"I thought I was there, just sitting in my chair"

Towards immersive task-based elicitation methodologies using virtual reality

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Overview

1   **Evolving interests, evolving methodologies**

2   **Virtual reality as an elicitation instrument**

3   **VR in practice: Results & future perspectives**

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Evolving interests, evolving methodologies

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Evolving interests

The **Dynamic Turn** in SLA and sociolinguistics: language as a "Complex Dynamic System"

- de Bot 2015; Gudmestad et al. 2019; Larsen-Freeman & Cameron 2008; Verspoor & Lowie 2019

- Bülow et al. 2018, 2019; Kretzschmar 2015; Schleef 2017; Tamminga et al. 2016

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ID variables as dynamic entities

- **L2 motivation** varies on several time scales, from seconds (MacIntyre & Serroul 2015) to the lifespan (Kormos & Csizér, 2008) > Recent rise of 'Motivational Dynamics' (Dörnyei et al. 2014; Jiang & Dewaele 2015)

- **Personality traits**: New Big Five model (McAdams 2006; cf. old Big Five Model by Costa & McCrase 1985)
  - dispositional traits: openness, conscientiousness, extraversion-intraversion, agreeableness, neuroticism-emotional stability;
  - characteristic adaptations, e.g. motives, goals, plans, strategies, virtues, self-images, etc.;
  - self-defining life narratives

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Evolving interests
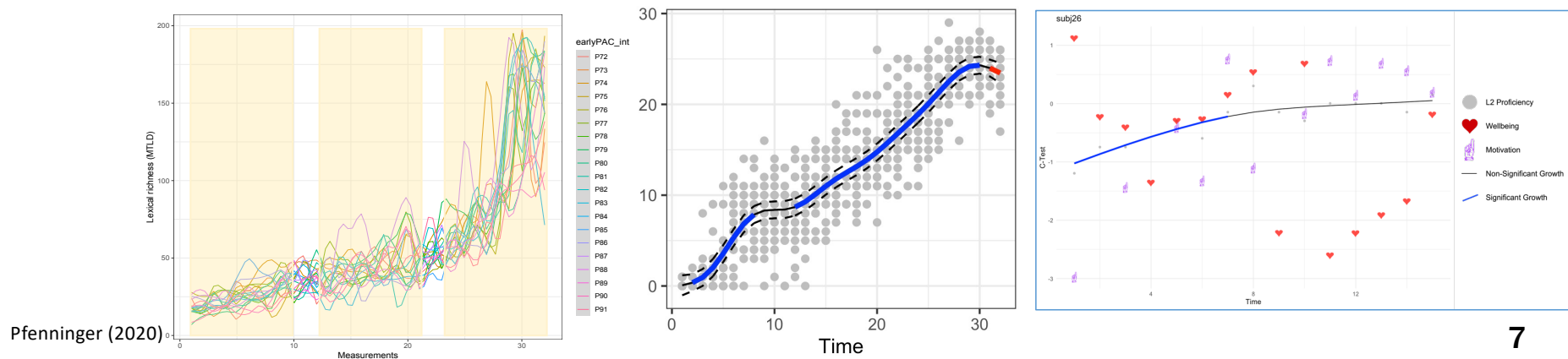
Process-oriented rather than product-oriented views

What's new about this? (Hyltenstam 1977; Tarone 1982; Thelen & Smith 1994)

- Capture 'adaptivity' and changing systems within and across environments
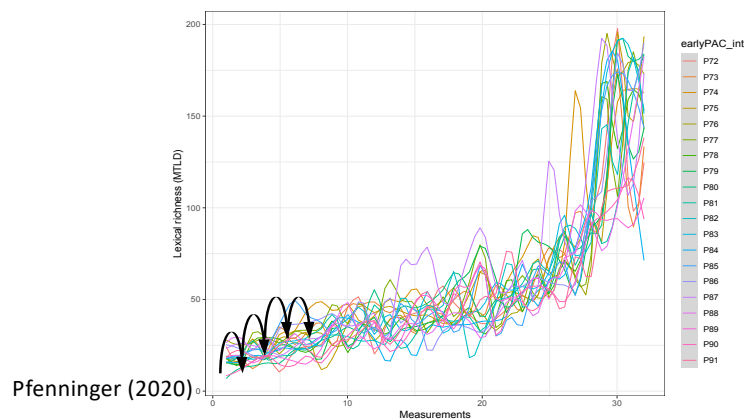
Pfenninger (2020)

Evolving methodologies

1. Over **what time** do ID variables (cognition, socio-affect, age, multilingualism, education) work in L2 development – and **for whom**?

2. **Who** profits from L2 learning and **when**? (see e.g. Kliesch, Pfenninger, Wieling, Stark & Meyer 2021)

3. What is more important for L2 development: **between** or **within-participant variation** in ID variables?

4. How are **periods of significant L2 growth** characterized in terms of variable learner behavior, socio-affective variables and cognitive functioning?

Pfenninger (2020)

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Evolving interests

ID varibales – and language in general – are **not (meaningfully) separable** from (a) their inherent **social function** or (b) **agents/individuals**
(Beckner et al. 2009; DeKeyser 1991; Sanz, 2014; Serafini 2017)

Language exists in individuals and communities and is constrained by the **social structures of interaction**.
(Hiver & Al-Hoorie 2019; Douglas Fir Group 2016)

- E.g. 'person-in-context relational' view of L2 motivation (Ushioda 2009)

- E.g. 'person-environment fit' of learners' L2 engagement (Reschly & Christenson 2012)

- "[C]ontext functions as a way of bracketing a system within an environment and giving ecological coherence to that system, its actions and its states"
(Hiver & Al-Hoorie 2019: 57)

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Evolving methodologies

1. Conceptualizing and operationalizing 'context'?

   - "The most uphill task [in SLA] may be in acknowledging that 'everything counts' (Thelen, 2005, p. 261) when it comes to how effects are caused." (Hiver & Al-Hoorie 2019: xx)

   - "How are the boundaries of a system to be identified? Is it entirely up to the arbitration of the researcher, and should boundaries naturally present themselves as the system evolves?" (Han 2021: 165)

2. Focus on the interaction between learner and environment

3. Participant perspectives help identify aspects of context that seem salient to particular individuals

4. Context-dependent **elicitation instruments**

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Promises of VR as a tool for the experimental language sciences

Ecological validity and experimental control should not be conceived of as two extremes on a continuum. (Peeters 2019)

Virtual Reality (VR) technology affords a relatively straightforward methodology to investigate the role of context on learning, memory, and emotion while maintaining experimental control.
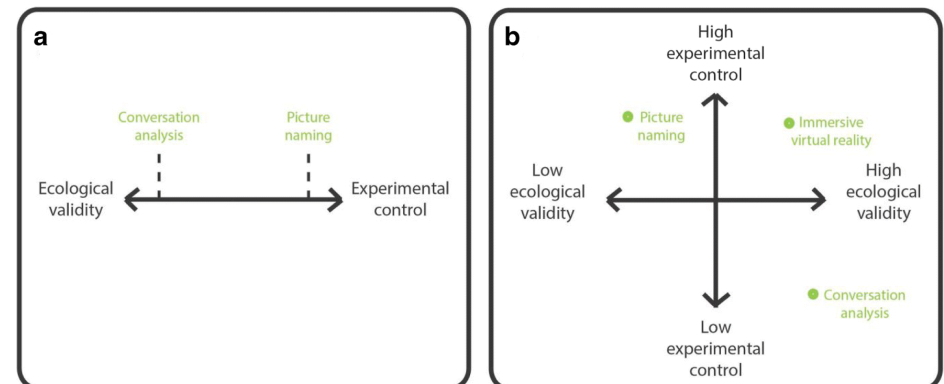
- no artificial spatial divide between participant and stimulus

- Virtual agents outperform experimental confederates in terms of the consistency and replicability of their behavior, allowing for reproducible science across participants and research labs.

- interplay between different modalities (e.g., speech, gesture, eye gaze, facial expressions) in dynamic and communicative real-world environments

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Virtual reality as an elicitation instrument

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Criticism of VR under the assumption that "humans do not interact with computers in the same way that they interact with other humans, making any behavioral measure of language interaction with a computer- partner ("avatar") ecologically equivocal." (Heyselaar et al. 2017: 2351)

Speakers socially and interactionally **engage** with virtual/digital avatars **in human-like ways.** (Casasanto et al. 2010; Heyselaar et al. 2017; Nass/Moon 2000; Peeters/Dijkstra 2017; Stoyanchev/Stent 2009)

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1. Interpersonal varietal behavior (e.g., convergence)

2. Intersituational varietal behavior (e.g., formal vs. informal)

3. Exclude common socioling. interview confounders:

   (a) live interlocutors' own (unintentional) accommodative behavior to their respective interviewee;

   (b) different power asymmetries between different dyads and

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Combination of **discourse completion tasks** (DCTs) with **virtual reality** (idea introduced in Vanrell et al. 2018)

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Virtual reality as an elicitation instrument: Rationale

1. DCT can be **administered orally** and/or in writing

2. Cornerstone of DCTs is that they **describe different scenarios** (e.g. with differing degrees of social distance/dominance), the rationale being to elicit a desired speech act (see Kasper/Dahl 1991)

3. DCTs provide **background information** about the current **context** and information on the **social distance** between interlocutors (Vanrell et al. 2018; Nurani 2009)

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Classic dialogue construction DCT:

You are at an academic conference and there is no coffee. An organizer asks you if everything is okay. You have a caffeine deficiency after a long day. Tell the organizer you need coffee.

← **Situational and social contextualizing information**

Organizer: Hey there, everything okay?

← **Initiated interlocutor utterance/question**

You: _____

← **Construction of dialogue**

- **Goal** typically to elicit speech acts
- The instrument has been **methodologically broadened**

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VR oral dialogue construction   VR open item-verbal response

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VR **oral dialogue construction**

Contextual information	[NAME] is from the countryside in Upper Austria where everyone speaks dialect with one another. She is now living in Salzburg and struggles to judge where and with whom she should speak dialect and High German. She would like to ask for your advice.
Q1: [Austrian dialect]	Hey, good that you're here! Um, I have a question for you (..). Well, I'm from the countryside and we really speak ONLY dialect with each other. (...) And, in Salzburg (..), it is really different. And I just don't know (...) when should I speak High German, and when should I speak dialect. Do you know?
Participant response	...
Q2, Q3 [Austrian dialect]	Series of 2 follow-up questions

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VR **open item-verbal response**

Informal	You have **entered the apartment of your friend Laura**. You are both running late and about to miss your bus to take to the movie theater. Laura promised to meet you at the front door, but you do not see her. You suppose she is in her room and didn't hear you come in. **Let Laura know she needs to hurry and meet you at the door if you are still going to catch your bus**.
Formal	The date for applying to a German exam has passed, but you know that someone last year applied at this language institute for the same exam after the application term had ended. You absolutely need this exam for your residency permit, otherwise it will not be able to be renewed. You go to the **secretary's office in the language institute** where applications for the German exam are handed in. **Explain that you have heard exceptions can be granted and clarify your dire need to take the coming exam**.
'Mixed'	Your meeting at work ran late and you know you missed the last bus. But luckily, **your work colleague Alex, with whom you have a good professional relationship**, drove to work in her car. While you have never met with Alex outside of work, you know she lives in the area near your apartment. Not wanting to call a taxi, **explain to Alex that you live not far away from her and ask if she could give you a ride home tonight**.

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Virtual reality as an elicitation instrument: VR configuration

VR headset:

Shinecon (model: FIYAPOO) headset for smartphones

Smartphone:

iPhone 11 with a 6.06" full HD screen, 4 GB RAM and a gyroscope sensor

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VR configuration criticism

Previous VR studies have made use of more advanced (and expensive) hardware configurations

BUT

No evidence that more advanced/expensive configurations produce significantly different/better results than low-cost VR headsets (Papachristos et al. 2017; Amin et al. 2016)

Results

RQ1

To what extent does this virtual reality configuration provide an immersive environment for participants?

RQ2

Do any background variables predict differences in the overall user experience ratings?

21 **L2 German speakers**

- L1 English
- Central Bavarian area (Salzburg/Upper Austria)
- Age: M = 30.3; SD = 8.97
- Length of residence: M = 3.81; SD = 3.27
- Highly educated
- Std. proficiency between A2–C1

System usability: Ease of use of the instrument
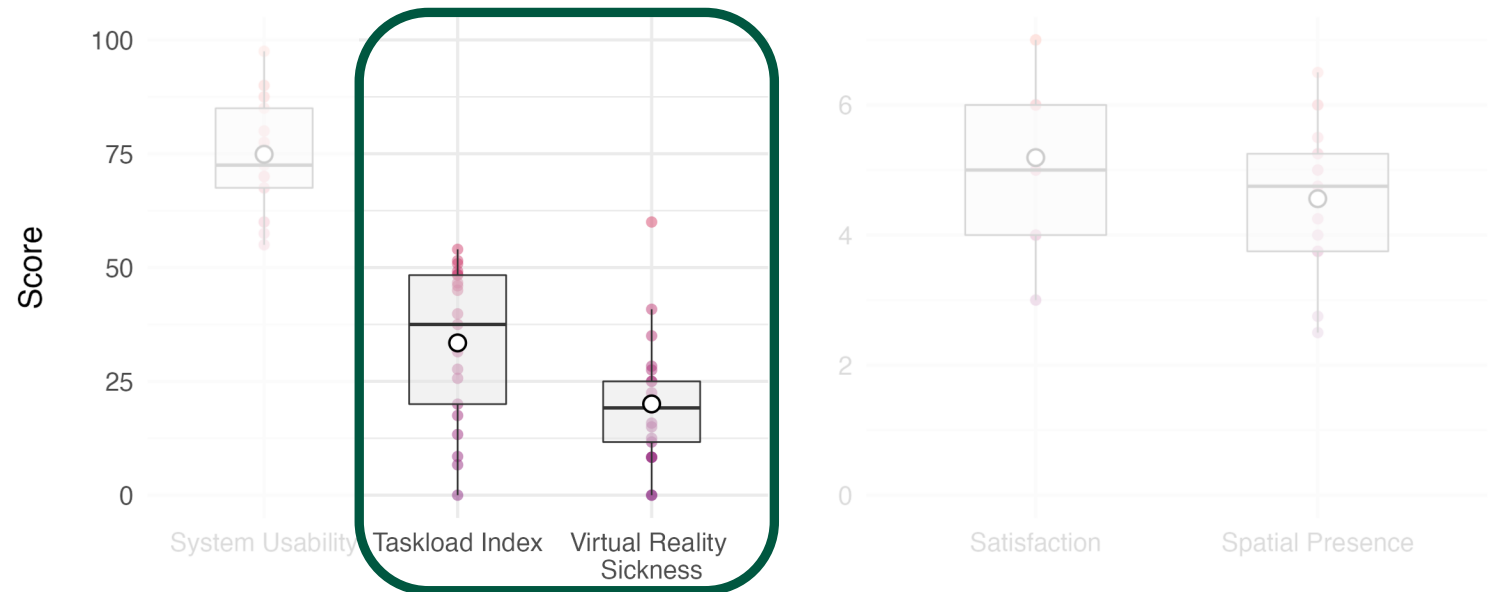
- Higher = better
- System Usability Scale (Brooke 1996)

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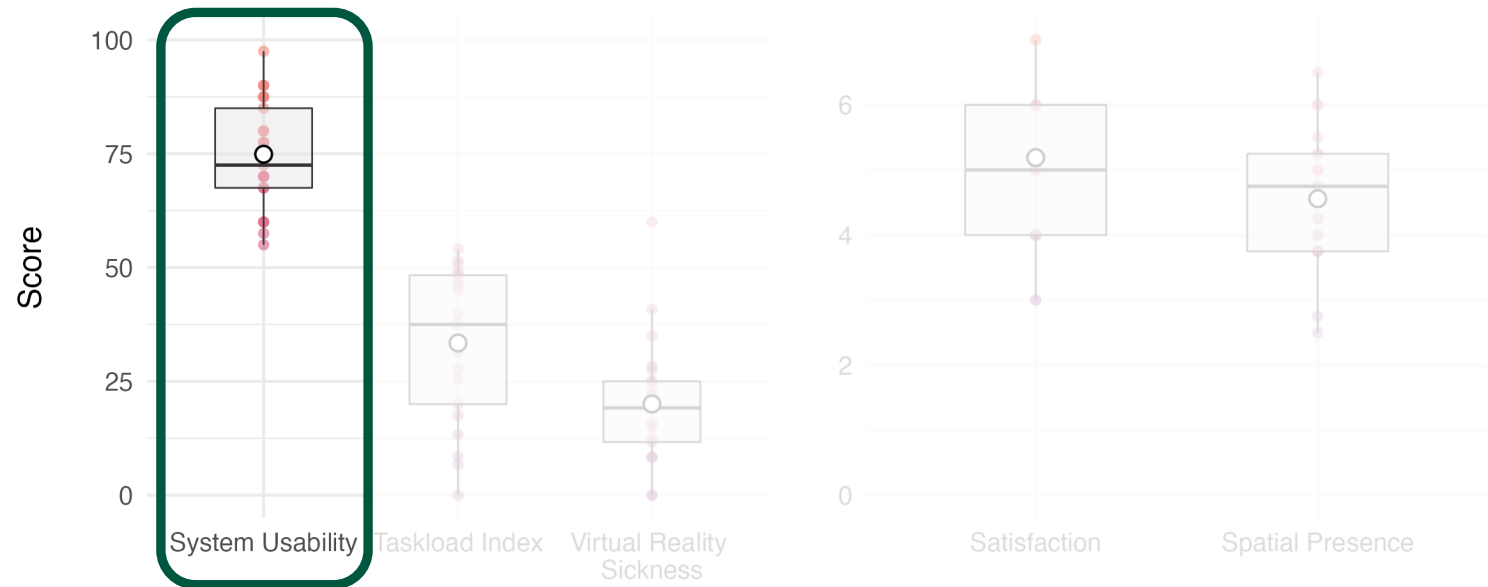
Taskload: Physical and mental effort required for task

- Lower = better
- Task Load Index (Hart 2006)

VR Sickness: Oculomotor and disorientation symptoms

- Lower = better
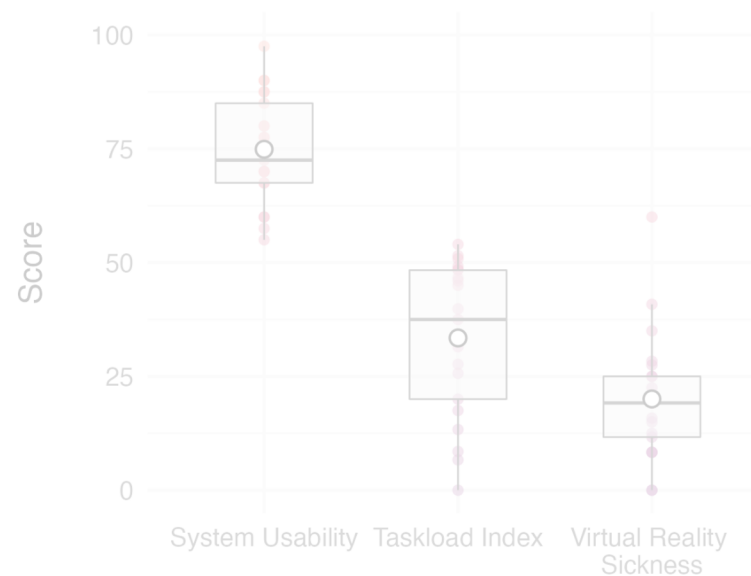- VR Sickness Questionnaire (Kim et al. 2018)

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Satisfaction: Overall satisfaction with VR

- Higher = better
- Satisfaction item (Papachristos et al. 2017)

Spatial presence: Immersiveness regarding field of view/visual quality

- Higher = better
- Temple Presence Inventory (Lombard et al. 2009)

Overall user experience **not predicted by:**

standard German proficiency (ß = −0.01 ± 0.13, t = −0.08, p = 0.94)

dialect proficiency (ß = −0.05 ± 0.13, t = −0.36, p = 0.73)

age (ß = −0.24 ± 0.15, t = −1.57, p = 0.14)

length of residence (ß = 0.16 ± 0.17, t = 0.94, p = 0.36)

Noteworthy results of **individual user experience dimensions**:

Older participants tended to be **less satisfied** with VR
(ß = −0.09 ± 0.05, t = −1.86, p = 0.07)

VR tended to require **higher mental demand** for participants with
lower standard German proficiency
(ß = −0.76 ± 0.39, t = −1.94, p = 0.06)

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RQ3

To what extent do L1 German speakers converge to the standard German and dialect variety of the VR interlocutor?

9 L1 German speakers

- Central Bavarian area in Austria
- M = 25.8 years (24–28), SD = 1.2
- High standard German and dialect proficiency
- College education

Analysis

- Bayesian mixed-effects models (due to small sample size)
  - Frequentist models with small N lead to more Type I errors (false pos.)
  - Bayesian models provide uncertainty measures → more conservative
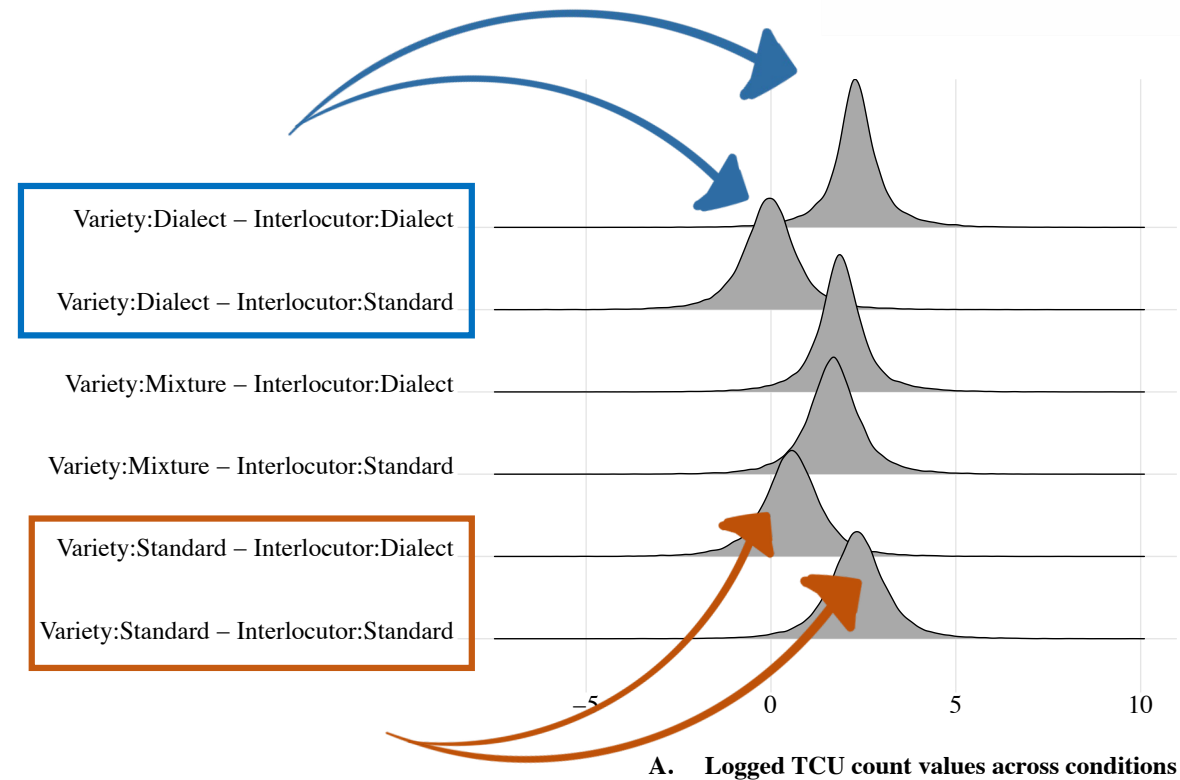
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Group patterns of intra-speaker variation

Clear trends of convergence:

- **Dial. variety** reduced w/ std. interlocutor

- **Std. variety** increased w/ std. interlocutor

(Wirtz, under review)

Open data: https://osf.io/ebcdf/

Variety:Dialect – Interlocutor:Dialect

Variety:Dialect – Interlocutor:Standard

Variety:Mixture – Interlocutor:Dialect

Variety:Mixture – Interlocutor:Standard

Variety:Standard – Interlocutor:Dialect

Variety:Standard – Interlocutor:Standard

−5   0   5   10

A.   **Logged TCU count values across conditions**

Perspectives for practice

Perspectives for practice: Pedagogical implications

- With increasing (open access!) VR material, language learners can practice in realistic interactions w/ cost-effective VR headsets (Ahlers et al. 2020)

- Introduce novel interactive situations via VR to reduce stress in future similar interactions (also applicable in behavioral neuroscience (Tarr & Warren, 2002), neuropsychology (Rizzo et al., 2004), and health science (Garrett et al., 2014))

- Create interactive and exciting material to engage students and increase motivation (teaching grammar with VR?)

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- Pilot studies
- Small(er)-scale investigations (at Bachelor, Master, doctoral level)
- (Partial) replacement of sociolinguistic interviews
- VR use replacing oral interviews (e.g., extraction of CALF measures)
- Elicitation of speech acts
- Use in large(r) groups
- Cost-efficient

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- Task-based elicitation methodology can **accommodate longitudinal designs** and provides a task primed to elicit and **capture learners' dynamically changing subsystems**

- New possibilities for exploring how **context-dependent IDs** and sub-components dynamically **interact with the external environment**

- Allows for analyses beyond CALF, i.e., a method to **investigate learners' developing socio-cultural and interactional skills** across realistic contexts

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Thank you for your interest!

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