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Grammatical gender in the mental lexicon Insights from L1 language change

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Aim

- Investigate the representation of the L1 grammatical gender system in the lexicon...
 - across different dialects
 - in the context of ongoing language change
- Focus on L1 Norwegian
 - currently undergoing the loss of feminine
 - high degree of variation among dialects

Gender in the lexicon

- A significant body of research has examined the representation of gender in the L1
- While the evidence diverges with respect to when gender information becomes available, or the contexts in which gender is selected, it seems clear that gender values (either as nodes or at the level of determiner forms) compete for selection in production and processing
 - Italian: Cubelli et al. (2005), Paolieri et al. (2010, 2011)
 - French: Alario et al. (2008)
 - Spanish: Alario et al. (2008), Paolieri et al. (2010)
 - Dutch: Schriefers (1993); Schiller & Caramazza (2003); van Berkum (1997);
 La Heij et al. (1998); Starreveld & La Heij (2004)
 - German: Schriefers & Teruel (2000); Schiller & Caramazza (2003); Alario et al. (2008)
 - **Greek:** Plemmenou, Bard & Branigan (2002)

Gender in L1 dialects

- To the best of our knowledge, very little lexical access research has focused on gender in L1 dialects
- The only related study were are familiar with is Vanhove (2017) which examined the effect of different L1 Dutch dialects on gender in L2 German
 - Standard Dutch: common, neuter
 - Belgium Dutch dialects: masculine, feminine, neuter
 - speakers of Belgium Dutch dialects did not differ significantly from speakers of Dutch in the Netherlands in assigning gender to L2 German cognates

Gender in Norwegian

- Norwegian has historically displayed masculine, feminine & neuter
 - masculine is argued to be the default value (Trosterud 2001)
- increasing shift to masculine/common & neuter system due to the loss of feminine
 - regions such as Bergen and Oslo are known to have a 2-gender system (Jahr 1998; Lødrup 2011)
 - other areas (e.g. Tromsø, Trondheim) have been shown to have systems in the process of change (Rodina & Westergaard 2015; Busterud et al. forthcoming)
- Significant dialectal variation throughout Norway
 - no spoken standard, so Norwegians tend to speak their dialect in all contexts
- Two written standards: *bokmål* and *nynorsk*
 - **bokmål:** based on Danish, allows for the use of a 2-gender system
 - nynorsk: based on Norwegian dialects, 3-gender system

Gender processing in Norwegian dialects

Previous eye-tracking studies (Lundquist et al. 2016 & Lundquist & Vangsnes under revision) have examined L1 speakers' abilities to use gender agreement predictively across different Norwegian dialects

Western Norway (Sogn): nynorsk area, stable 3-gender system

 speakers used gender agreement predictively for masculine, feminine and neuter nouns

Northern Norway (Troms): bokmål area, less stable 3-gender system

- speakers who still produced 3 genders only used neuter predictively
- speakers who only produced 2 genders used masculine and neuter predictively

Oslo: bokmål area, 2-gender system

• only neuter predictive

Gender in L1 language change

The present study complements and extends previous research by:

- offering new evidence of the representation of the gender system...
 - across a variety of L1 dialects
 - through the process of L1 language change
- complementing previous research on Norwegian
 - adding representation information to the processing data from eyetracking studies
 - contributing to the evidence on the ongoing change in the gender system

Present Study

L1 speakers of different Norwegian dialects completed a gender decision task in which they assigned an indefinite determiner (en_M , ei_F , et_N) to each noun as quickly and accurately as possible.

L1 gender decision task

- 96 inanimate, count nouns (32 traditionally M, F and N)
 - consulted with colleagues from Northern and Western
 Norway to avoid words known to vary (form, gender) across dialects
 - matched as closely as possible across conditions for number of letters as well as frequency in web and subtitle corpora (TenTen, Opus2)
- practice session (12 nouns) prior to the task to train participants on the use of 3 response buttons
- hosted on Ibex Farm to allow for recruitment through social media
- button pressed and reaction time (RT) recorded

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Present Study

L1 speakers of different Norwegian dialects completed a gender decision task in which they assigned an indefinite determiner (en_M , ei_F , et_N) to each noun as quickly and accurately as possible.

Participants

- 134 L1 Norwegian adults
- 57 men; 77 women
- 16-73 years old (M: 38.7)
- indicated the dialect (specific place) they speak and where they currently live

Participants

Participants were grouped by county and then by geographical region according to the dialect information they provided:

Region	N
Western	30
Southern	4
Oslo	10
Eastern	38
Mid	26
Northern	21

Participants' use of gender

The button response data show that mean the rate at which they assigned corresponding gender determiner forms varied according to the (traditional) gender of the noun:

Noun gender	Mean rate of M/F/N determiner assignment
masculine	95%
feminine	70%
neuter	97%

- masculine & neuter: rate as expected (remaining 3-5% could be erroneous button pushes, for example)
- **feminine:** significantly lower rate (consistent with previous work)
- focus on feminine from geographic distribution and psycholinguistic perspectives

Mean use of feminine by region

- Northern, Western, and Mid-Norway highest fem use regions
- Southern, Eastern and Oslo lower fem use areas
- this pattern could be deceiving given previous work has shown gender use to vary by age

Region	Mean fem use
Northern	91%
Western	87%
Mid	83%
Southern	77%
Eastern	52%
Oslo	19%

Mean use of feminine by region and age

- general trend towards less feminine use in younger speakers
- exceptions: Western Norway and Oslo
 - Oslo results driven by 2 speakers in their 20s
 - these speakers likely took a prescriptive approach to the task

Region	Mean fem use	Age >35	Age <35
Northern	91%	94%	84% 🔶
Western	87%	86%	89%
Mid	83%	87%	81% 🔶
Southern	77%	94%	72% 🔶
Eastern	52%	63%	43%
Oslo	19%	0%	48%

Effect of written standard

There is a trend towards a significant correlation between age and written standard of the region (p=.062).

Region	Mean fem use	
	age >35	age <35
Nynorsk (Western)	86%	89%
Bokmål (other regions)	79%	65%

 feminine is more vulnerable in speakers of dialects in bokmål predominant areas



Classification of participants

To divide the participants into groups to examine the RTs, participants were classified according to their use of feminine determiners with feminine nouns:



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Mean RTs by (traditional) noun gender



- interestingly, each group displays a different pattern of results
- The groups differ significantly from each other (interaction between Condition and Group, p< 0.001)
 - low fem group overall faster

RTs: High fem group



- RTs for M nouns significantly slower than F and N ones (M vs F=p<.005; M vs N=p<.001)
- no significant difference between RTs for F and N nouns

RTs: Middle fem group



- RTs for M and F nouns significantly slower than N ones (F vs N=p<.001; M vs N=p<.01)
- no significant difference between RTs for M and F nouns

RTs: Low fem group



• no significant difference in RTs for M, F, or N nouns

Discussion: High fem group

The determiner assignment data indicates that these speakers have a stable 3-gender system, which following previous lexical access work is represented as gender nodes to which each noun is linked:



Discussion: High fem group

Differences in RTs by gender of the noun may be due to markedness.

noun gender	mean RT
masculine	1191
feminine	1123
neuter	1107

Optiz & Pechmann (2016) also found that L1 German speakers' RTs were slowest for M nouns in German:

- these authors suggest that this can be linked to feature specification

Along these same lines, we would like to suggest that RTs for M nouns in the high fem group are slower given that M is considered to be the default gender in Norwegian and is thus underspecified.

Note: In principle these results could also be due to type frequency, however we do not argue for this explanation given that this pattern is not consistent across groups.

Discussion: Low fem group

The determiner assignment data also suggested that this group has a stable gender representation, though it consists of only two gender values:

- traditionally F nouns have a well-established link to the M gender node



Discussion: Low fem group

The lack of differences in RTs by gender of the noun may mark an important shift in markedness in the 2-gender Norwegian system.

noun gender	mean RT
masculine	1051
feminine	1071
neuter	1054

If the slower RTs for M nouns in the high fem group can be linked to the fact that M is the default value in the 3-gender system, the fact that there is no difference in RTs for speakers a 2-gender system suggest a shift in markedness where M and N are equally marked.

Discussion: Middle fem group

In contrast to both previous groups, the range in the determiner assignment scores for the middle fem group show a system in the process of change for these speakers:

- the middle fem group has a representation for F, however the links to this node are either fundamentally weak and/or are destablising as F is gradually lost in the speakers' grammars and F nouns must be linked to the M node
- given that this group ranges in their use of fem, varying explanations likely apply to subsets of the speakers



Discussion: Middle fem group

The RT data for the middle fem group can be accounted for by the unstable underlying representation of gender in these speakers.

noun gender	mean RT
masculine	1202
feminine	1204
neuter	1091

N nouns

• RTs fastest given that N has the most stable representation

M & F nouns

- RTs equally slow
- weak links to the F node and increasing links to the M node mean that speakers take longer to resolve the competition between the M and F nodes in order to select the determiner form

Conclusions

This study has offered novel evidence of the representation of gender across L1 dialects as well as shifts in the L1 representation as a result of language change:

- speakers' use of gender can be linked to a fundamentally different underlying representation in the lexicon
 - this representation can shift or become unstable as a result of language change
- different representation of an L1 gender system can have different effects on processing
 - even speakers with stable 2- or 3-gender systems showed varying RTs

Findings with respect to geographic distribution of the speakers complement previous work on Norwegian showing variation by age and region.

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Thank you!

Takk!

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