Do German-French L2 listeners
use German (L1) gender
when listening to French (L2)?

The Case of Non-Cognate Nouns

IGK Colloquium
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Originated as follow-up to my Master's work, in which I showed something similar for cognate nouns

If interpretation is correct, it would make the conclusions of that project much stronger

(both the behavioral claims as to what happens in non-native processing, and the more formal interpretation concerning origin of gender effect - today I'll stick with the non-native processing aspect)

Basically, I'm extending here my results to non-cognate nouns, but before I can explain how I did this...

The model of spoken-word recognition that I am assuming is a competition model.

At first, acoustic input (1)... and then (2) ...

For example, in French, a French "R" sound would activate all nouns containing that phoneme, such as...

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And then, (3)...

So here, after hearing "RA", *crêpe* and *rose* would drop out, and this would go on until the correct word is identified.

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Importantly, it has been shown that in the case of people who speak more than one language, (4)...

For example, in the case of German native-speakers who were listening to French, when they heared an "R", this would also activate German words such as "*Rechner*", "*Frucht*", and so on, which would take part in the competition process.

However, acoustic information from the word itself is not the only factor to influence lexical access.

The preceding context can also influence spoken-word recognition.

In French or German, nouns are divided into classes called "gender", and the gender of a noun determines the form of the corresponding article.

In French, masculine nouns such as "radis" have to be preceded by "le" and feminine nouns by "la", whereas in German, the masculine, feminine, and neuter articles are "der", "die" and "das", respectively.

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Now, in French, it has been shown that (1)...

So after hearing the masculine article "*le*", only masculine nouns such as ... are considered.
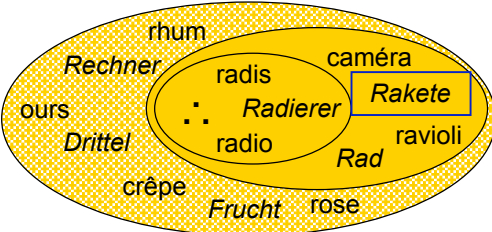
CLICK

Similarly, in German, we would assume that a native-speaker who heard "*der*"... might activate... but not...

Thus, gender works as if "hinting" at what words can follow; it can be used to reduce the search space, thereby speeding up the competition process

As I said before, what I investigated here was whether (1)... continue to use...

So: We assume that when they hear the onset of French "*radis*", German listeners also activate German words containing the sounds "RA", such as *Radierer, Rakete*, *Rad*, and so on.

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What happens when they hear "*radis*" preceded by its French definite masculine article "*le*"?

Will they exclude the word for "rocket", "*Rakete*", which is feminine in German?

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Cognate Nouns

➢ *"Two words in related languages are cognate if they come from the same origin. Generally cognates will have similar, though often not identical, sounds and meanings"* E.g. French *canon*, German *Kanone*, English *canon*

➢ Previous work on L1 gender interference in non-natives:

◆ In the case of cognates, non-natives cannot use L2 gender: Upon hearing French $la_{[fem]}$, German natives consider 'canon' as a lexical candidate, although French $canon_{[masc]}$ does not fit

◆ Instead, non-natives continue to use L1 gender: After hearing German $die_{[fem]}$, French natives exclude $canon_{[masc]}$ as a lexical candidate, although $Kanone_{[fem]}$ is feminine

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A working definition of cognates...

Problem: it's not always obvious where to draw the line between cognates and non-cognates!

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In my Master's project, I showed that in the case of cognate nouns, non-natives showed an interference of L1 gender when processing their L2.

On the one hand, we showed that non-native listeners cannot use the gender of their 2nd language...

And on the other hand, they tend to use native gender instead...

Gender in Cognates/Non-Cognates

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➢ But: L2 gender could be stored differently for cognates and non-cognates!

➢ Cognate facilitation effect: In general, bilinguals produce/react faster to cognates, presumably because part of phonetics are shared (effects stronger)

➢ Might gender interference from L1 be stronger for cognates?

➢ ... Or even absent for non-cognates?

The participants were... At the end of the experiment, we gave them a vocabulary test to make sure they were good in French.

Moreover, we also had a control group of native speakers, to check that any effects we find weren't due to the pictures or anything else we didn't control. Any effect of non-native listening should only show up with the non-natives but not with the controls.

The instructions were in French. There were 4 pictures in each display.

Participants were asked to click on one of the 4 pictures.

In the carrier sentences, the gender-marked definite article preceded the noun, thus providing gender information before the noun.

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The picture that the participants were asked to click on is referred to as the target, for example here the table.

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One of the other objects had a German name which overlapped in onset with the target, here *Rakete*. This is called the competitor.

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There were also 2 more objects with phonologically unrelated names on the screen: the distractors.

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Setup (2): Conditions

	Same-Gender (20)		Different-Gender (20)	
	Target	Competitor	Target	Competitor
French	la_{FEM} $table_{[fem]}$		le_{MASC} $radis_{[masc]}$	
German	...	$Tanne_{[fem]}$	...	$Rakete_{[fem]}$

"Cliquez sur la_{FEM} ta..."   *"Cliquez sur le_{MASC} ra..."*

Main prediction:

➢ Non-natives:

◆ Same-gender: More fixations to the competitor than to the unrelated distractors due to onset overlap between target and competitor, and their matching genders

◆ Different-gender: No effect because of gender mismatch

➢ Native controls: No fixations to the competitor in any case

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Two conditions were compared in the experiment.

In the first condition, target and competitor had the same gender in French and German, so the French article in the instruction also agreed with the German competitor, for example...

By comparison, in the second condition, the German competitor's gender was different from the target: *rocket* in German is feminine while *radish* in French is masculine. Thus here the article did not agree with the German noun across languages.

Same-gender and Different-gender pairs, 20 items in each case.

The competitor was always a non-cognate noun.

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In addition, in order to make sure that looks to the competitor picture would not be due to its French name, we chose only competitors whose gender in French was different from the target.

Here are the predictions...

For German participants taking part in French, if gender information is not taken into consideration, we would expect the competitor to be activated together with the target in both conditions, due to the onset overlap. Thus, the competitor picture should receive more attention than the pictures with unrelated names.

In the same-gender pairs, gender should not interfere, since gender is the same for the French target and the German competitor. So we should observe a competition effect, that is...

In the different-gender pairs, however, we expect the competition effect to go away, because...

As for the native control group... since they aren't supposed to know any German...
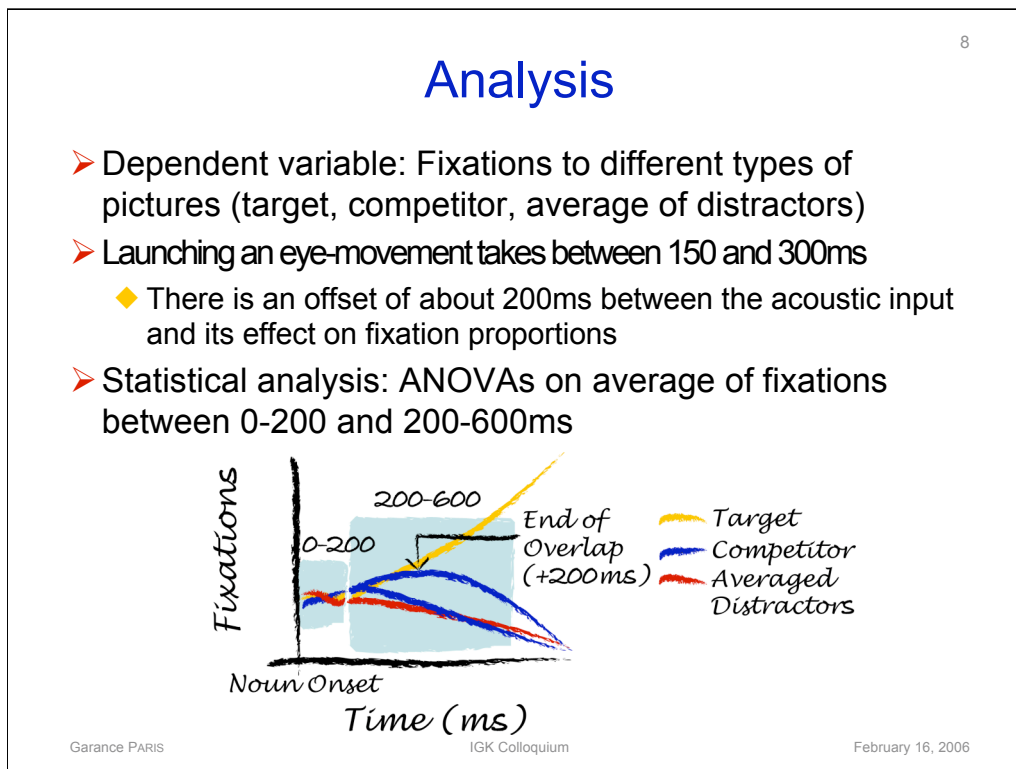
What I am interested in are fixation proportions to the different types of pictures (targets, competitor and distractors), starting from the onset of the target noun in the acoustic input. Here the target is plotted in yellow, the competitor in blue and the distractors in red. Fixations to the 2 distractors were averaged.

It has been shown that after an eye-movement is planned, it takes approximately 150 to 200 ms to actually launch it.

So in general, there is an offset of about 200 ms between a given acoustic input and its effect on the observed fixations.

Before 200 ms, all pictures should be fixated equally often if there is no bias due to the pictures or any other uncontrolled factors.

Then I look at what happens in the time-frame from 200 to 600 ms, which is where I expect the noun in the spoken instruction to influence participants' fixations.

Since people are asked to click on the target, fixations to it will continue increasing until the mouse-click (much later).

Since the names of the distractors do not overlap acoustically with the target, fixations are going to drop as fixations to the target rise. They are a good baseline against which to compare the competitor to judge whether it is being activated or not.

If there is no difference between the competitor and the distractors, the competitor was not activated

By comparison, if the competitor rises with the target at first and drops later on (after the disambiguation point, the end of the overlap), then we say there was a competition effect - the competitor was activated, as long as it wasn't clear to the participants on which object they would be asked to click.

For the statistical analysis, I run ANOVAs on the fixation proportions averaged over each time-window.

(0-200ms: fixation proportions to all 3 picture types, potentially followed by pair-wise comparisons;

200-600ms: fixations to the competitor and to the distractors only, since after the end of the overlap, the target rises above the competitor)

Non-Natives, Same-Gender

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French target:
la$_{FEM}$ table$_{[fem]}$

German competitor:
Tanne$_{[fem]}$

Av. of distractors

Fixation proportions (y-axis: 0 to 1); x-axis: Time after noun onset (0, 200, 400, 600, 800, 1000)

	0-200	200-600
Target	19.4%	
Competitor	23.7%	25.5%
Av. of dist.	21.9%	14.0%
Stats	T vs C: p_2=.046	F_1**, F_2**

When gender does not interfere (target and competitor have the same gender), German participants activate non-cognate German competitors while listening to French

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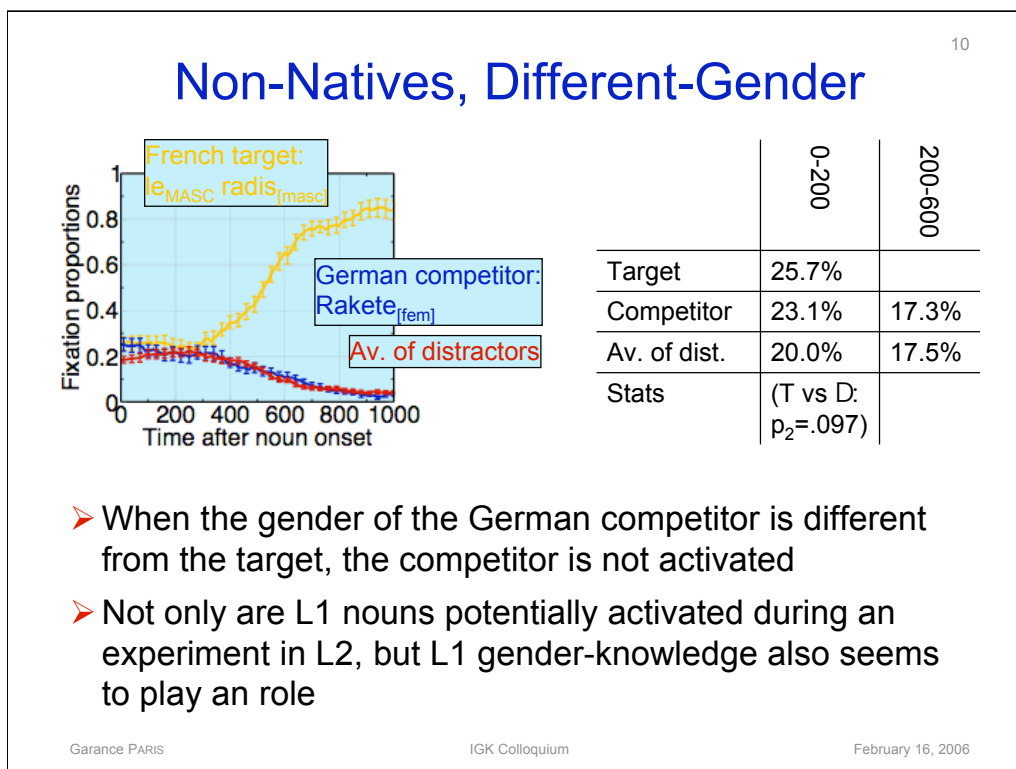In the case of the non-native speakers, in the same-gender pairs, we can see that there is a significant difference between the fixations to the competitor and to the distractor. The competitor is first activated together with the target before dropping. Given that gender does not interfere with competition (the gender of the French target is the same as the gender of the German competitor), the German competitor is activated, although the experiment is run entirely in French.

Non-Natives, Different-Gender

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French target: le_MASC radis_[masc]

German competitor: Rakete_[fem]

Av. of distractors

	0-200	200-600
Target	25.7%	
Competitor	23.1%	17.3%
Av. of dist.	20.0%	17.5%
Stats	(T vs D: p$_2$=.097)	

➢ When the gender of the German competitor is different from the target, the competitor is not activated

➢ Not only are L1 nouns potentially activated during an experiment in L2, but L1 gender-knowledge also seems to play an role

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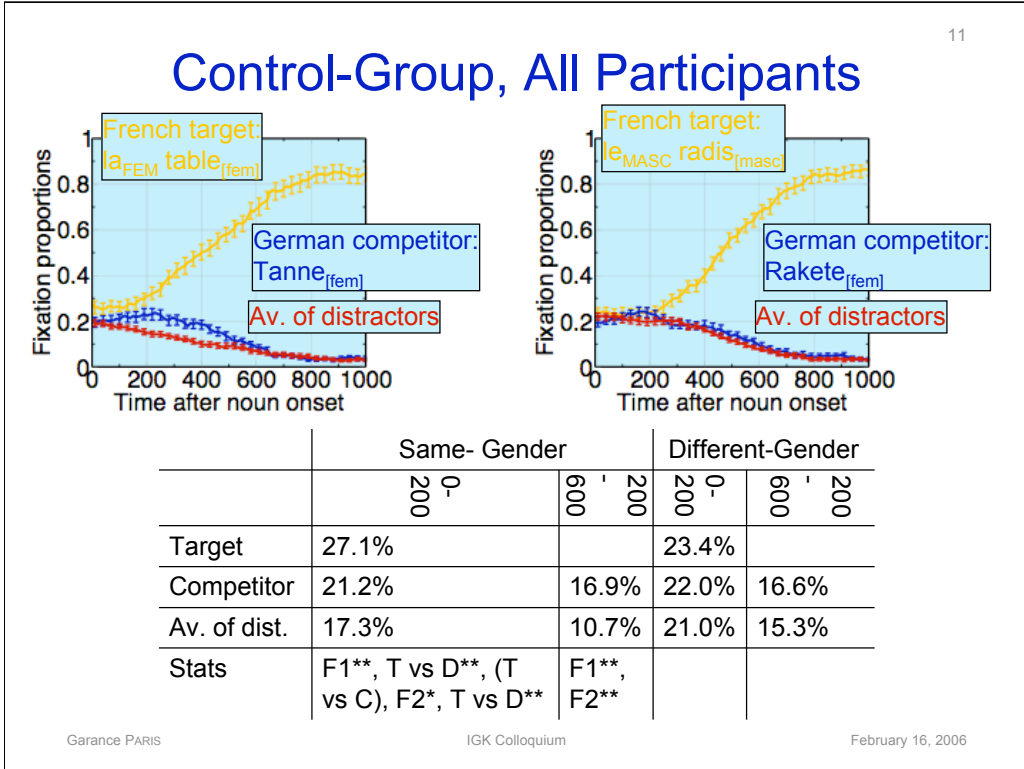
By comparison, here are the results in the different-gender condition - so that's the case in which the gender of the German competitor is different the target…

Here, there's no difference between the amount of fixations to competitors and distractors between 200 and 600 ms.

When the gender of the German competitor is different from that of the French article preceding the noun, the competitor wasn't activated.

The participants excluded gender-mismatching German competitors from the very start from the competition set.

Not only are German nouns activated during an experiment run entirely in French, but German gender-knowledge also seems to be playing an role!

Control-Group, All Participants

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French target:
la[FEM] table[fem]

German competitor:
Tanne[fem]

Av. of distractors

French target:
le[MASC] radis[masc]

German competitor:
Rakete[fem]

Av. of distractors

	Same- Gender		Different-Gender	
	0-200	200 ' 600	0-200	200 ' 600
Target	27.1%		23.4%	
Competitor	21.2%	16.9%	22.0%	16.6%
Av. of dist.	17.3%	10.7%	21.0%	15.3%
Stats	F1**, T vs D**, (T vs C), F2*, T vs D**	F1**, F2**		

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Control Group: Language Background

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➢ 25 Participants

➢ Language Background:

◆ 8 said they were fluent in German

◆ 11 had been in Germany >6 months (2 of which for 3 years!)

◆ 13 had studied German >6 years

◆ 1 was studying at Saarland University in a German department

➢ Is competitor activation in the same-gender condition due to their knowledge of German?
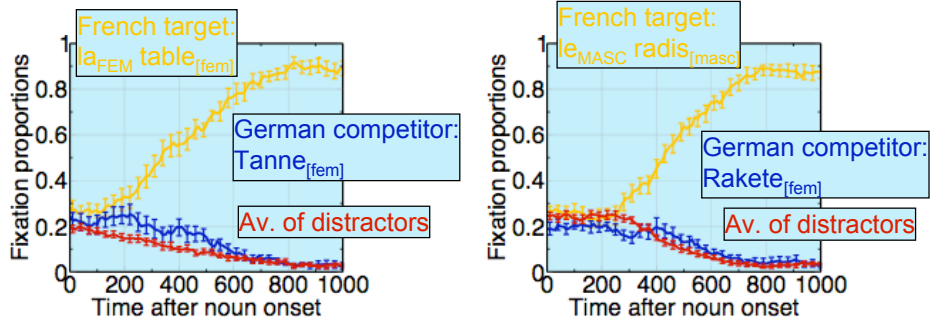(L2 activation during L1 processing)

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Controls: No German Knowledge (9)

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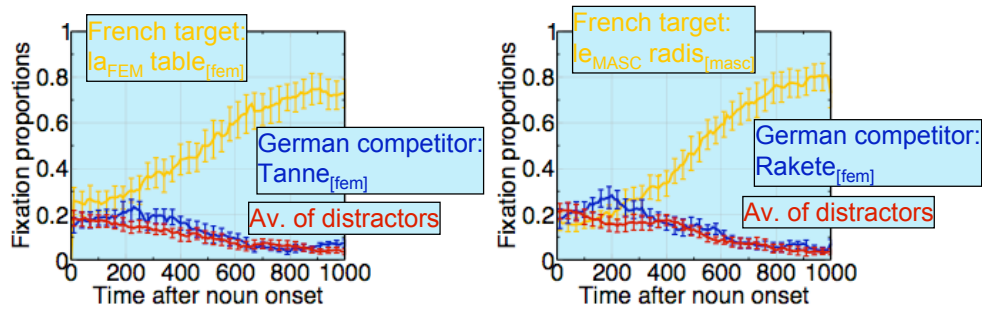
	Same- Gender		Different-Gender	
	0-200	600-'200	0-200	600-'200
Target	26.2%		17.3%	
Competitor	18.2%	15.6%	23.0%	17.5%
Av. of dist.	16.8%	11.4%	19.0%	14.4%
Stats		(p_2=.065)		

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Controls Very Proficient in German (10)

French target:
la$_{FEM}$ table$_{[fem]}$

German competitor:
Tanne$_{[fem]}$

Av. of distractors

French target:
le$_{MASC}$ radis$_{[masc]}$

German competitor:
Rakete$_{[fem]}$

Av. of distractors

	Same- Gender		Different-Gender	
	0-200	200'600	0-200	200'600
Target	28.0%		25.3%	
Competitor	22.7%	16.0%	19.8%	15.7%
Av. of dist.	17.3%	10.4%	24.2%	15.7%
Stats	(p$_1$=.084, p$_2$=.058)	F1*, F2**		

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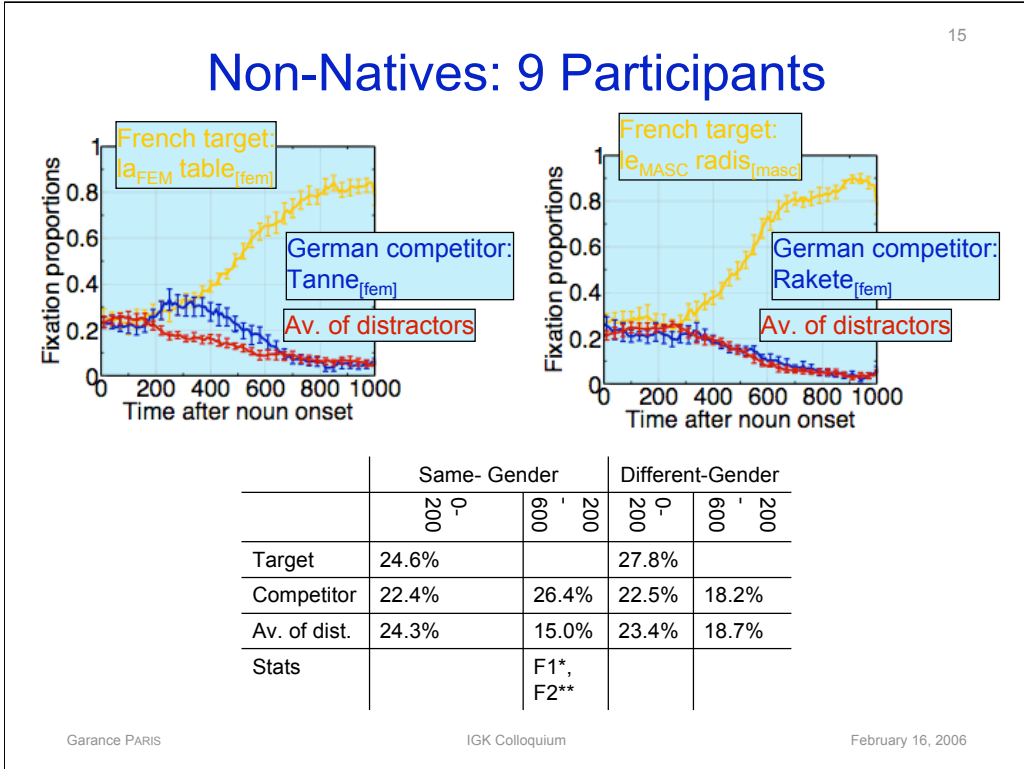
Additional Manipulation: The Target

	Same-Gender		Different-Gender	
	Target	Competitor	Target	Competitor
French	la_{FEM} $table_{[fem]}$	$sapin_{[masc]}$	le_{MASC} $radis_{[masc]}$	$fusée_{[fem]}$
German	$Tisch_{[masc]}$ ($Tafel_{[fem]}$)	$Tanne_{[fem]}$	$Radieschen_{[neuter]}$	$Rakete_{[fem]}$

The target's name and gender in German should not matter for the main manipulation

◆ In half of the items in each condition, the target overlapped in onset in French and German (and/or was a cognate), in half it did not (e.g. French *cadeau*, German *Geschenk*)

◆ In half the items in each condition, the target had the same-gender in French and German (e.g. French *fourchette*$_{[fem]}$, German *Gabel*$_{[fem]}$), in half it did not
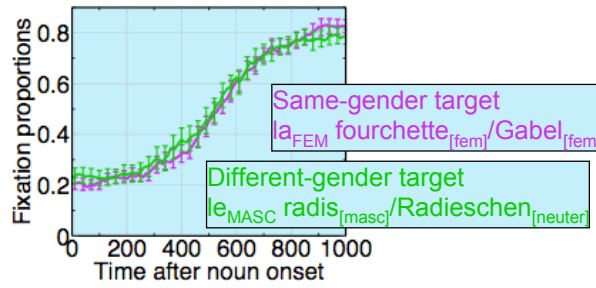
17
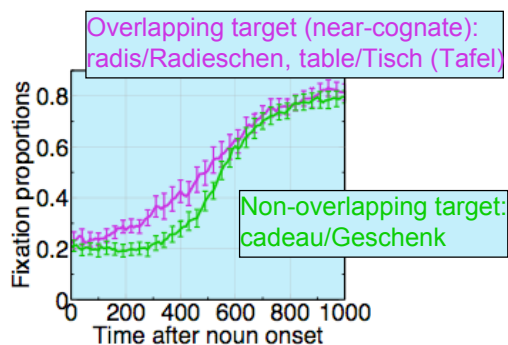
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Conclusions

➢ Main point:
 ◆ German learners of French activate German *Tanne$_{[fem]}$* when hearing French *"la$_{FEM}$ ta...",* but not *Rakete$_{[fem]}$* when hearing *"le$_{MASC}$ ra..."*
 ◆ French monolinguals show no activation in either case
 ◆ This extends evidence of L1 gender interfering in during L2 processing to non-cognate nouns (much more general)
➢ Additionally:
 ◆ French learners of German show a similar, but weaker pattern than the German participants (L2 activation in L1)
 ◆ Target activation: Identity of gender does not seem to influence the speed of the target's activation, but cognateness does
➢ Question: Why is offset between input and effect on fixations so variable?

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German learners of French activate German Tanne when hearing French la ta..., but not Rakete when hearing le ra...

A control group of French monolinguals shows no activation in either case

French learners of German show a similar, but weaker pattern than the German participants

Target activation: Same-gender does not seem to influence rapidity of reactions, but cognateness does

Question mark: Why is the offset between the acoustic input and ist effect on fixations so varibale, given the same method for recording and editing the sound files? (Sometimes 125-150ms, 200ms, 300ms...)