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October 9-10, 2025

# Book of Abstracts

**Konstanz Linguistics Conference 2025**

KLC2025 Organising Committee

## KLC 2025 Programme

<b>Timeline</b>	<b>Day 1</b>	
8:30-9:00	Registration	
9:00-9:10	Opening remarks	
9:10-10:10	<p style="text-align: center;"><b>Keynote 1 – Linda Drijvers</b>            Towards a neurobiology of multimodal language            Chair: Alec Gallo  <b>E404</b></p>	
10:10-10:40	Coffee break	
	Syntax I Chair: Deniz Özyıldız <b>E402</b>	Psycholinguistics/Neurolinguistics Chair: Scott Kunkel <b>E404</b>
10:40-11:05	<b>Miriam L. Schiele</b> Semantic and syntactic constraints on ellipsis: Experimental evidence from German sluices	<b>Li Klooststra, Rick Nouwen, Jakub Dotlačil</b> Memory retrieval in discourse with ‘again’: Eye-tracking and acceptability studies
11:05-11:30	<b>Aikaterini Thomopoulou</b> Aspectual predicates and ‘quirky’ coordination in Greek	<b>Marian Simarro Gonzalez, Alec Gallo, Matthew H. Davis</b> Hearing What You Expect? Prior Use in Speech Perception – a pilot study
11:30-11:55	<b>Antonina Mocniak</b> On complementizer doubling in Polish	<b>Philine Link, Leendert van Maanen, Jakub Dotlačil</b> Similarity comes at a cost: Novel evidence for associative memory retrieval
11:55-12:20	<b>Marzia Bencivenga</b> The grammaticalization of estar and stare in adjectival predication: A comparative study of Catalan and	<b>Chiara Bernini, Anna Czypionka, Maria Vender</b> Human learning of Lindenmayer Systems: A traditional AGL paradigm applied to non-canonical grammars

	Neapolitan	
12:20-13:20	Lunch	
	Semantics/Pragmatics Chair: Lukas Beiske <i>E402</i>	Phonetics/Phonology/Prosody I Chair: Tianyi Zhao <i>E404</i>
13:20-13:45	<b>Charles Ononiwu</b> Power, politics, and active citizenship: A multimodal analysis of political cartoons from Nigeria's and Finland's 2023 elections	<b>Alec Gallo</b> Acoustic description of vowel systems in older native speakers of Canavesano Piedmontese
13:45-14:10	<b>Sandro Dal Cero</b> On the meaning of absolute comparatives in German	<b>Andre Batchelder-Schwab</b> Consonant duration as sonorance in whistled kinande: Consequences for glottals
14:10-14:35	<b>Mengxi Jia</b> Beyond truth-conditions: Rethinking semantic structure through quantum contextuality	<b>Theresa Abele</b> Voiceless oral stops in speech and song of Californian thrash-influenced metal artists at the turn of the millennium
14:35-15:05	Coffee break	
	Phonetics/Phonology/Prosody II Chair: Marieke Einfeldt <i>E 402</i>	
15:05-15:30	<b>Olawale Akingbade</b> Tone behavior of Oloma noun phrase	
15:30-15:55	<b>Davide de Martino</b> Orthographic influence in second language vowel production: the case of Italian learners of German	

16:00-17:00	<b>Keynote 2 – Eleanor Chodroff</b> Advancing phonetic typology with massively multilingual speech corpora Chair: Tamara Rathcke <i>E404</i>
18:30	Conference dinner <i>Constanzer Wirthaus</i>

Timeline	Day 2
9:00-10:00	<b>Keynote 3 – Nadine Bade</b> Methods Matter: Experimental Perspectives on the Derivation of Implicatures Chair: Leah Doroski <i>E404</i>
10:00-11:30	Coffee break + <b>Poster session</b> <i>E4</i> <b>Dániel Arató</b> “Phantom blocking” versus the function model of acceptability <b>Huaizhe Yang</b> Refinements of the hierarchy of Chinese sentence-final particle projections <b>Ivana Bogdanović</b> Toward linguistic subjectivity in low-coherence (transmedial) texts <b>Marie Christin Walch</b> Influence of speaker ignorance under uncertainty on the interpretation of bare numerals

	<b>Yining Yan</b> Affective responses to political speeches: Evidence from pupillometry and self-assessment in Chinese-English bilinguals	
	Syntax II Chair: George Walkden <i>E 402</i>	Semantics II/Computational linguistics Chair: Regine Eckardt <i>E404</i>
11:30-11:55	<b>Gabriel Malheiros Teodoro</b> Beyond preposition stranding: exploring orphan prepositions in Brazilian Portuguese	<b>Moshe Bar-Lev, Itai Bassi, Tue Trinh</b> The set of alternatives must be a good question
11:55-12:20		<b>R Karthick Narayanan, Siddharth Singh, Saurabh Singh, Aryan Mathur, Ritesh Kumar, Shyam Ratan, Bornini Lahiri, Benu Pareek, Neerav Mathur, Amalesh Gope, Meiraba Takhellambam, Yogesh Dawer</b> Introducing MATra-Lab: Collaborative AI-powered processing of multimodal language data
12:20-13:20	Lunch	
	Language acquisition Chair: Chingiz Poletaev <i>E402</i>	
13:20-13:45	<b>Rajamathangi Shanmugasundaram</b> Negotiating identity and language maintenance: Intergenerational language shift in Swiss Tamil communities	
13:45-14:10	<b>Yulia Zuban, Franziska Baumeister, Pauline Wolfer, Stephanie Durrleman</b> Comprehension of passive voice in German and French-	

	speaking children with autism spectrum disorder (ASD): no negative effects of bilingualism	
14:10-14:40		Coffee break
14:40-15:40	<p style="text-align: center;"><b>Keynote 4 – Simon Wehrle</b></p> <p style="text-align: center;">Individual variability and the natural habitat of language: Insights from autism and non-native speech</p> <p style="text-align: center;">Chair: Massimiliano Canzi</p> <p style="text-align: center;"><i>E404</i></p>	

## Towards a neurobiology of multimodal language

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Face-to-face communication involves auditory signals, such as speech, and visual signals, such as visual speech and hand gestures. Despite the abundance of visual expressions in language, most models and theories on the neurobiology of language are based on characteristics of (clear) speech and text, and they rarely consider multimodal signals. In this talk, I will argue that we need a multimodal view on the neurobiology of language, and that these visual signals are often taken on board immediately by listeners in creating and shaping an interpretation of the linguistic input. This talk will center around the question of how we, as language users, integrate auditory and visual signals into a coherent message, how this is orchestrated within and between brains, and how we do this in both clear and adverse listening conditions.

## **Advancing phonetic typology with massively multilingual speech corpora**

*Eleanor Chodroff*

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The phonetic realization of speech sounds varies considerably across individuals, dialects, and languages. This variation extends beyond simple anatomical or biomechanical explanations, revealing additional influences from social, cognitive, and historical influences on phonetic realization. Two foundational constraints — uniformity and distinctiveness — may structure this variation within the phonological inventory; however, their consistent role across languages has been relatively under-investigated. Only in the past few years has crosslinguistic investigation of crosslinguistic phonetic variation and systematicity become feasible with dramatic increases in computational power, storage, and the availability of “massively multilingual speech corpora”. In this talk, I present recent developments in the creation of large-scale crosslinguistic phonetic corpora and the theoretical insights these resources enable. I then highlight findings on systematic crosslinguistic speech patterns such as intrinsic vowel f0 and intrinsic vowel duration, and discuss these in light of uniformity and distinctiveness.

**Methods Matter:  
Experimental Perspectives on the Derivation of Implicatures**

*Nadine Bade*

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Experimental research on implicature has shown striking variability across paradigms and tasks, especially regarding whether pragmatic strengthening is observed at all, and to what degree. Building on studies that use priming, training, and truth value judgment tasks, this talk examines the derivation of implicatures with simple and complex disjunctions as well as so-called ad hoc implicatures. I compare a new training paradigm to more established methods, showing that task demands and baseline assumptions crucially shape the outcomes: while some tasks reliably elicit implicatures, others make them virtually disappear. I further argue that disjunction and ad hoc implicatures are affected differently across tasks, and that the format of experimental input, whether linguistic or visual, exerts additional influence on how implicatures are derived. I discuss theoretical and methodological consequences, including the possibility of integrating experimental paradigms themselves into probabilistic models of pragmatic reasoning.

## **Individual variability and the natural habitat of language: Insights from autism and non-native speech**

Simon Wehrle

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Conversational interaction—the dynamic exchange of spontaneous utterances—is the natural habitat of language, and it lies at the heart of language use, learning, and evolution. Nevertheless, much of linguistic science has failed to do justice to this fact by depending on monologic or highly controlled speech. This is true also of most research on communication in autism, even though differences in social interaction are the defining characteristic of autism. Similarly, assessment and research of non-native speech have largely relegated interactional skills to the background.

I will present results from three corpora of conversational interaction that were collected to address these gaps. The main focus lies on autistic vs. non-autistic speaker pairs, complemented by parallel research on (non-)native speakers of German. The key phenomena of interest are turn-timing (speaker transitions), backchannels (listener feedback), and hesitations (filled/silent pauses).

Our analyses reveal robust group differences, but also substantial within-group heterogeneity. While such variability is to be expected, most relevant studies fail to account for individual-specific behaviour. This reflects common practice in linguistics, where human diversity tends to be downplayed if not downright overlooked.

I suggest that embracing individual specificity and acknowledging the primacy of conversational speech can lead us towards a holistic, inclusive model of communicative interaction centred on cognitive as well as cultural diversity.

## Voiceless Oral Stops in Speech and Song of Californian Thrash-Influenced Metal Artists at the Turn of the Millennium

Theresa Abele

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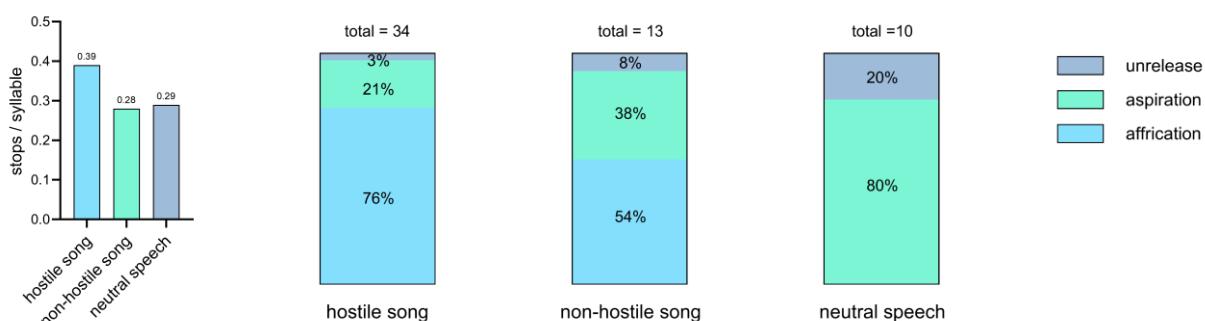
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Previous research in the area of sociophonetics has shown that a speaker's emotional state affects the way speech is articulated, which is subsequently mirrored in changes of the acoustic signal (Banse & Scherer 1996). Specifically in genres of staged speech, some of these modifications may be employed deliberately as means of stylistic expression (Bell & Gibson 2011). This becomes especially relevant in highly affectual contexts like song (Hakanpää, Waaramaa & Laukkanen 2023). Despite extensive analysis of both short-term and long-term features in such environments, gaps remain with regard to voiceless oral stops in particular, as their articulation is arguably too restricted to allow meaningful phonetic marking (Lee et al. 2004; Morrissey 2008). The categorical disregard of voiceless plosives, however, stands in opposition to their importance in the English sound system and the variety of alternations they offer.

The present study investigates the direction this conflicting evidence takes in a genre of singing typically characterized by a strong hostile affect, namely *Californian Thrash-influenced Metal at the turn of the millennium*. Its objective is to determine whether voiceless plosives used in this environment differ from other emotional contexts with regard to their relative frequency in the text and their concrete phonetic realization, so that potential stylistic-affectual marking on the phonosemantic and phonetic level may be identified.

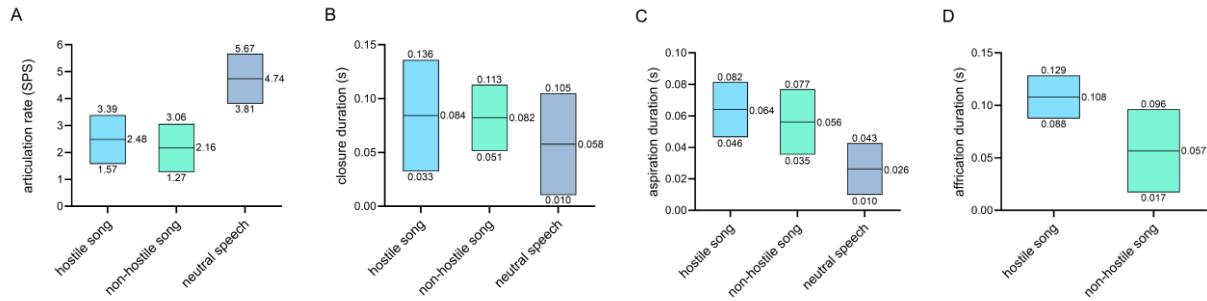
An exemplary analysis of voiceless plosives was performed across the three contexts *hostile song*, *non-hostile song*, and *neutral speech*, each represented by selected audio material from three different performers of the genre. The classification of the songs' affective expression was based on thematic and contentual properties. In a two-part evaluation, the voiceless-stops-to-syllable-ratio, collapsed for all places of articulation, was calculated first. The second part of the study then consisted of an audio-perceptual analysis supported by spectral properties of the velar stop /k/ in the especially variable and marked coda position, regarding release type and duration, as well as closure duration. The average articulation rate per context was additionally ascertained to put these measurements into perspective.

The study yielded a higher relative frequency of voiceless oral stops in hostile song than in other contexts (see Figure 1). The measurements also indicate increased proportions of affricated release of coda /k/ in both types of singing compared to neutral speech (see Figure 2), with a significantly longer mean duration in hostile song than in non-hostile song (see Figure 3D). However, closure and aspiration durations do not differ to a significant extent between contexts, despite varying articulation rates (see Figure 3A, B and C).



**Figure 1** Stops-to-syllable ratios per context.

**Figure 2** Proportions of aspiration, unrelease, and affrication of coda /k/ tokens per context. Total number of tokens indicated above.



**Figure 3** Predicted means and ranges of articulation rate (A), closure duration (B), aspiration duration (C), and affrication duration (D) of coda /k/ tokens per context. Indicated are mean, minimum, and maximum values for all datasets. Neutral speech not included in (D) due to a lack of affrication.

The increased relative frequency of voiceless plosives in hostile contexts suggests a certain degree of deliberate and potentially phonosemantically motivated usage related to the emotion being expressed. This is further confounded by frequent and salient additional marking via affrication, which may be connected to typical phonetic features of anger, such as flatter spectra and higher intensity (Banse & Scherer 1996). Considering the increased affrication rate of coda /k/ in *non-hostile song*, however, observations may also be traced back to singing as a mode of articulation, for example as a means to improve intelligibility for the listener (cf. Vurma et al. 2023) or singability for the performer (cf. Morrissey 2008; Niebuhr 2012).

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## Tone Behavior of Oloma Noun Phrase

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This study investigates the tone behavior of noun phrases in Oloma [ólòmà], a Northwestern Edoid language. While previous research has addressed nouns, agreement, and phonology in Oloma (Elugbe & Schubert, 1976; Schaefer & Egbokhare, 2016; Ajani, 2023), the tone behavior of Oloma noun phrases remain understudied. Furthermore, Across African tone languages, recent work has highlighted the interpretive role of tone in structuring the relationship between nouns and modifiers (e.g., McPherson & Heath, 2016 on Dogon; Rolle & Kari, 2022 on Degema; Hyman & Katamba, 2023 on Luganda). This paper addresses this gap by analyzing how tone functions within Oloma noun phrases.

The data for this study were elicited from three native Oloma speakers (one female, two male) during fieldwork conducted in 2024. I developed a noun phrase paradigm comprising 42 nouns from various semantic domains and syllable structures, 16 adjectives selected according to Dixon's (2004) criteria, as well as determiners and numerals. All words were first recorded in isolation to establish their underlying tonal patterns, then combined at three levels to form simple and complex noun phrases. Each phrase was produced twice by all speakers to assess accuracy and variation.

The results show that Oloma noun phrases exhibit a phrasal HL (High-Low) tonal melody, resulting in obligatory spreading of H and consistent lowering of the final tone within noun phrases (1a-c). Exceptions arise in simple noun phrases consisting of a noun followed by a cardinal numeral or quantifier, where the canonical HL pattern does not apply as illustrated in (2a-b). However, in complex noun phrases with multiple modifiers as illustrated in (3), the HL pattern reasserts itself regardless of the noun's position, indicating that tonal changes are determined at the phrasal rather than the lexical level. When the final tone of a noun phrase is high, it undergoes downstep. The distinct tonal behavior of noun-cardinal numeral combinations - as opposed to noun-determiner or noun-adjective combinations- suggests that cardinals do not integrate phonologically with nouns in the same way as other modifiers, corroborating findings in related languages (cf. Hyman and Katamba, 2023).

- 1(a) ó-ní ó-fí /HL/ + /HL/ → [HHHL]  
AGR-DEF SG-rat  
'the rat'
- (b) gí-zíú gó-nò /HLL/ + /HL/ → [HHHL]  
SG-goat AGR-DEF  
'this goat'
- (c) é-fí é-nókízé /HL/ + /HHHL/ → [HHHHHL]  
PL-rat AGR-black  
'black rats'
- 2(a) é-fí éní /HL/ + /HL/ → [HLHL]  
PL-rat four  
'four rats'
- (b) í-zìù ígbé /HLL + HH/ → [HLLHH]  
PL-goat ten  
'ten goats'
- 3 é-ní é-fí é-nókízé  
AGR-DET PL-rat AGR-black  
'the black rats'

I propose that the presence of a phrasal HL melody governing tone alternations in Oloma noun phrases constitutes phonological evidence for intonational structure in this two-tone language. This analysis contributes to ongoing studies on the interaction between tone and intonation in African languages.

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## “Phantom blocking” versus the function model of acceptability

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For any natural language  $L$ , it is common and natural to conceive of acceptability or grammaticality judgements as a mapping  $j$  from the set  $L^*$  (the Kleene closure of  $L$ 's terminals) to the range  $[0, 1]$ . But it is just as well known that this idealized model of the operation of linguistic processing quickly turns out to be overly simplistic for a number of reasons.

Actual acceptability judgements will often depend on context, on the social situation in which the communicative act happens, on the idiolect of the speaker themselves, and sometimes even time (within the usage of the same speaker). Inconveniently enough, the outputs yielded by  $j$  may also prove to be non-deterministic for certain inputs, meaning that the arguments do not fully determine the output value, and the same exact list of arguments might lead to a variety of different judgements.

On the other hand, none of these complications necessarily represent an incurable problem for the “function” view. After all, one could conceivably add context, situation, the identity of the speaker and even the time of judgement to the list of  $j$ 's arguments — and also say it's actually a stochastic function instead of a regular one. However, this concept of a plain mapping from a multidimensional domain to a scalar acceptability value is stretched thinner still when we consider sentences like (1a) and the reasons behind their apparent oddity.

(1a) *This house was built.*

(1b) *This house was built in 1995.*

(1a) exemplifies a type of sentence that *should* be perfectly acceptable on paper according to our intuitive notion of syntax, yet for some unexpected and perhaps non-grammatical reason turns out to be less than fully acceptable. Some sources call these “unacceptable grammatical sentences”. In fact, (1a) might be related to another type of “unacceptable grammatical” input such as (2), commonly known as garden-path sentences:

(2) *The old man the boat.* (i.e. ‘The old people operate the boat.’)

Like the latter example, (1a) should “technically” be acceptable, yet it is robustly deemed less acceptable than something like the undoubtedly acceptable (1b) and its ilk. But why should it not be completely acceptable at all?

Attempted explanations of this finding invoke semantic and pragmatic factors. In fact, such factors may be minor contributors, or indirect causes at best. The direct cause, we claim, lies with the way (1a)'s on-line processing unfolds: the decreased acceptability is due to the mere existence and relative prevalence of similar sentences like (1b), which create a reasonable predictive expectation in the hearer as to the structure of the full sentence, and thereby derail the processing of the (otherwise seemingly grammatical) input. For lack of an established term, we might choose to tentatively refer to this effect as “phantom blocking” for now. Regular blocking as understood in the literature is the phenomenon whereby certain linguistic forms are avoided in favor of well-established equivalents, e.g. *\*stealer* is blocked by *thief* and *\*roter Wein* is blocked by *Rotwein*. While regular blocking involves a canonically acceptable alternative though, phantom blocking significantly degrades the acceptability of the original form and does *not* provide a common, semantically equivalent form. Our central claim then is that the altered acceptability of (1a) is chiefly caused by phantom blocking:

(H) The lower than expected acceptability of sentences like (1a) is caused by the influence of other, lexically and structurally similar sentences in the language, which derails the processing of the sentence.

(H) is motivated by the assumption that the characteristic confusing and eerie effect that (1a) tends to evoke in listeners is the consequence of the same internal processing mechanics as the effect created by (2): the establishment of a reasonable expectation early on as to where the rest of the input is headed, and a striking violation thereof. This expectation is created by a rival sentence pattern ingrained in the listener's competence. Like garden-path sentences, (1a) seems to produce a definite sense of where it is going during the early stages of online processing, only to contradict it later on. Except while (2) keeps going after the expectation is established, (1a) just finishes earlier than expected. In this sense, (H) regards (1a) as a special case of a garden-path sentence.

While the current presentation does not include experimental work, the hypothesis is conveniently exposed to practical falsification by means of measuring ERP reactions to this kind of input. In psycholinguistics, sentences that parse correctly but involve unexpected semantic or lexical content famously tend to produce the N400 deflection, while sentences that fail to parse syntactically tend to be associated with the P600 shift. (H) predicts a perception of *syntactic* incongruence when (1a) is heard, and consequently a P600 ERP effect. If no P600 is observed, (H) will be falsified.

On the theoretical side, the degraded acceptability of such sentences may mean that a linguistic form may be less than fully acceptable for reasons that are completely extrinsic to its own form and content, i.e. through no fault of its own. This may be taken as a hint that *j* is not a function in the traditional sense after all. Instead, our linguistic competence seems to produce its (sometimes certain, sometimes gradual, sometimes fickle) judgements through the interaction of more than one internal factor or process. Like circular orbits in classical mechanics or an infinite speed of light, the old-school function model of *j* is a didactically useful, accessible and intuitive abstraction for how grammar supposedly works. In the actual study of how linguistic input is processed and judged by actual speakers though, this kind of intuitive simplification may actually hinder the accurate modeling of grammar and thereby our understanding of how grammatical competence ultimately works in humans.

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## The set of alternatives must be a good question

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**Background.** The ‘symmetry problem’ (Kroch 1972) is illustrated by the observation that the strengthened (i.e., exhaustified) meaning of (1) is ‘(1)  $\wedge \neg(1a)$ ’ (‘some but not all students smoked’), not ‘(1)  $\wedge \neg(1b)$ ’ (‘all students smoked’), although (1a) is relevant iff (1b) is relevant on standard views of relevance (Lewis 1988) and both entail (1).

- (1) Some players smiled
- All players smiled
  - Not all players smiled

Katzir (2007) and Fox and Katzir (2011) proposed a theory of alternative generation that avoids this problem.

- (2) COMPLEXITY
- The set of formal alternatives F of S is the set of simple alternatives of S.
  - A is a simple alternative of S iff A is derivable from S by successive deletion or lexical substitution.

Assuming that the input to exhaustification is some subset of the set of formal alternatives F of a sentence, a consequence of COMPLEXITY is that exhaustification cannot result in the negation of more complex alternatives.

- (3) Consequence of COMPLEXITY
- S can mean ‘S  $\wedge \neg A$ ’ only if there is a simple alternative B such that A  $\equiv$  B.

Schwarz and Wagner (2024) recently argued for an alternative solution for the symmetry problem that blocks an exhaustified meaning if it ends up equivalent to a simple alternative. We call it BLOCKING:

- (4) BLOCKING (Schwarz and Wagner 2024)
- S can mean ‘S  $\wedge \neg A$ ’ only if S has no simple alternative B such that B  $\equiv$  S  $\wedge \neg A$ .

Both COMPLEXITY and BLOCKING rely on the difference in structural complexity between (1a) and (1b), but they solve the symmetry problem differently. For COMPLEXITY, some cannot mean ‘some  $\wedge \neg$  not all’ because there is no simple alternative which is equivalent to not all, and consequently not all is not in F to begin with. For BLOCKING, some cannot mean ‘some  $\wedge \neg$  not all’ because there is a simple alternative, all, which is equivalent to some  $\wedge \neg$  not all.

The simplex threats problem. Schwarz and Wagner (2024) present an argument for BLOCKING over COMPLEXITY based on what they call ‘simplex threats’: cases where symmetry is broken even though the alternatives are all simple.

- (5) Some students are inside.
- All students are inside.
  - Some students are outside.

Intuitively (5) can mean ‘(5)  $\wedge \neg (5a)$ ’ (‘some but not all students are inside’) but not ‘(5)  $\wedge \neg (5b)$ ’ (‘all students are inside’). This is not immediately explained by COMPLEXITY, as both alternatives are as

simple as the prejacent; but it is explained by BLOCKING: The first reading is possible because it's not equivalent to any simple alternative of (5), but the second reading is equivalent to (5a) which is a simple alternative of (5), and is hence ruled out.

**A problem for BLOCKING.** Schmitt and Haslinger (2025) point out that BLOCKING fails to account for the observed interpretation in cases where both symmetric alternatives are logically independent from the sentence. For example, in a context where we care about the question Who among John and Mary came?, (6) can mean '(6)  $\wedge \neg(6a)$ ' ('John but not Mary came') but not '(6)  $\wedge \neg(6b)$ ' ('John and Mary came').

- (6) John came.
  - a. Mary came
  - b. Mary did not come

There is no simple alternative of (6) which is equivalent to (6)  $\wedge \neg(6b)$ . Thus, BLOCKING does not rule out '(6)  $\wedge \neg(6b)$ ' as a reading of (6) (see also Cremers et al. 2023 for discussion of the same problem, which they call 'anti-exhaustivity', for other accounts which do not assume COMPLEXITY). COMPLEXITY, on the other hand, does rule out '(6)  $\wedge \neg(6b)$ ' as a reading of (6), because there is no simple alternative of (6) that is equivalent to (6b). The fact that symmetry can only be broken in favor of the simple alternative in such cases as (6) shows that COMPLEXITY is still needed. One now may wonder whether the conclusion should be that we need both COMPLEXITY (for (6)) and BLOCKING (for simplex threats). Our goal: we will argue that COMPLEXITY suffices and can account for simplex threats once it is combined with a novel requirement on alternative sets resulting in a partition once exhaustified (following Fox 2019, 2020) and a ban on alternatives being contextually equivalent (Magri 2009).

**Weak PbE.** We will, following many, symbolize the exhaustification of sentence S with respect to a set of alternatives Q as  $\text{exh}(Q)(S)$ , where we remain agnostic as to whether  $\text{exh}$  has syntactic reality or is a mnemonic device representing some post-syntactic (i.e. 'pragmatic') process. Fox (2019, 2020) argues based on considerations that have to do with the semantics of questions that a question should partition the context set once exhaustification is applied to each member of the question. This requirement is called Partition by Exhaustification (PbE). Let ' $E_Q$ ' be defined as  $\{\text{exh}(Q)(p) \mid p \in Q\}$ . PbE can then be stated as the felicity constraint on Q that says  $E_Q$  must result in a partition of C (a partition of a set C is a set of non-empty subsets (cells) of C that do not overlap with one another and whose union equals C). Now, since the set of alternatives for implicature computation can also be identified with a question, it is perhaps natural to expect a similar requirement to be made from the domain of exhaustification in implicature computation, and this idea has indeed been argued to have desired consequences for implicature computation (see also Bar-Lev and Fox 2023, Enguehard 2023). However, the requirement for partitioning the full context set would be too strong in the case of a question serving as the set of alternatives for implicature calculation; such a requirement would predict that a sentence like some students came, enriched with an implicature based on the set of alternatives  $Q = \{\text{some students came}, \text{all students came}\}$ , would force the context set to entail the prejacent, i.e. it would force the context to entail that some students came. That would mean that an utterance of *some students came*, enriched with an implicature based on the set Q, would presuppose that some students came, which doesn't seem right. We therefore propose a weaker version of PbE as a requirement on implicature calculation, called Weak PbE (WPbE).

- (7) Weak Partition by Exhaustification (WPbE) for implicature computation:  
 $\text{exh}(Q)(S)$  is acceptable given a context set C only if  $E_Q$  is a partition of  $C \cap \cup Q$  ( $E_Q$  defined as above).

WPbE differs from PbE only in that it does not require  $E_Q$  to be a partition of the whole context set  $C$ , but rather only of the intersection of  $C$  with the set of worlds that are in some member of  $Q$ , that is,  $\cup Q$  (see also Enguehard 2023: fn. 23 for a similar suggestion). Since  $C \cap \cup Q$  is a subset of  $C$ , the requirement that  $E_Q$  partition the former rather than the latter allows e.g. *some students came* to be exhaustified against  $Q = \{\text{some students came}, \text{all students came}\}$  without presupposing that some students came.

**Solving simplex threats.** With WPbE, we can revisit what should happen in the case of (5), assuming COMPLEXITY. First, consider the full set of formal alternatives  $F$  which COMPLEXITY would expect the sentence in (5) to have:

$$(8) \quad F = \{\text{some inside}, \text{all inside}, \text{some outside}, \text{all outside}\}$$

$F$  cannot be the question used for implicature computation, because if  $Q = F$  then WPbE is not satisfied:  $E_Q = F$  would not result in a partition (no matter the  $C$ ) because  $\text{exh}(Q)(\text{some inside})$  would overlap with both  $\text{exh}(Q)(\text{all inside})$  and  $\text{exh}(Q)(\text{some outside})$ , and overlap just means that  $E_Q = F$  is not a partition (this assumes a contradiction-sensitive  $\text{exh}$  as in Fox 2007, but also a contradiction-insensitive version would not produce a partition). The actual  $Q$  would then have to be some subset of  $F$  in order for WPbE to stand a chance of being satisfied. Let us consider two options: One which would make some inside, when exhaustified, mean 'some inside  $\wedge \neg$  all inside', in (9a), and one which would make some inside, when exhaustified, mean all inside, in (9b):

- $$(9) \quad \begin{aligned} \text{a.} \quad Q1 &= \{\text{some inside}, \text{all inside}\} \\ \text{b.} \quad Q2 &= \{\text{some inside}, \text{some outside}\} \end{aligned}$$

To see how these questions fare with respect to WPbE we need to look at what  $E_Q$  looks like for both of them:

- $$(10) \quad \begin{aligned} \text{a.} \quad E_{Q1} &= \{\text{exh}(Q1)(\text{some inside}), \text{exh}(Q1)(\text{all inside})\} \\ &= \{\text{some inside} \wedge \neg \text{all inside}, \text{all inside}\} \\ \text{b.} \quad E_{Q2} &= \{\text{exh}(Q2)(\text{some inside}), \text{exh}(Q2)(\text{some outside})\} = \\ &= \{\text{some inside} \wedge \neg \text{some outside}, \text{some outside} \wedge \neg \text{some inside}\} \\ &= \{\text{all inside}, \text{all outside}\} \end{aligned}$$

$E_{Q1}$  will result in a partition of  $C \cap \cup Q_1$  as long as  $C$  contained worlds where each of the members of  $E_{Q1}$  is true. The case of  $E_{Q2}$  is different: note that  $\cup Q_2$  contains worlds where some but not all are inside, but those worlds are not in any member of  $E_{Q2}$ . So in order for  $E_{Q2}$  to result in a partition of  $C \cap \cup Q_1$ ,  $C$  would have to have no such worlds. In other words, WPbE could only be satisfied here if there is a 'homogeneity presupposition', namely if  $C$  entails '*all inside*  $\vee$  *all outside*'. However, if  $C$  entails homogeneity (i.e., if  $Q_2$  is fine as far as WPbE is concerned), then *some inside* ends up contextually equivalent to *all inside*. Crucially, it is known independently since Magri (2009) that a sentence with *some* is odd whenever it is contextually equivalent to its *all* alternative, as in (11):

- $$(11) \quad \#\text{Some Italians come from a warm country.}$$

- $$(12) \quad \begin{aligned} \text{Fatal Competition (Bar-Lev and Fox 2023, based on Magri 2009):} \\ \text{A sentence } S \text{ is unacceptable in a context } C \text{ whenever } S \text{ has a formal alternative which is} \\ \text{logically stronger but contextually equivalent to } S \text{ given } C. \end{aligned}$$

Given WPbE and Fatal Competition, *some inside* can be exhaustified with respect to  $Q_1$  (if the context does not entail homogeneity), but it cannot be exhaustified with respect to  $Q_2$ : If  $C$  does not entail homogeneity, WPbE isn't satisfied, as we have seen; and if  $C$  does entail homogeneity, then the sentence would be ruled out due to Fatal Competition; either way,  $\text{exh}(Q_2)(\text{some inside})$  would be ruled out.

Nothing similar happens with Q1: The WPbE requirement can be met without making any formal alternative equivalent to some inside. This concludes our proposal: symmetry breaking with simplex threats can be derived from COMPLEXITY when taken together with WPbE and Fatal Competition. In the talk, we will present a further prediction teasing apart COMPLEXITY from BLOCKING.

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## Consonant Duration as Sonorance in Whistled Kinande: Consequences for Glottals

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This paper presents an analysis of the segmental inventory of whistled Kinande (Haddow 1952; Batchelder-Schwab 2024). The contrastive whistled inventory consists of a subset of those found in the spoken counterpart. The consonants are predominantly encoded by varying the length of pauses between the whistled vocalic pulses, as predicted for whistled surrogates based on lexically-tonal languages (Rialland 2005; Meyer 2015). Although place of articulation does not seem to be encoded into whistled Kinande (c.f. whistled Spanish and Turkish), the register maintains distinctions in consonantal manner of articulation as of Hmong and Moba (Rialland 2005; Meyer 2015). Encoding consonant manner generally follows the sonority hierarchy (Clements 1990), where more sonorous consonant classes are linked to shorter intervocalic pauses in whistled Kinande. The phonemic /h/ of Kinande, which frequently has no consonantal pause in the whistled surrogate, patterns with liquids /l r j/.

A production experiment was run with twelve L1-Kinande speakers between the ages of 18 and 28. The experiment design employs a frame sentence to test 101 lexical items in randomized order to test the phonemic inventory of spoken and whistled Kinande through minimal pairs. The experiment was then repeated in the spoken modality with each participant to maintain comparability with the spoken language (Barnes et al. 2023). The consonant tokens were measured in Praat by measuring the pauses, and coding the target consonant phoneme (Mutaka 2007; 2011) for voicing, manner, and place. After cleaning the data for pauses and false starts, the total number of consonant tokens in this dataset is 3465. The data was normalized in RStudio for each experiment run, resulting in a speaker-specific and modality-specific comparison. A series of mixed effects models was run on normalized pitch (F0), duration, and intensity measurements. Random effects include participant and word; fixed effects are modality and phoneme.

The results for the whistled surrogate of Kinande show that the length significantly differs for manner of articulation (Figure 1). While speaking shows finer-grained distinctions between consonant classes, whistled Kinande groups consonants into two duration categories, where stop consonants, nasal consonants, and fricatives pattern in one group as longer intervocalic pauses, while liquids, glides, and the glottal /h/ pattern with shorter intervocalic pauses ( $p < .01$ ).

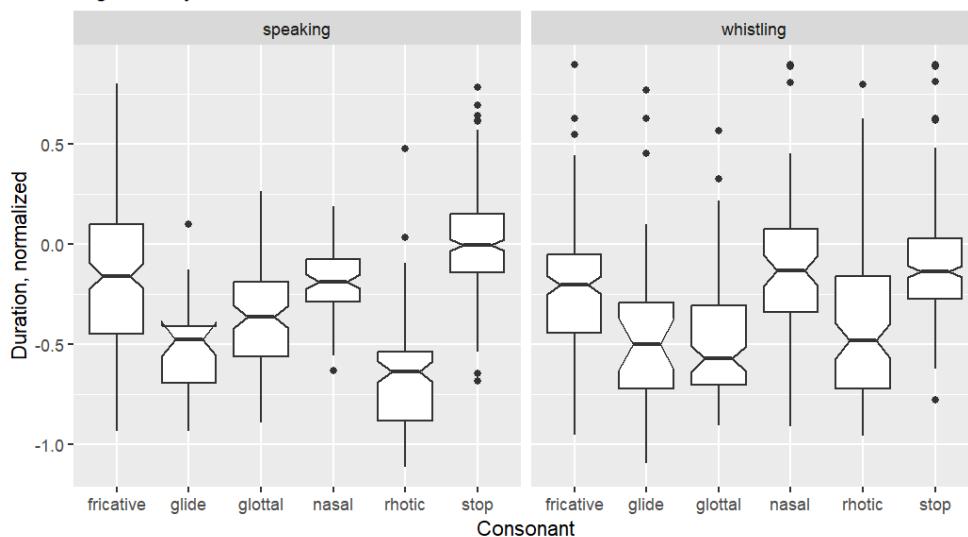
This two-way distinction in consonant duration demonstrates that the Kinande glottal fricative patterns phonologically with glides /w j/ and liquids /r l/, in a class opposite to obstruents. Voiced obstruents like nasal stops and /b d g/ pattern identically to voiceless obstruents; intensity reflects a distribution that is virtually identical to duration, with glottals and glides being the loudest (most whistled), and obstruents being the softest (silent).

This paper argues that consonant duration in whistled Kinande is a reflex of sonorance, as has been noted elsewhere in whistled language literature (Meyer et al. 2015). Thus, /h/ patterns as sonorous in Kinande. In the larger debate about glottal sonorance (Parker 2002), such evidence supports theorizing the glottal fricative as more sonorant than nasal stop consonants within the context of Kinande phonology [Parker 2002; Chomsky & Halle 1968; Pike 1951; c.f. Levin 1985; Ladefoged 1971; Durand 1987]. As scalar sonority is reflected through length of intervocalic pause in whistled Kinande, then a lack of pause altogether might be argued to reflect a lack of featural specification of /h/ along this axis (Clements 1990; Brittain 2000). However, such an analysis would have to contend with identical specifications for glides and liquids, typically placed at the top of the sonority hierarchy.

Thus, because whistled Kinande seems to merge /h r l j/ into one phonological class in a sonority-sensitive modality, this paper argues that /h/ must be specified as sonorant in Kinande, and must be more sonorous than nasal stop consonants.

Figure 1: Normalized duration of Kinande consonants

Organized by manner



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## The Grammaticalization of *Estar* and *Stare* in Adjectival Predications: A Comparative Study of Catalan and Neapolitan

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The presence of a copulative system has been described as a hyper-characteristic phenomenon of Ibero-Romance languages; in contrast, Italo-Romance languages are generally considered monocopular. Nevertheless, southern-central varieties show an extended use of *stare* in adjectival predications which remains largely unexplored in the investigations of the Romance copular systems.

This work has two main aims: on one hand, to describe and broadly formalize the copular system of Neapolitan dialect which shows considerable variation in the distribution of *essere* and *stare* adjectives compared to Standard Italian and, on the other, to contrast the tendencies of use of this micro-copular system with the resultative *stare* of Central Catalan in order to explore the degree of grammaticalization of STARE in this dialect in relation to the Romance copular systems.

A comparative-contrastive methodology between Catalan and Neapolitan dialect was used to describe the phenomenon. The starting hypothesis is based on the work of Pérez-Jiménez et al. (2018) who argue that the syntactic status of *estar* in the varieties of Catalan ranges between a bicopular system, – characteristic of Central Catalan and Valencian –, and a system where *estar* is a pseudo-copula with resultative value. The innovative tendencies of Neapolitan correspond to this second pattern.

By analysing the type and semantic classes of the adjectives in the Neapolitan corpus of Ledgeway (2009), we registered some similarities with the innovative uses described for Catalan by Ramos (2002) not only with participles and perfective adjectives, but also with non-perfective adjectives describing physical properties such as weight (nap. *chiatt, rass*; cat. *gros, grand*) and some aesthetics (nap. *bello*; cat. *maco*) which trigger contrastive distinction between IL and SL predicates.

To confirm these findings, we designed an acceptability judgment task using a five-point Likert scale, testing four different acceptability conditions for *stare* with three types of adjectives (non-perfective, perfective and participle) to identify any statistical effects. The questionnaire was administered to two groups of university students: a control group of Standard Italian speakers from Venice and an experimental group of Neapolitan speakers from Naples.

The responses were analysed using a cumulative link mixed effect (CLMM) using *R Studio* to investigate the effects of linguistic variety and the adjective type, as well as the interactions. The results show statistically significant effects for both perfectives and non-perfectives adjectives, leading to the conclusion that Neapolitan, like Central Catalan, reveals the presence of a pseudo-copula *stare*.

### Acknowledgments

The author gratefully acknowledges the financial support provided by a predoctoral grant from the University of Alcalá (E-28-2023-0828728), as well as funding from the project *Epsil2* (Evidentiality, Perspectivization, and Subjectivization in Language Interfaces – II), funded by the Spanish Ministry of Science, Innovation and Universities (Ref. PID2023-148755NB-I00).

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## Human Learning of Lindenmayer Systems: A traditional AGL paradigm applied to non-canonical grammars

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The ability to extract and represent hierarchical structures from a linear input is one of the core traits of human cognition, and it is employed in numerous domains, the most prominent being language processing. Human languages are expressed as linear sequences of basic units, organized according to particular hierarchical rules. Recursion is a specific type of hierarchical operation that embeds one structure into a copy of itself, in a potentially infinite process (Martins, 2012). In natural languages, this phenomenon is extremely frequent, as can be noticed in sentences such as *Mary thinks that John said that Claire is beautiful*. For grammar learning, the interplay between hierarchical structure learning and the mere extraction of statistical regularities, i.e., statistical learning (SL), is still not clear and has proven difficult to demonstrate empirically. SL is the ability to recognize and process patterns of environmental stimuli as they occur over time (Daltrozzo & Conway, 2014). How do humans represent structure from a sequentially presented input? How do they combine statistical and hierarchical information to learn the properties of a set of stimuli? These are some of the core questions at the interface between cognitive psychology, neuroscience, and linguistics. Experimentally, these issues have been investigated by exposing learners to a stream of artificial language input and then assessing their learning using behavioral methods (looking time in infants [Saffran et al., 1996], choice tests, and reaction times in adults), as well as neurophysiological measures (Weiss et al., 2020). However, empirical studies have often produced contrasting evidence.

The present study aims to contribute to this debate by expanding the stream of research on Lindenmayer grammar learning, a subfield of Artificial Grammar Learning (AGL), which is particularly suitable to investigate the interplay between SL and hierarchical representation. Lindenmayer grammars are recursive systems that fall outside the Chomsky hierarchy, which is why they are often referred to as “non-canonical” grammars (Krivochen & Saddy, 2018; Lindenmayer, 1968). By employing a traditional AGL paradigm consisting of a training and a test phase (Reber, 1967), we tested adults’ ability to learn sequences of visual stimuli based on two non-canonical grammars: the Fibonacci grammar (Fib) and one of its modifications called Skip (Vender et al., 2020). Fib and Skip are simple grammars whose alphabets only consist of two symbols, 0 and 1 (in our experiment design, 0 is a red square and 1 is a blue square). The two grammars share the same superficial regularities: in any generation, a 0 is always followed by a 1, and two consecutive 1s are always followed by a 0. However, due to their different generation rules, their hierarchical structure differs as well. Fib is strongly self-similar, meaning that each generation is the concatenation of the two previous generations (Fig. 1), while Skip is not (Schmid et al., 2023). The first aim of our study was to assess whether Fib’s self-similarity allowed subjects to learn it more efficiently than Skip. In addition, we expected a difference to emerge, both within and across grammars, between the two types of ungrammatical sequences presented during the test phase. “First-order violations” are sequences in which the surface transitional probabilities (TPs) between single items are violated, as in the sequences \*00 and \*111. First-order violations are the same in Fib and Skip. “Second-order violations” are sequences that do not violate single-item TPs and whose

ungrammaticality can only be recognized if the learner has gained understanding about the constituent structure of the grammar. For instance, the sequence \*01010 is Fib-ungrammatical, as two consecutive bigrams [01][01] are always followed by a [1].

0	<b>1</b> ( $Fib_0$ )
1	<b>1</b> ( $Fib_1$ )
01	<b>2</b> ( $Fib_2$ )
101	<b>3</b> ( $Fib_3$ )
01101	<b>5</b> ( $Fib_4$ )
10101101	<b>8</b> ( $Fib_5$ )
0110110101101	<b>13</b> ( $Fib_6$ )
101011010110101101	<b>21</b> ( $Fib_7$ )

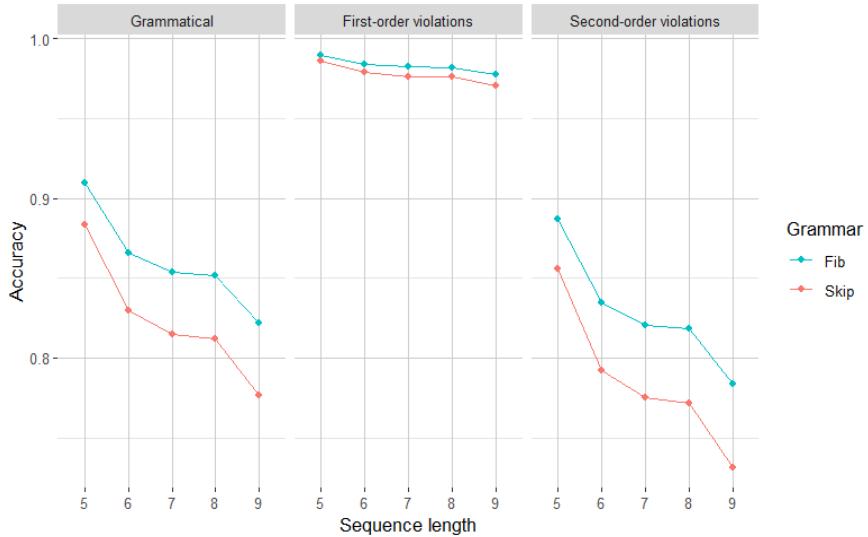
Fibonacci sequence = {1, 1, 2, 3, 5, 8, 13, 21...}

**Fig. 1.** Graphical representation of the first seven generations of the Fibonacci grammar. The numbers on the right indicate the number of symbols that constitute the relative generation. On the top left, the generation rules, to be read as “rewrite 0 as 1” and “rewrite 1 as 01”.

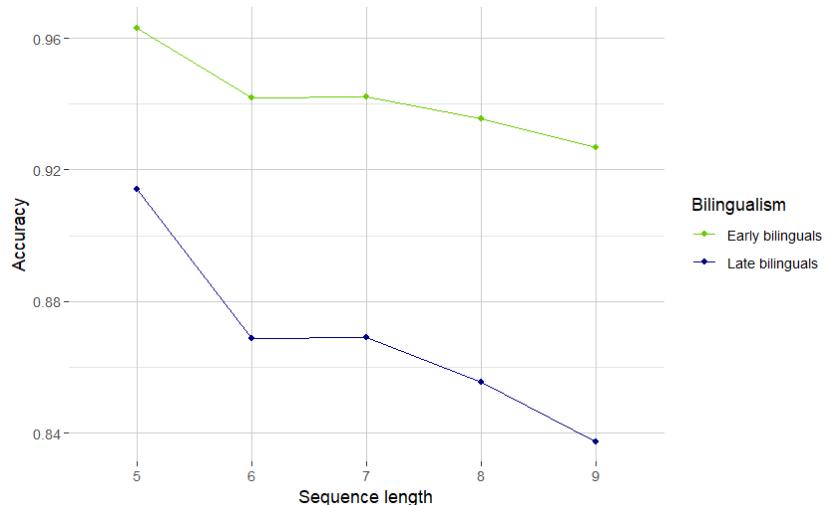
Sixty-six adult participants (mean age 25.2) were tested on a web-based platform. Before the experiment, subjects completed a brief questionnaire assessing their linguistic background. Participants were randomly split into two groups and exposed to either Fib or Skip. After a 15-minute-long training consisting of a long grammatical sequence, participants were presented with 72 grammatical and ungrammatical subsequences ranging from five to nine squares, and had to perform a grammaticality judgment task. Among the ungrammatical sequences, half were first-order violations (e.g., Fib/Skip \*0110111) and half were second-order violations (e.g., Fib \*0101011; Skip \*0110110). Data were analyzed using R (R Core Team, 2024). Binomial tests indicated that participants successfully learned both grammars ( $p < .001$ ), with performance varying depending on sequence length and grammaticality condition, but significantly above chance in all cases. Linear mixed-effects models did not reveal a significant difference between the two grammars ( $p = .327$ ), although we observed a trend in the expected direction, with the Fib group generally being more accurate than the Skip group (Fig. 2). The nearly ceiling accuracy for first-order violations demonstrated that people relied on the cues provided by single-item TPs, suggesting that SL took place. Both groups were significantly more accurate in detecting first-order violations compared to second-order violations ( $p < .001$ ), supporting our hypothesis that second-order violations are more challenging to acquire and indicating that they may engage distinct processing mechanisms. A post-hoc analysis with a subset of the original sample showed that early bilinguals (age of acquisition of L2 between zero and five years old) seemed to have an advantage over late bilinguals (age of acquisition of L2 after 11 years old) in this task (Fig. 3). This result is in line with a previous Lindenmayer study assessing SL abilities in children (Vender et al., 2019).

These findings suggest that adults can process and learn simple recursive systems such as the Fibonacci grammars within a short time, though the differences in how specific types of grammar are learned remain subtle and may be affected by individual cognitive strategies. Moreover, the above-chance performance on longer subsequences, particularly in the Fib group, suggests that participants were not merely relying on surface-level memorization. Instead, they likely engaged in some form of hierarchical reasoning, combining individual items into higher-order constituents. Importantly, the difference we found between first- and second-order violations paves the way to electrophysiological explorations to shed light on the different kinds of cognitive operations involved in statistical and hierarchical processing (Bahlmann et al., 2006; Tabullo et al., 2011).

Finally, the findings from the bilingual sample underscore the potential of Lindenmayer systems as a methodological framework for investigating the highly debated bilingual advantage in cognitive processing, particularly within the domain of SL (Bartolotti et al., 2011; Bulgarelli et al., 2019; Onnis et al., 2018).



**Fig. 2.** Predicted probabilities of accuracy depending on sequence length for the three grammaticality conditions. The blue line represents the Fib group; the red line represents the Skip group.



**Fig. 3.** Predicted probabilities of accuracy across different sequence lengths. The green line represents early bilinguals, and the blue line represents late bilinguals.

## Acknowledgements

This research was supported by the Konstanz department's fund for student thesis support.

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## Toward linguistic subjectivity in low-coherence (transmedial) texts

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**Introduction and scope.** This paper proposes a segment-based modeling strategy to analyze linguistic subjectivity in low-coherence, transmedial texts. The model investigates linguistic subjectivity as it becomes observable through coherence patterns – or their breakdown. Meaning-making processes in disintegrated textual environments were examined using Nietzsche's works, particularly drawing inspiration from his so-called *Wahnsinnszettel* (commonly referred to as the “Testament”) – a document that simultaneously marks the peak of incoherence in the modeled system. Further data from this period include analyses of the so-called *Wahnbriefe* dated January 1889 (Briefe1889). Here, coherence is not defined as a feature of the subject itself, as may be suggested by the data, but rather as its relational proximity to a topologically structured and semantically coherent field: the *sema*-Versum. This concept draws inspiration from Lotman's semiosphere and Jackendoff's understanding of grammar rules as constraint-based structures. According to Jackendoff, “rules are implicit [...]”; they describe emergent regularities (perhaps statistical regularities) among more basic elements, but are not themselves implemented in any direct way” (p. 57). These rules “lend themselves better to a ‘data structure’ interpretation, in the sense that they delimit a space of possibilities within which linguistic entities can be located.” (p. 57 seq.) Such a space-based view resonates with the project’s modeling of the *sema*-Versum as a semantic topology: a probabilistically organized, topologically structured field in which subjectivity, fragmentation, and coherence drift can be systematically traced, measured, and modeled.

**Conceptual Foundations.** The *sema*-Versum relies in its ideal form on the total linguistic and cultural material available to the author (e.g., Nietzsche, Hölderlin), including published works, manuscripts, letters, notation, and references to cultural consumption – as embodied in his personal library, made accessible through the Goethe and Schiller Archive of the Weimar Foundation (which holds a full analog and partly digitized inventory of Nietzsche’s book holdings). This corpus corresponds structurally to a finely tuned LLM’s vector space.

**Focus, data, and methods.** At the center lies the question of how coherence can be conceptualized, modeled, and measured. As Jackendoff notes, “Clearly a sentence is more than a collection of words: the word meanings are structured into the meaning of the sentence by means of semantic relations among them” (Jackendoff 2002: 58). A brief illustration of this problem can be taken from Nietzsche’s note to Heinrich Köselitz (Turin, 4 January 1889): “Singe mir ein neues Lied: die Welt ist verklärt und alle Himmel freuen sich. Der Gekreuzigte.” (cf. Briefe 1889). Apparently, Nietzsche is not the “Gekreuzigte” but rather Jesus, so there is a coherence break in this note, provoked by a `referential_gap`, – a variable to be addressed later on in the model. Jakobson’s formulation in *Aphasia as a Linguistic Topic* captures the underlying problem with even greater precision: “The rules governing the combinations of words into sentences belong to the code. [...] To find out whom the addresser presents as the lover and whom as the beloved, the listener must know the syntactic rules of English” (Jakobson 1972, p. 43). Yet, this is only one side of the coin. From a broader perspective, and in line with Jakobson’s distinction between the paradigmatic and syntagmatic axes, lexical and syntactic structures are treated here as combinatorial and constraint-based – a view also affirmed by Jackendoff: “An item’s lexical semantic/conceptual structure is also conceived of (in most approaches) as combinatorial” (2002, p. 52). Furthermore, Jakobson’s account of aphasia can be generalized to the outbreak of incoherence – conceived as a scalable impairment of language that may extend to its very disappearance, manifesting through elliptical and constructions with variously open slots (see also Johnson & Keller, 2021).

**A brief sketch of the workflow.** The source materials – combining script, musical notation, and graphical elements – are segmented and conceptualized as `lingv_Text_Subj_n`, forming the ontologically grounded basis of the model. Originally conceived as static units, these may later be transformed into dynamic subject models (`lingv_Subj` or `symbolic_Subj`, considering the multilayered character of the manuscripts) through scalable metrics such as `vacancy_index`, `coherence_score`, and `referential_gap`. These segments also serve as the primary dataset for exploratory toy models. To underscore this once more with our example data: Nietzsche's so-called *Wahnsinnszettel* – and in particular the notes known as *The Testament*, bearing the explosive triad “diaboli! – Furz! – Stimulus” – have often been interpreted as signs of linguistic dissociation under clinical conditions. Yet beyond their apparent incoherence, this specific autograph presents a multimodal configuration, offering a singular instance of post-narrative writing (cf. “narration is impossible for a computer”, Bajohr 2024): musical notation, erratic calligraphy, and fractured syntax converge into a material-textual performance of the absurd, evoking a hallucinated coherence reminiscent of the statistical drifts in LLMs (cf. He et al.).

**Operationalization.** Because coherence phenomena are abstract and often latent, they cannot be directly observed. In this model, they are operationalized through three measurable components. First, the `vacancy_index` indicates how far the breakdown of syntax or construction can progress before meaning collapses (cf. Jakobson, 1971; Beaugrande & Dressler, 1981). Second, the `referential_gap` captures unreliable or paradoxical referents (e.g., Nietzsche signing as “Der Gekreuzigte”). Third, the `coherence_score` is a composite derived from the two prior metrics and additional dimensions still to be formalized – for example, *informativity* in the sense of Beaugrande & Dressler (1981), who defined “[t]he seven standards of textuality” as “cohesion, coherence, intentionality, acceptability, informativity, situationality, and intertextuality” (p. 3). As they note, “Informativity concerns the extent to which the occurrences of the presented information are expected vs. unexpected or known vs. unknown” (p. 8). And crucially, “When we move beyond the sentence boundary, we enter a domain characterized by greater freedom of selection or variation [...] we have no hard and fast rules which force us to prefer just one continuation” (p. 43). The framework established on the views of authors we reviewed previously offers us a promising foundation for further operationalization. These metrics are applied to segments (`lingv_Text_Subj_n`) extracted from multimodal primary materials – manuscripts, letters, and notational fragments. The resulting scores allow for the repositioning of subject instances (`lingv_Subj_n` / `symbolic_Subj_n`) within the author-specific semantic topology (*sema-Versum*), enabling analysis of coherence breakdown and drift. Comparable automated approaches to coherence scoring have been explored in clinical linguistics (Voleti, Liss, & Berisha, 2020; Leaman & Edmonds, 2020) and more recently in NLP (He, Long, & Xiong, 2023), and may certainly be extended for digital humanities purposes, provided that the metrics remain grounded in a linguistic framework.

**The Three-Layer Model.** The model proceeds in three layers. **Base Layer:** `lingv_Text_Subj_n` instances are segment-based representations of primary materials (e.g., letters, fragments, notations), annotated across textual, notational, and symbolic dimensions. A multi-stage pipeline – OCR, segmentation, RDF/OWL mapping – reconstructs meaning-based coherence, independent of syntax but syntax-oriented. Material evidence and interpretive conjecture are strictly separated. **Intermediate Layer:** `lingv_Subj_n` and `symbolic_Subj_n` are ontological instances generated from annotated base segments. Represented in RDF/OWL, they carry coherence-relevant metrics (`vacancy_index`, `coherence_score`, `referential_gap`) and act as dynamic mediators between the material base and the higher semantic field. To introduce contrast and scalability, further `lingv_Subj` instances are derived from Nietzsche's *Wahnbriefe* (delusive but coherent) and from earlier coherent work (*Über Wahrheit und Lüge im außermoralischen Sinn*), together with Schopenhauer and related source texts that define the early *sema-Versum*, created as a toy-model for explorative purposes. **Top Layer (*sema-Versum*):** This author-specific semantic field, derived from Nietzsche's complete corpus – including

published/unpublished writings, correspondence, and inferred cultural intake – acts as a declarative memory field calibrated to Nietzsche's production phases. It exerts gravitational constraints on subject instances, enabling semantic positioning and drift analysis. While not a generative system, the *sema*-Versum is a constrained, interpretable semiotic space; LLM-like tools may assist in bounded domains, but in this exploratory phase are not planned to replace its ontological foundation.

**Broader research interest: Coherence in LLMs vs. Humans.** While the so-called referential gap in LLMs has often been framed as an absolute lack of grounding (cf. Bender & Koller, 2020; Harnad, 1990), it may be more precise to describe it as a pseudo-grounding derived from context. LLMs do not access extralinguistic referents; their output reflects statistically inferred coherence within the bounds of training data. Their “lexicon-semantics is structured differently because the acquisition processes are based on entirely different principles.” Unlike human agents, LLMs do not experience the world but navigate token-space through distributional alignment. This distinction becomes analytically productive when contrasted with human referential breakdown – for instance, in Nietzsche's *Wahnsinnszettel*, where linguistic dissociation stems not from architectural absence but from neurological disintegration. Both forms of referential instability – one computational, the other cognitive – become analytically comparable when modeled within the same interpretative field (*sema*-Versum), which exposes their internal dynamics, positional drift, and failure to maintain alignment with an averaged semantic topology. In this context, it should be noted that text types strongly frame our perception of coherence; for instance, drafts are not expected to be as coherent as pre-prints. This distinction remains valid throughout the entire modeling approach. As Bajohr (2024) notes, “insofar as modern natural language processing (NLP) aligns with the tradition of such formalization attempts – albeit no longer in their technical implementation, as deep learning has shifted away from rule-based transformations to rely instead on the ‘distributional hypothesis’ of statistical signal processing – the hope that coherence will arise naturally through cohesion runs parallel to the idea that semantics can be conjured up solely through syntax.” Lenci (2025) frames this issue more pointedly as a referential gap: LLMs operate without extralinguistic anchoring and therefore lack grounded semantic force, a limitation which, as discussed in Lenci (2025), is linked to the symbol-grounding problem (Harnad 1990) and to critiques that distributional meaning is insufficient for referential understanding (cf. Bender & Koller 2020; Lake & Murphy 2021). Even with the infinite typing monkey metaphor (cf. 100SekundenPhysik), Shakespeare makes sense only when probability converges with emergence and the thresholds for human language, i.e., linguistic structure, are met. Coherence here lies in the eye of the observer, not the producer. What is required is a select-and-match alignment process with a gatekeeping function, ensuring that emergent patterns cross the thresholds necessary for coherent output. Coherence thus rests not only on the emergence of patterns, but also on their compatibility with the constraints we subsume under the concept, provided these thresholds are met. The task, then, is to understand those constraints more clearly. Coherence depends not simply on emergence, but on selective alignment, where thresholds guarantee intelligibility. LLMs approximate this through statistical inference; this model investigates it as a condition of human literary subjectivity.

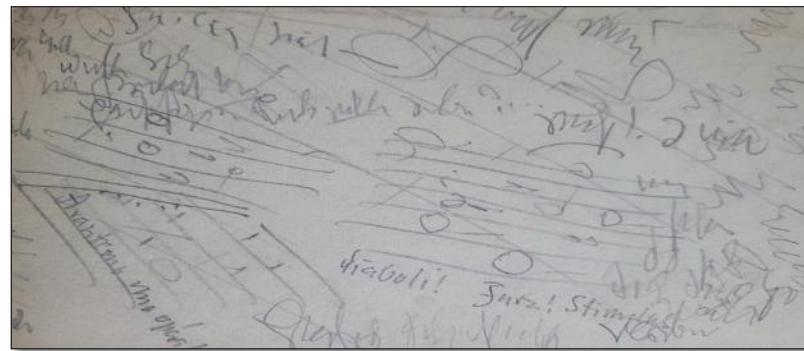


Figure 1 – Lingv\_Text\_Subject raw data – OCR-Layer-Segmentation

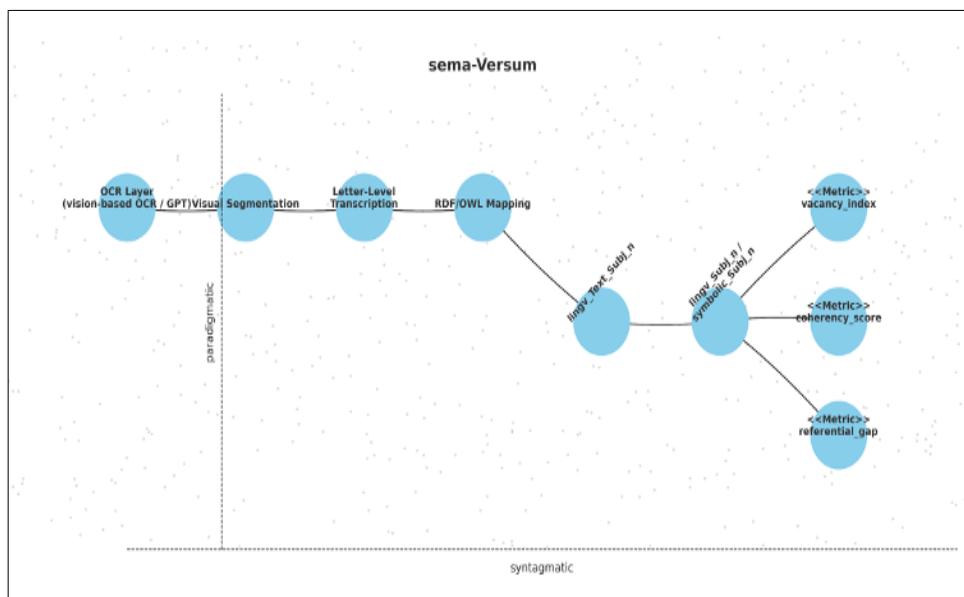


Figure 2 – Proposed Workflow

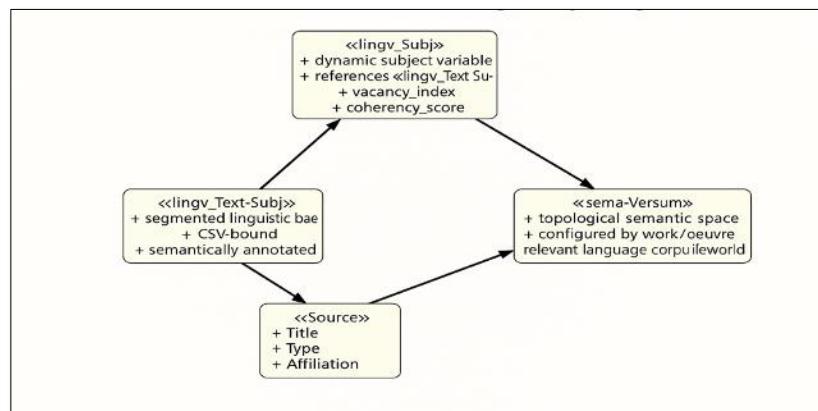


Figure 3 – Conceptual draft (Dynamic Modeling of Linguistic Subjects within a Semantic Space)

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## On the meaning of absolute comparatives in German

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**Introduction:** In German, absolute constructions as illustrated in (1) and (2), can express a moderately high degree that's lower than the degree expressed by the corresponding positive form. A *längere Reise* ('longer-than-usual journey') is shorter than a *lange Reise* (long journey) but longer than a *normale Reise* (journey of normal length).

- (1) Tom packt für eine längere Reise.  
Tom packs for a long-*er<sub>ABS</sub>* journey  
'Tom is packing for a journey-that-is-longer-than-usual'

- (2) Moritz plant ein größeres Projekt.  
Moritz plans a big-*er<sub>ABS</sub>* project  
'Moritz is planning a project that's bigger than his usual projects'

Absolute comparatives can appear in attributive constructions (Engel 1991). In predicative position, the adjective must be interpreted as normal comparatives with an elided comparative clause (3).

- (3) Das Projekt, das Moritz plant, ist größer.  
The project that Moritz plans is big- \**er<sub>ABS</sub>*/\COMP  
# unavailable: 'Moritz is planning a project that's bigger than his usual projects'

This paper formalizes German absolute comparatives as *norm-comparatives*, building on Kennedy's (1999) analysis of comparatives, taking into account earlier descriptive literature (Weinrich 1987, Becker 2005, Thurmair 2001).

**Background:** Kennedy (1999) provides the analysis (4) for the comparative morpheme in the usual sense, where *G* is a gradable adjective meaning and *d* is a standard value.

- (4) *er/more* =  $\lambda G \lambda d \lambda x [ \text{MORE}(G(x))(d) ]$  (Kennedy 1999: 128)

The operator *MORE* (5) expresses the following relation between two degrees:

- (5)  $\| \text{more}(d_R)(d_S) \| = 1 \text{ iff } d_R > d_S$  (Kennedy 1999: 128)

Kennedy provides the formalization in (6) for the positive morpheme *DegØ*, which will provide the basis for my proposed interpretation for the absolute comparative in German:

- (6) a.  $[ \text{DegØ} ] = \lambda G \lambda P \lambda x [ \text{ABS}(G(x))(SNDN(G)(P)) ]$  (Kennedy 1999: 119)  
b.  $\| \text{ABS}(d_1)(d_2) \| = 1 \text{ iff } d_1 \geq d_2$  (Kennedy 1999: 119)

According to this analysis, positives express a property of entities *x*, namely that the degree *d<sub>1</sub>* to which *x* is *G* is at least equal to the degree *d<sub>2</sub>*, the threshold a member of a relevant comparison class *P* must reach to qualify as *outstandingly G for P*. This threshold is determined by applying the standard-identification function *SNDN* to the adjective meaning and the comparison class *P*: *x* has a degree of *G*-ness above the standard degree of *G*-ness in the comparison class *P*.

The absolute comparative in German was discussed in three kinds of descriptive accounts:

**I.** Antonymensteigerung (Comparing to the Antonym) assumes that the absolute comparative refers to the positive form of the antonym, i.e. an *älterer Herr* (elderly gentleman) is older than a *junger Herr* (young gentleman). This analysis either results in an overlap of the meaning of absolute comparatives and their antonym forms (which does not correspond to the actual use of absolute comparatives, Becker 2005) or in an incorrect ordering of the scale, e.g: *jung–älter–jünger–alt* (*young–older–younger–old*).

**II.** Steigerungsinversion (Inversion of Comparison): The comparative expresses a lower degree rather than a higher degree in absolute constructions, i.e. an *älterer Herr* (elderly gentleman) is less old than an *alter Herr* (old gentleman) (Renicke 1955). This analysis, however, rests on the questionable assumption that the comparative morpheme means its own opposite in certain contexts, which is dubitable on semantic grounds (Thurmair 2001).

**III.** Norm-Komparative (Norm-comparative approach): Absolute comparatives make reference to a zone of indifference that is context-sensitive and dependent on a comparison class determined by the corresponding noun phrase (Weinrich 1987, Thurmair 2001).

The present paper builds on analysis III. In order to capture the positive ('long') and the absolute comparative ('longish') in a common frame of standards, I assume that the zone of *indifference*, i.e. the set of degrees  $d$  where neither the positive ('long') nor its antonym ('short') apply, has its maximum *below* the STND(G)(P) of Kennedy.

$$(7) \quad \text{STND}(G)(P) > \text{IND}(G)(P)$$

**Proposal:** Combining insights by Becker and Thurmair yield the formalization in (8) for absolute comparatives in German, where  $P$  is a relevant comparison class,  $G$  is a gradable adjective meaning and  $\text{IND}(G)(P)$  is the degree up to which  $x$  can be described as having a neutral degree of  $G$ -ness.  $\text{IND}(G)(P)$  corresponds to the maximum of the zone of indifference in Thurmair's sense. We then capture the absolute comparative morpheme  $_{\text{Deg}-\text{er}}^{\text{ABS}}$  as in (8).

$$(8) \quad \text{Deg-er}_{\text{ABS}} = \lambda G_{<\epsilon,d>}. \lambda P_{<\epsilon,t>}. \lambda x_\epsilon [P(x) \wedge \text{MORE}(G(x))(\text{IND}(G)(P))]$$

This analysis rests on Kennedy's interpretation of comparatives (3) with the only difference that the standard value is determined by the function *IND*, which identifies the maximum of the zone of indifference of the adjective  $G$ , relative to the comparison set  $P$ . The analysis of (1) can be paraphrased as "Tom is packing for a journey  $x$  of length *above* those of journeys of indifferent length, but (possibly) below the length that counts as a 'long journey'. The analysis in (8) also predicts that the absolute comparative is inappropriate in predicative constructions, because the function requires a second argument  $P$  of type  $<\epsilon,t>$ , which must be provided by the NP. Such an argument is unavailable in predicative uses.

Finally, the account predicts Becker's (2005) finding that the absolute comparative and the positive form a Horn scale. The pragmatic competition can be illustrated by the following real-life example from German public transportation: If a bus seat is reserved for *ältere Fahrgäste* ('old-  $_{\text{er}}^{\text{ABS}}$  ( $\approx$  elderly) passengers'), then *alte Fahrgäste* ('old passengers') can also claim these seats. — The proposed analysis correctly predicts that *alte F* qualify as *ältere<sub>ABS</sub> F*. The expression *alte F* is logically stronger than *ältere<sub>ABS</sub> F* and, therefore, pragmatically preferred when referring to persons  $x$  of age  $\text{OLD}(x) > \text{STND}(\text{old})(P)$ . If absolute comparatives, in contrast, were analysed as a degree interval  $I$  above  $\text{IND}(\text{old})(P)$  and below  $\text{STND}(\text{old})(P)$ , we'd predict that a 65-year-old passenger has the right to send a 90-year-old passenger off the reserved seats, arguing that they are too old to count as an *älterer Fahrgast* (old- $_{\text{er}}^{\text{ABS}}$  passenger). This is not the case, and the present analysis correctly predicts this observation.

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## Orthographic influence in second language vowel production: the case of Italian learners of German

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Acquiring new phonological rules in a second language can be difficult. Challenges are posed not only by the necessity to adapt and learn new sounds but also new and sometimes divergent grapheme-to-phoneme conversion rules between the two languages. A line of research has investigated the orthographic impact in L2 phonological acquisition and found mixed results, with some studies showing beneficial effects and others hindering ones. The present study aims to shed light in this regard by investigating the influence of orthography on vowel length production in Italian learners of German. In Italian, vowel duration is allophonic (shorter before geminates than singletons, D'Imperio & Rosenthal 1999); in German, vowel length is contrastive and predictable based on vowel quality in stressed syllables (lax vowels short, tense vowels long, Wiese 2000). German long vowels can be orthographically marked, e.g., with a following “h” (e.g., Sahne ['za:nə], ‘cream’) or not (e.g., Gabel ['ga:bəl], ‘fork’). Vowels are short when followed by two consonants (e.g., Lampe ['lampə] ‘lamp’, Falle ['falə] ‘trap’, the latter visually resembling geminates in Italian). In this study, two German vowels were chosen, namely /ɔ,o:/ and /a,a:/. This restriction was made because these two vowels are mostly shared between the two phonologic systems and were the most common marked by the lengthening-h (Missaglia & Sendlmeier, 1999). Furthermore, one aim of the study was to test whether orthography would have a different influence for the neutral vowel /a,a:/ compared to /ɔ,o:/, with the latter having a greater quality difference between the long and the short version. To this end, the selected stimuli were 48 trochaic target words with long vowels (half with “h”, half without) and short vowels (half with two different, half with two identical consonants). Half of the words had open (/a,a:/), half mid-back (/ɔ,o:/) vowels. Words were embedded in carrier phrases in focused position, mixed with 24 fillers and recorded by 15 Italian speakers of German (mean age 23.7 years, SD=3.0, 7 A2-B1 and 6 B2-C2) and 15 German native speakers (average 22.9 years, SD=2.1). Vowel durations were manually annotated and analyzed using mixed-effects regression models. The controls were not influenced by orthographic marking and produced phonologically long vowels longer than short ones. In line with Antoniadis & Strube (1984), phonologically long /a:/ (180.2 ms , SD= 30.5) was produced on average significantly longer than phonologically long /o:/ (151.3, SD= 25.9). Italian learners produced on average phonologically long /a:/ with a significant longer duration in words with “h” (183.7, SD = 35.5) than without (160.3, SD = 35.8), reaching the length of the German control group. As for the phonologically long vowel /o:/ no significant difference in production was observed. Phonologically short vowels were not influenced by whether the following consonants differed. These data corroborate previous cross-linguistic findings and show beneficial effects of orthographic marking of vowel length. Limits of the current study are represented by the language proficiency heterogeneity of the participants and by the experimental design itself.

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## Beyond Truth-Conditions: Rethinking Semantic Structure Through Quantum Contextuality

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Traditional Boolean truth-conditional semantics and Boolean-probabilistic semantic frameworks have long served as the dominant paradigms in formal semantics. Yet, they often struggle to account for dynamic, vague, and context-sensitive phenomena in natural language, including the sorites paradox, gradable adjectives (e.g., tall, red), and Non-transitivity of comparative concepts (e.g., smart, handsome). Even seemingly crisp concepts such as adult, married, or single may exhibit truth-conditional indeterminacy under incomplete contexts, challenging the assumption of binary classification in classical semantics. Likewise, sentences without overt focus exhibit a curious semantic openness, where any constituent seems "potentially focusable," defying fixed interpretation.

This article contends that such phenomena expose foundational limitations not only in classical Boolean semantics, but also in Kolmogorovian probabilistic approaches that assume a locality, context-independent structure of meaning. In contrast, we advocate for a quantum probabilistic framework, wherein meaning is represented as a potentiality structure that collapses into determinate interpretation only under contextual interaction. To this end, we adopt the SCOP framework (Gabora & Aerts, 2002), originally developed in quantum cognition. In SCOP, a concept is not represented as a set of entities for which the concept holds true—i.e., its extensions, but as a superposition of potential states within a structured conceptual space. Contexts act as projection-like measurements that collapse this potentiality into observed meaning. For example, the vague adjective “red” is modeled as a set of potential property states that collapse into determinate meanings under contextual influence. Formally, this process corresponds to a context-sensitive projection on a conceptual state vector, as defined in the SCOP framework. Likewise, sentences lacking a focalized constituent are treated as semantic ground states—highly symmetrical states where all constituents possess latent focus potentiality.

To assess non-classical behavior, we design a Bell-type test inspired by Bell-type experiments in quantum theory, using binary typicality judgments across varying contexts. Classical models impose an upper bound on such judgments, which SCOP is predicted to violate under entangled conceptual conditions. These violations arise when different semantic operations—such as assigning focus, projecting attributes, or sequencing contexts—interfere with one another. The result is a measurable non-classical signature of meaning interaction, grounded in the non-commutative dynamics of the SCOP framework. Besides, these predicted violations provide a falsifiable test of its non-classical structure and reflect a deeper architecture: certain core semantic operations cannot be simultaneously resolved without mutual disruption. For instance, assigning focus, projecting attributes, selecting contextual frames, and specifying conceptual states each interact in ways that resist independent treatment. This semantic interference is captured natively in SCOP through its contextual measurement dynamics. These structural deviations from classical assumptions motivate the two central analyses developed in the main body of the paper: (i) a Bell-type contextual judgment experiment, and (ii) a corpus-based model of focus-induced projection asymmetries.

Rather than opposing classical compositional semantics, the SCOP framework complements it by addressing a different layer of semantic structure. Just as classical physics emerges as a stable limit of quantum mechanics under macroscopic conditions, truth-conditional compositionality can be viewed as

a special case of a broader, context-sensitive meaning dynamics. SCOP provides tools to model the indeterminacy and interference that arise before semantic collapse occurs, offering a micro-level perspective beneath the surface of classical interpretations.

Although classical and probabilistic semantics aim to determine or estimate the truth value of an expression in a given world or situation, SCOP semantics reframes this task. Here, meaning emerges as a probabilistic collapse from a structured space of conceptual potentialities, under the influence of context. The result is not a fixed truth or even a hidden variable awaiting discovery, but a probability distribution that encapsulates the entire semantic behavior of a concept. We do not reject the determinate nature of events once realized—as in situation semantics—but we shift focus: from assigning truth in isolated cases to modeling the probabilistic geometry of meaning across possible contexts. Crucially, we argue that semantic vagueness is not a defect, but a robust adaptive feature of conceptual cognition. Just as physical systems stabilize through wave-like fluctuations, cognitive categories achieve communicative stability through partial, distributed activations across contexts. A word that projects weakly but consistently across a range of situations is often more communicatively effective than one that activates strongly in only one. Language, as a compression system, trades resolution for resilience—ensuring meaning transmission in a noisy and evolving cognitive environment. At the same time, we do not claim that the quantum formalism used in SCOP reflects any biological or neurological substrate. Our adoption of a quantum probabilistic framework is methodological, not metaphysical: it is motivated by the framework’s ability to model contextuality, interference, and non-classical compositionality more adequately than classical probabilistic approaches.

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## Memory Retrieval in Discourse with ‘again’: Eye-tracking and acceptability studies

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**Background:** Memory retrieval for dependency processing is commonly postulated to rely on a cue-based retrieval (CBR) mechanism (Jäger et al., 2017). Under CBR, elements that share cues with a target can cause interference during dependency resolution, even when their syntactic position should make them unavailable for resolution. Despite its success, the theory still faces several challenges. First, it has only been tested on a small subset of cases, mainly agreement and reflexives (Jäger et al., 2017), but we know little about its role beyond the sentence domain. Second, the small size of the established interference effects and the noisy nature of the data makes it difficult to find strong evidence in support of the theory’s properties (Jäger et al., 2017; Schad et al., 2023). We address both concerns by considering iterative presuppositions, following recent research on CBR in discourse (Schmitz et al., 2025). Consider “We met last year. I hope we meet again soon”. Here, ‘*again*’ triggers a presupposition that requires a discourse dependency between information in first and the second clause (i.e., we met before). We argue that such presuppositions can elicit interference effects similar to those predicted by CBR and in line with prior findings (Schmitz et al., 2025). Moreover, in our study we observe effects that are compatible with CBR and much stronger than those reported to date.

**Method:** We designed two experiments in Dutch to study the effect of (mis)matching information and interference on presupposition resolution in short discourses. Following a short introduction, the second sentence introduced a target direct object (DO) and a distractor DO. Either could (mis)match the presupposition in the third sentence, leading to a 2x2 design (T-MATCH vs. T-MIS, D-MATCH vs. D-MIS). Crucially, the distractor appeared under the scope of negation (Exp 1) or was linked to a different discourse referent (Exp 2) making it inaccessible for resolution (see (1) and (2)). We ran separate acceptability studies for either experiment as a pretest, and an eye-tracking-while-reading study on Exp 1. Eye-tracking for Exp 2 is planned.

**Results + discussion:** For Exp 1 ( $n=56$ , items=36) the eye-tracking results were partially consistent with CBR (**Fig. 1**): we found slowdown effects for T-MIS and D-MIS in early measures. Reading times were faster for D-MATCH T-MIS compared to T-MIS D-MIS (95% Confidence Interval for Right Bounded = [-0.05;-0.00]), consistent with interference predicted by CBR, however, the comparable effect in the T-MATCH condition (95% CI = [-0.05;-0.00]) requires additional explanation, such as encoding interference (Yadav et al., 2017). For Exp 2, the off-line acceptability showed a Target\*Distractor interaction. The nested model (**Fig. 2**) revealed a clear interference pattern in line with CBR: D-MATCH increased acceptability in T-MIS conditions (95% CI = [0.03;0.23]) and a trend towards decreased acceptability in T-MATCH (95% CI = [0.16-0.07]). Results suggest that (i) readers are sensitive to information relevant for presupposition resolution and (ii) inaccessible clauses interfere with resolution, particularly when the accessible DO mismatches. These findings provide evidence that memory models can and should be applied beyond the syntactic domain. Discourse dependencies

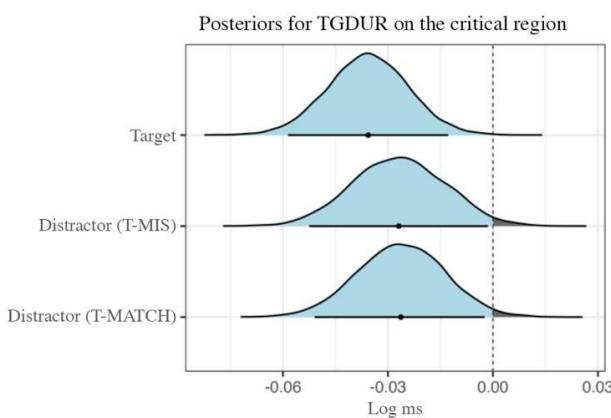
provide a unique opportunity to collect novel data that is more easily obtained. We argue that size of the effect reflects not just a contrast between discourse and syntax, but between the ways information is encapsulated in memory and tied to other information in a discourse.

**Exp 1, example item in all four conditions.** Regions of interest are indicated with square brackets. Regions 6 and 7 are considered the critical and post-critical regions.

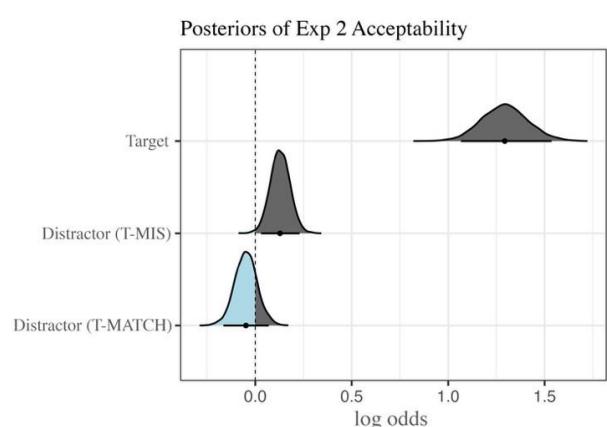
T-MATCH D-MATCH/D-MIS	[Megan had hunger maar gelukkig stond er een volle fruitschaal in de lobby van het hotel.] <sub>1</sub>	[Megan heeft een gele <b>appel</b> gegeten] <sub>2</sub> [maar ze heeft geen groene <b>appel / peer</b> gegeten.] <sub>3</sub> <i>Megan ate a yellow <b>apple</b> but she did not eat a green <b>apple / pear</b>.</i>	[De ochtend erna heeft Megan] <sub>4</sub> opnieuw [een <b>appel</b> gegeten] <sub>6</sub> [want ze wilde] <sub>7</sub> [meer fruit eten.] <sub>8</sub> <i>The morning after, Megan again ate an <b>apple</b> because she wanted to eat more fruit.</i>
T-MIS D-MATCH/MIS	<i>Megan was hungry but luckily there was a full fruit bowl in the lobby of the hotel.</i>	[Megan heeft een gele <b>peer</b> gegeten] <sub>2</sub> [maar ze heeft geen groene <b>appel / peer</b> gegeten.] <sub>3</sub> <i>Megan ate a yellow <b>pear</b> but she did not eat a green <b>apple / pear</b>.</i>	

**(1) Exp 2, example item in four conditions.** An additional four versions were created with reversed order of referents where ‘Jan’ and the target precede ‘Megan’ and the distractor. The final sentence remained the same. Critical region coding will be similar to Exp 1.

T-MATCH D-MATCH/D-MIS	(same intro as Exp 1)	[Megan heeft een gele <b>appel</b> gegeten] <sub>2</sub> [en Jan heeft een groene <b>appel / peer</b> gegeten.] <sub>3</sub> <i>Megan ate a yellow <b>apple</b> and John ate a green <b>apple / pear</b>.</i>	(same trigger sentence as Exp 1)
T-MIS D-MATCH/MIS		[Megan heeft een gele <b>peer</b> gegeten] <sub>2</sub> [en Jan heeft een groene <b>appel / peer</b> gegeten.] <sub>3</sub> <i>Megan ate a yellow <b>pear</b> and John ate a green <b>apple / pear</b>.</i>	



**Figure 1. Exp 1 Right bounded reading times with effects of the Distractor nested inside the two Target conditions.** Horizontal lines denote 95% Credible Intervals. Matching Distractors had faster reading times in both.



**Figure 2. Acceptability study. Effects of the Distractor nested inside the two Target conditions.** Horizontal lines denote 95% CI. Matching Distractors increased acceptability only in the T-MIS.

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## Similarity Comes at a Cost: Novel Evidence for Associative Memory Retrieval

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**Background.** A key observation in the study of associative memory is that the greater the number of associations a concept has (its associative fan), the longer the reaction times (RTs) and the lower the accuracy demonstrated by participants during recall. This is called the *fan effect* (Anderson, 1983). In classical fan experiments, participants study sentences containing reoccurring concepts in multiple contexts (e.g., “The *doctor* is in the *desert*”, “The *doctor* is in the *field*”). Models of memory in psycholinguistics assume a content-addressable associative memory, in which semantically related items cause interference in retrieval (Van Dyke, 2007; Jäger et al., 2017; Smith and Vasishth, 2020). This assumption is based on the cue-based retrieval framework from the memory module in ACT-R, which in turn was established through the findings from fan experiments. Classic fan experiments, however, did not directly test the role of semantic similarity. To address this gap, we tested whether the fan effect explains how associations occurring in natural language are retrieved by using semantically related concepts based on similarity measures from Dutch vector space models (e.g., Bojanowski et al. 2017).

**Method.** In Experiment 1 ( $N = 134$ , 46 lab, 88 online), we replicated Anderson and Reder (1999) to test the experimental paradigm in Dutch and with an adjusted learning method to make the manipulation of fan size less evident. In this experiment, concepts were repeated in two (fan 2) or four different (fan 4) contexts. Based on this replication, we conducted Experiment 2 ( $N = 97$ , online) which used semantically similar instead of repeated concepts. In both experiments, participants learned short sentences (see Table 1). In the testing phase, participants read a sentence and indicated via button press whether it belonged to the set of sentences they studied before (target) or not (foil). For each decision, we recorded the corresponding RT and accuracy.

**Results.** We fitted Bayesian generalized linear mixed models to analyze RTs and accuracy. In both experiments, participants exhibited longer RTs for fan 4 than for fan 2 conditions (see Figure 1, left), showing that the fan effect persists in Experiment 2 despite the aforementioned manipulations. Lower accuracy for the fan 4 conditions could only be found in Experiment 1 (see Figure 1, right). Accuracy in Experiment 2 was high in all experimental conditions, suggesting a potential ceiling effect.

**Discussion.** Our results show that the fan effect persists even when we use associated concepts occurring in natural language. These findings indicate that activation in memory spreads along a network of semantic connections as opposed to a network of individual words. This supports the interpretation of the original fan effect as a measure of associative fan, which will enable us to connect similarity measures from vector space models to theories of memory retrieval.

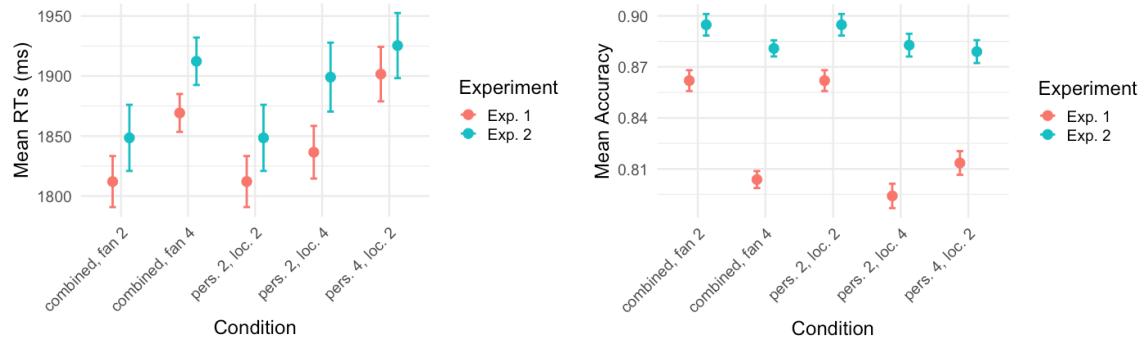


Figure 1: Mean reaction times (left) and accuracy (right) across conditions in Experiments 1 and 2. Error bars show the standard error of the mean.

Experiment	Person	Location	Example sentences	
1	<i>a</i>	<i>A</i>	<i>The captain is in the tower</i>	
	<i>b</i>		<i>The salesman is in the tower</i>	
1	<i>a</i>	<i>B</i>	<i>The captain is in the pool</i>	
	<i>c</i>		<i>The baker is in the pool</i>	
1	Foils		<i>The painter is in the tower</i>	
			<i>The painter is in the pool</i>	
2	<i>a</i> <sub>1</sub>	<i>A</i> <sub>1</sub>	<i>The doctor is in the canyon</i>	
	<i>b</i> <sub>1</sub>	<i>A</i> <sub>2</sub>	<i>The teacher is in the ravine</i>	
2	<i>a</i> <sub>2</sub>	<i>B</i> <sub>1</sub>	<i>The surgeon is in the factory</i>	
	<i>c</i> <sub>1</sub>	<i>B</i> <sub>2</sub>	<i>The barista is in the workshop</i>	
2	Foils		<i>The lawyer is in the canyon</i>	
			<i>The judge is in the factory</i>	

Table 1: Stimuli used in Experiments 1 and 2. Person and location refer to stimulus categories. Foils used the same items with new pairings. Stimulus sets were randomly generated and each participant received a unique set.

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## Beyond preposition stranding: exploring orphan prepositions in Brazilian Portuguese

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Preposition stranding (P-stranding) is common in Germanic languages like English but is systematically disallowed in Romance languages (Abels, 2012; Salles, 1997). Nevertheless, colloquial Brazilian Portuguese (BP) speakers frequently produce sentences in which certain prepositions — notably *sem* ‘without’, *contra* ‘against’, and *sobre* ‘about/on’ — surface without adjacent complements, as in:

- (1) O candidato *que* João votou **contra**.  
‘The candidate *who* John voted against.’
- (2) Tem uma parte da física que eu só conheço uma pessoa além de mim que teve aula **sobre** no ensino médio.  
‘There is a part of physics *that* I know only one other person besides myself who had classes about \*(it) in high school.
- (3) Eu fumo e a única rede social *que* eu falo **sobre** é o Twitter.  
‘I smoke, and the only social network *that/where* I talk about \*(it) is Twitter.
- (4) Não é porque você fica estonteante de maquiagem que você não seja linda **sem**.  
‘Just because you look stunning with makeup on doesn’t mean that you aren’t beautiful without \*(it).’

At first glance, sentences (1) and (2) might suggest English-type P-stranding; however, BP exhibits a distinct derivational pattern: these constructions seem to involve base-generated null complements, and the superficial resemblance to English P-stranding is misleading. In addition, sentences (3) and (4) illustrate constructions unattested under English P-stranding (Citko, 2014; Pesetsky, 1998), but highly productive in BP. Such cases demonstrate that null (pronominal) complements extend far beyond relative clauses, confirming their systematic presence across diverse contexts in BP (Grolla, 2005).

Building on Salles’ (1997, 2001) [P+D] hypothesis and Law’s (1986, 2006) D-to-P incorporation, I argue that BP prepositions split into two classes. On the one hand, functional Ps (*de* ‘of’, *em* ‘in’, *a* ‘to’, *com* ‘with’, *para* ‘to/for’) form a syntactic complex with a D or (resumptive) pronoun ([p+D]) via head movement. This configuration gives rise to two related outcomes depending on the phonological realization of the D/pronoun: when both the preposition and the D/pronoun are spelled out at PF, the structure results in resumptive relatives; when the D/pronoun is null, the complex head is entirely unpronounced, yielding “chopping” relatives. In this way, the [p+D] mechanism captures the alternation between fully pronounced phrases and structures with null elements, illustrating the flexibility of BP’s resumptive system.

On the other hand, lexical Ps (*sem*, *contra*, *sobre*) project as independent heads and resist incorporation due to both their structural configuration — they head a prepositional phrase selected by a higher functional p: [pP p [PP P [ DP D]]] — and general constraints, namely the Proper Head Movement

Generalization and the Head Movement Constraint (Baker, 2003). Interestingly, this pattern in BP resembles orphan prepositions in French, which also involve a recoverable null pronoun (*pro*) (Authier, 2016; Kaiser, 2012; Roberge & Rosen, 1999; Roberge, 2012; Zribi-Hertz, 1984). In both languages, the semantic specificity and structural independence of lexical prepositions allow the complement to remain unpronounced and be coreferent to a discourse antecedent, while functional prepositions never appear orphaned.

In this connection, the Proper Head Movement Generalization (PHMG) prohibits head movement from a functional category into a lexical category, while the Head Movement Constraint (HMC) allows movement only between a head X and the head of its complement. Accordingly, functional Ps in BP can incorporate with a resumptive pronoun to form a [p+D] complex: they carry  $\varphi$ -features, enter into an Agree relation with the determiner, value the case features on D, and form a syntactically and phonologically dependent complex head. Movement of D into P in these functional structures does not violate PHMG or HMC. By contrast, lexical Ps do not form a [P+D] constituent and never contract with a determiner.

Importantly, BP's resumptive system is syntactically active and highly productive (Grolla, 2005; McCloskey, 1990): resumptives occur not only in island contexts as a repair strategy (as in English), but also in simple sentences, non-canonical relatives, and D-linked interrogatives (*[Que professor]<sub>i</sub> todos os alunos queriam conversar com ele<sub>i</sub>*? ‘Which teacher did all the students want to talk to [\*him/her/them]?’). Many of these relatives and D-linked questions involve left-dislocated (LD) topics, which are merged in the left periphery and interpreted as discourse-linked constituents coindexed with resumptive or null pronouns. Following Kato (1993, 2010) and Kato & Nunes (2009), relativization in BP does not involve operator movement from an internal position within TP (subject, object, adjunct), but instead targets a base-generated topic in the left periphery (in an LD position), allowing resumptives and null elements to link and corefer to the discourse topic, reflecting BP's topic-prominent nature. While marginal true P-stranding may occur in non-D-linked interrogatives (e.g., *[O que]<sub>i</sub> você não vive sem t<sub>i</sub>*? ‘What can you not live without?’), these are highly restricted and always involve lexical prepositions, which is also consistent with the [p+D] hypothesis. Formally, the syntactic derivation of functional [p+D] structures can be represented as follows:

- (5) a. O livro que eu preciso  $\emptyset_{\text{pro}} / \mathbf{dele}$ .  
          the.MASC book that I need.1SG  $\emptyset_{\text{pro}} / \mathbf{of it.MASC}$   
          ‘The book that I need.’
- b. [o [CP [DP livro<sub>i</sub> [DP que t<sub>i</sub>]]<sub>k</sub> [CP [LD t<sub>k</sub> [TP eu preciso [pP [p **de** + D pro<sub>k</sub> / ele<sub>k</sub>]  
                  [DP pro<sub>k</sub> / ele<sub>k</sub>]]]]]]]]]

For a lexical preposition:

- (6) a. A pessoa que eu escreveria **sobre**  $\emptyset_{\text{pro}} / \mathbf{ela}$ .  
          the.FEM person that I write.COND.1SG **about**  $\emptyset_{\text{pro}} / \mathbf{him/her}$ .  
          ‘The person who I would write about.’
- b. [a [CP [DP pessoa<sub>i</sub> [DP que t<sub>i</sub>]]<sub>k</sub> [CP [LD t<sub>k</sub> [TP eu escreveria [pP [PP [p **sobre**  
                  [DP pro<sub>k</sub> / ela<sub>k</sub>]]]]]]]]]]]

In (5), the PF “all-or-nothing” realization applies: overt pronouns yield a spelled-out [p+D], while null pronouns yield unpronounced complex heads, with the lexical *pro* recoverable pragmatically through discourse. In (6), P-orphaning occurs, as the pronoun is not incorporated into lexical P, which is pronounced regardless of whether it c-commands a null or overt pronoun.

Taken together, these factors highlight the structural and syntactic mechanisms underlying BP’s orphan prepositions. These structural properties — namely, the topic-prominent nature of BP, which allows many non-canonical relatives and D-linked questions to be base-generated; the syntactic productivity of resumptive pronouns, whether overt or null; and the structural configuration of lexical prepositions, which project as heads of a PP selected by a higher functional p and license null complements recoverable through discourse — converge to produce what superficially appears to be preposition stranding, but actually involves no extraction from the PP, in line with the typological generalization that Romance languages resist true P-stranding.

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# On Complementizer Doubling in Polish

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The aim of this talk is to explore the conditions characterising complementizer doubling in Polish, using both corpus data and native speaker judgements, and with the existing analyses of Romance and South Slavic complementizer doubling as a reference point.

**Background.** Complementizer doubling, or recomplementation, has been extensively studied in Romance (e.g. Paoli 2005; Ledgeway 2005; Demonte & Fernández-Soriano 2009; Munaro 2016) and more recently an analogous phenomenon has been described in South Slavic (Mihaljević 2019; Plesničar 2020). While the multifunctionality of the Polish *że* as a complementizer, focus particle, and particle supporting agreement clitics in the past tense, and its resulting ability to occur multiple times in a single clause were discussed before (Szczegielniak 1999; Bański 2000; Migdalski 2016), complementizer doubling as such remains unexplored in Polish.

**Data.** In Polish, complementizer doubling is found in both indicative complements headed by *że* and in subjunctive or infinitival ones headed by *żeby*. The complementizers can be mismatched, but only in the configuration shown in (1), with *żeby* following *że* after verbs usually associated with subjunctive. Doubling is licit only with a fronted element, typically an adverbial clause (1), but also other elements, such as the subject of the lower clause (2), separating the two complementizers. The second complementizer can be preceded by the particle *to*. Doubling is entirely optional and does not affect the meaning.

- (1) Doktor poradził **że** jak ciepło i ładna pogoda,  
 doctor advise.PST.3MSG COMP if warm and pretty weather  
**żeby** czytanie listów odbywało się w królewskim  
 COMPL reading letters happen.PST.3NSG REFL in royal  
 ogrodzie.  
 garden  
 ‘The doctor advised that, if it’s warm and the weather is nice, that the reading of letters should take place in the royal garden.’ (Korpus PWN)

(2) Ja by=m chciała, **żeby** ci wszyscy, którzy mają  
 I cond=1SG want.PTCP.FSG COMP those all who have.3PL  
 wątpliwości, **żeby** przyszli wysuchać ekspertów.  
 doubts COMPL come.PTCP.MPL listen.INF experts  
 ‘I would like all those who have doubts to come and listen to the experts.’

**Analysis.** In complementizer doubling constructions, the complementizers spell out different heads in the extended left periphery (Rizzi 1997) – from the highest head, Force, through the Topic and Focus heads, to the lowest head in the left periphery, Fin. They usually have to be separated by a fronted element of the embedded clause.

I propose that in Polish the upper complementizer heads the Force projection, closing off the upper boundary of the left periphery. Doubling is not limited to subjunctive complement clauses, and the type of the intervening element is not restricted, therefore, the lower complementizer realizes the Topic head, as was the case in historical Romance (Munaro 2016). In this regard, Polish differs from

Slovenian, which restricts doubling to subjunctive environments, and in which the lower complementizer is associated with Fin (Plesničar 2020).

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## Introducing MATra-Lab: Collaborative AI-powered Processing of Multimodal Language Data

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MATra-Lab is a web-based, AI-integrated platform designed to facilitate the management, processing, and annotation of multilingual and multimodal datasets, particularly for Indian languages. We developed MATra-Lab to address critical needs in the humanities, social sciences, linguistics, and digital humanities. It provides researchers with sophisticated yet user-friendly tools to efficiently handle audio, video, text, and image data.

At the core of MATra-Lab is an innovative blend of automation and human-in-the-loop AI techniques, enabling collaborative research teams to rapidly and accurately manage linguistic resources. It offers a single integrated environment for data ingestion, annotation, transcription, translation, and lexicon development, significantly reducing manual processing and improving data accuracy.

The platform's strength lies in its advanced automated workflows. It supports Automatic Speech Recognition (ASR) for 22 Scheduled Indian languages and several non-scheduled languages, transforming oral narratives, interviews, and field recordings into analyzable text. MATra-Lab integrates state-of-the-art ASR models from different sources.

Translation between multiple Indian languages and English is seamlessly supported through sophisticated machine translation (MT) tools, addressing cross-linguistic challenges. These translation capabilities enable researchers to overcome language barriers efficiently, fostering broader cultural engagement and data accessibility.

Additionally, MATra-Lab incorporates Optical Character Recognition (OCR) optimized for diverse Indian scripts, allowing researchers to digitize handwritten manuscripts, archival documents, and scanned textual materials quickly. The OCR functionality is tailored to manage the intricacies of various scripts, thus facilitating rapid data digitization for historical and cultural studies.

Annotation and metadata management form another critical dimension of MATra-Lab's functionality. The platform offers highly customizable tagging and annotation features, enabling researchers to apply labels at multiple granularity levels, from entire documents to specific spans within multimedia datasets. Tasks like morphological analysis, syntactic tagging, semantic labeling, discourse annotation, and interlinear glossing are readily supported, streamlining intricate linguistic analyses.

MATra-Lab also excels as a collaborative workspace. The platform integrates real-time sharing, synchronized team annotation, and controlled data access, ensuring secure collaborative research environments. Users have the flexibility to define granular permissions for viewing, editing, and exporting data, facilitating smooth team coordination across geographically dispersed projects.

Technologically, MATra-Lab leverages modern web and database frameworks, employing Python with FastAPI, MongoDB, and Flask, providing robustness and scalability. Its integration with advanced NLP technologies, such as HuggingFace models(Hugging Face, n.d.), Stanford's Stanza toolkit(Qi et al., 2020), and APIs from India's Bhashini program(Bhashini, n.d.), further enriches its analytical capabilities. MATra-Lab also incorporates universal language tools for voice activity detection, and automatic phonetic transcription through models like Silero VAD, PyAnnote, and Allosaurus, delivering comprehensive linguistic processing.

The seamless integration of MATra-Lab within the larger LiFE Suite ecosystem further enhances its practical usability. Field data collected via mobile-first applications such as Atekho flows directly into MATra-Lab, creating streamlined pipelines from initial collection through processing and eventual NLP model training. This integrated approach preserves rich metadata throughout the data lifecycle, enhancing the contextual value of final linguistic resources.

Finally, MATra-Lab simplifies data export, supporting widely used structured formats like JSON, CSV, TextGrid, and CHAT. Such interoperability allows smooth integration with external analytical tools and long-term digital archives, ensuring the sustainability and usability of linguistic data.

In sum, MATra-Lab offers an unprecedented combination of collaborative functionality, multimodal linguistic processing, and accessible AI automation. By empowering researchers with no-code yet sophisticated NLP capabilities, MATra-Lab transforms data management and analysis in the humanities and social sciences, promoting innovative, inclusive, and culturally informed research methodologies..

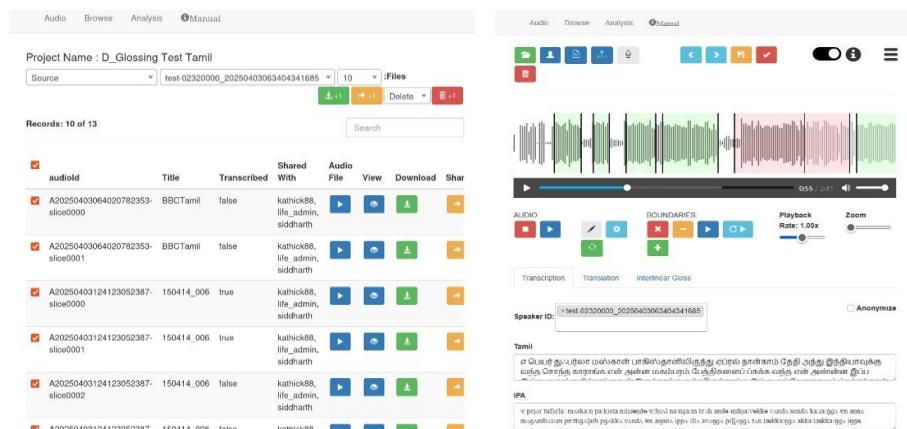


Figure 1: MATra Lab Screens

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## **Power, politics, and active citizenship: A multimodal analysis of political cartoons from Nigeria's and Finland's 2023 elections**

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Political cartoons have long been a vital form of expression in democratic societies, serving both as a mirror and a catalyst for public opinion (Agba et al., 2014; Ashfaq & Hussein, 2013; Sadiq et al., 2023). This paper examines how political cartoons shaped democratic engagement during the 2023 elections in Nigeria (a transitional democracy) and Finland (a mature democracy). While both contexts have individually attracted scholarly attention (Herkman, 2019; Salisu Ogbo & Nuhu, 2016), there is a dearth of comparative studies on how cartoons function differently across various democratic settings.

This study adopts a descriptive research design. A purposive sample of 93 political cartoons was collected from selected Nigerian (Mike Asukwo, Giftedart, Bulama) and Finnish (Ville Ranta, Juha Sihto) cartoonists across Facebook, X, and Instagram between April 2022 and April 2023, a period marked by the height of election campaigns in both countries. The analysis applied Entman's Framing Theory and Kress & van Leeuwen's Multimodal Critical Discourse Analysis (MCDA), focusing on the representational, interactive, and compositional dimensions of cartoons (Entman, 1993; Kress and van Leeuwen, 2006). Using thematic coding (Braun & Clarke, 2016), recurring themes such as economic responsibility, political manipulation, ideological polarisation, and voter disillusionment were identified. Visual elements (caricature, colour, gaze, layouts) and rhetorical devices (satire, metaphor, irony) were examined to show how cartoons frame political actors, negotiate power, and foster public debate.

Findings identify three multimodal strategies, namely representation, persuasion, and engagement. Nigerian cartoons condemn corruption, electoral deceit, and political domination, while Finnish cartoons highlight ideological polarisation and disaffection with political elites. While both countries employ similar visual resources such as colour composition, juxtaposition, and caricature, their stylistic and thematic approaches differ, reflecting each country's political landscape, media environment, and cultural values.

The study concludes that political cartoons, amplified by social media, serve as counter-narratives to mainstream reporting while stimulating critical civic reflection. By comparing Nigeria and Finland, the research demonstrates the contextual ways cartoons frame political actors, negotiate power, and advance active citizenship in diverse democratic environments.

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## Semantic and syntactic constraints on ellipsis: Experimental evidence from German sluices

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**Background.** According to the sententialist approach to ellipsis (Merchant 2001, 2004), clausal ellipsis involves the non-pronunciation of a TP to the exclusion of one phrase, i.e. the sluice, as in (1). The structure in the ellipsis site (E-site), is an ongoing debate in the literature (Nykiel 2013; Ronai & Stigliano 2020; van Craenenbroeck 2010; among other). That is, the E-site could be isomorphic to the antecedent clause, as in (1a), or a copular clause, as in (1b).

- (1) John kissed someone but I don't know...
- a. who<sub>1</sub> John kissed *t<sub>1</sub>*.
  - b. who<sub>1</sub> that was *t<sub>1</sub>*. (highlighting represents ellipsis)

Barros et al. (2015) proposed that copular clauses are available as ‘last resort’ strategy to evade islands under ellipsis. In German, the structure of the E-site can be determined by the morphological form of the sluice (*ceteris paribus*). If the sluice is ACC-marked, the E-site must be isomorphic, as the sluice must have originated in the object position, as in (1a). In contrast, if the sluice is NOM-marked, the E-site must be a copular clause, as in (1b). Schiele (2024) tested German ACC- and NOM-marked sluices and found that copular clausal E-sites function as a ‘last resort’ strategy to derive sluices without island violations, aligning with Barros et al.’s (2015) predictions. This suggests that syntactic incongruence, such as island violations, is sufficient to license a copular clause as an E-site.

In addition, the definiteness of the correlate has been found to influence the processing of the sentence (Chung et al. 1995; Dayal & Schwarzschild 2010; Barros 2013). However, most of the analyses have been based on English and did not incorporate E-site as potential factor. In (2), the NOM-marked sluice must target the object in the antecedent clause (*einen der Praktikanten*) and cannot inquire about the antecedent subject (*Paul*) because the subject is definite, which would lead to a semantic incongruence. However, if the subject were indefinite, as in (3), the NOM-marked sluice could refer to the subject or the object.

- (2) Paul hat einen der Praktikanten gelobt, aber ich weiß nicht...  
Paul.NOM has one.ACC of.the interns praised but I know not  
'Paul praised one of the interns, but I don't know...'
- a. welchen<sub>1</sub> Paul hat *t<sub>1</sub>* gelobt. *isomorphic, definite*  
which.one.ACC Paul has praised  
'which one (Paul has praised).'
  - b. welcher<sub>1</sub> das war *t<sub>1</sub>*. *copular clausal, definite*  
which.one.NOM that was  
'which one (that was).'
- (3) Einer der Mitarbeiter hat einen der Praktikanten gelobt, aber ich weiß nicht...  
one.NOM of.the employees has one.ACC of.the interns praised but I know not  
'One of the employees praised one of the interns, but I don't know...'
- a. welchen<sub>1</sub> einer der Mitarbeiter hat *t<sub>1</sub>* gelobt. *isomorphic, indefinite*  
which.one.ACC one of.the employees has praised  
'which one (one of the employees praised).'

This study tests whether semantic incongruence can license a copular clause as an E-site. We propose that the interpretation of the sluice depends on the definiteness of the correlate: if both correlates are indefinite, the case marking of the sluice determines its correlate; if the antecedent subject is definite, a NOM-sludge cannot target it and must instead refer to the antecedent object. Accordingly, we hypothesize that **(H1)** ACC-marked sluices, which are only compatible with an isomorphic E-site, must target the antecedent object and that **(H2)** NOM-marked sluices can target the antecedent object if the antecedent subject is definite.

**Experiment.** 32 German monolinguals were sourced via Prolific (online, unsupervised). The study tested E-SITE (isomorphic or evading) and DEFINITENESS (definite or indefinite correlate), as shown in (2) and (3), with 3 repetitions per condition selected from 12 lexical sets, plus 64 fillers. In a forced choice task, participants identified the referent of the sluice. The order of antecedent subject and object was controlled. Participants could choose between first referent, second referent, both, or neither.

**Results.** Figure 1 shows the proportions of responses. A binomial logistic regression revealed an interaction between E-SITE and DEFINITENESS ( $z = -2.46$ ,  $p = 0.01$ ), with participants most likely to choose the object in the isomorphic conditions, supporting H1. In contrast, when the analysis was restricted to NOM-marked sluices which are only compatible with a copular clause, DEFINITENESS emerges as a significant factor ( $z = 3.89$ ,  $p < 0.01$ ). That is, participants choose the antecedent object for NOM-sl uices if the subject is definite, supporting H2.

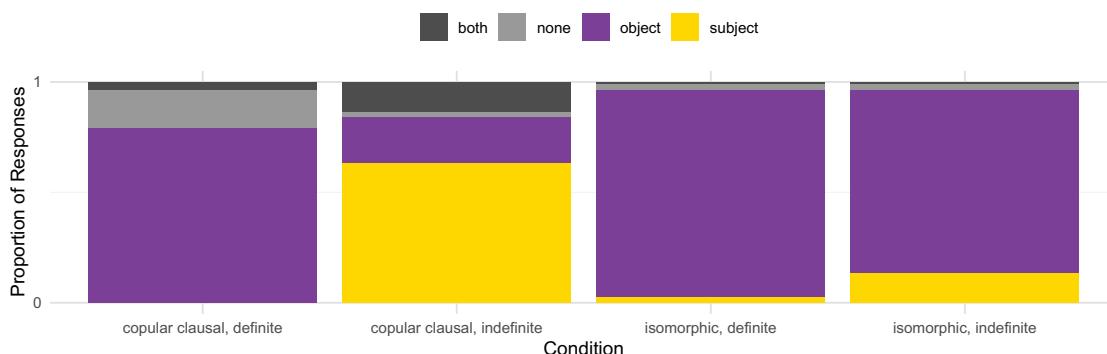


Figure 1: Participants responses to the forced choice task.

**Discussion.** The results show that sluices can only refer to indefinite correlates, as predicted by Dayal and Schwarzschild (2010). When both subject and object are indefinite, case marking on the sluice determines its referent. Crucially, if the subject is definite and the sluice bears NOM-case, a conflict arises: NOM-marking forces a copular clausal E-site, but referring to a definite subject causes semantic incongruence. Participants then prefer the indefinite object as the sluice's referent. This suggests that avoiding semantic incongruence can license copular clauses as E-site as a 'last resort' strategy. This contributes a key insight to the literature on ellipsis structure: both semantic and syntactic pressures can force a non-isomorphic ellipsis structure.

### Acknowledgments

This research is supported by the German Research Foundation (Deutsche Forschungsgemeinschaft), project number 522896622.

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# Negotiating Identity and Language Maintenance: Intergenerational Language Shift in Swiss Tamil Communities

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This abstract presents preliminary findings from the sociolinguistic component of an ongoing study on Swiss Tamil, which is examined as a heritage language in the sense defined by Valdés (2000) and Rothman (2009). One of the study's primary goals is to investigate language use and identity among intergenerational speakers, particularly in Switzerland's multilingual and dynamic sociocultural setting. The country is home to an estimated 60,000 Tamil speakers, many of whom arrived in two main waves of migration: the first during the early years of the Sri Lankan civil war in the 1980s, and the second around 2011. The data presented here are drawn entirely from Sri Lankan Tamil speakers who migrated during the conflict, primarily from the northern and eastern regions.

The data were collected through in-person (with a few on Zoom) sociolinguistic interviews using a semi-structured questionnaire in French- and German-speaking regions of Switzerland. The dataset in this talk includes 4 first-generation and 10 second-generation speakers. Second-generation speakers predominantly use Tamil with their parents but often shift to French or German with siblings and peers, even when all are fluent in Tamil. While oral proficiency was generally strong, literacy skills varied and often correlated with whether they had attended Tamil community schools.

Tamil community schools, run by the Tamil Education Service Switzerland (TESS), are officially recognized under the Swiss government's Mother Tongue and Culture initiative and offer instruction from Class 1 through Class 12. While these schools are often viewed as key institutional supports for heritage language education, participants' reflections suggest that what is taught in school may not always align with their everyday language use. Several speakers noted that they do not regularly use the formal Tamil learned in school in their home or peer interactions, because colloquial varieties are more common in speech. These accounts point to a diglossic dynamic in the diaspora context, similar to the homeland, with Tamil schools helping maintain exposure to literal/written Tamil, even as informal spoken Tamil continues to dominate in everyday communication.

The study also highlights emotional and interpersonal dynamics around language use. A few second-generation speakers sought affirmation about their Tamil proficiency. Sarcastic comments from first-generation speakers, such as *nee nalla tamil kathaikura* ('Oh, you speak Tamil so good!'), were perceived as discouraging. The stressed adjective *nallaa* conveys sarcasm, implying the speaker's Tamil is inadequate or not pure.

One young first-generation speaker referred to this variety as *konna* Tamil ("blunt"), suggesting a perceived lack of cultural depth. One or two participants also recalled being told in Sri Lanka they spoke *chella* Tamil ("dear"), which was likened to Indian Tamil. While they were not sure why this label was used, one possible interpretation is that Indian Tamil, especially as heard in metropolitan cinema, is often associated with English code-mixing. While such comments from Sri Lankan relatives were not overtly critical, the judgmental tone of first-generation Swiss Tamils felt more stigmatising. These experiences illustrate how notions of "correct" or "pure" Tamil continue to shape perceptions of heritage speakers. They align with Canagarajah (2008) on the complex dynamics of linguistic legitimacy and identity negotiation within Tamil diaspora families.

A consistent pattern across families showed that eldest children, irrespective of gender, spoke fluent Tamil, having acquired it as their first language before exposure to French or German. Gender-based variation emerged among younger siblings: second-born daughters often maintained fluency, while second-born sons were more likely to shift to French or German, even when interacting with siblings who spoke Tamil. Participants suggested that this may be due to early exposure to dominant languages through elder siblings, making those languages more dominant for the younger child. While this gendered sibling pattern was not previously reported in the literature, it complements broader family-level dynamics of language shift observed in Tamil diaspora families, as discussed by Canagarajah (2008).

Tamil remains essential for intergenerational communication with parents, grandparents, and relatives, especially during religious functions and family gatherings. It is also used across Switzerland's linguistic regions (French, German, and Italian) and in communication with relatives abroad. While dominant societal languages are used more broadly, Tamil remains a practical and unifying tool. These dynamics reflect the kind of identity negotiation heritage speakers face in multilingual environments, echoing insights from Pavlenko and Blackledge (2001) on how speakers position themselves within and across languages under the influence of societal ideologies.

Many participants also noted that some cultural references, jokes, and film dialogues could only be expressed fully in Tamil. Media practices reinforced this connection: most second-generation participants reported that Tamil cinema also significantly contributed to maintaining spoken Tamil. They also expressed a strong emotional bond with Tamil music, often preferring it over French, German, or English songs. In digital communication, Roman script ("Tanglish") is typically used due to the complexity of the Tamil keyboard, allowing for ease and speed in everyday interactions.

Beyond formal education, cultural transmission is supported through small community groups and youth-led initiatives. In La Chaux-de-Fonds—a watchmaking town in the French-speaking canton of Neuchâtel—local Tamil women organise informal literary sessions and *Saiva Samayam* classes. These informal community initiatives help maintain Tamil cultural traditions in the absence of large formal associations. In contrast, university-level youth associations like the Tamil Association of Zurich (TAVS) and Lausanne's LUTSA blend Tamil and Swiss cultural elements through events such as Tamil-themed games, music shows, and film screenings. These examples highlight differing approaches to cultural transmission across generations and institutional contexts, reflecting broader patterns of translocal identity-making in diasporic spaces (Canagarajah, 2013, 2019).

By integrating observations on intergenerational attitudes, formal and informal learning, regional variation, and emotional experiences with language use, this study offers a holistic view of how Swiss Tamil evolves within its sociolinguistic context. These trends reflect community-level efforts to support Tamil through both formal schooling and informal practices, aligning with Fishman (1991) on the importance of intergenerational transmission in language maintenance. Further research is needed to assess how these dynamics may influence language practices among third-generation speakers and whether heritage language education can contribute to reversing language shift in Swiss diasporic contexts.

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## Hearing What You Expect? Prior Use in Speech Perception – a pilot study

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Predictive coding theories propose that perception arises from the integration of sensory input with prior expectations (Friston, 2005, 2018; Rao & Ballard, 1999). Accounts differ on whether expectations influence perception through early top-down modulation of sensory processing (e.g., McClelland & Elman, 1986) or only through later decision processes (Massaro, 1989; Norris, McQueen, & Cutler, 2000). Autistic perception is often described as atypical, but it remains unclear whether such differences reflect difficulties in forming predictions or in applying them to guide perception.

As a first step toward addressing this question, we conducted a pilot study in neurotypical adults. Participants heard noise-vocoded words preceded by visual cues that were matching, mismatching, or neutral. Crucially, cue–word contingencies were not disclosed, allowing to probe implicit learning of generative models from exposure and implicit use of predictive information under different levels of acoustic clarity and contextual bias. Participants provided clarity ratings, word identification responses, and same/different judgments across conditions that manipulated acoustic clarity and contextual bias. Improvements in clarity and identification across predictive trials would indicate successful model formation.

Results showed robust effects of clarity, with higher sensory detail leading to greater discrimination and clarity ratings. Crucially, expectations shaped both subjective and objective measures: matching cues enhanced clarity ratings, while block-level biases modulated both perceptual sensitivity ( $d'$ ) and response criterion. Expectation effects were clarity-dependent, emerging only when the acoustic signal was sufficiently strong (medium – high clarity). Moreover, subjective clarity ratings were broadly influenced by context, whereas discrimination performance was selectively enhanced under aligned block-level and trial-level expectations.

These pilot findings demonstrate that neurotypical listeners flexibly integrate prior expectations with sensory evidence, but that such integration depends on the precision of bottom-up input. This dissociation between subjective clarity and discrimination performance constrains accounts of predictive processing, supporting models in which expectations can modulate early perceptual processing when the bottom-up signal is adequate. This provides a mechanistic baseline for future comparisons with autistic participants, clarifying whether differences in predictive learning or prior use underlie atypical speech perception in autism.

### Acknowledgments

This work was supported by the Fundación Rafael del Pino. The authors gratefully acknowledge this funding, which made the present research possible.

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## Aspectual predicates and ‘quirky’ coordination in Greek

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**Aim:** The aspectual verb *arhizo* ‘start’ in Greek can be followed by two types of clauses: *na*-complement clauses and *ke*-clauses. Although the particle *ke* typically takes part in coordination, when it follows the verb *arhizo*, it has been analyzed as a subordinator with properties similar to the *na* element (Kotzoglou 2018, Kotzoglou & Canakis (K&C) 2021). By comparing the two types of clauses, I present novel data suggesting a coordination analysis, in which *ke*-clauses form a coordinate complex, with *arhizo* functioning as the initial conjunct (Zhang 2023).

**Data:** *Arhizo na*-clauses (1a) illustrate similarities with *arhizo ke*-clauses (1b). First, they share a similar interpretation (Kotzoglou 2018, K&C 2021).

- |                               |                                   |
|-------------------------------|-----------------------------------|
| (1) (a) Arhizi      na trehi. | (b) Arhizi      ke    trehi.      |
| start.3SG to run.3SG          | start.3SG and run.3SG             |
| ‘He starts running.’          | ‘He starts to run (and he runs).’ |

Second, they show the same aspect restrictions. Regardless of *arhizo*’s aspectual features, the verb (V2) appears in the imperfective aspect both in the *na*-clause and the *ke*-clause (3) (Kotzoglou 2018, K&C 2021).

- |                         |   |          |
|-------------------------|---|----------|
| (3) Arhizi              | na/ ke    trehi/                                | *treksi. |
| start.3SG.NPFV.NPST.IND | to/ and run.3SG.NPFV.NPST.IND/ run.3SG.PFV.NPST |          |
| ‘He starts to run.’     |   |          |

Moreover, *arhizo* obligatorily has the same subject as V2 in both *na*-clauses and *ke*-clauses (4) (Kotzoglou 2018, K&C 2021).

- |  |  |
|--|--|
| (4) O Janis arhizi    *i Maria    na/ ke    trehi. |  |
| the Janis start.3SG the Maria to/ and run.3SG      |  |
| ‘Janis starts to run/ *Janis starts Maria to run.’ |  |

Last, K&C (2021) claim that both *arhizo na*-clauses and *ke*-clauses display impoverished tense morphology.

The above similarities lead Kotzoglou (2018) and K&C (2021) to propose that *ke* in the context of *arhizo ke*-clauses is a subordinator. In their view, *ke*-clauses function as complements to *arhizo*, in the same way that *na*-clauses serve as complements to it. The assumption of the impoverished morphology on the *ke*-clause’s verb has led them to assume that the *ke*-clause is syntactically dependent on *arhizo* and that its subject is controlled by it, as a further case of exhaustive control in Greek (Spyropoulos 2007, Roussou 2009).

Importantly, though, *ke*-clauses present at least three fundamental differences from *na*-clauses. First, they allow different negation markers preceding them. A *ke*-clause allows the indicative negative marker *dhen* ‘not’ to precede V2 (5a), while *na*-clauses only allow the subjunctive negative marker *min* (5b).

- |  |                                       |
|--|---------------------------------------|
| (5) (a) Arhise    ke    dhen/ *min etrehe. | (b) Arhise    na    *dhen/ min trehi. |
| start.3SG and NEG                          | run.3SG                               |
| ‘He started not to run.’                   | start.3SG to NEG    run.3SG           |
|  | ‘He started not running.’             |

V2 in *ke*-clauses is morphologically marked for tense (6a), whereas in *na*-clauses it is not (6b).

- |   |  |
|---|--|
| (6) (a) Arhise              ke    etrehe. | (b) Arhise              na    trehi.   |
| start.3SG.PFV.PST and run.3SG.PFV.PST     | start.3SG.PFV.PST to run.3SG.NPFV.NPST |
| ‘He started to run.’                      | ‘He started running.’                  |

Last, contrary to complement *na*-clauses (7a), *ke*-clauses cannot linearly precede *arhizo* (7b).

- (7) (a) Na trehi arhise.  
 to run.3SG start.3SG  
 ‘He started running.’
- (b) \*Ke trehi arhise.  
 and run.3SG start.3SG  
 ‘He started to run.’

Overall, V2 in *ke*-clauses takes the declarative negative marker, carries morphological tense, and cannot precede V1 *arhizo*. Thus, it becomes apparent that *ke*-clauses and *na*-clauses illustrate significantly different syntactic structures and that a subordination analysis cannot explain *arhizo ke*-clauses.

**Analysis:** A more straightforward way to account for the data is to propose a coordination analysis, retaining the function of *ke* as a coordinator. Following the analysis of coordination in Zhang (2010; 2023; 2024), I propose that V2 merges as the complement of the particle *ke*, forming a constituent. The particle *ke* bears no specific syntactic category features. It introduces an intermediate projection and percolates the T features from V2, rendering the *ke*-clause unlabeled. Then, *arhizo* is merged to label the coordinate complex. The outcome is a TP-TP coordination as in (8).

- (8) [C [TP arhizi [VP *arhizi* [T’ ke [TP trehi [VP *trehi*]]]]]]]

Under this view, there is no need to postulate an impoverished verbal morphology for V2 in *ke*-clauses (cf. K&C 2021), given that tense is canonically morphologically marked in these cases. Moreover, assuming a coordination analysis explains why there is no possibility of reordering the two conjuncts. This comes for free as a property of all asymmetric coordination types (Ross 1967, Lakoff 1986). The analysis further accounts for the restriction on the mood type that determines the negation marker. *Min* is connected to the subjunctive mood. Subjunctive is tightly connected to *na*, which, along with the morphosyntactic restrictions, gives rise to the phenomenon of control (Spyropoulos 2007, Roussou 2009). No *na* is present in *ke*-clauses. Therefore, *ke*-clauses select for the negative marker *dhen*. This analysis allows us to account for the interpretation of the *arhizo ke*-clauses as well. The identical tense features on both verbs allow for a simultaneous temporal reference between *arhizo* and V2, giving rise to an interpretative reflex: The two predicates are interpreted as a single event.

**Conclusion:** The comparison of *arhizo na*-clauses to *arhizo ke*-clauses highlighted significant differences between the two structures. It was argued that *ke*-clauses cannot exemplify subordination (cf. K&C 2021) but are a ‘quirky’ case of coordination.

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## Influence of Speaker Ignorance under Uncertainty on the Interpretation of Bare Numerals

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**Motivation:** Theoretical accounts of interpretation of (bare) numerals dispute whether they receive a punctual (i.e., ‘exactly  $n$ ’) or lower-bound (i.e., ‘at least  $n$ ’) interpretation (Spector, 2013). A bare numeral can be interpreted as expressing a lower bound via pragmatic inferences. Experimental evidence supports this ambiguity (Geurts et al., 2010): in the study, 50% of participants accepted the lower-bound interpretation of a numeral  $n$ . It is noteworthy, however, that the test items were phrased in the past tense, suggesting that the described events had already occurred. Employing *at least* gives rise to an ignorance inference, suggesting an absence of precise knowledge of the speaker (Cummins & Katsos, 2010).

Consequently, a bare numeral  $n$  receiving a lower-bound interpretation should trigger the same ignorance inference. Based on this, I hypothesize that future-tense scenarios (i.e., involving event uncertainty) will increase the acceptance of lower-bound interpretations. As a secondary factor, the characteristic of  $n$ , its roundness, may influence its interpretation as well by creating a pragmatic halo around the actual numeral, leading to an approximate reading (Krifka, 2009) and a reduction in the speaker’s commitment to the accuracy of their utterance (Van der Henst & Sperber, 2004).

**Method:** An online experiment (Prolific) was conducted in German. It incorporated a 3x3 between-subject design, with the two factors EPISTEMIC (competence\_certainty vs. ignorance\_certainty vs. ignorance\_uncertainty) x NUMERAL ( $n < m$  vs.  $\tilde{n} < m$  vs.  $\tilde{n} > m$ ). All nine conditions are listed representatively in Table 1. Each participant ( $L1$ : German, total: 318) was exposed to only one item in a single experimental condition. They were asked to judge whether a bet had been won or lost in the following context: Two befriended teachers made a bet about the number of class attendees. The class in question was either previously taught, had already been booked, or was in the process of being booked. Subsequently, it was ascertained that the actual number of attendees  $m$  was either less than or greater than the stated number  $n$  of participants. Regarding the influence of numeral roundness, both round and non-round numerals were tested; the number 30 was chosen as a base.

**Discussion & Results:** A binomial logistic regression (GLM with logit link) examined how speaker knowledge under event (un)certainty and numeral roundness influenced acceptance of lower-bound interpretations. There was a significant simple effect for the ignorance\_uncertainty condition compared to certainty in the non-round case ( $p = .03$ ), and likewise a significant difference between competence under certainty and ignorance under uncertainty for non-round numerals ( $p = .01$ ). In contrast, the study found no reliable effect for the contrast between competence and ignorance under conditions of certainty when it came to non-round numerals ( $p = .52$ ). This may be due to the lack of contextual salience in the ignorance condition (no knowledge about the number) or to the speaker’s expertise as an educator. These issues will be addressed in future studies.

Across conditions, numeral roundness exerted a significant main effect ( $p = .014$ ), with a tendency toward stronger contrasts between round and non-round numerals under certainty (see Figure 1). Finally, across all epistemic conditions, participants were significantly more likely to interpret round  $n$  as a lower bound rather than as an upper bound ( $p = .001$ ).

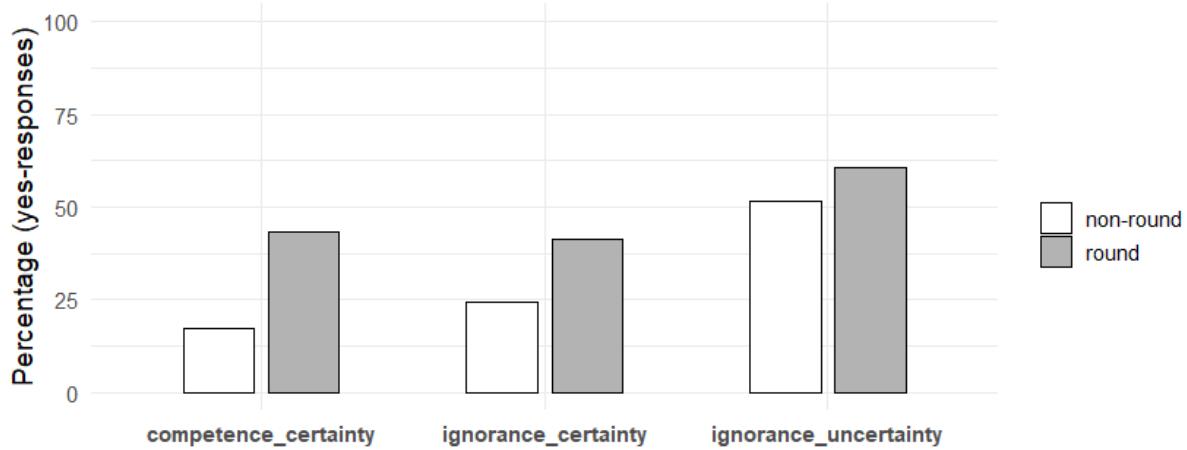


Figure 1: Acceptance rates for lower-bound reading of *n*.

	EPISTEMIC			
	competence_certainty	ignorance_certainty	ignorance_uncertainty	
<b>NUMERAL</b>	$\bar{n} < m = 31$	30 did attend	30 did attend	30 will attend
	$\bar{n} > m = 29$	30 did attend	30 did attend	30 will attend
	$n < m = 32$	31 did attend	31 did attend	31 will attend

Table 1: Default design of the critical sentences („I bet that *p*“) across conditions with the claimed numeral *n* and the actual number *m*

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## Refinements of the Hierarchy of Chinese Sentence-Final Particle Projections

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**Introduction:** Mandarin Chinese (along with other Sinitic varieties) is rich in sentence-final particles (SFPs), such as 吗 *ma*, 啊 *a*, 呀 *ya*, etc. Evidence shows that there is a hierarchical structure of SFP projections. Previous studies stretching from Zhu (1982) and Tang (1998) to Tang (2010) have proposed SFP hierarchies and indicated different SFP projection layers. Pan (2015, 2019, 2021) provides a detailed and sophisticated structure of the Chinese SFP hierarchy, indicating that the hierarchy of the Chinese SFP projections comprises six core projections, with the Attitude Phrase projection being the highest: (TP) < S.AspP < OnlyP < iForceP < SQP < AttP1 < AttP2. The core projections have different functions. S.AspP stands for Sentential Aspect Phrase. It marks temporal information related to the proposition in the sentence and, in recent syntactic theory, is viewed to project above (i.e., external to) the tense projection, or TP (Pan, 2019). OnlyP proposes a sentential exclusive focus in a sentence. iForceP stands for illocutionary Force Phrase. An iForceP expresses illocutionary forces such as interrogative and imperative. SQP stands for Special Question Phrase. SQP indicates a strong negative sense. AttP1 and AttP2 are two layers of Attitude Phrases. AttP layers convey exclamative force. AttP2 is the highest projection in Chinese. However, the above hierarchical structure cannot explain all combinations of Chinese SFPs, and the complete hierarchy of Chinese SFPs remains to be identified.

**Aims and Claims:** I will analyze the data from large-scale corpora, mainly the Beijing Language and Culture University Corpus Center (BCC) and the Center for Chinese Linguistics, Peking University (CCL) Corpus, aiming to refine the structure proposed by Pan (2015, 2019, 2021). I will adopt the Syntactic Cartography Approach of generative syntax, founded by Rizzi (1997), and concentrate on depicting the complete structure of the SFP projections. The analysis will conform to the X-bar Theory (Carnie, 2013). I shall argue that the refined hierarchical structure of Chinese SFP projections is: (TP) < S.AspP < OnlyP < iForceP1 < iForceP2 < SQP1 < AttP1 < AttP2 < AttP3 < SQP2.

**Analysis:** The hierarchical structure of Chinese SFP projections can be refined in the following three aspects: (1) Identifying 了 *le* as a judgment marker and subdividing two layers in iForceP projections; (2) Subdividing three layers in AttP projections; (3) Subdividing two layers in SQP projections, the higher one being the highest in the Chinese core projection hierarchy. The following analysis shows some examples from the corpora.

### 1. 了 *le* as a Judgment Marker and Two Layers in iForceP Projections

Pan (2021) suggests that 了 *le* is a typical head of S.AspP, the lowest projection above TP. Other typical heads of S.AspP are 来着 *laizhe* (as a recent past aspect marker) and 呢 *ne* (as a progressive aspect marker). However, evidence shows that 了 *le* can occur in a higher position.

(1) OnlyP < 了 *le*'s projection < iForceP

这	件	事	仅	此	而已	了	吗
zhe	jian	shi	jin	ci	eryi	le	ma
this	CL	matter	only	this	ERYI	LE	MA

'Is this everything about this matter?'

Sentence (1) shows that the syntactic position of the projection of this 了 *le* is between the projection of the OnlyP head 而已 *eryi* and the projection of iForceP head 吗 *ma*. Considering that 了 *le* in sentence

(1) conveys the speaker's judgment mood, this 了 *le* is a head of an iForceP. Because 了 *le* is lower than other iForceP heads like 呀 *ma*, iForceP needs to be subdivided into iForceP1 and iForceP2. Therefore, a better hierarchy of the relevant projections is: S.AspP < OnlyP < iForceP1 < iForceP2.

## 2. Three Layers in AttP Projections

Pan (2015) suggests that there are two layers in AttP projections. The lower AttP layer (AttP1) usually includes the SFP 呢 *ne* as an attitude marker. The higher AttP layer (AttP2) contains SFPs like 吧 *ba*. However, many AttP2 heads can co-occur in a sentence.

### (2) AttP2 < 吧 *ba*'s projection

你	总是	拖欠	房租	来着	吧
ni	zongshi	tuoqian	fangzu	laizhe	ba
you	always	fall.behind.with	house.rent	LAIZHE	BA

‘Oh, you always fall behind with the house rent!’

In sentence (2), 来着 *laizhe* conveys the speaker's attitude of uncertainty, making it differ from 来着 *laizhe* which indicates the sentential aspect. Sentence (2) indicates that SFPs like 吧 *ba* are higher than AttP2 head 来着 *laizhe*. Thus, AttP should be subdivided into three layers. 呢 *ne* is the head of the low-layer AttP1. 呀 *ya*, 啊 *a*, and 吧 *ba* are the heads of the high-layer AttP3. Other AttP SFPs are the heads of the medium-layer AttP2. The hierarchy of these layers is: AttP1 < AttP2 < AttP3.

## 3. Another SQP Layer as the Highest Projection

Pan (2015) proposes that an SQP layer is between iForceP and AttP in Chinese. Pan (2019) argues that SFPs related to the speaker's attitude cannot be interpreted under the scope of SQP. Otherwise, the speaker's attitude will be questioned in the SQP layer, leading to an incorrect interpretation. Nevertheless, sometimes, a speaker wants to question every element in the questioned sentence, including attitude. Then, the questioned attitude should be interpreted within the SQP layer of the speaker's sentence.

### (3) AttP < SQP

什么	Ø	我	留	在	这里	吧
shenme	Ø	wo	liu	zai	zheli	ba
what	NegQ°	I	stay	at	here	BA

‘In what sense can I stay here?’

= ‘It is nonsense of you to say that I can stay here!’ = ‘I cannot stay here!’

In sentence (3), SQP is higher than AttP (the projection of 吧 *ba*), because the speaker wants to negate another person's attitude, which is conveyed by 吧 *ba*. Consequently, there are two different SQP layers. The one is between iForceP and AttP, and the other is higher than AttP. The hierarchy of relevant projections is: iForceP < SQP1 < AttP < SQP2.

**Conclusion:** I evaluate the previous studies on the hierarchy of the projections of Chinese Sentence-Final Particles (SFPs) and provide three refinements for the hierarchy proposed by Pan (2015). I hypothesize three types of sublayers of SFP phrases: two sublayers of iForceP (instead of just one), three sublayers of AttP (instead of just two), and two sublayers of SQP (instead of just one). A better hierarchical structure of Chinese SFP projections is: (TP) < S.AspP < OnlyP < iForceP1 < iForceP2 < SQP1 < AttP1 < AttP2 < AttP3 < SQP2. This analysis provides a more precise perspective of understanding Chinese SFPs and peripheral structures, attempting to contribute to constructing the syntactic cartography.

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## Affective Responses to Political Speeches: Evidence from Pupillometry and Self-Assessment in Chinese–English Bilinguals

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**Background.** In the context of globalization, bilinguals' affective processing has increasingly attracted scholarly attention. However, most existing research has focused on isolated words or short phrases, leaving discourse-level affective processing, particularly in political speeches that employ affective framing, largely unexplored. Consequently, it remains unclear whether language and affective framing jointly influence bilinguals' affective responses. In addition, research that simultaneously incorporates both explicit and implicit measures has been especially scarce among late Chinese–English bilinguals living in the L2 environment.

**Previous Research.** Affective responses are typically measured along valence and arousal (Bradley & Lang, 1994). Many studies show stronger affective reactions in L1 than in L2 (Ayçiçeği-Dinn & Caldwell-Harris, 2009), influenced by factors such as acquisition context, language proficiency, and political orientation (Brader, 2006; Pavlenko, 2012; Chen et al., 2022). Moreover, the widespread use of affective framing in political speeches has been shown to shape audience responses (Nabi, 2003), but such effects may be confounded by paralinguistic cues. Reliable measurement is also essential in affective research. Pupillometry has been increasingly employed to investigate the physiological reactions underlying bilingual affective processing (Iacobza et al., 2017; Yao et al., 2023). While pupil dilation provides a sensitive index of affective arousal (Bradley et al., 2008), it is also affected by cognitive and contextual factors that may confound interpretation (Hyönä et al., 1995). Moreover, prior studies have reported divergences between subjective and physiological measures, highlighting the value of combining both approaches (Thoma, 2021).

**Current study.** To address these gaps, this study investigates late Chinese – English bilinguals living in an L2 environment by combining implicit (pupillometry) and explicit (questionnaire responses) measures. It examines how language (L1 vs. L2), affective framing (positive, neutral, negative), and their interaction shape affective responses to political speeches, and further explores whether these responses predict persuasion and decision-making tendencies. Specifically, the study addresses the following research questions: RQ1: Does language (L1 vs. L2) influence bilinguals' affective responses to political speeches? RQ2: Does affective framing (positive, neutral, negative) influence bilinguals' affective responses to political speeches? RQ3: Does language (L1 vs. L2) moderate the effect of affective framing on bilinguals' affective responses? Exploratory RQ: Are bilinguals' affective responses (valence and arousal) associated with their likelihood of being persuaded by political speeches or supporting the positions they advocate? This study advances theoretical understanding of bilingual affective processing and provides practical insights into the communicative efficacy of political messaging in multilingual contexts.

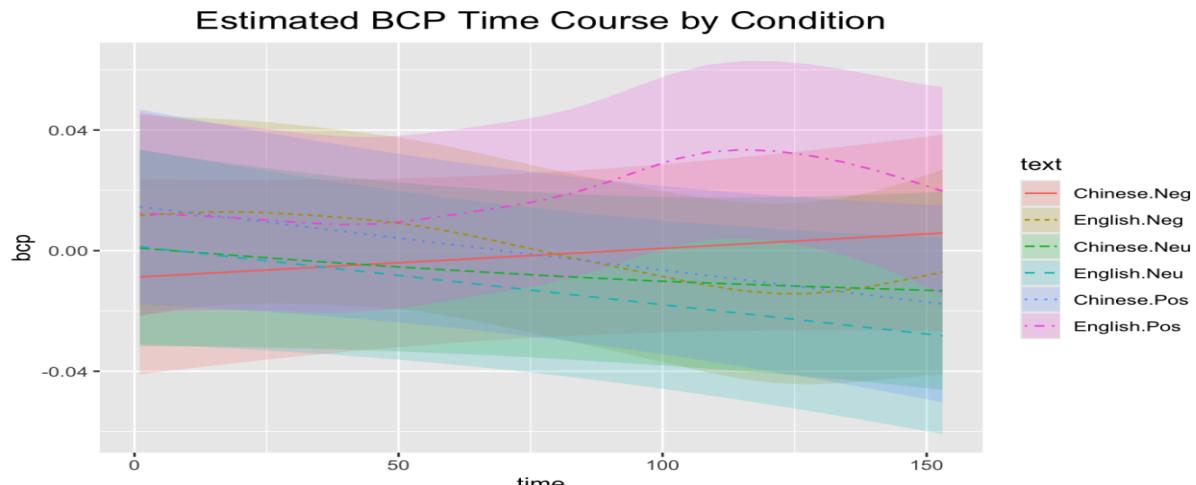
**Methods and Materials.** All participants ( $N = 40$ ; 24 female;  $M_{age} = 27$  years) wore Tobii Pro Glasses 3, listened to six audio clips presented in random order, answered four self-assessment questions after each clip, and completed a final questionnaire (including such information as language background and proficiency, political orientation, attitude of general trust, persuasion openness, and authority trust) at the end. A passage of around 80 words was edited from a UN political speech on climate change and, after matching affective properties using Affective Norms for Chinese Words dictionary (Lv et al.,

2024), word frequency, and syntactic complexity, developed into six audio stimuli across two languages (Chinese, English) and three affective frames (positive, neutral, negative). Stimuli were presented in neutral AI-generated voices to minimize prosodic variability. Five keywords per condition were selected for pupillometry analysis. Pupil size was baseline-corrected (-500 ms to +3000 ms around keyword onset) and modeled with Generalized Additive Mixed Models (GAMMs) to analyse affective arousal results. Valence and arousal ratings of self-assessment were analyzed with Linear Mixed Models (LMMs), and persuasion/support responses with Generalized Linear Mixed-Effects Models (GLMMs).

**Results.** Results from pupillometry showed no significant difference between Chinese and English conditions across emotional frames. Emotional framing elicited larger dilation in Positive and Negative than Neutral, though not all contrasts reached significance. The model indicated a language and framing interaction, with the strongest pupil response to positively framed speeches in L2. Figure 1 illustrates baseline-corrected pupil dilation time course across the six conditions. Self-assessment results showed that for valence, language effects were not significant, framing effects approached significance, and no interaction was found. For arousal, neither language nor framing effects were significant, and no interaction was observed. The overall persuasion rate was 76.7%, and support for the political speeches was reported in 94.2%. Arousal significantly predicted persuasion and decision-making outcomes, while valence intensity showed no effect on decision-making and unexpectedly exerted a negative influence on persuasiveness.

**Discussion.** No consistent main effect of language was observed in either subjective or physiological measures, while emotional framing showed partial main effects across both. For the interaction between language and framing, self-assessments showed no significant effects, whereas pupillometry indicated differential physiological responses across languages. Exploratory analyses further revealed that arousal, but not valence, predicted persuasion and support, underscoring arousal as a key driver of bilinguals' engagement with political messages. Overall, the findings highlight bilingual emotional processing as a multistage, dynamic system in which early unconscious reactions may diverge from later reflective evaluations.

**Conclusion.** This study showed that Chinese–English bilinguals' affective responses to political speeches were not reliably influenced by language. Emotional framing significantly shaped responses, with the strongest effects observed for positively framed speeches in L2. Stronger emotional resonance was also associated with increased persuasion and support. Overall, the findings contribute to a nuanced understanding of bilingual affective processing in political contexts and highlight the importance of integrating physiological and subjective approaches to examine how language and framing interact in shaping affective responses.



**Figure 1.** GAMM-estimated baseline-corrected pupil dilation time courses across the six conditions

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## Comprehension of passive voice in German and French-speaking children with Autism Spectrum Disorder (ASD): no negative effects of bilingualism

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According to current estimates, more than half of the world's population is bilingual (Ansaldi et al., 2008; Crystal, 2008). Bilingualism can be defined as "the use of two or more languages (or dialects) in everyday life" (Grosjean et al., 2013, p.5). Since bilingualism is a widespread phenomenon, many children, both typical and atypical, are growing up bilingual. Autism spectrum disorder (ASD), one of the most widespread neurodevelopmental disorders today (Zeidan et al., 2022), typically affects social communication, potentially yielding delays and deficits in language development (Beauchamp & MacLeod, 2017).

Bilingualism has been investigated for its potential cognitive benefits, particularly in Executive Functioning (EF). While bilingualism has been associated with improved EF, these effects remain inconsistent across studies (Bialystok et al., 2012; Paap et al., 2019). Research regarding the links between bilingualism, EF and the comprehension of complex syntactic constructions is still largely unclear, especially for autistic individuals who are reported to experience challenges in EF (Craig et al., 2016).

The current study aims to contribute to the growing but still limited research on autism and bilingualism by investigating the comprehension of a complex late acquired syntactic structure, namely passive voice, in French and German by 65 children with ASD and by 116 typically developing (TD) children aged 3 to 13 who show various degrees of bilingual experience, and for whom the aforementioned languages are the languages of the larger society and school/kindergarten instruction. The study also explores potential links between the comprehension of passive voice, age, and verbal working memory.

Passive voice comprehension was assessed through a gamified tablet-based character-selection task (Figure 1, Example 1). The children were presented with three pictures that depicted some characters, and the task was to select one picture that corresponded to the test item that had been aurally presented to the participants. First, the participants got familiarized with the main characters of the picture. Then they heard a test and saw three pictures on the screen. The picture on the right showed the target sentence in passive voice, the picture on the top showed the sentence with reversed theta roles while the picture on the left was not connected with the test item. After the response had been given, participants saw a motivating sign (e.g., a star) and heard a motivating phrase (e.g., nice job!).



**Figure 1.** Example of an image eliciting the comprehension of passive voice

### Example 1

#### Familiarization:

[Hier sind ein Hund und eine Maus]

[Here are a dog and a mouse]

**Test item:**

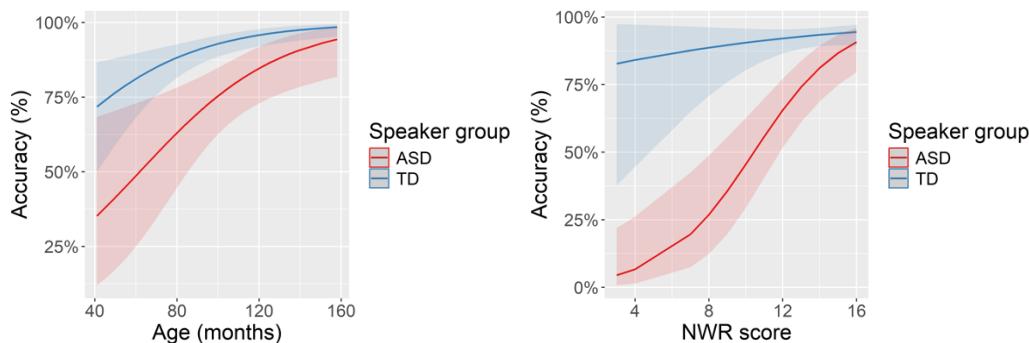
Die            Maus    wird            von    dem    Hund    ge-waschen  
 the.NOM        mouse    get. PRS. 3SG    by        the.DATdog    PST. PTCT-wash  
 ‘The mouse is being washed by the dog.’

Verbal working memory (WM) was measured through a non-word repetition task (NWR) from the LITMUS test battery (Chiat, 2015).

The current study, in line with the recent more nuanced views on bilingualism, adopts a *continuous* approach to bilingualism without splitting the participants into strict groups of monolinguals vs. bilinguals (Leivada et al., 2023; Rothman et al., 2023; Xia et al., 2025). We define bilingual experience as a balance of cumulative exposure (taken from Q-Bex questionnaires), measured through entropy scores (De Cat et al., 2023; Gullifer & Titone, 2020). Cumulative language exposure is the overall proportion of hearing a language throughout life (N of languages: 1 till 3). Based on this proportion the language entropy score was calculated. Language entropy captures the uncertainty of using a given language in a given moment and ranges from 0 till 1.585. The entropy score of 0 means no language diversity and a high predictability of a language while high entropy scores are linked to the higher language diversity and, consequently, very low predictability of a language in a given context.

Using binomial generalized linear mixed effects models, we modelled the response accuracy on passive sentences (either correct, 1, or incorrect, 0) as a function of speaker group (TD/ASD), bilingual experience (entropy score 0; 1.585), chronological age (3.42; 13.17), and verbal WM (1; 16). The model included two-way interactions of speaker group with every other fixed effect and a three-way-interaction of speaker group, verbal WM, and bilingual experience.

We found that the comprehension of passive voice improved with age among both groups (Figure 2, left panel), and higher WM predicted better performance in autistic but not TD children (Figure 2, right panel). Further, although autistic children were less accurate than TD children, bilingual experience did not contribute to the differences between the two groups, i.e., higher balance of cumulative exposure did not lead to better comprehension of passive voice within every group (i.e., TD and autistic children). These findings suggest that bilingualism has no detrimental effect on the comprehension of complex syntactic structures in autistic children.

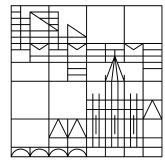


**Figure 2.** Left panel: Effect of age on the comprehension accuracy of passive voice by typically developing children and children with ASD; Right panel: Effect of verbal working memory on the comprehension accuracy of passive voice by typically developing children and children with ASD.

**Acknowledgments:** This study was supported by the Swiss National Science Foundation (SNSF) awarded to Stephanie Durrelman (grant PR00P1\_193104/1).

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We are very grateful to the [Dr. August und Annelies Karst Stiftung](#) for their support.