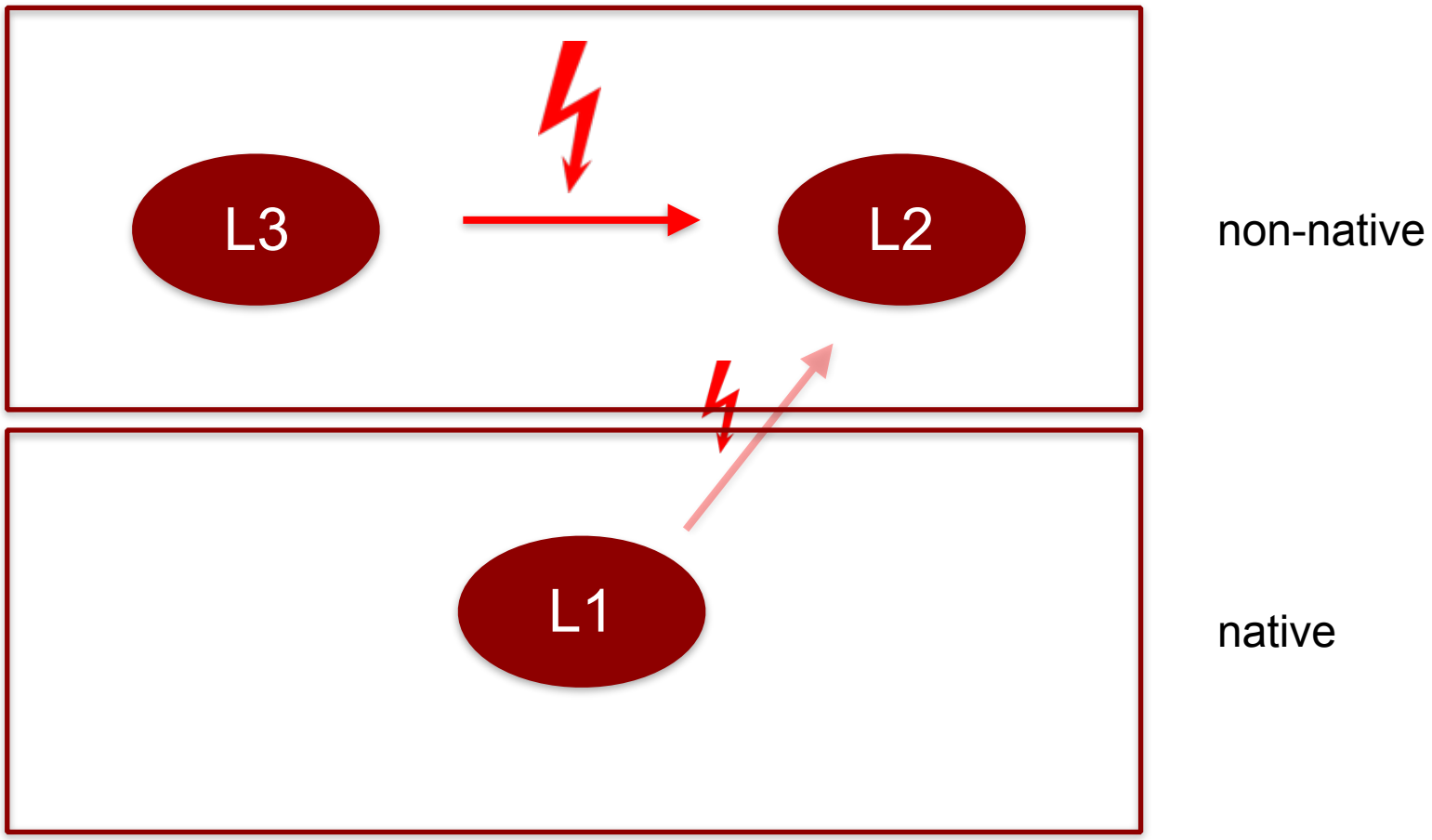
So, what is happening?

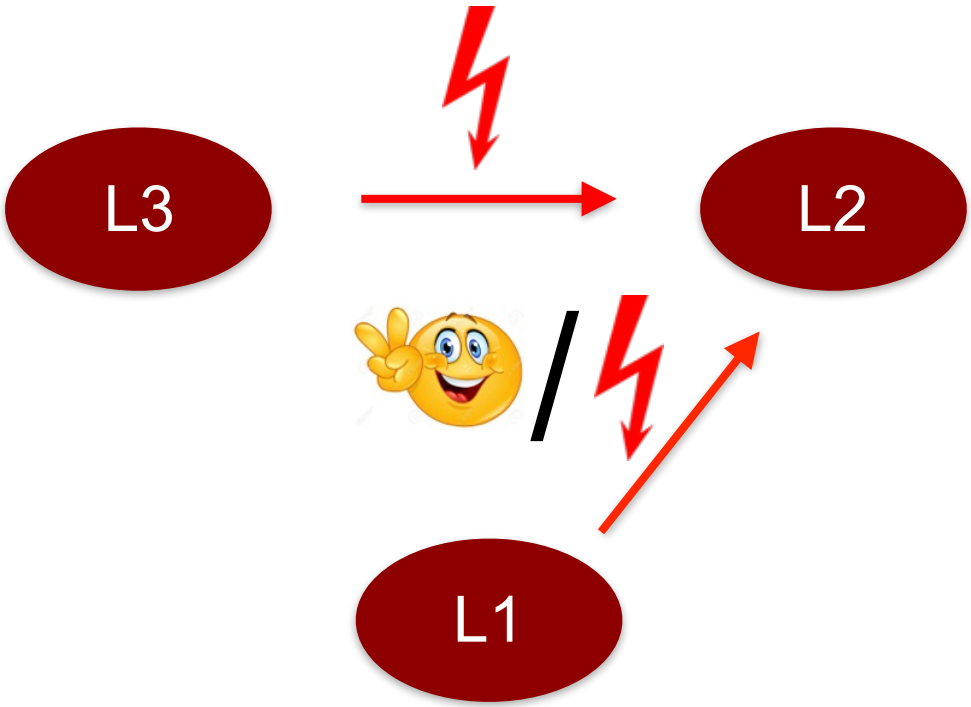
➙ translation effect is a mix of lexical inhibition **and strategic facilitation**



➙ offers **explanation** for paradoxical pattern with respect to phono-translation effects

Back to trilingual cross-language effects



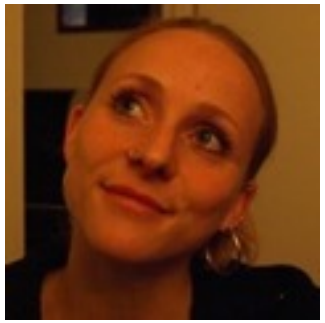


non-native

native

Work by…

Herbert
Schriefers



Judith
Schellenberger

Lorenz
Weise

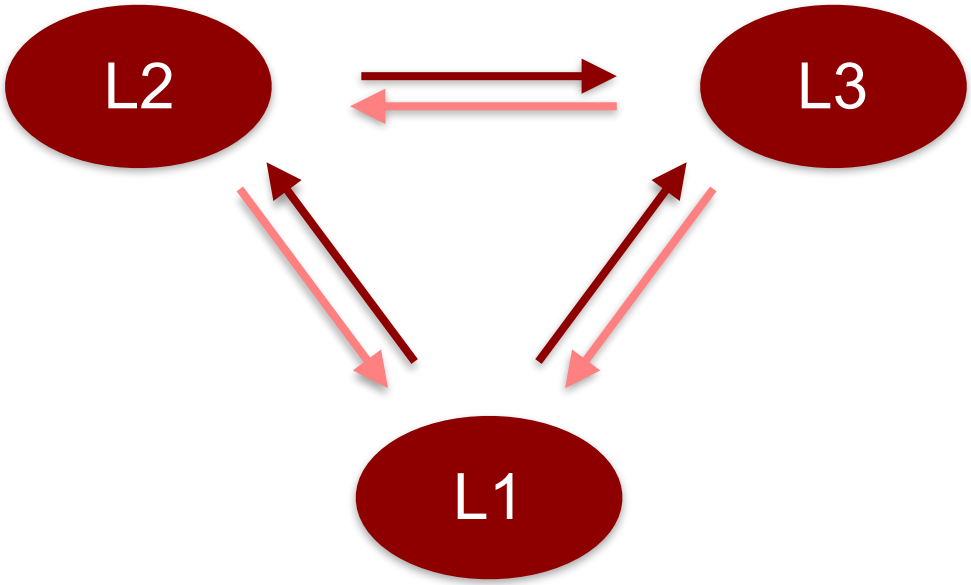
Randi
Goertz

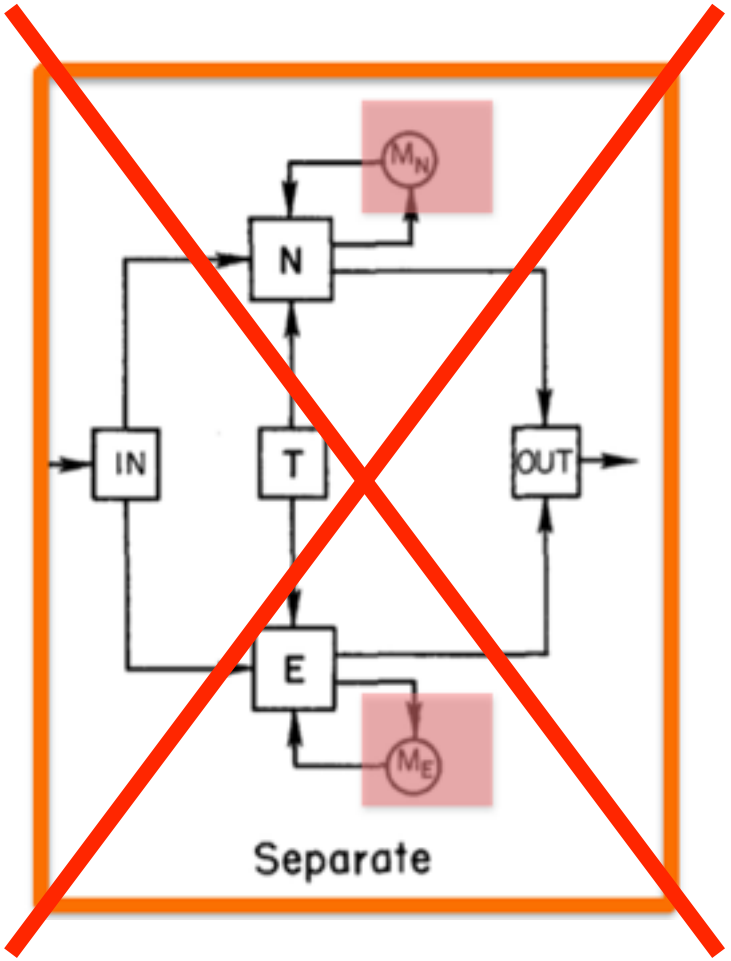
Nadine
Grabner

Leonie
Albers

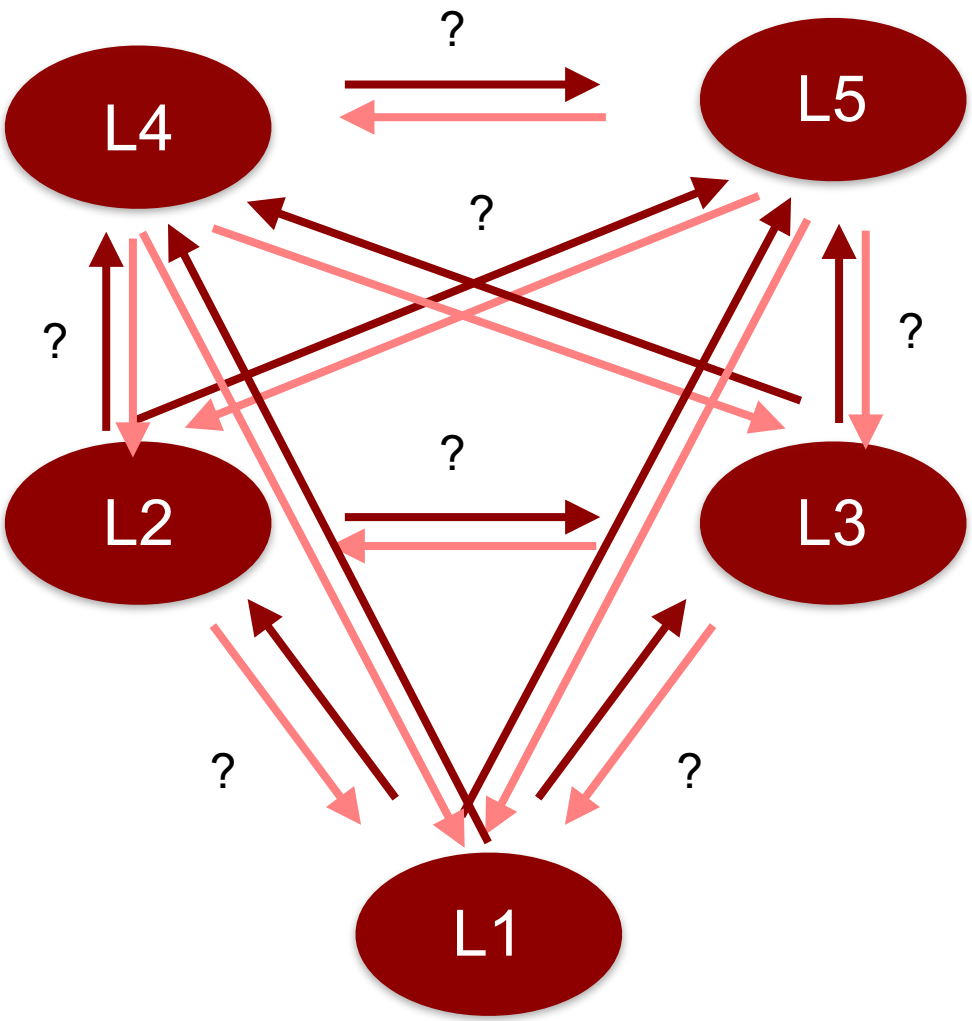
Iris
Verpaalen

Trilingual cross-language effects





anybody?



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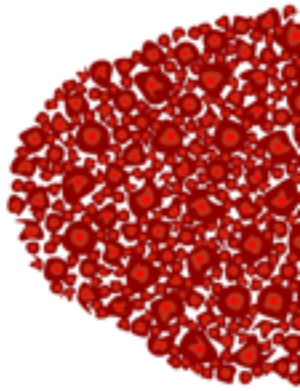

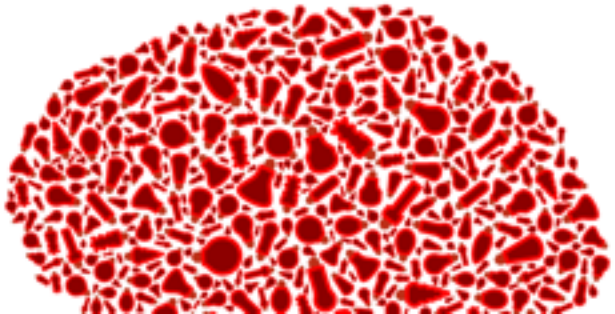

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