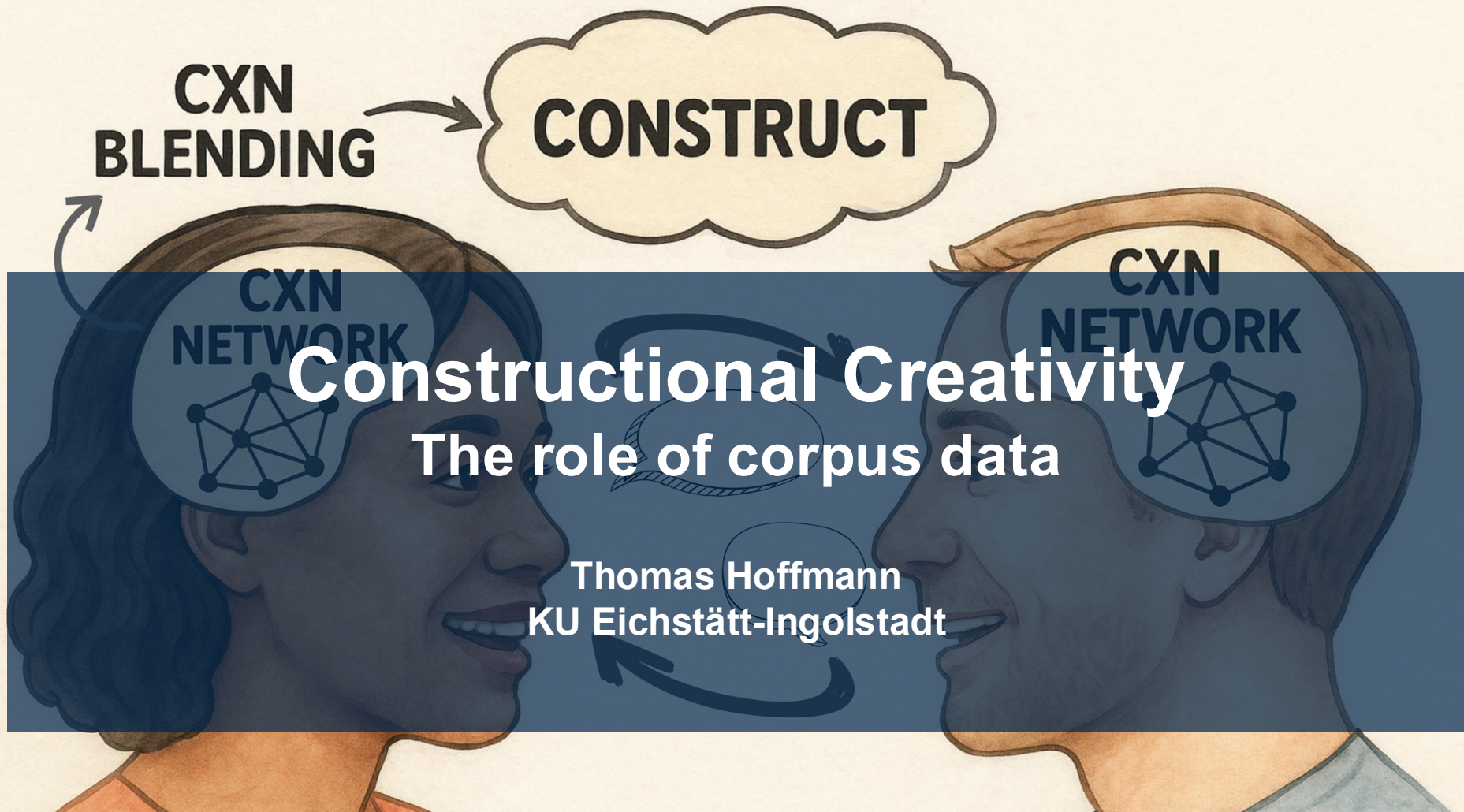




CREATIVITY, CONSTRUCTIONS & CREATIVITY



01

Usage-based CxG



02

SC model



03

CxG & LLMs



04

corpus data



05

road ahead



Constructions

(= arbitrary & conventional form-meaning pairs)

Words

e.g. *apple*

Idioms

e.g. *John kicked the bucket*

Morphemes

e.g. *untrue, unfriendly,
un-Gucci, ...*

Idioms

e.g. *She spills the beans*

Argument Structure Constructions

e.g. *Could he shriek himself unconscious ...?* (BNC)
Firefighters cut the man free ...(BNC)



CxG: “Constructions all the way” (Goldberg 2006)

Construction name	FORM ↔ MEANING	Traditional name
Ditransitive cxn	[X Verb Y Z] ↔ ‘X causes Y to receive Z by V-ing’	syntax
SPILL <i>the beans</i> idiom cxn	[X ₁ SPILL ₂ the beans ₃] ↔ divulge ₂ (X ₁ , information ₃)	idiom
un-ADJ cxn	un-Adj ↔ ‘not(PROPERTY)’	morphology
N cxn	[Noun] ↔ ‘THING’	synt.category
<i>bean</i> cxn	/bi:n/ ↔ ‘THING(bean)’	word/lexicon



Construction Grammar

(e.g., Diessel 2019; Fried & Nikiforidou 2025; Goldberg 2019; Hilpert 2019; Herbst & Hoffmann 2024; Hoffmann 2022b; Hoffmann & Trousdale 2013)

- **constructions** = stored mental form & meaning pairings
[long-term memory $\Rightarrow$ routines: substantive & schematic]
- **constructs** = specific utterances = combinations of constructions
[working memory $\Rightarrow$ routines & creativity]
- **mental constructicon** = network of cxns
- **usage-based** approach: constructions acquired via:
 - **input** (= specific usage events with rich contextual clues)
 - **domain-general cognitive mechanisms**
(e.g., intention reading, pattern finding, schematization, categorization or chunking/automatization, ...)

CXN NETWORKS

Schematization builds vertical taxonomies:

FORM: SBJ₁ V₄ OBJ₂ OBJ₃

↔

MEANING: 'Agent₁ Causes Recipient₂ to receive Theme₃ by V₄-ing'

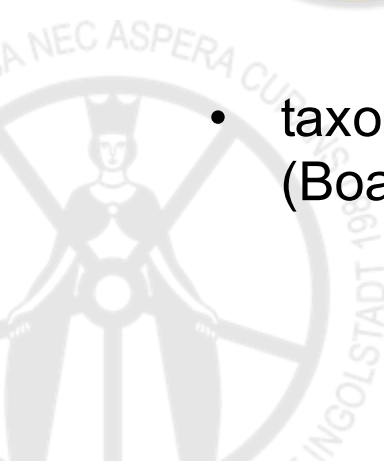
He gave her a present.

posted emailed

She threw him the ball.

They whatsapped her the dates. ...

texted snapchatted

- taxonomy important for **slot productivity**
(Boas 2003; Herbst 2018: analogy; Goldberg 2019: '**coverage**')


Usage-based alternatives: Coverage

(Goldberg 2019)

- “a potential productive use of an existing construction (a coinage) is acceptable to the degree that the category which would be required to include the previously attested examples *and* the coinage is well attested within the hyper-dimensional conceptual space in which exemplars cluster.” (Goldberg 2019: 62–63)

+ cognitive, usage-based approach

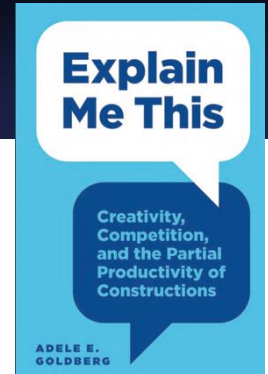
+ domain-general processes of learning

? no selective projection, no emergent meaning

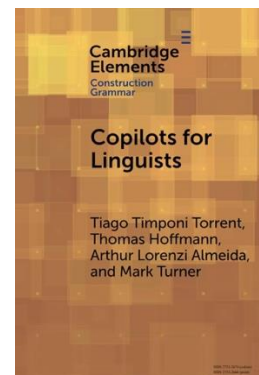
⇒ How do speakers form new expressions?
How are these interpreted?

Coverage (Goldberg 2019) & AI (Torrent et al. 2023)

- **Large Language Models:**
self-supervised training on enormous amounts of data
in a deep neural network architecture
(Bommasani et al., 2021)
- “Attention is all you need” (Vaswani, et al. 2017):
vector space models keep track of context
⇒ ≈ **coverage**
- **current controversy: LLM = creative?**
- **we will get back to this towards the end!**



LLaMA



CXN NETWORKS: Dynamic coverage

X BE NOT *the* Y-est Z in the Q-cxn (Bergs 2018; Hoffmann 2022b; Trousdale pc)

- (1) **She's not the sharpest tool in the shed**, Lily. (COCA, Trial Fire, 2016)
- (2) **a stuck-up mean girl**, and **not the brightest bulb in the pack**.
(COCA, Shape, 2011)
- (3) **Poor Billy Frisk was not the quickest bunny in the warren**.
(COCA, Southwest Review, 2009)

FORM: **SBJ₁ [BE NOT [the ADJ_{SUPERLATIVE_2} N₃] [in the N₄]]₅**

↔

MEANING: 'Theme₁ = 'not-very-intelligent'₅
SUPERLATIVE_2 = synonym for *intelligent*
Z₃ and Q₄ from same FRAME

But what about (4)?

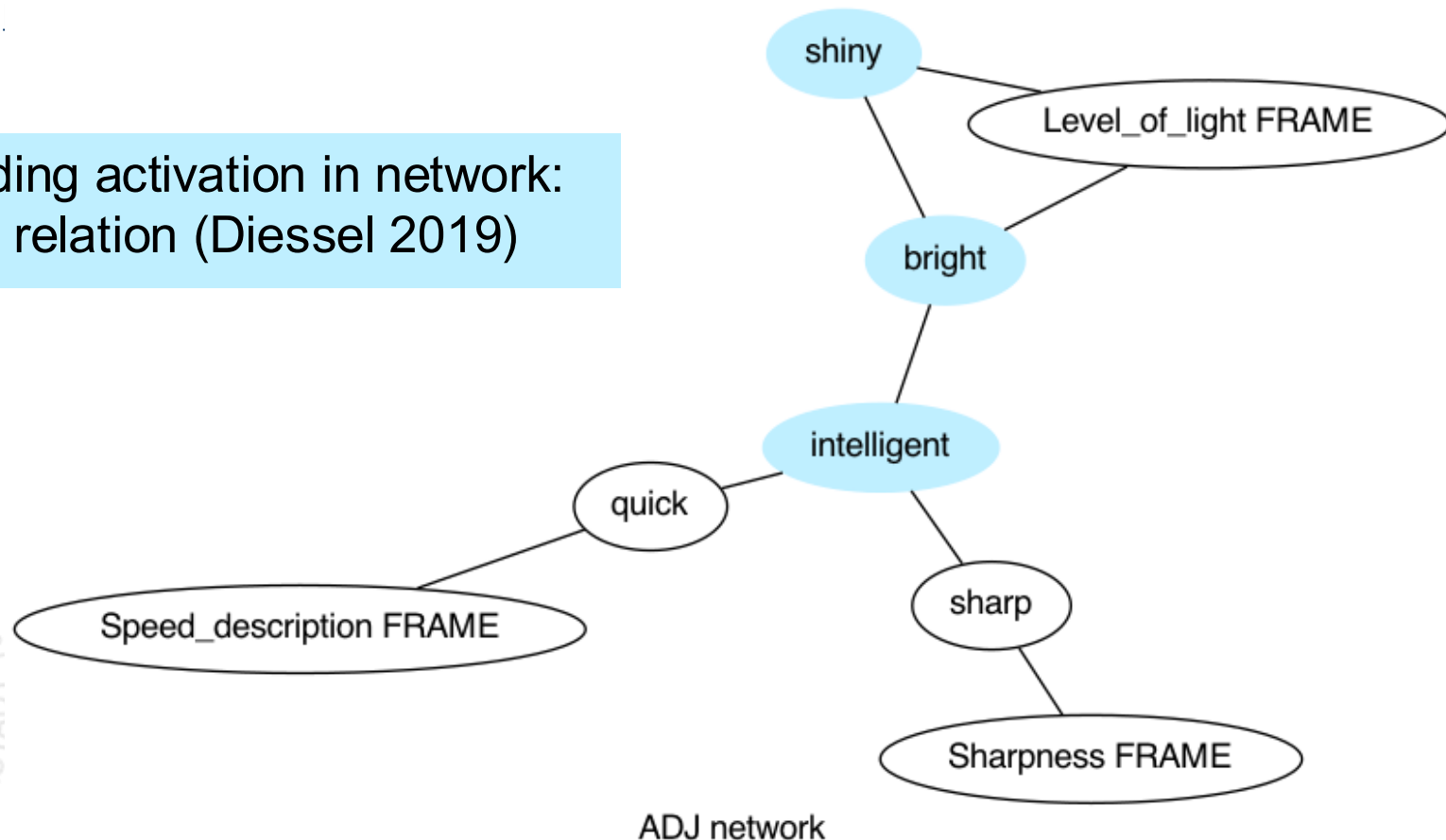
- (4) **Not the shiniest penny in the piggy bank**.

http://news.bbc.co.uk/sport2/hi/funny_old_game/2912483.stm

CXN NETWORKS: Dynamic coverage

- (4) I mean he's not the brightest lad is he?
Not the shiniest penny in the piggy bank.

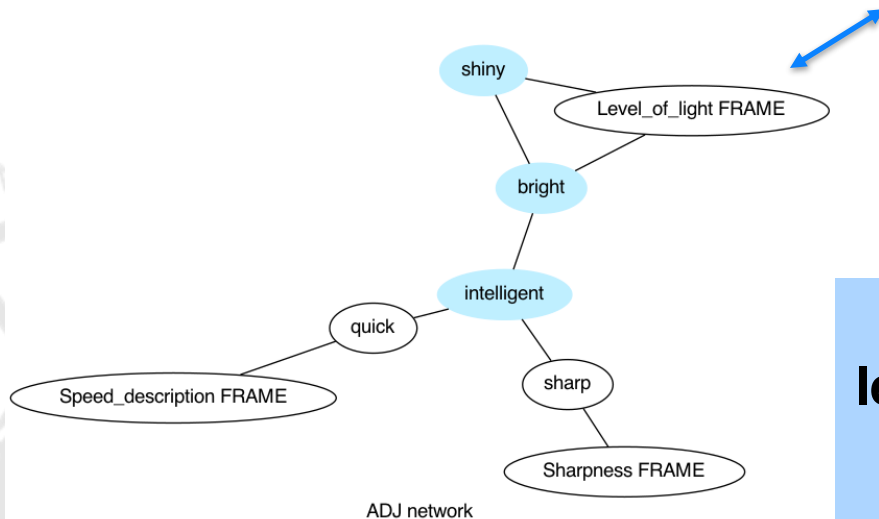
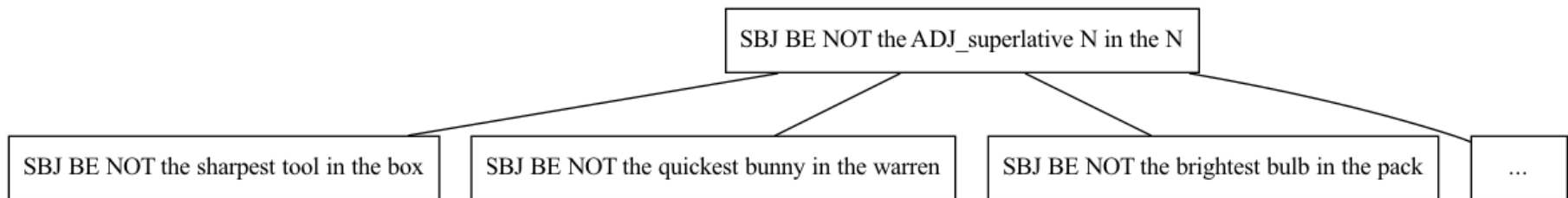
spreading activation in network:
lexical relation (Diessel 2019)



CXN NETWORKS: Dynamic coverage

- (4) I mean he's not the brightest lad is he?
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http://news.bbc.co.uk/sport2/hi/funny_old_game/2912483.stm



Not the shiniest penny in the piggy bank.

spreading activation in network:
lexical relation & filler-slot relation
(Diessel 2019)

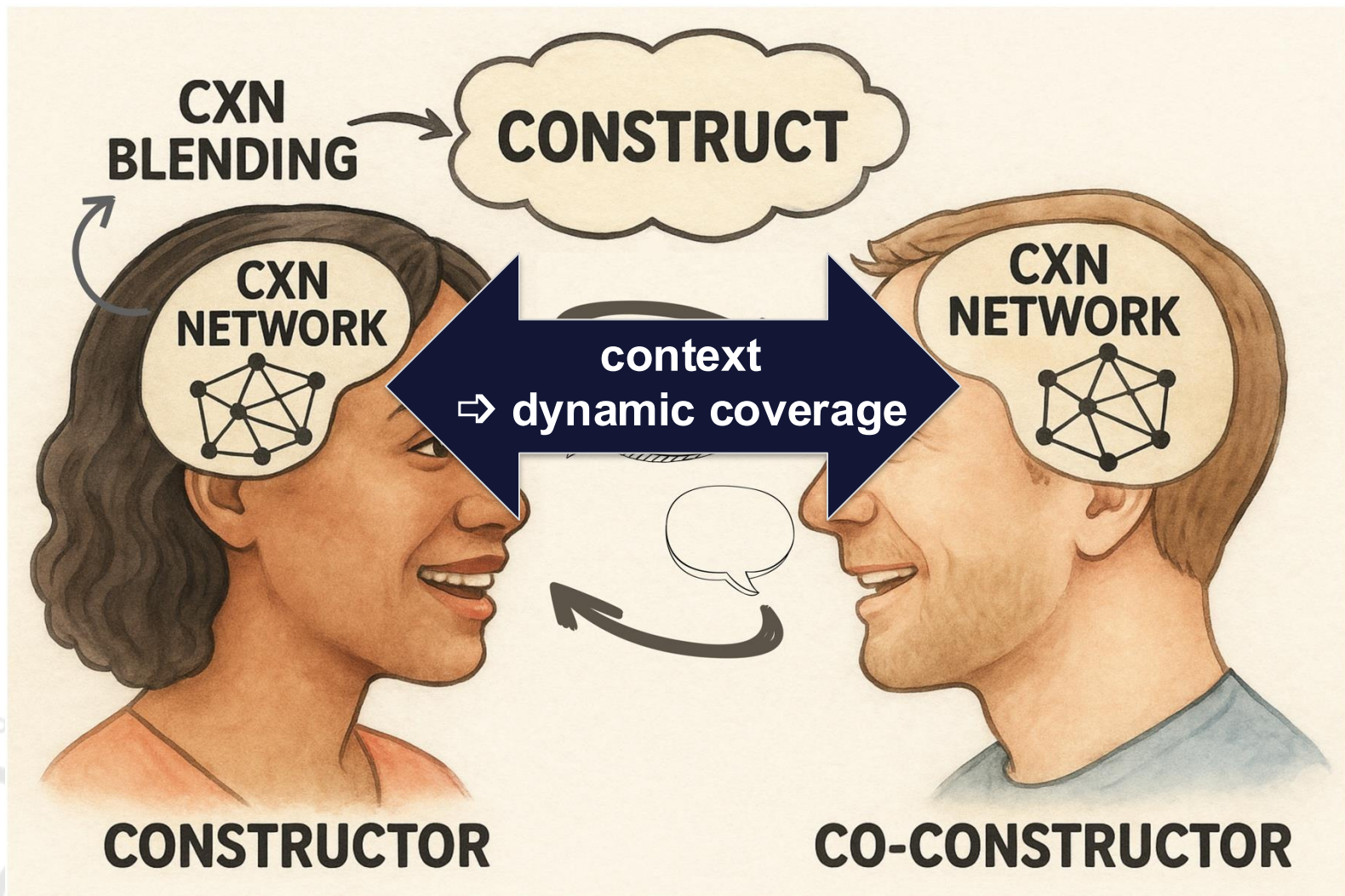


Figure 1: 5C framework of constructional creativity

(adapted from Glăveanu 2013: 72; Hoffmann fc.)

<https://osf.io/ypvxh/files/osfstorage/68308170dea2a77c3985b21d>

CONSTRUCTOR & CO-CONSTRUCTOR



Source: What are igloos usually made of?

QI s09 e16 XL Ice| <https://www.youtube.com/watch?v=md6paBh-8uc>

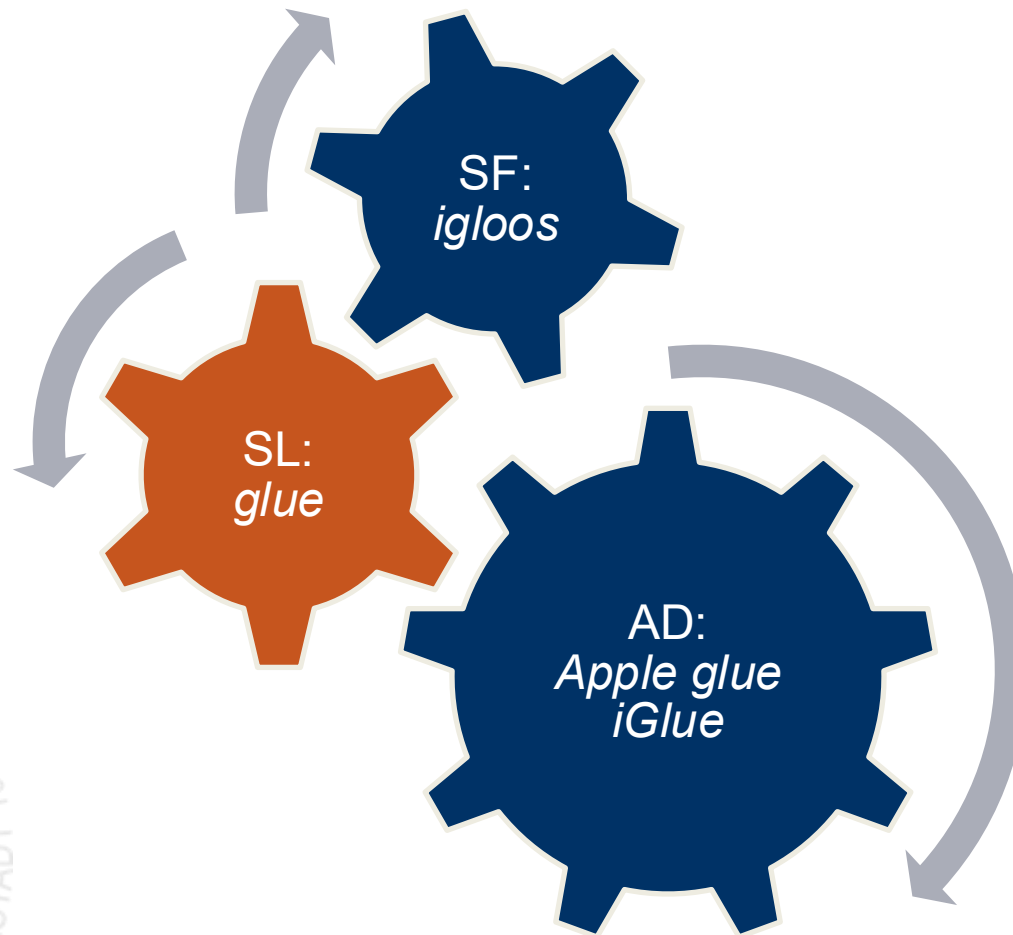


CONSTRUCTOR & CO-CONSTRUCTOR

- (5) Minute 35:02–35:26: **mental spaces = igloos | construction | Apple**
- a. Stephen Fry: What are igloos usually made from?
 - b. [CHURCH BELLS RINGING]
 - c. Brian Blessed: Blue ice?
 - d. [KLAXON SOUNDS]
 - e. Stephen Fry: Noooh! No. You get a forfeit. They are not made of ice, at all.
 - f. Sean Lock: Made from **glue**.
 - g. Stephen Fry: Nice thought.
 - h. Alan Davies: Is it an **Apple glue**? Are they actually **iGlues**?
 - i. Stephen Fry: iGlue?
 - j. Very good.
 - k. [LAUGHTER AND APPLAUSE]



CONSTRUCTOR & CO-CONSTRUCTOR



Cxn innovation: *V the N_{TABOO} out of NP-cxn*

(Hoffmann 2021; Hoffmann & Trousdale 2022)

- (6) Snape's meddling annoyed the hell out of him. (GloWbE-US-G)
- (7) My husband also likes to scare the crap out out of the kids.
(GloWbE-US-G)
- (8) Watched England kick the crap out out of Ireland in the Rugby
(GloWbE-IE-G)

FORM: [NP_i V_j [*the* N_{TABOOj}]_k [*out of* [NP_l]]

↔

MEANING: ['SEM_i excessively_k PRED_j SEM_l']

i = Subject/Agent

l = Oblique/Theme

function: [speaker's heightened emotion]

Cxn innovation: *V the N_{TABOO} out of NP-cxn*

(Hoffmann 2021; Hoffmann & Trousdale 2022)

Diachrony:

- Hoeksema and Napoli (2008: 370–3): late part of 19th c.
 - **main source exorcism**: *beat the devil out of someone*.
 - **bleaching**: religious term (e.g. *the devil*, *Satan*) > intensifier substitution: *the devil* > *the hell*
 - **analogy**: similar expressions involving e.g. *life*, *daylights* cooccur with verbs like *scare* (19 c.)
- Perek 2015: Removal cxn ('X CAUSES Y to MOVE from Z')
- lawata 2020: Resultative cxn ([*The cops*] *beat a confession out of him*)



Cxn innovation: *V the N_{TABOO} out of NP-cxn*

(Hoffmann 2021; Hoffmann & Trousdale 2022)

Hoffmann & Trousdale 2022:

- **multiple cxn sources in network**
(see, *inter alia*, Breban and De Smet 2019; Gisborne 2010; Hudson 2007; Sommerer & Smirnova 2020; Van de Velde, De Smet and Ghesquière 2015)
- **Construction Grammar is more than just cxns!**





Cxn innovation: Multiple source cxns – corpora

Removal / Resultative cxns

FORM: [NP_i V_j [*the* N]_k [*out of* [NP_i]]]

MEANING: ['SEM_i CAUSE SEM_k to MOVE from SEM_i by PRED]

*I will preach **the devil**_k out of thee* (1835 COHA)
⇒ 'remove SEM_k'

*She can knock **the spots**_k out of these boys_j at that game.*
(1887, OED, s.v. *spot*) ⇒ 'excessively_k beat SEM_j'

*They took **the starch**_k out of that Twelfth Maine_j, sir*
(1867, COHA) ⇒ 'excessively_k humiliate SEM_j'

*you nearly frightened **the wits**_k out of me_j.* (1869, COHA)
⇒ 'remove SEM_k' vs 'excessively frighten SEM_j'

TABOO cxns

What **the Devil**_x do you do without your Shoes!
(1739, OBC 17390502_25)
⇒ function_x: [speaker's heightened emotion]

'The Pacha has put 12 ambassadors to death already.'
'**The devil**_x he has!' (1832, OED s.v. *devil*)
⇒ function_x: [speaker's heightened emotion]

Elsa wished in her heart that they had Sarah between their teeth,
and shaking the devil out of her. (1865, COHA)

FORM: [NP_i V_j [*the* N_{TABOOj}]_k [*out of* [NP_i]]]

MEANING: ['SEM_i excessively_k PRED_j SEM_i']

function: [speaker's heightened emotion]



Increasing productivity: N slot

Figure 2: N_{TABOO} s in *V the hell-cxn* COHA – 19c data (VSM)

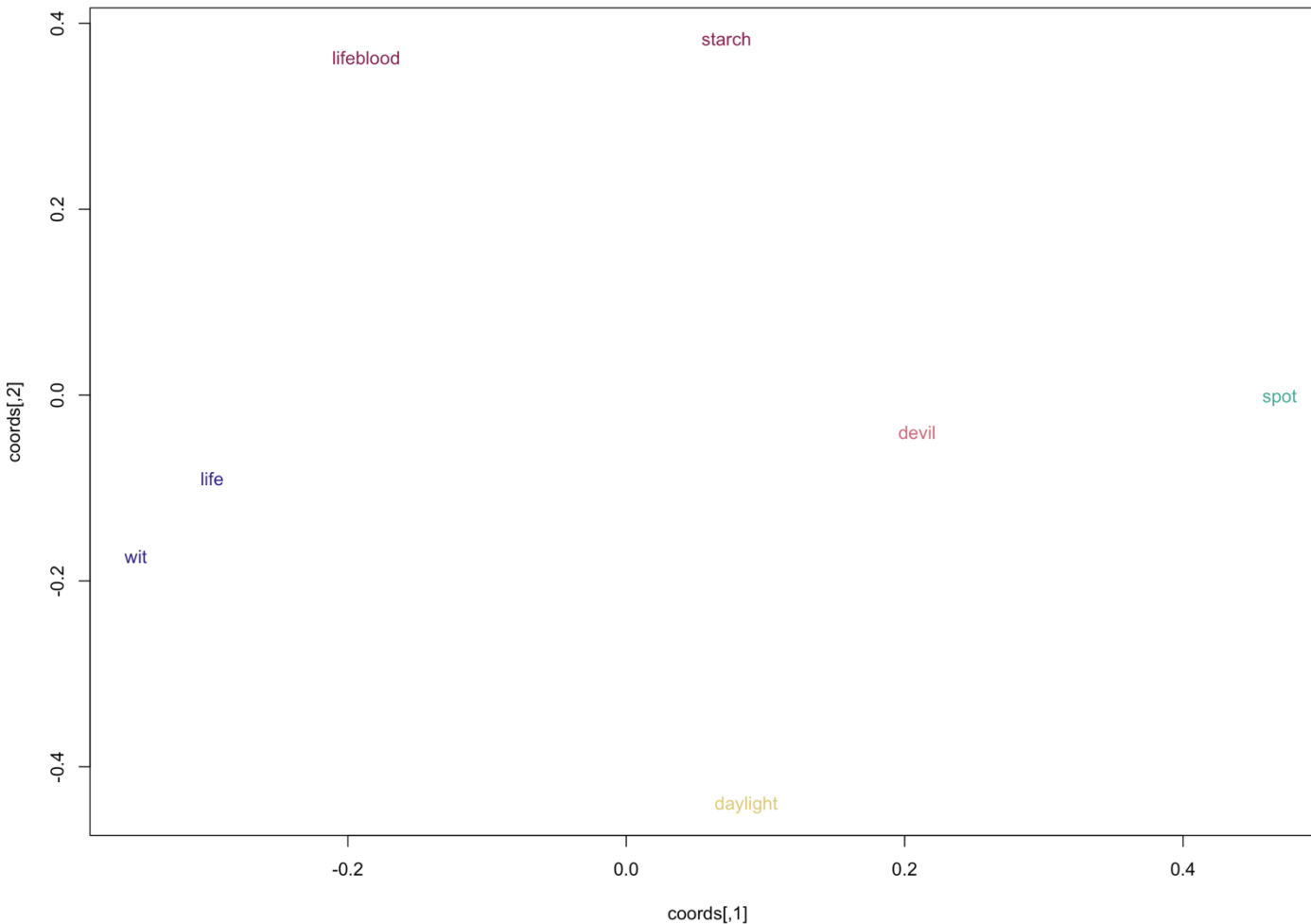
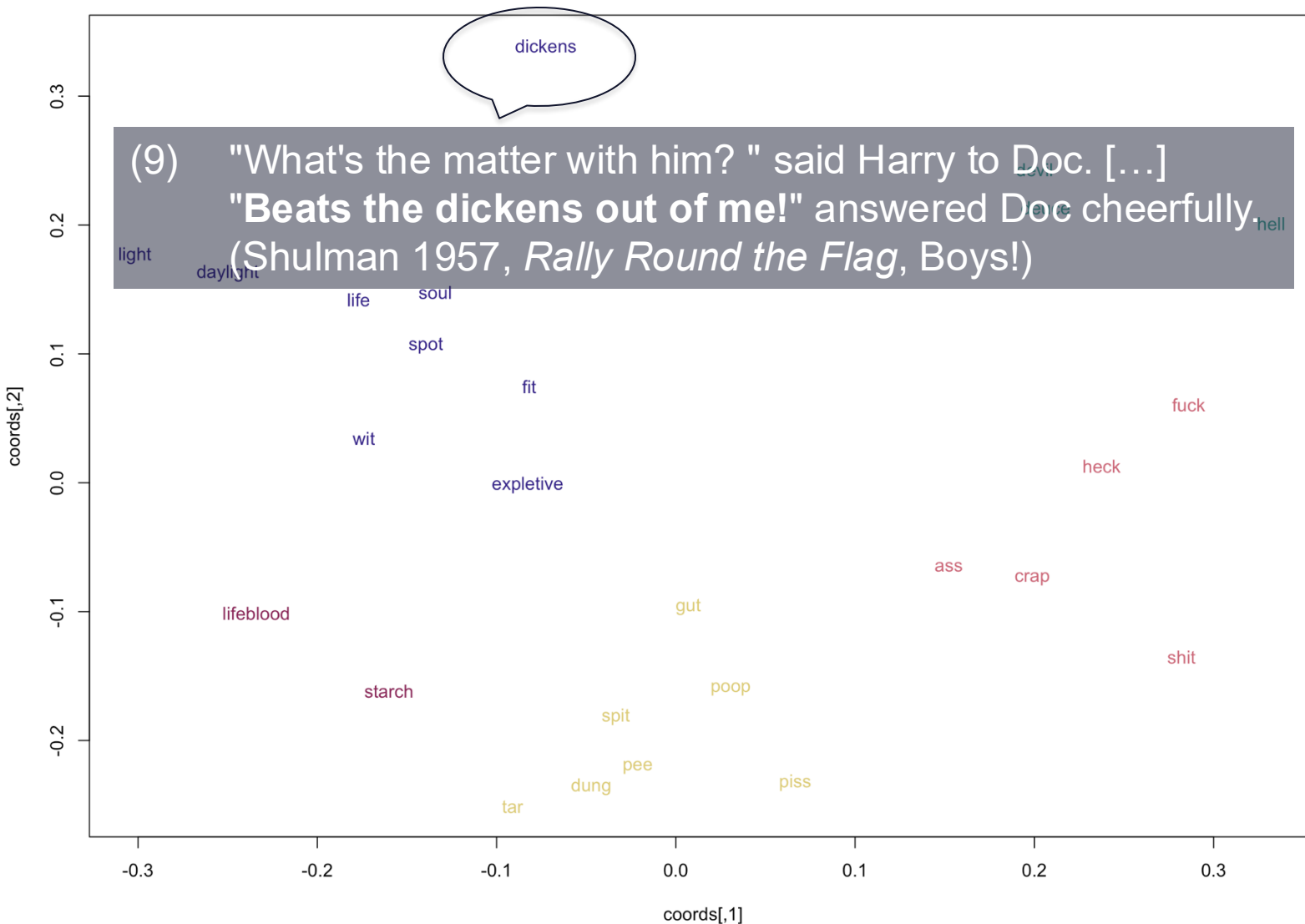
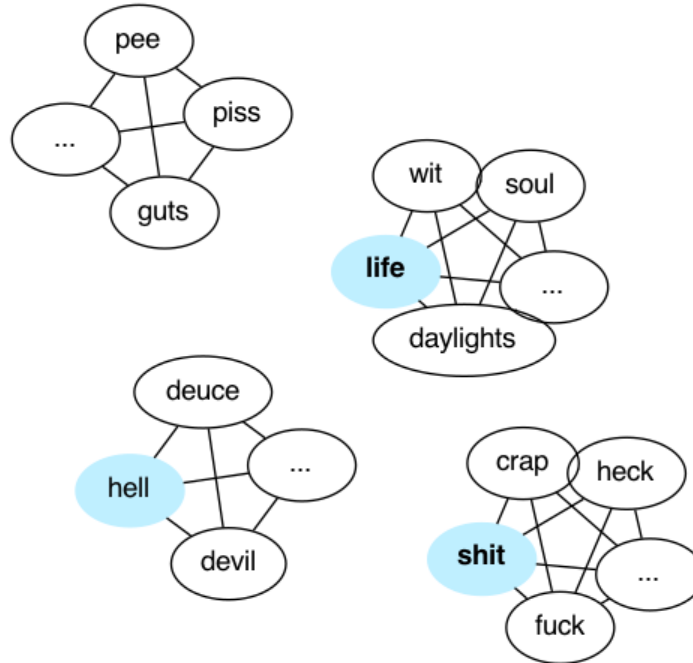
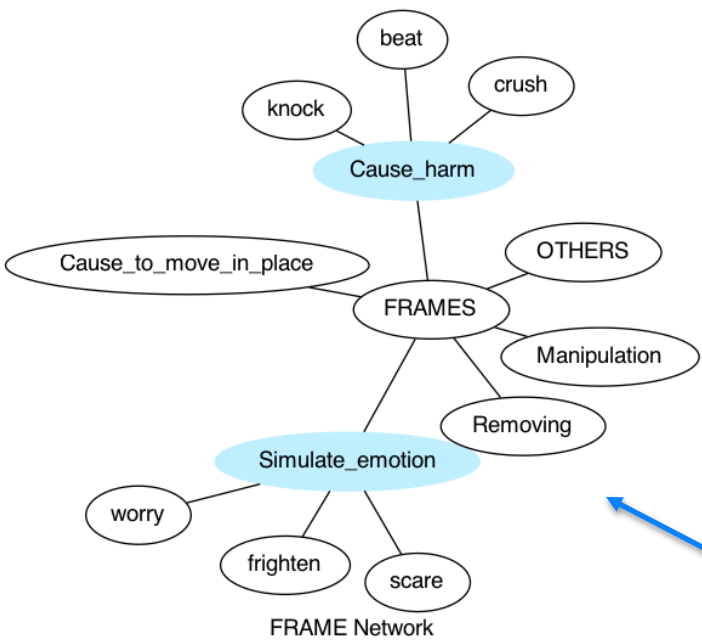


Figure 3: N_{TABOOS} in *V the hell-cxn* COHA – 20c data (VSM)



20c cxn network (construction see Diessel 2019)



20c. TABOO Network

G-construction (e.g. *She got the hell out of Dodge*)

$[[NP_i V_j [the N_{TABOO}]_k out ([of XP]_l)]] \leftrightarrow [[SEM_i PRED_j (SEM_l)]]$
| subjective function: [speaker's heightened emotion]_k]

i = Subject/Theme
l = Oblique/Source

The hell/B-construction (e.g. *She beat the hell out of George*)

$[[NP_i V_j [the N_{TABOO}]_k [out of [NP]_l]] \leftrightarrow [[SEM_i excessively_k PRED_j SEM_l]]$
| subjective function: [speaker's heightened emotion]_k]

i = Subject/Agent
l = Oblique/Theme

Intransitive cxn

Transitive cxn

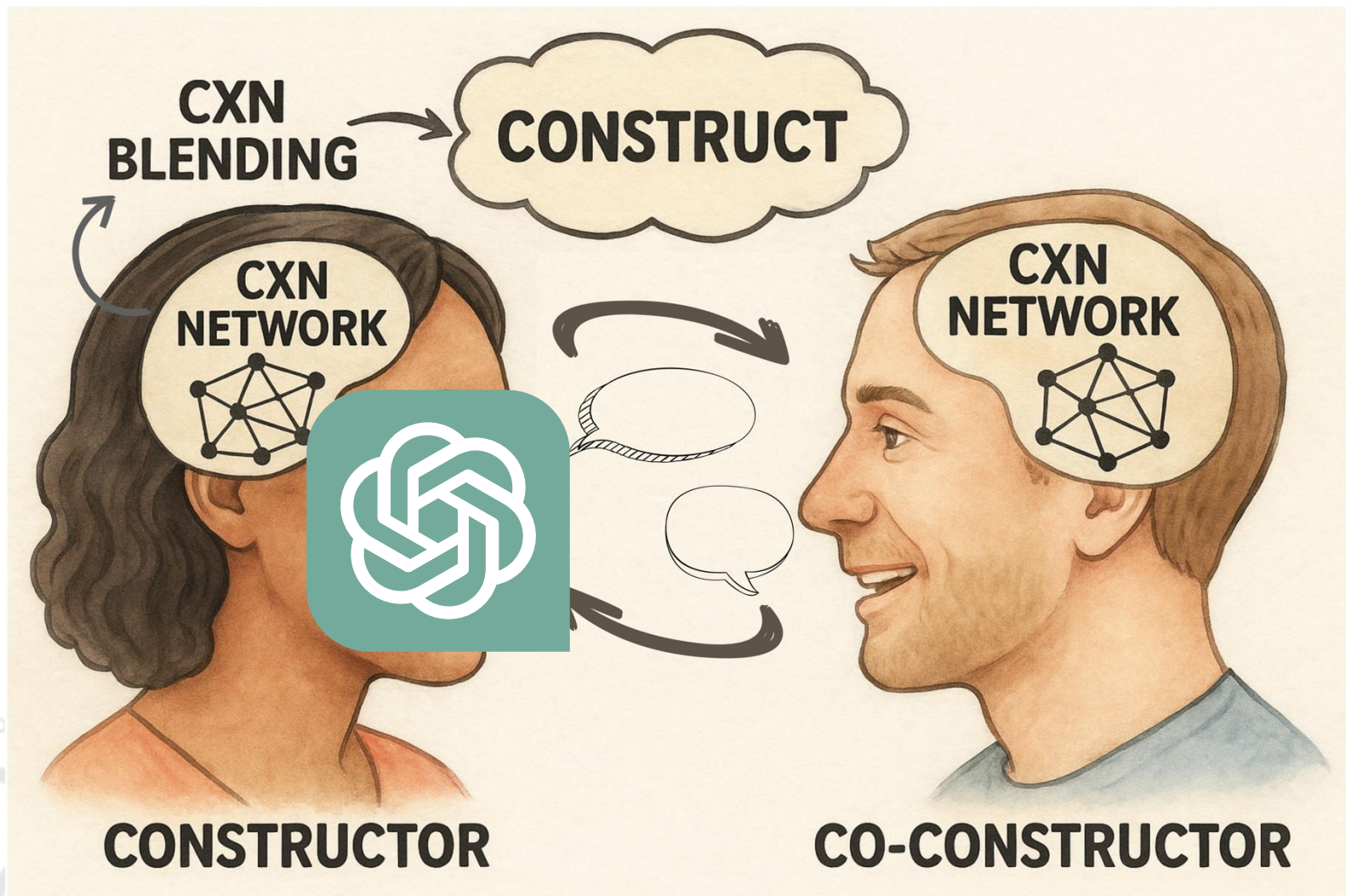


Figure 4: LLMs as (Co-)constructor?
(adapted Hoffmann fc.)

<https://osf.io/ypvxh/files/osfstorage/68308170dea2a77c3985b21d>

CxGs & LLMs

- **Large Language Models:**
enormous amounts of data in deep neural network architecture (Bommasani et al., 2021)
- “Attention is all you need” (Vaswani, et al. 2017):
vector space models keep track of context
⇒ **≈ coverage** (Goldberg 2024)
- Bonial & Madabushi (2024): 10 cxns (each 50+ tokens)
 - **lower-level (substantive) cxns encoded**
 - **not higher-order, fully schematic constructions**
- Beuls & van Eecke (2024: 1302): **language is “acquired through the processes of intention reading and pattern finding during situated communicative interactions.”**
≠ LLMs
- **LLM = creative?**

Psychological approaches: Creativity = ?

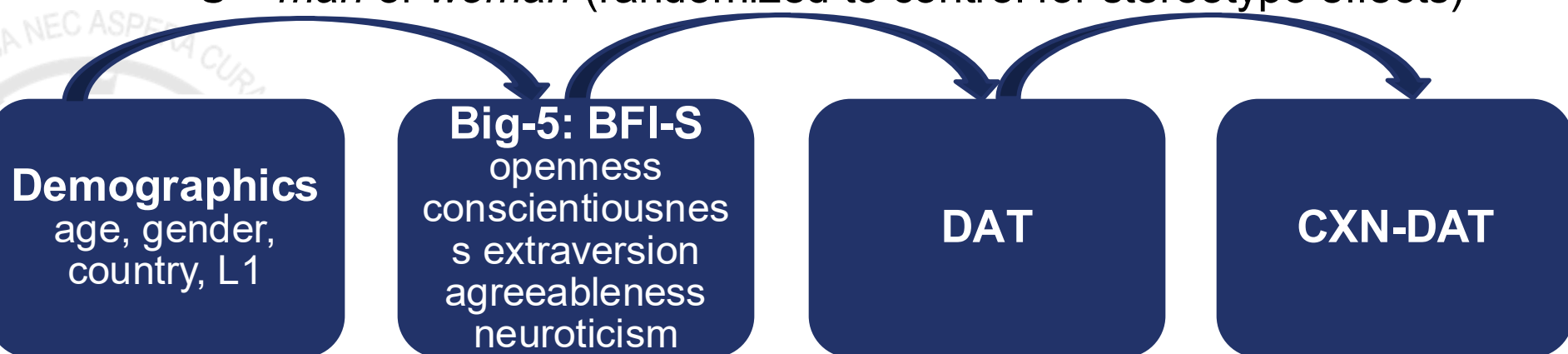
(Kaufmann 2016)

- Simonton (2012): **Creativity = Originality x Appropriateness**
- Steinhauser & Hoffmann: **neurocognitive study of cxn creativity**
- Moreno-Rodriguez et al. (2024)
default mode network (DMN) = novel idea generation
executive control network (ECN) = idea evaluation
- Gu et al. 2018: **creativity and neuromodulators**
e.g. dopamine-reward (= emotional benefit)
- **AI = human idea generation**
≠ (hormonal/emotional) evaluation

Constructional Divergent Association Task

(CXN-DAT | Hoffmann & Steinhauser 2025)

- modelled on Divergent Association Task (DAT):
<https://www.datcreativity.com> (Olson et al. 2021)
- e.g.: *Yesterday, the woman _____ the hell out of the man.*
- “enter 10 verbs that are as different from each other as possible, in all meanings and uses of the words.”
- 55 subjects (Prolific):
AGE = 18–60y | GENDER = 37f, 18m | UK | L1 English
- S = *man* or *woman* (randomized to control for stereotype effects)



Excursus: **Experimental** vs **corpus data**

- **experiment = individual (entrenchment)**
corpus data = speech community
(conventionalization)
(Schmid 2020)
- **corpus data as proxy for input / output**
(Stefanowitsch & Flach 2017)
- **corpus data = proxy for coverage**
(Hoffmann & Steinhauser 2025)

CXN-DAT: Experimental vs corpus data

(Hoffmann & Steinhauser 2025)

- e.g.: Yesterday, the woman _____ the hell out of the man.



**Figure 5a: Word cloud
(experiment)**



**Figure 5b: Word cloud
(GB corpus data data from
GloWbE; Hoffmann 2021)**

⇒ **strong coverage-based prototype effects** (*scare/beat*)

⇒ SBJ & OBJ: also bias production

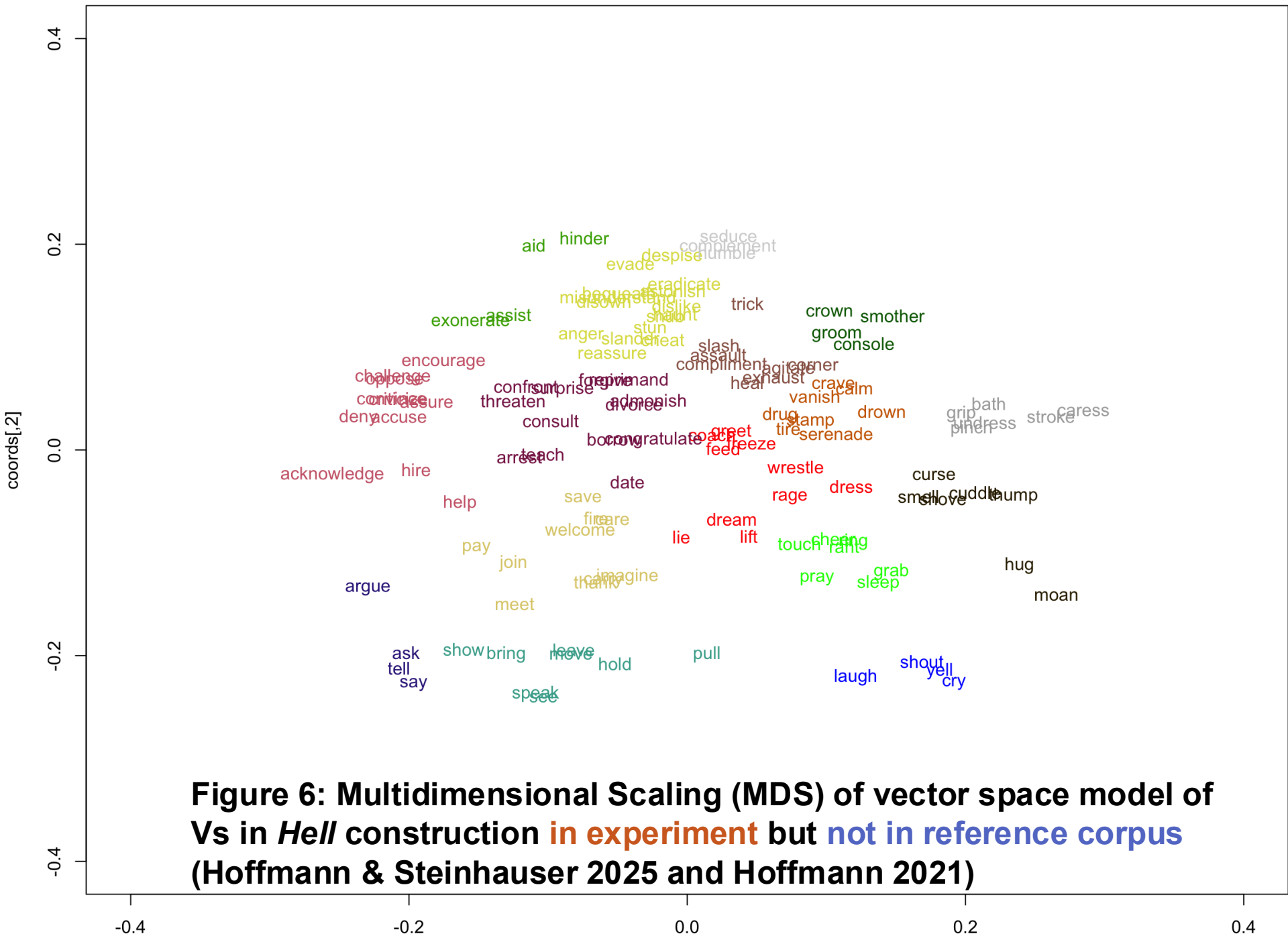


Figure 6: Multidimensional Scaling (MDS) of vector space model of Vs in *Hell* construction in experiment but not in reference corpus (Hoffmann & Steinhauser 2025 and Hoffmann 2021)

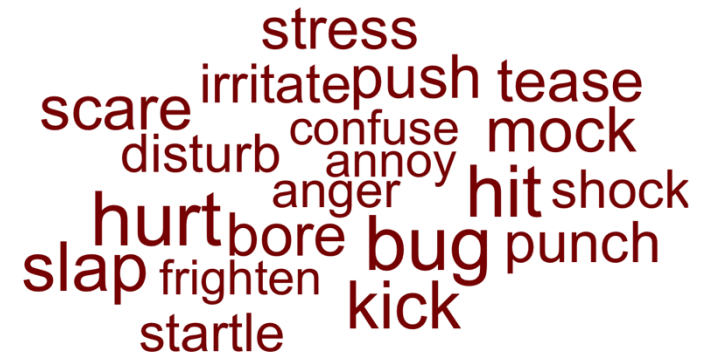
CXN-DAT: Humans vs LLMs

(Hoffmann & Steinhauser 2025)

- e.g.: Yesterday, the woman _____ the hell out of the man.



Figure 3a: Word cloud (human participants)



**Figure 7: Word cloud
(ChatGPT: simulation N=200)**

⇒ humans:

stronger coverage-based prototypes (scare/beat)

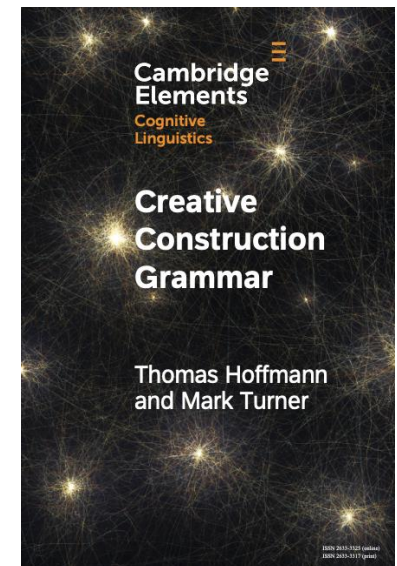
more creativity beyond coverage (e.g. *conned*, *danced*, *rizzed*)

CXN BLENDING $\neq$ compositional combination

- “... construction combination is performed by Conceptual Blending – a domain-general process of higher cognition that has been used to explain complex human behavior such as, inter alia, scientific discovery, reasoning, art, music, dance, math, social cognition, and religion.” (Turner & Hoffmann fc.)

Conceptual Blending =

- + cognitive, usage-based approach
- + domain-general processes of learning
- + selective projection, no emergent meaning





CXN BLENDING

(*inter alia*, Fauconnier & Turner 2002; Hampe & Schönefeld. 2003; Herbst & Hoffmann 2018, 2024; Hoffmann 2019; Hoffmann and Turner fc; Steen and Turner 2013; Turner & Fauconnier 1999)

- **constructs = working-memory units**
- **constructions = long-term memory units (chunks / schemata)**

(10) Construct: *They were able to cut the turtle loose ...*

CXN BLENDING

- **constructs = working-memory units**
- **constructions = long-term memory units (chunks / schemata)**

(11) *the more opaque that atmosphere is*_{C1a}

*the less conductive it is*_{C2a|C1b}

*the bigger the temperature difference you need to cross it.*_{C2b}

ICE-GB corpus: S2A-043-F104

Constructions

COMPARATIVE CORRELATIVE CXN	the	Comp1	Subj	PRED

the	Comp2	Subj	PRED

COMPARATIVE CORRELATIVE CXN

the	Comp1	Subj	PRED

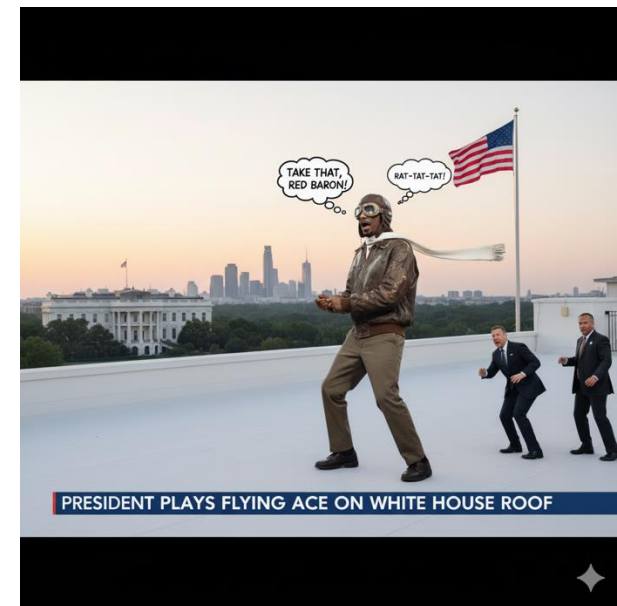
the	Comp2	Subj	PRED

CXN BLENDING

(12) “It...says a lot about the chaos of this administration, **that the president just fully Snooped on national TV.**

(John Oliver | cf. keynote Laura Michaelis)

ChatGPT & Gemini:



CXN BLENDING

gandalfed



To be denied access to somewhere or something. Derived from Lord Of The Rings The Two Towers where Gandalf proclaims "YOU SHALL NOT PASS!"

"Pete couldn't get in Sophbeck because he didn't have any ID so got gandalfed by the bouncer"

by Pedro the square October 7, 2008



34



11



FLAG

<https://www.urbandictionary.com/define.php?term=gandalfed>

'simple' N_{proper} > V conversion/coercion?



CXN BLENDING

(13) **She Gandalfed me**
(source: TikTok– Taylor Tomlinson)



NETFLIX



TikTok

@taylortomlinsoncomedy

And they are not wrong, alright?

CXN BLENDING

(13) **She Gandalfed me**
(source: TikTok– Taylor Tomlinson)

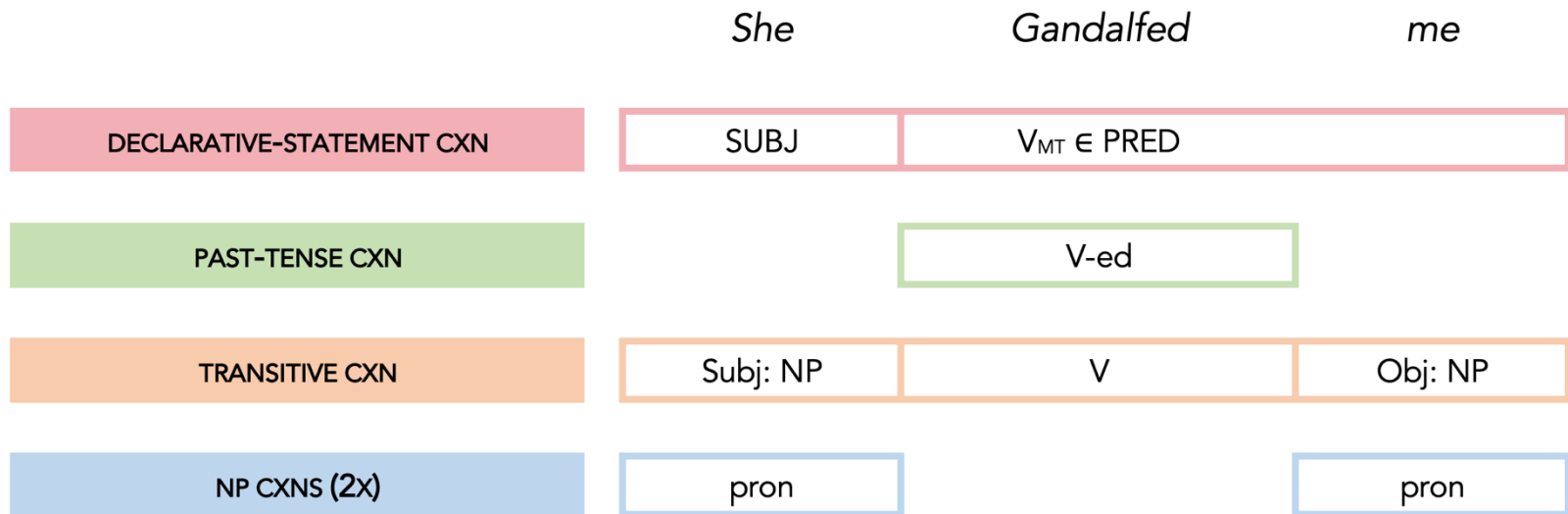


Figure 6: CASA analysis of (12)

**Blending of mental spaces (LoR & relationships)
& constructions**

'Bread-and-butter' examples: (Hoffmann & Turner fc.)

morphological blends: *brunch*, *Chunnel*, *McJob*

(14) snaccident

SNACCIDENT
(noun.)

Eating a family sized
bar of chocolate
by mistake

 ParentBible™

facebook.com/theparentbible

⇒ selective blending of FORM & MEANING



'Bread-and-butter' examples: compounds (Hoffmann & Turner fc.)

- (15) a. boat house (place of boats)
 b. jail house (function of incarceration)
- (16) a. stress headache (caused by stress)
 b. caffeine headache (caused by caffeine withdrawal)
- (17) land yacht ('large, luxurious car')

⇒ **selective projection & emergent meanings**





'Bread-and-butter' examples: predication (Hoffmann & Turner fc.)

- (18) a. The child is safe. (child from harm)
 b. The beach is safe. (safe place for people)
 c. The secret is safe. (secret not disseminated)
 d. The food is safe. (for consumption)
 ...

⇒ **selective projection & emergent meanings**





'Bread-and-butter' examples: ASCs (Hoffmann & Turner fc.)

- (19) The novice skier walked her way down the ski slope.
(Goldberg 1995: 205)
- (20) She elbowed her way through the crowd.

⇒ **selective projection & emergent meanings**



'Fireworks' example: Multimodality (Hoffmann & Turner fc.)

(21) Dead end.



Source: <http://theconversation.com/whats-driving-the-worldwide-obesity-epidemic-70153>

⇒ selective projection & emergent meanings



AI & Creativity





AI & Creativity



Amy
@scifisunsets

Follow



AI expanded the Descartes portrait. I don't know what I expected, but it definitely wasn't this.



19:36 · 15/06/2023 From Earth · **1M** Views

334 Reposts **222** Quotes **2K** Likes **230** Bookmarks



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19:36 · 15/06/2023 From Earth · **1M** Views

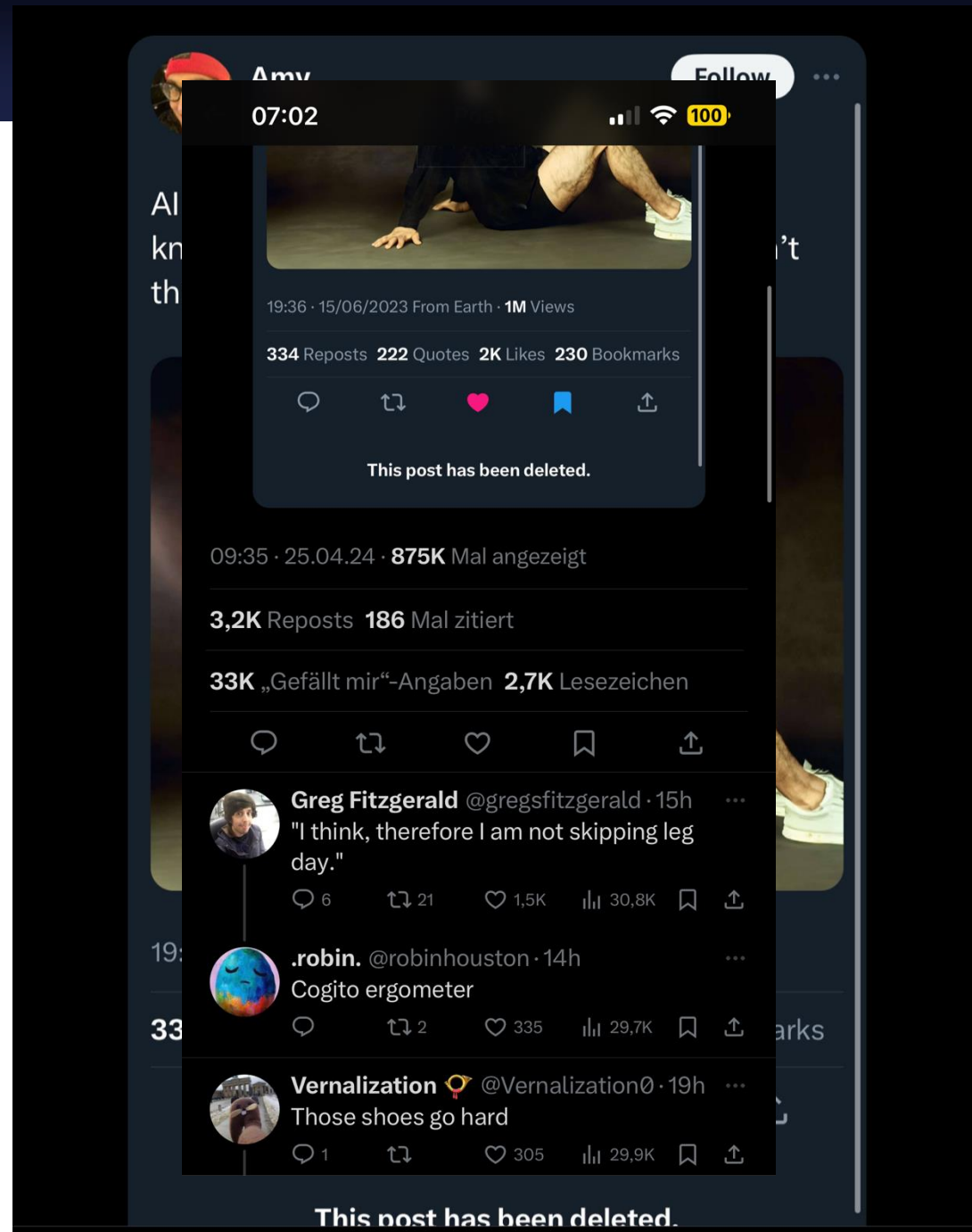
334 Reposts **222** Quotes **2K** Likes **230** Bookmarks



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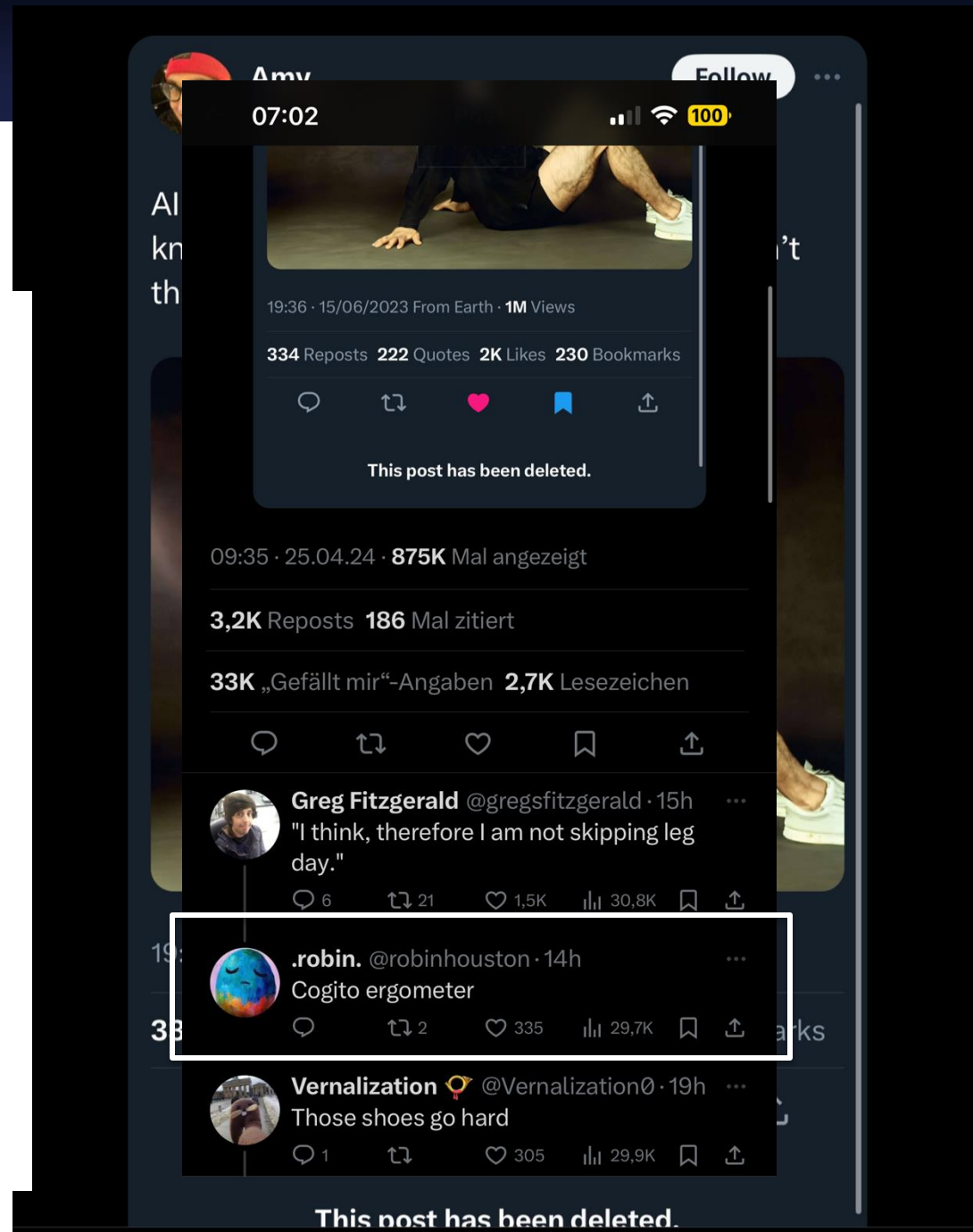


AI & Creativity



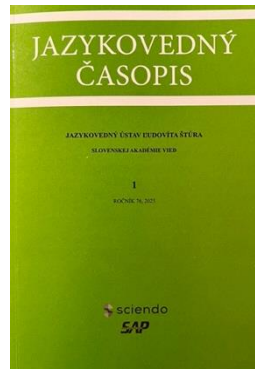
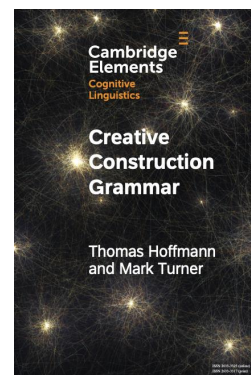
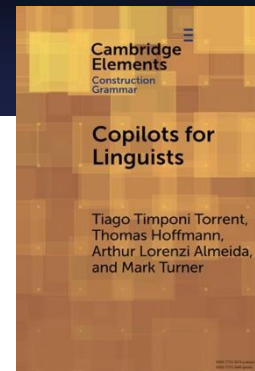
AI & Creativity

- **AI used coverage**
- *Cogito ergometer*:
creative construct
creative human creator
- **AI output can be creative**
- **AI ≠ creative creator**
AI = productive
(no neurotransmitter
= no emotions)
- **creativity requires**
appropriateness
(which AI only models
implicitly through
coverage)



Conclusion

- 5C model as framework for CxG & creativity
- constructors:
experiments to detect inter-individual differences
corpus data as proxy of coverage
- co-constructors: context in corpus data important
- creative constructors: humans vs LLMs
humans: abstract cxns | intention reading | situated communicative interactions
LLMs: no emotional appropriateness assessment | no embodiment | no blending
- corpus linguistics still very important in age of LLMs!





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The end?

**Thank you very much
for your attention –**

**I look very much forward
to your questions!**

