

'Eating', 'drinken' or both?

Dutch and English exposure effects on the structure of young bilinguals' receptive vocabulary networks



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BACKGROUND

Many studies have used **network analysis** to study language acquisition [1].

The edges/links in networks can express many '**unique linguistic relationships**' [2].

In bilingual children's lexical networks, there is an '**associative** [...] **preference**', meaning the child relies more on one language's links for network links [3].

Frequency and **phonology** can guide acquisition [4].

Results in non network analytical approaches show **cross-linguistic interaction** [5].

Translation equivalents and **cognates** are facilitators in acquisition [6].

Familiarity (related to exposure) as important factor [3].

METHOD

Total sample of **297** children (age $m=34.5$ months; [7]).

Use of the **Dutch** [8] and **English** [9] versions of the Peabody Picture Vocabulary Test to measure vocabulary.

Exposure measured through **parental questionnaires** and **daycare curricula** [7].

5 PPVT sets were used based on participants' age and set appropriateness.

3 networks: total group, higher English exposure sub-group ($n=118$), higher Dutch exposure sub-group ($n=100$).

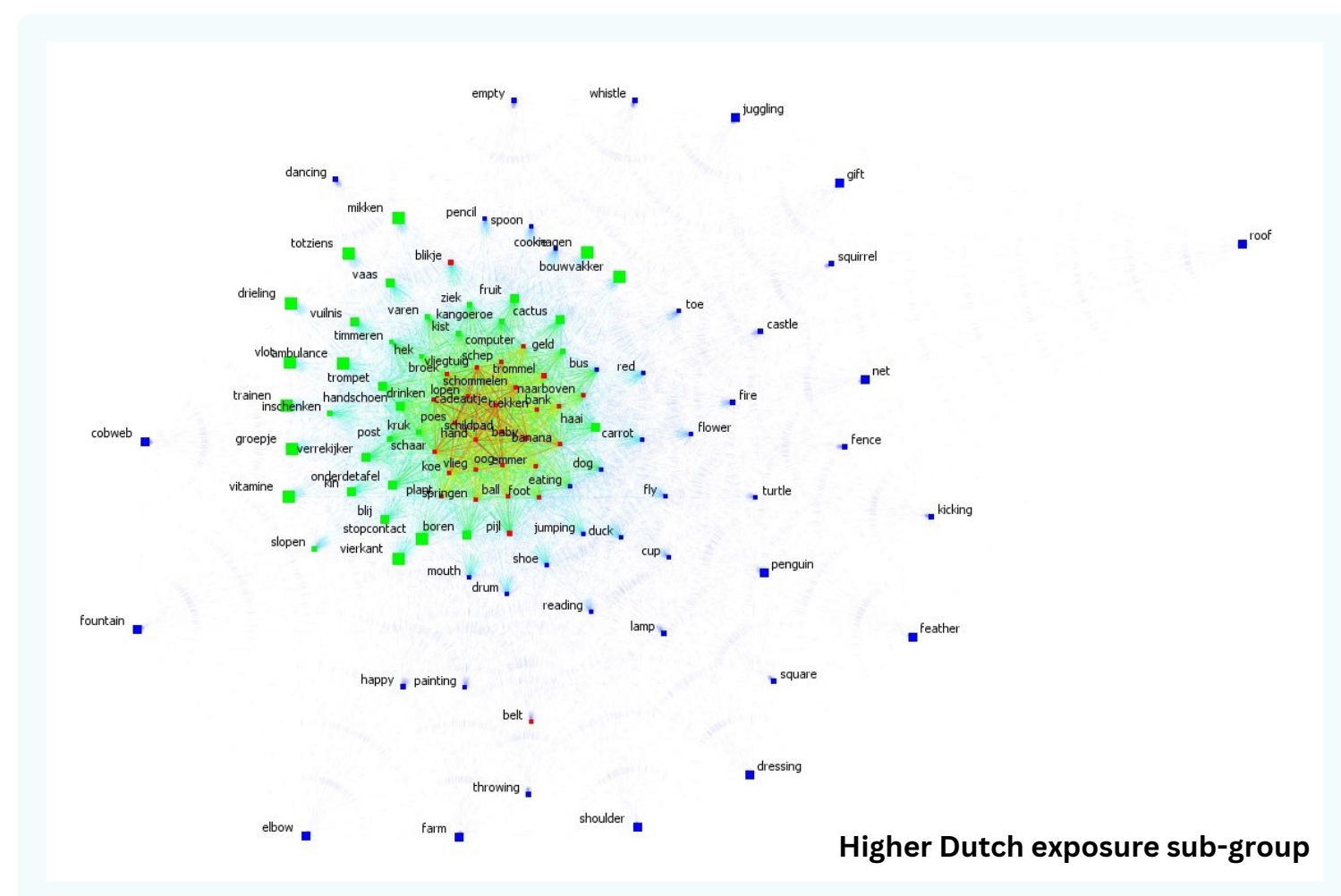
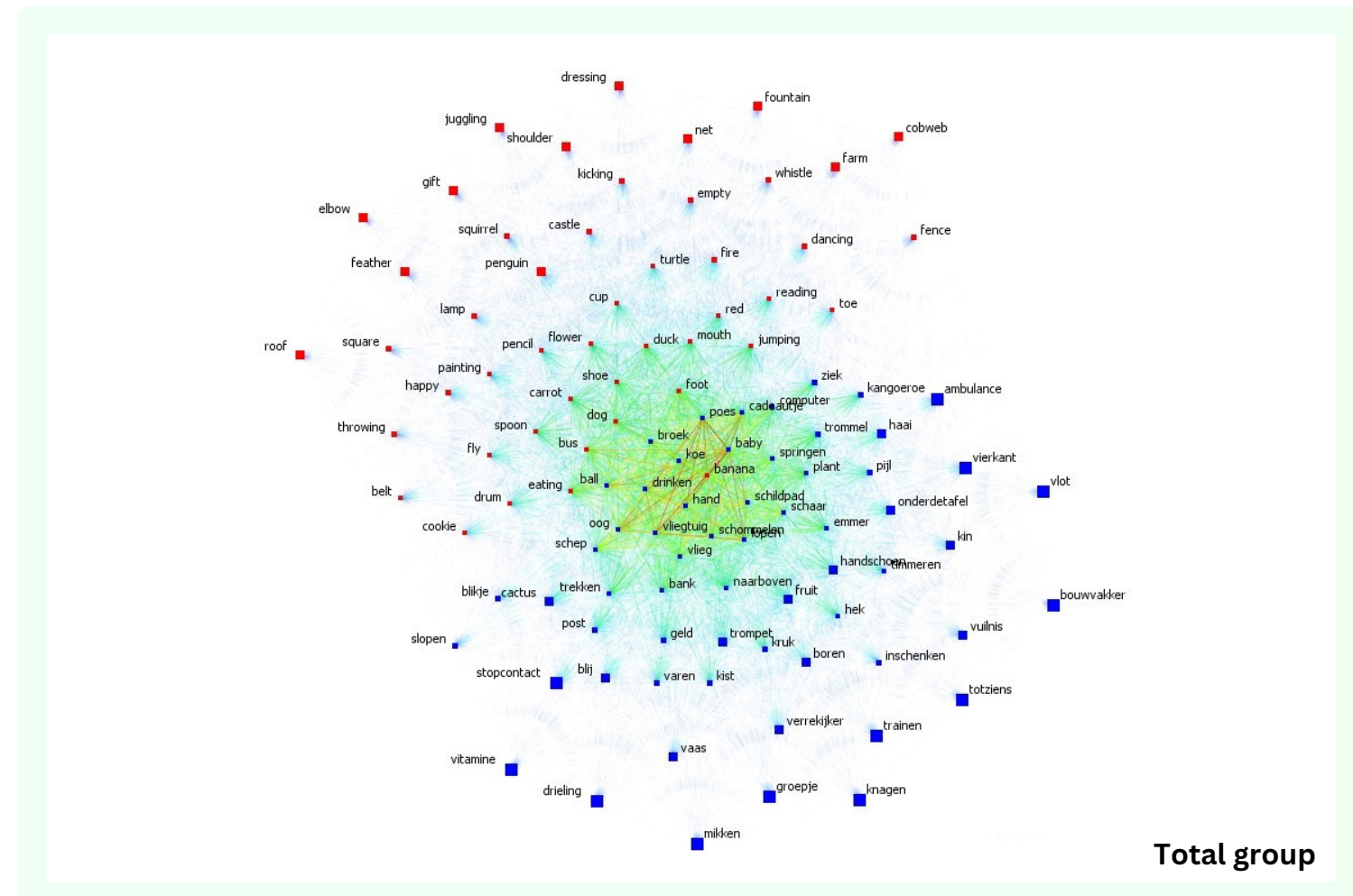
ORA-lite [10] was the software used.

Nodes are PPVT words and links show whether two words are known at the same time.

The **Leiden algorithm** was used to identify node sets [11].

Group	n	age (m)	age (sd)	EN exposure (m)	EN exposure (sd)	NL exposure (m)	NL exposure (sd)
High exposure in both languages	11	31.11	6.34	3.67	2.02	7.09	4.001
High English exposure (Group A)	100	34.23	6.71	4.9	3.79	2.53	2.16
High Dutch exposure (Group B)	118	34.84	6.67	0.61	1.02	9.24	6.34
Low exposure in both languages	68	34.17	5.94	1.24	1.59	2.86	2.57

Table 1. Mean age and exposure scores for both languages, as well as their standard deviations.



RESULTS

Exposure was a catalyst for learning connections.

Total group: nodesets along language divide.

Dutch words are more well-connected in the network ($p=.0026$ and $p=.0062$, regression of eigenvector centrality and total degree centrality to language respectively).

High English exposure group: three Leiden algorithm groups (two peripheral ones upholding the language divide, a central cross-linguistic one).

High Dutch exposure group: three groups (the central group consisting of mostly Dutch words).

The higher the **PPVT set number** the word belonged in, the lower its eigenvector centrality in the network.

DISCUSSION

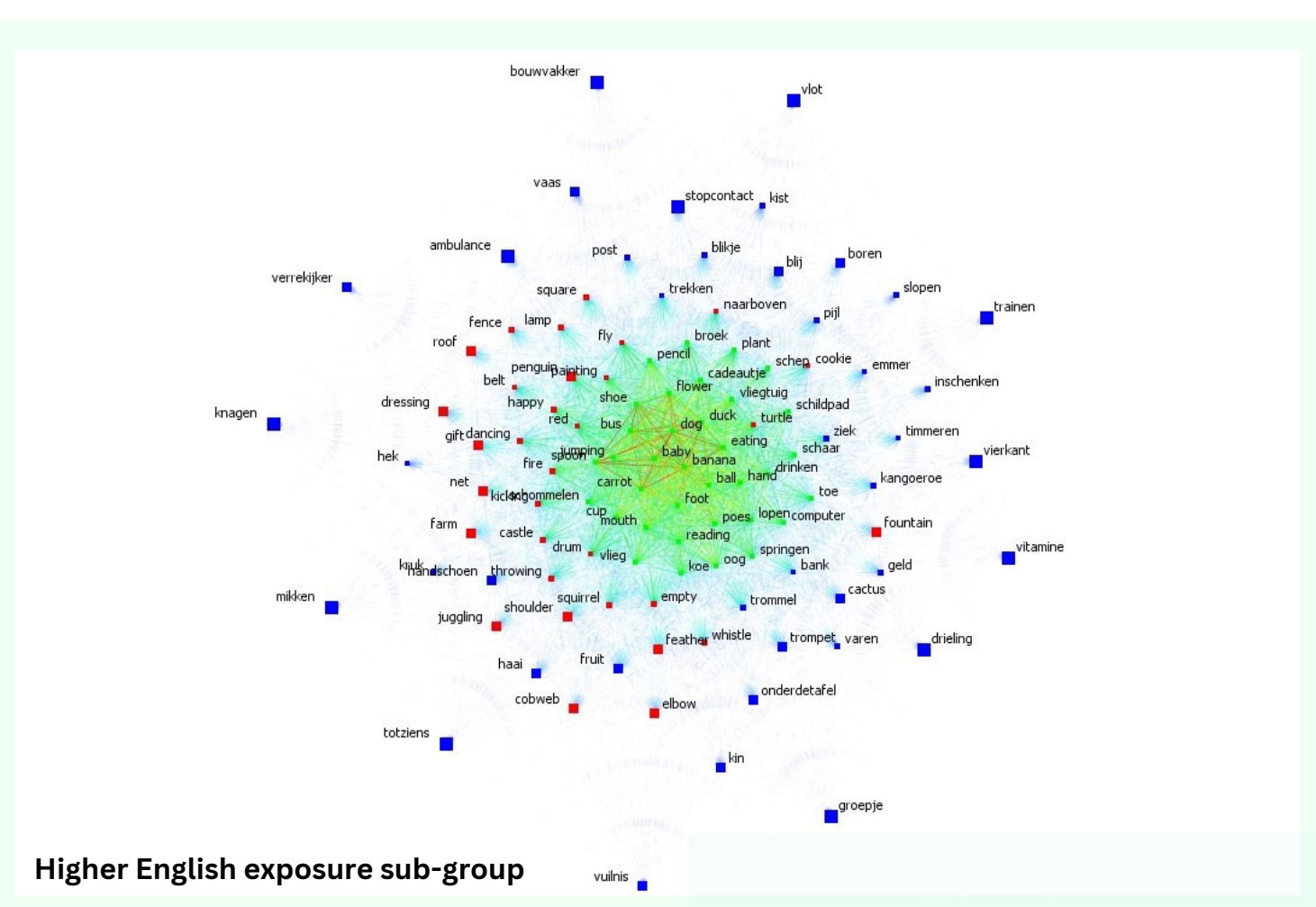
Semantic cues aid simultaneous learnability (e.g. 'eating' and 'drinken', or 'foot' and 'lopen')

Central words belong to **categories** already established in the literature (e.g. animal names or foods, [12]) with the addition of 'body parts' (>10% of all networks).

New approach of **combining bilinguals' vocabularies** cross-linguistically in **one network**.

Role of **heritage languages** still unclear.

Ongoing analysis on phonological and semantic cues.



REFERENCES AND APPENDIX

