MAPPING MEANING: LARGE LINGUISTIC NETWORKS IN THE DIGITAL HUMANITIES LANDSCAPE

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CASS
Corpus Approaches to Social Science

TOPICS

WHAT IS CORPUS LINGUISTICS?

WHAT ARE COLLOCATIONS?

WHAT CAN WE EXPLORE USING COLLOCATION NETWORKS?

WHAT IS CORPUS LINGUISTICS?
AND WHAT IS A CORPUS?

A corpus is…

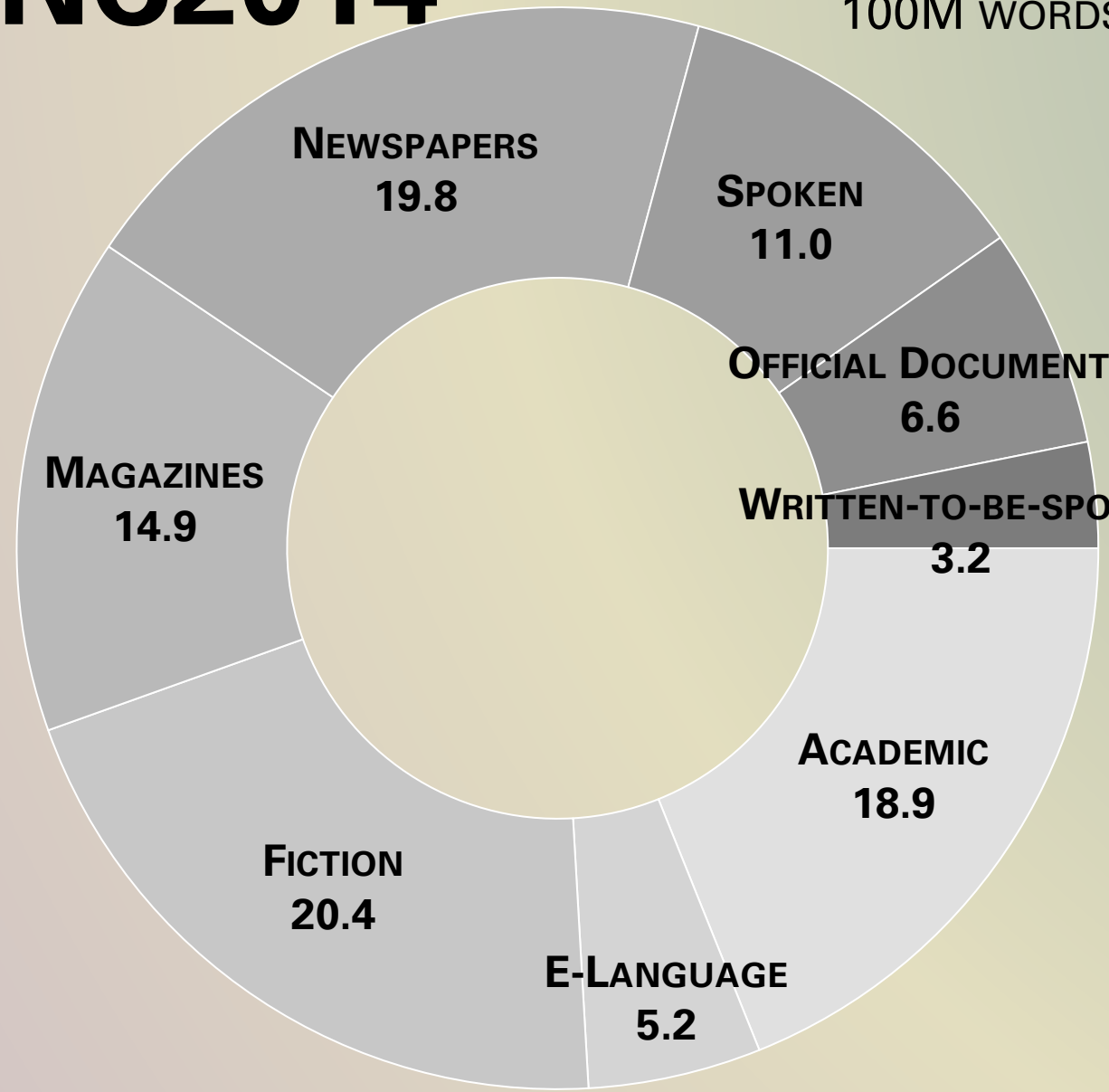
- A large body of text
- Aims to be representative of language (or a genre of language)
- Machine readable (McEnery & Hardie, 2011)

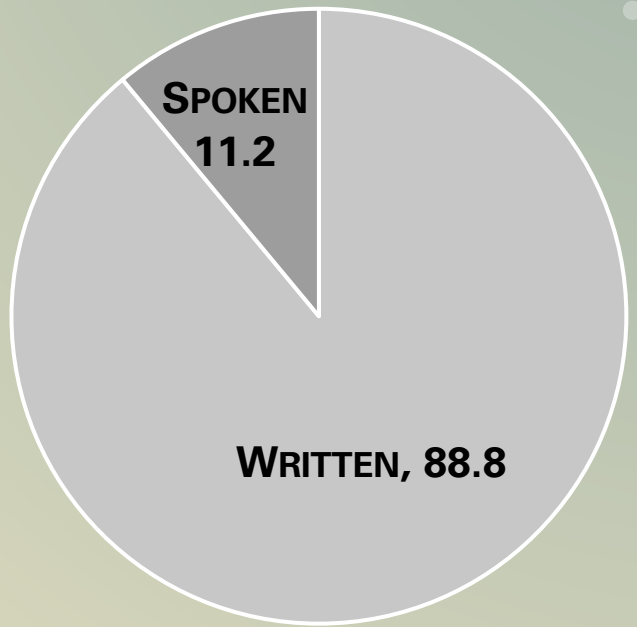
Often annotated with additional linguistic information – e.g. grammatical codes, learner errors etc.

THE BNC2014

100M WORDS OF CONTEMPORARY BRITISH ENGLISH

(BREZINA ET AL., 2021; LOVE ET AL., 2017)





WHAT IS A COLLOCATION?

- break the car|window|ice|peace
- It's no use crying over spilt milk
- Monkey's birthday
- Mother earth
- Father Christmas

But also grammatical collocations: going to, feeling like etc.

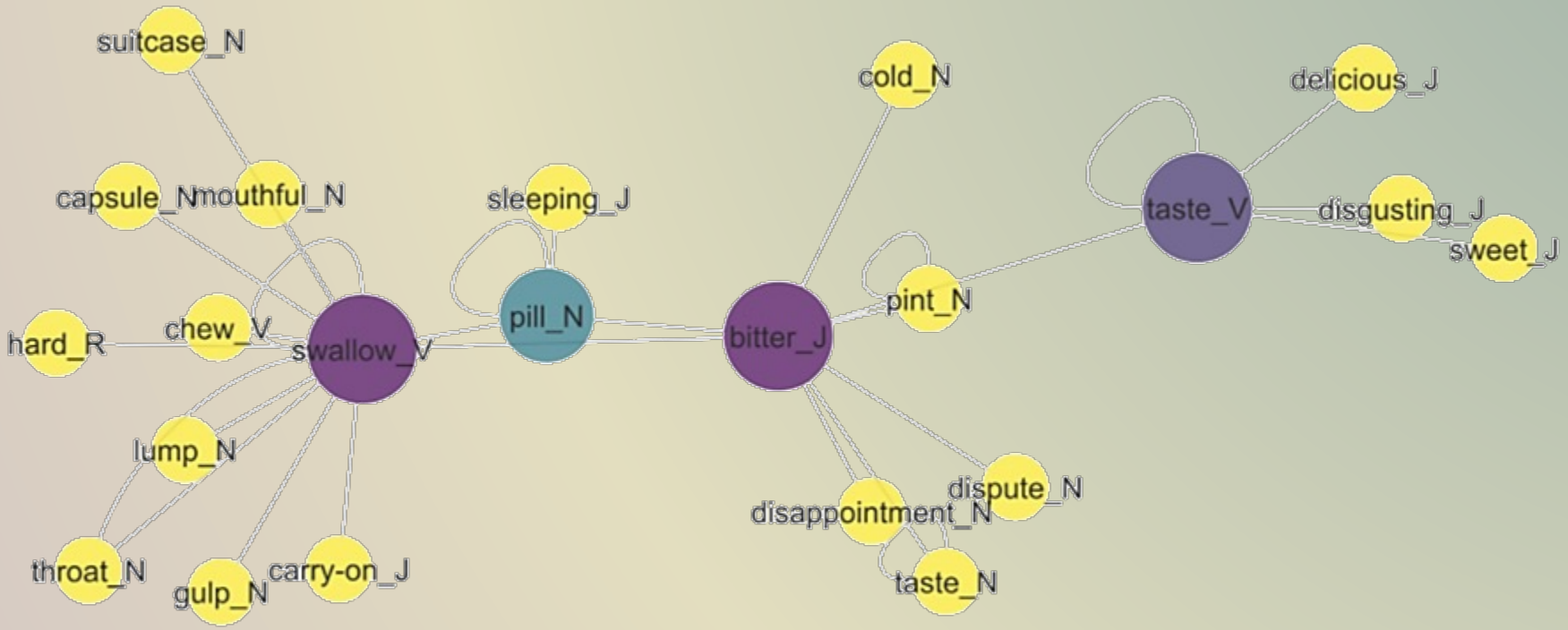
WHAT IS A COLLOCATION?

- commonly co-occurring group or set of words (Barnbrook et al., 2013, p. 3; Stulpinaitė et al., 2016, p. 31)

WHAT DO THEY REPRESENT?

- language learning context: high language proficiency and fluency
- Mental Lexicon: conventionalised and entrenched form-meaning mappings (Croft & Cruse, 2004, p. 292; Simpson-Vlach & Ellis, 2010, p. 488)
- contextual embeddings – can be used to track changes over time (see McGillivray & Tóth (2020) for an example)

EXAMPLE



idiom *[leave a] bitter taste* and *a bitter pill to swallow*

WHY USE COLLOCATION NETWORKS?

VISUALISATION OF

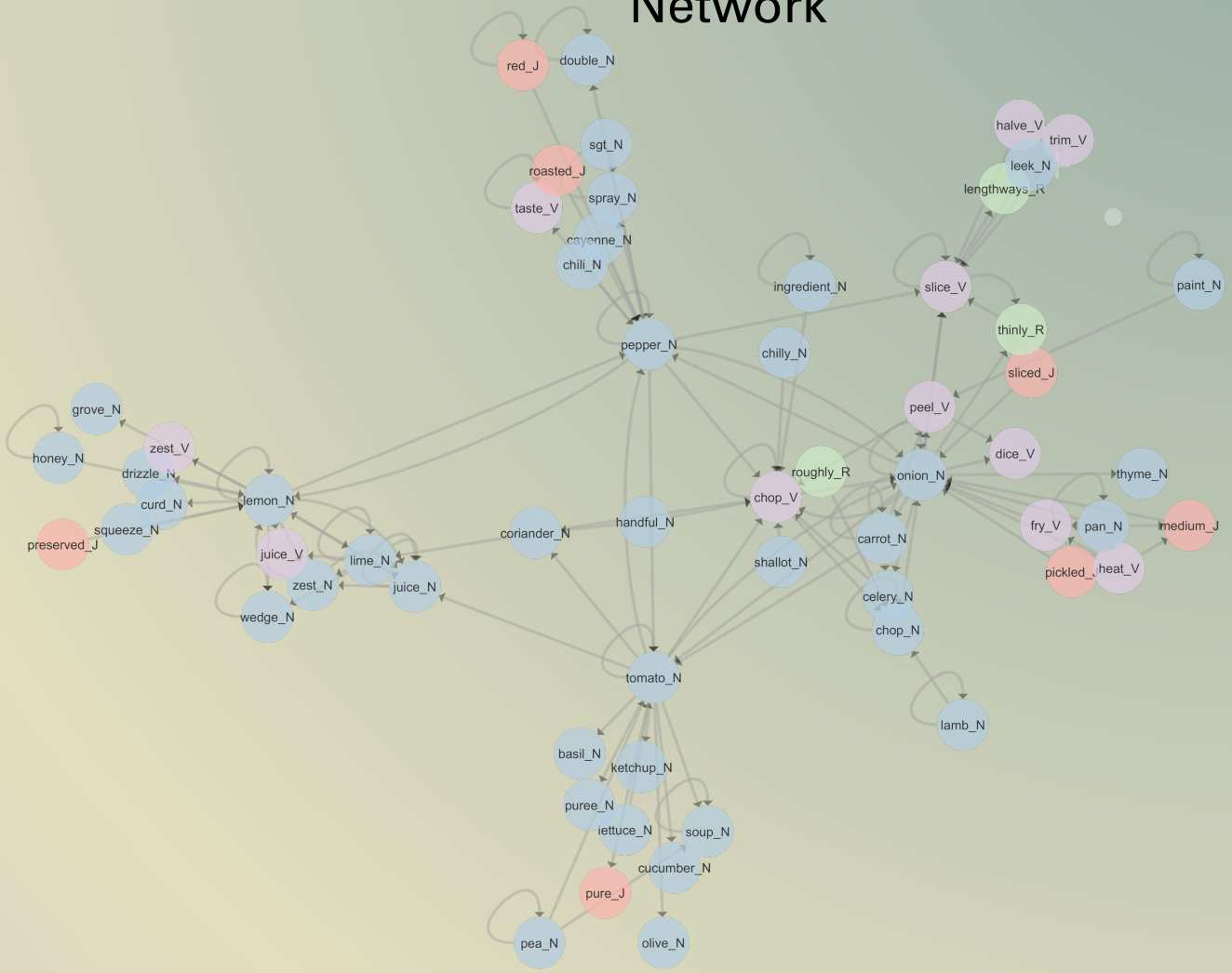
- **DISCOURSE RELATIONSHIPS, ABOUTNESS** OF A TEXT OR DISCOURSE
- **SEMANTIC RELATIONS** (PECINA, 2010; XIAO & MCENERY, 2006; BREZINA, 2016; BAKER, 2016; BREZINA ET AL., 2015)
- **LEXICOGRAMMATICAL FEATURES** (MCENERY & BREZINA, 2019)

NETWORKS VS. TABLES

Table

node	collocate	logDice	node	collocate	logDice	node	collocate	logDice
thinly_R	sliced_J	10.38	lime_N	lime_N	8.10	chop_V	onion_N	7.46
lemon_N	juice_N	10.14	heat_V	fry_V	8.07	chop_V	chop_V	7.44
lemon_N	zest_N	10.07	lemon_N	zest_V	8.05	tomato_N	cucumber_N	7.43
thinly_R	slice_V	10.07	carrot_N	peel_V	8.04	onion_N	carrot_N	7.42
onion_N	chop_V	9.26	lemon_N	lemon_N	7.99	pickled_J	onion_N	7.41
heat_V	pan_N	9.25	taste_V	taste_V	7.95	chilly_N	chop_V	7.41
chop_N	chop_N	9.17	chop_V	chop_N	7.94	pepper_N	taste_V	7.40
pea_N	pea_N	9.10	cayenne_N	pepper_N	7.94	celery_N	chop_V	7.38
roughly_R	chop_V	9.02	juice_N	lime_N	7.93	trim_V	slice_V	7.36
lime_N	juice_N	8.95	onion_N	pepper_N	7.92	pepper_N	slice_V	7.32
onion_N	slice_V	8.90	juice_N	zest_N	7.91	onion_N	celery_N	7.31
carrot_N	celery_N	8.88	lemon_N	drizzle_N	7.88	roasted_J	pepper_N	7.31
shallot_N	chop_V	8.84	handful_N	coriander_N	7.87	chop_N	onion_N	7.30
wedge_N	wedge_N	8.83	onion_N	tomato_N	7.86	sgt_N	pepper_N	7.27
lime_N	juice_V	8.79	handful_N	chop_V	7.83	lemon_N	grove_N	7.26
lemon_N	juice_V	8.71	onion_N	peel_V	7.83	onion_N	thinly_R	7.26
juice_N	lemon_N	8.70	tomato_N	pepper_N	7.80	tomato_N	chop_V	7.22
lamb_N	chop_N	8.70	peel_V	chop_V	7.79	tomato_N	pure_J	7.22
peel_V	slice_V	8.62	carrot_N	onion_N	7.79	onion_N	thyme_N	7.20
soup_N	soup_N	8.60	lemon_N	lime_N	7.78	preserved_J	lemon_N	7.19
tomato_N	ketchup_N	8.59	pepper_N	onion_N	7.76	honey_N	lemon_N	7.18
honey_N	honey_N	8.51	pepper_N	tomato_N	7.76	pan_N	pan_N	7.16
carrot_N	carrot_N	8.48	zest_N	juice_N	7.75	slice_V	slice_V	7.16
tomato_N	tomato_N	8.45	leek_N	slice_V	7.73	ingredient_N	chop_V	7.15
slice_V	thinly_R	8.37	tomato_N	puree_N	7.71	lemon_N	pepper_N	7.10
coriander_N	lime_N	8.34	paint_N	paint_N	7.70	roughly_R	chop_N	7.10
slice_V	lengthways_R	8.32	peel_V	dice_V	7.69	heat_V	onion_N	7.10
spray_N	spray_N	8.30	coriander_N	chop_V	7.67	tomato_N	coriander_N	7.09
zest_N	lemon_N	8.28	sliced_J	onion_N	7.65	tomato_N	olive_N	7.07
pan_N	fry_V	8.28	tomato_N	juice_N	7.62	pea_N	soup_N	7.03
lime_N	wedge_N	8.27	squeeze_N	lemon_N	7.62	carrot_N	tomato_N	7.02
fry_V	onion_N	8.26	pan_N	onion_N	7.60	pea_N	tomato_N	7.02
lime_N	zest_N	8.24	heat_V	medium_J	7.59	double_N	double_N	7.02
lamb_N	lamb_N	8.22	lettuce_N	tomato_N	7.59	pepper_N	double_N	7.01
pan_N	medium_J	8.22	pepper_N	spray_N	7.57	pepper_N	lemon_N	7.01
tomato_N	basil_N	8.21	juice_N	juice_N	7.57	red_J	red_J	7.01
onion_N	dice_V	8.18	pepper_N	pepper_N	7.57	medium_J	onion_N	7.01
chili_N	pepper_N	8.14	lemon_N	wedge_N	7.54	paint_N	peel_V	6.99
tomato_N	onion_N	8.13	tomato_N	soup_N	7.51	red_J	pepper_N	6.98
onion_N	onion_N	8.12	pepper_N	chop_V	7.50	ingredient_N	ingredient_N	6.98
lemon_N	curd_N	8.11	halve_V	slice_V	7.47			

Network



(Atomic unit: lemma_POS, AM: logDice, Threshold: 6.73, Sentence-span, min collocation frequency: 10, min collocate frequency: 10) (2-dimensional, Edge length: AM, Colour-coding: POS, Layout type: Edge-weighted spring embedded) – Visualisation Software: Cytoscape (Shannon, 2003)

NETWORKS VS. TABLES

Adaptability of tables

- Sorting (highest/lowest AM)
- Inclusion of more metadata/annotation

Adaptability of networks

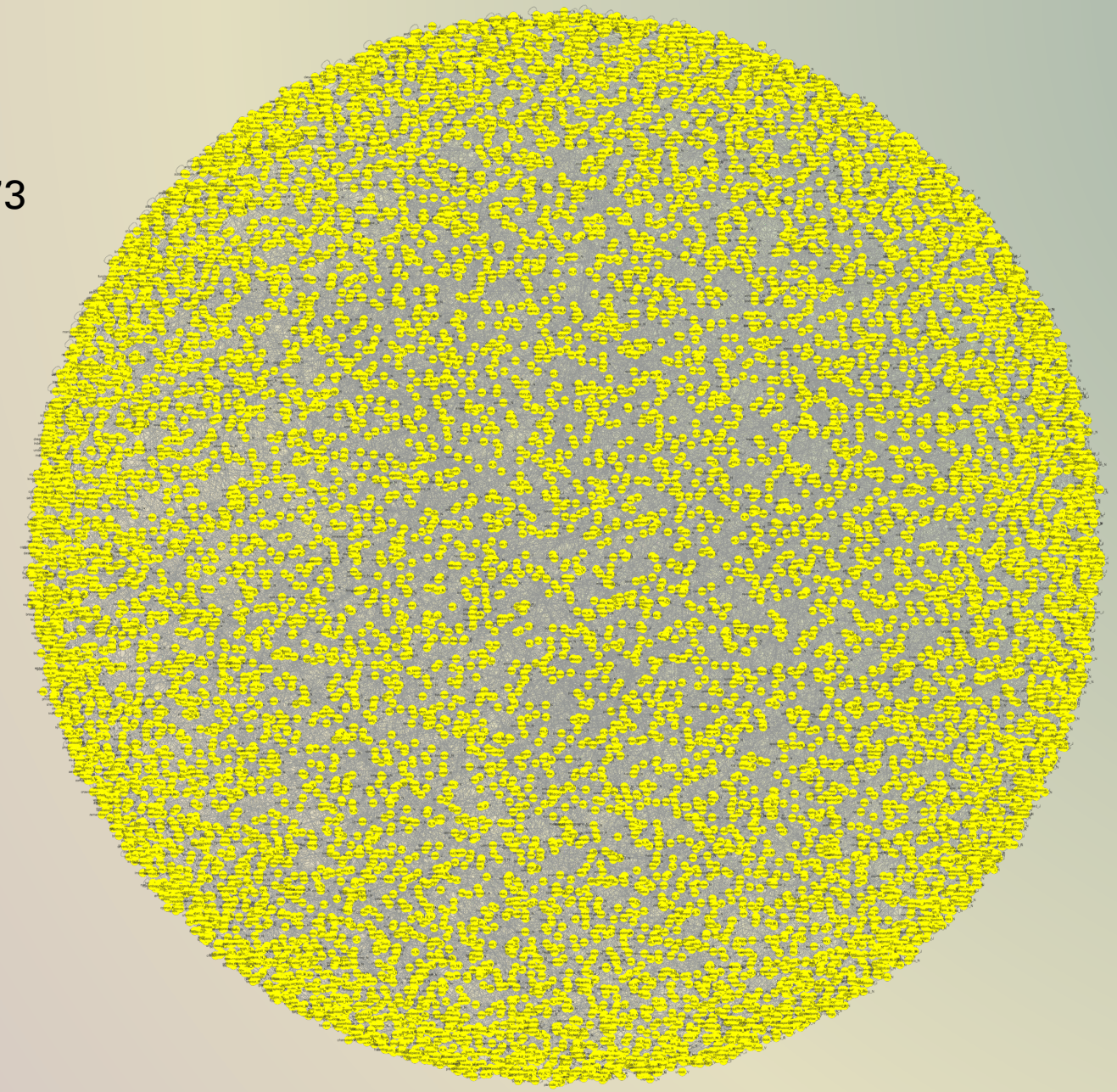
- Size
- Shape
- Colour
- Labels

LLN

BNC-2014 – logDice > 6.73

LARGEST CONNECTED COMPONENT

NODE COLOUR = POS



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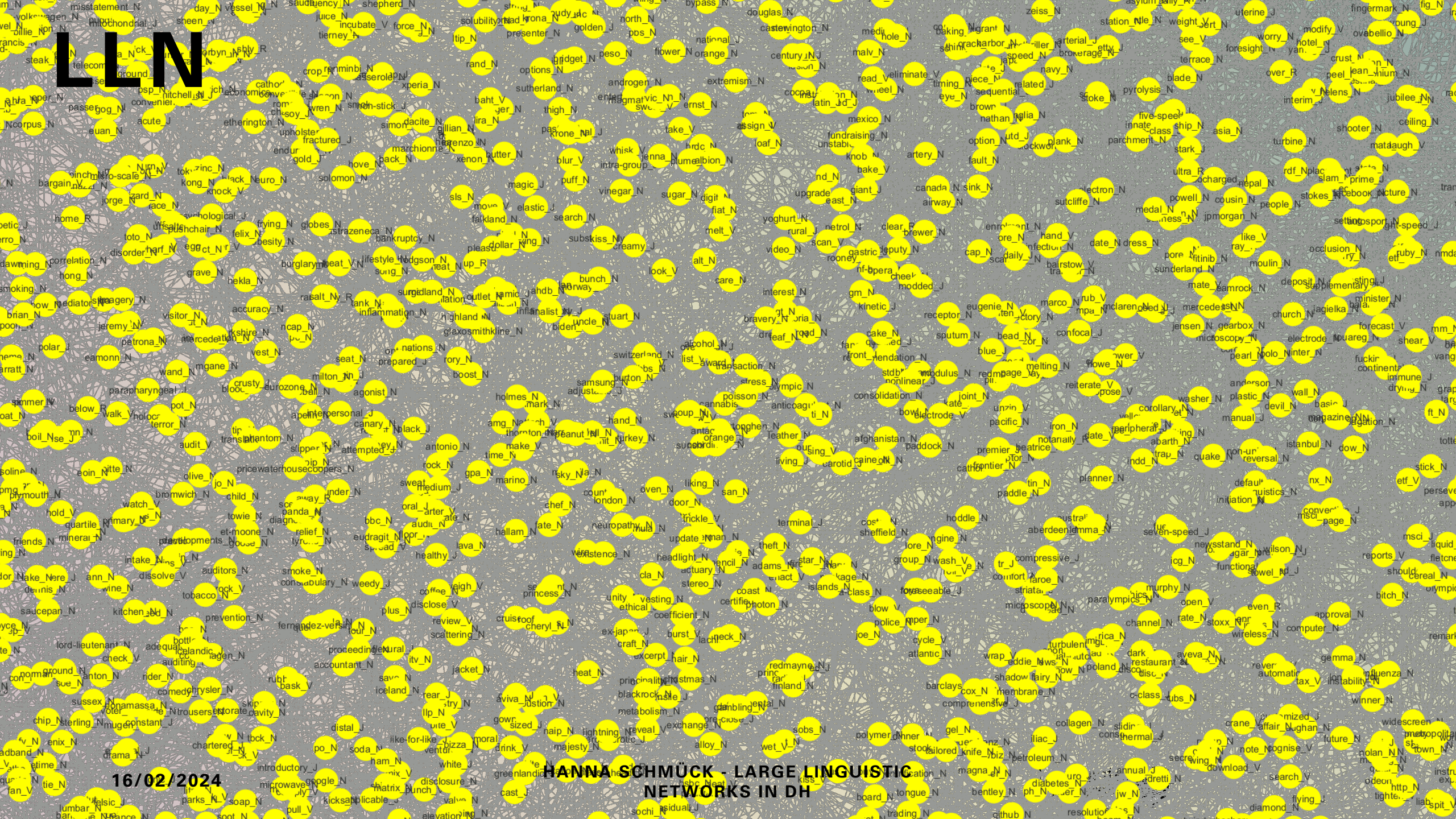
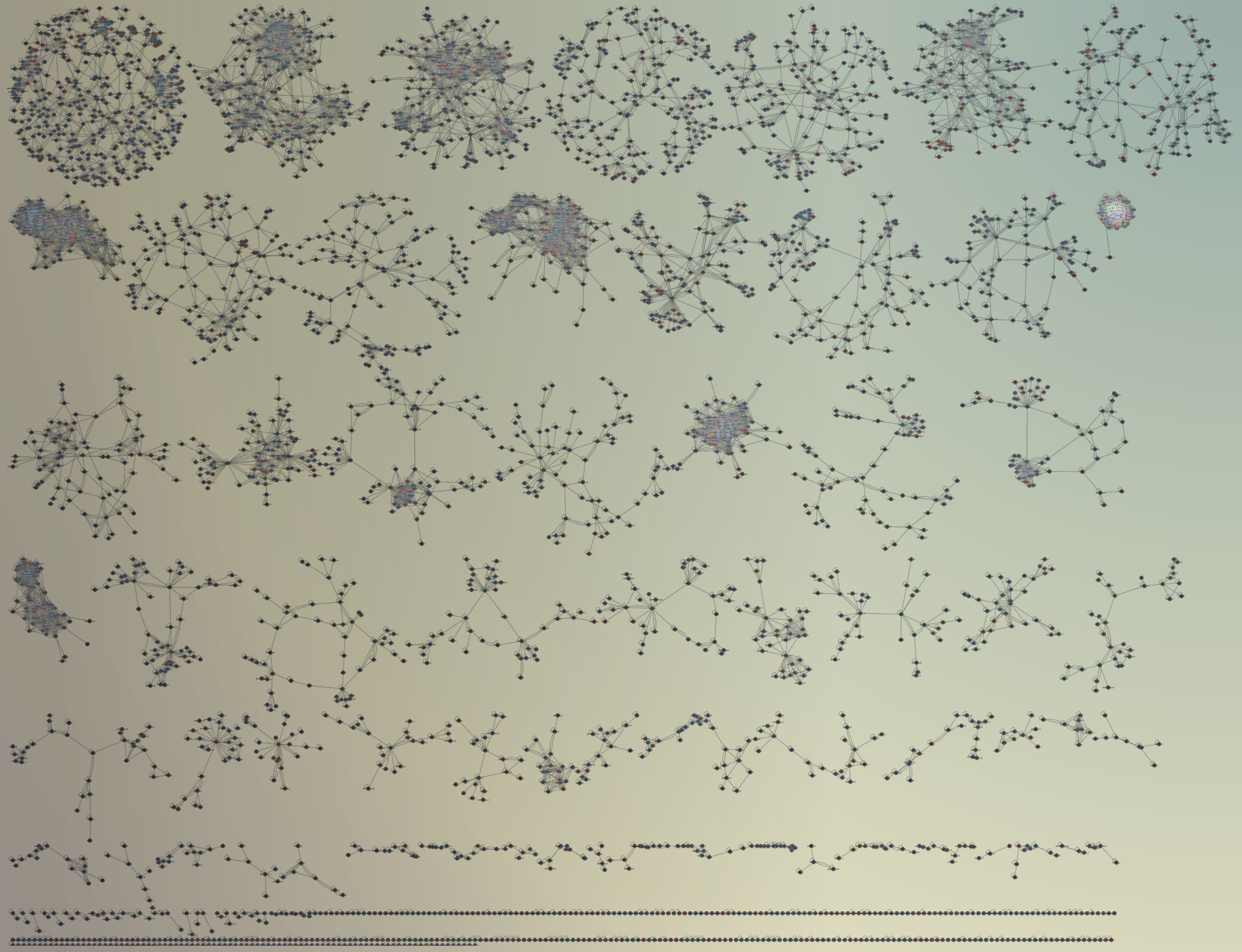
2-dimensional, Edge length: AM, Colour-coding: POS, Layout type: Edge-weighted spring embedded


LLN
16/02/2024
HANNA SCHMÜCK - LARGE LINGUISTIC NETWORKS IN DH

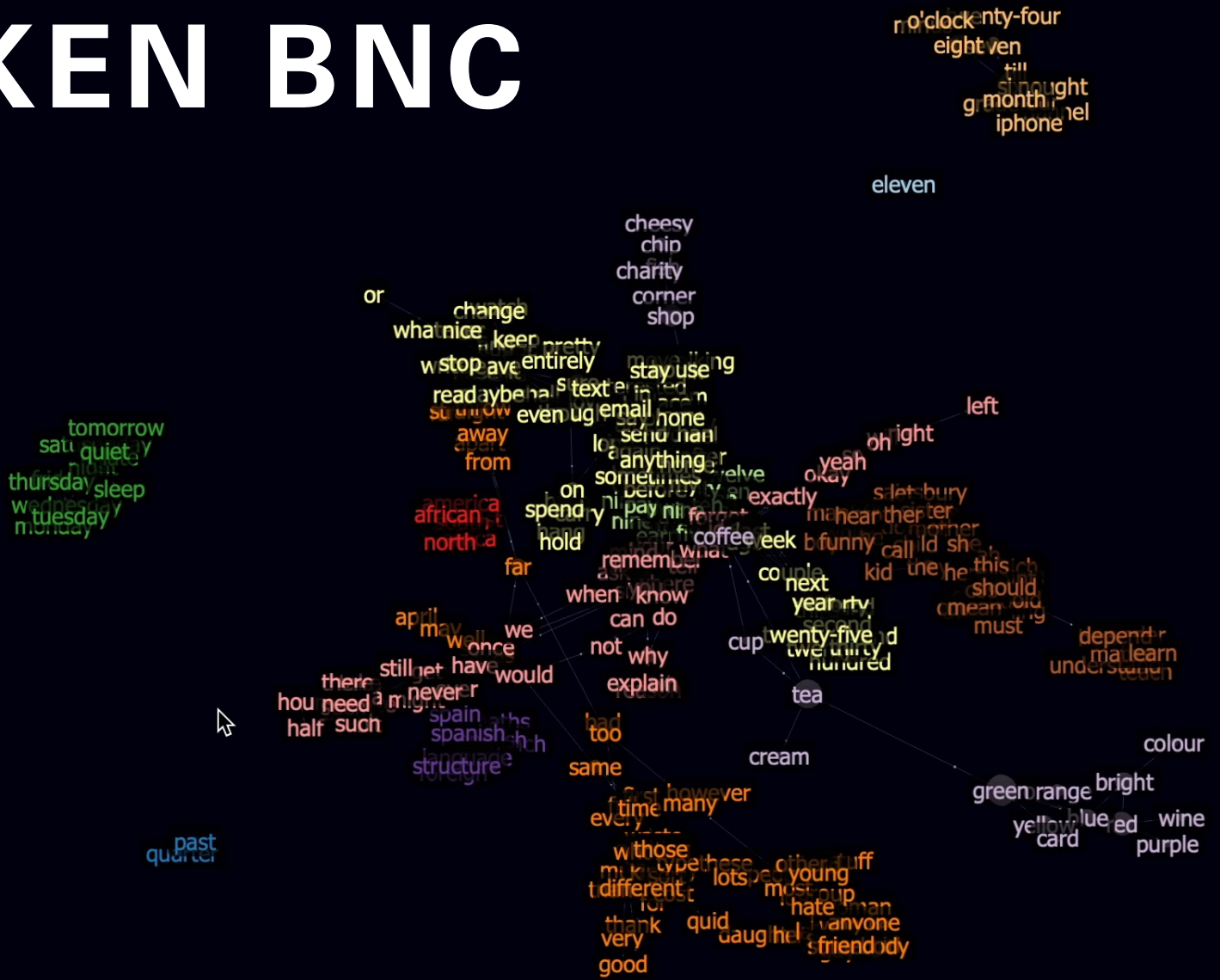
LLN

Clusters emerging from collocates of drug*|drink*|alcohol*|abuse* in the BNC2014

SAME PARAMETERS



SPOKEN BNC

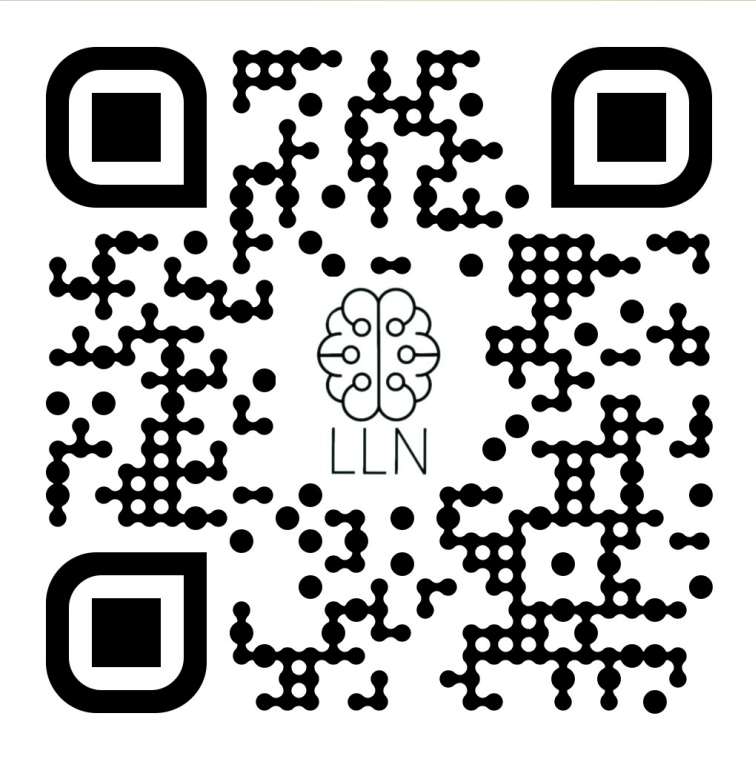


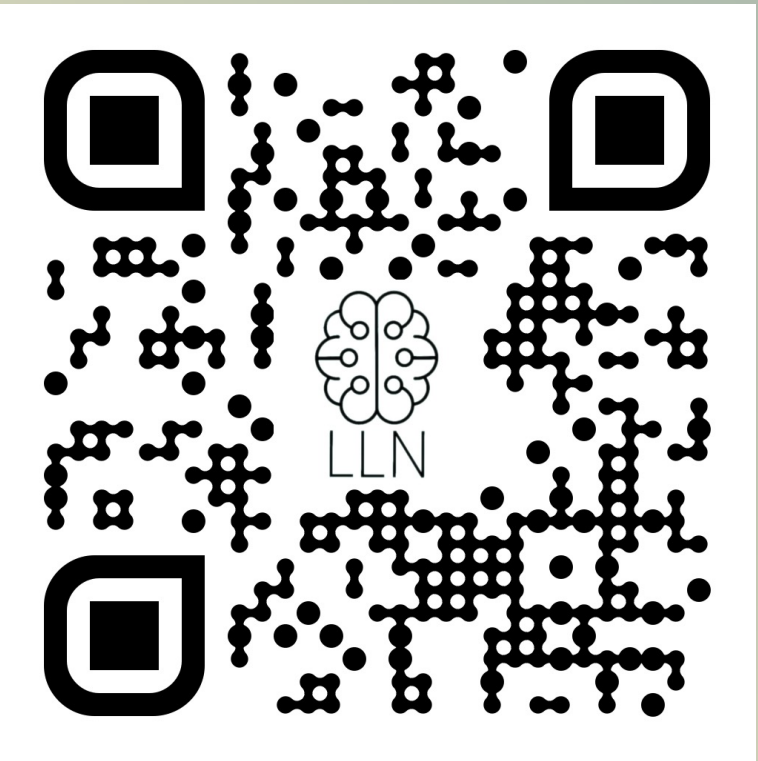
Left-click: rotate, Mouse-wheel/middle-click: zoom, Right-click: pan

ACADEMIC BNC

Left-click: rotate, Mouse-wheel/middle-click: zoom, Right-click: pan

ACADEMIC BNC – SPOKEN BNC





RELATED WORK

- Included in the PhD:
  - Systematic network comparisons – e.g. of word association networks and collocation networks
  - Integration of other datasets
- Exploring changing networks, e.g. displaying results from diachronic studies
- Including more annotation in visualisations – examples from corpora, metadata
- Allowing researchers to dynamically change existing visualisations

QUESTIONS?

THANK YOU

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