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## Dialogical cognition<sup>☆</sup>

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### ABSTRACT

In this article we review Per Linell's work within the last five decades that led to his dialogism framework, which he defines as a general epistemology of language, cognition and communication. We critically discuss how his contribution on the one hand, altered and qualified existent models within language, communication and cognitive science, because dialogism removed language and cognition from their abstract and mental seat in the brain, and embedded them instead in situational contexts and embodied interaction. In that sense, his dialogism successfully replaced monological assumptions about the mind, action and thinking with more contextual and temporally distributed ones. On the other hand, we also question why Linell has not pursued a more rigorous empirical program for studying human cognition, when he did establish a theoretical apparatus for approaching cognition from a dialogical starting point. In going through Linell's arguments over the past five decades we suggest that this absence of an empirical program is due to his humanistic roots which both have sensitised him to appreciating the contingencies and dynamics of human sense making and cognition, and have impeded him from buying into a necessary condition for pursuing a cognitive analysis, even if he conceptually and methodologically accepts a distributed view on cognition. The outcome of this discussion leads to an empirical-based cognitive analysis of a medical interaction. Altogether, the purpose of this article is to show how Linell's conceptual framework can be put to use in ways that make a dialogical cognitive science achievable.

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## 1. Introduction: Linellian landscapes

Everyone who sets out to develop a theory of language, languages, or languaging, is destined to produce a proto-anthropology. Vocalisations of the kind that are classified as 'linguistic' in our everyday understanding of the term, are so uniquely human that we cannot embark on an exposition on them without—implicitly or explicitly—providing a viewpoint on human nature. In the second half of the twentieth century, a key nexus between linguistic theorising and proto-

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anthropology has been theories of cognition, traditionally understood as the mental mechanisms that underlie observable behaviour. The so-called cognitive sciences were taken to include psychology, philosophy, linguistics, anthropology, neuroscience, and artificial intelligence (Miller, 2003), whereby the partial projects of understanding human nature were subsumed under an overarching aspiration of understanding cognition. Accordingly, from Chomsky and onwards, the particular projects of theorising language, languages, or languaging, have pivoted on general proto-philosophies of human cognition. To Chomsky, language was basically a specialised computational system for generating sentences, the social fate of which was inconsequential and relegated to a realm of linguistic postpartum. To the cognitive linguists in the 1970s and 1980s, language was not a specialised cognitive domain, but an expression of general cognitive capabilities: “a grammar is then a theory of cognition, not just a theory of language” (Langacker, 1976, p. 321). Finally, in the recent decade, contemporary thinking on cognition as embodied and distributed has prompted a new school of language scientists who see language as intertwined with behaviour or agency more generally (Cowley, 2011; Di Paolo et al., 2018; Steffensen, 2015).

While the dominant theories in linguistics have derived theories of language from a general conceptualisation of cognition, this article will reverse the relationship by assuming that our understanding of cognition can gain from contemporary approaches to human sense making. More specifically, we will examine the oeuvre of Per Linell, which to date counts 200 publications, out of which five are monographs (Linell, 1979, 1982, 1998, 2005, 2009). We orient to Linell for two reasons. First, throughout his career he has encouraged and insisted on asking foundational questions about constitutive features of communication, language, and thinking. He has articulated strong epistemological concerns regarding the need to counter monological and individualistic assumptions prevalent in Western culture and science. Second, he has developed a unique research program of *dialogism* (later, extended dialogism) as a framework for understanding and investigating how human sense making derives from the interdependence with other human beings, as well as with their surroundings. Reiterating our starting point—that all theories that pivot on the human capacity for sense making are inherent philosophies of human nature—a dialogical theory of sense making in language entails a dialogical theory of cognition. Linell has occasionally hinted to his thinking on cognition, but he has never explicated it in a systematic way. In this article, we will discuss his work as a contribution to cognitive science, and we will synthesise and extrapolate his contribution into an *anthropology of dialogical cognition*.

In section 2, we discuss why cognition matters for the language sciences. We also argue for the need to link Linell's contribution to the cognitive sciences in systematic ways by proposing the frame *dialogical cognition*. In section 3, we review Linell's impact on the language sciences and beyond by scrutinising his significant epistemological and ontological contributions to our understanding of human sense making. Then in section 4, we present an anthropology of dialogical cognition that is firmly rooted in the Linellian landscapes of dialogism, sense making, and interdependence. We illustrate this framework with a single case study in section 5, before drawing some concluding remarks section 6.

## 2. Why cognition?

Per Linell has been very explicit about his disappointment with the *modus operandi* of linguistics from the 1970s and onwards. He emphasised that he gave up on linguistics many years ago, and as he expresses in the interview in this special issue (see Trasmundi, 2024, this issue), he laments the fact that he has not managed to change the discipline's focus from abstract language systems to language use. He highlights a specific frustration that characterised his mindset for many years, influencing the course of his career: “In the beginning, in the late 1970s, I was confused, because I didn't understand why linguists created these kinds of weird models, and why these formal models were so remote from the way that language was used in mundane situations, or what the Danish linguist Jakob Steensig calls ‘language in reality’” (Trasmundi, 2024, this issue).

Linell's move towards a dialogical epistemology allowed him to address the dialogicality of human life forms, that is, how humans interact with their world as biological, social, and cultural beings. His approach involves theoretical notions of action, perception, languaging, and multimodal engagement, both theoretically and empirically. Yet, his linguistic background always developed in dialogue with observations of human activity as it was practiced in and across communicative contexts. While his starting point was indeed dialogical and anthropological in nature, his descriptions were closer to a philosophy of real people of flesh and blood. His descriptions of agency as constrained by linguistic patterns were elaborate, yet he has been relatively silent when it comes to ‘cognition’, and he never went on to explicate a *dialogical theory of cognition*. We take up this challenge in this article by outlining a dialogical theory of cognition. We do so by synthesising (an extrapolated version of) Linell's reflections on human thinking, his dialogical contribution to the language sciences, and our own work in the intersection between cognitive ethnography and dialogical interaction analysis.

While Linell has relied on historical and cultural arguments for not outlining a dialogical theory of cognition, we argue that Linell's work on the dialogical mind, human thinking, sense making, and the dialogical brain offers a framework for ‘dialogical cognition’. Our contention is that dialogical cognition can add to both ecological psychology and distributed cognition (which we see as continuous, cf. Baggs and Steffensen, 2023). Indeed, by taking Linell's theoretical contribution into the realm of cognitive science, we suggest some future avenues of dialogism. Dialogism may have started with Linell, but it does not end with him.

Our approach is itself dialogical. Specifically, we unfold concepts from Linell's authorship over more than fifty years by going through selected works that engage with cognitive issues of human life forms, while at the same time connecting these ideas to developments in cognitive science. In this respect, our leitmotif is that while Linell has been silent about cognition,

the cognitive sciences have been equally silent when it comes to the dialogicality of human behaviour, because its primary focus has been on the functional mechanisms of cognition as they unfold in a person's mind, decoupled from other agents. The two fields have highlighted different aspects of human thinking, but they have unfortunately worked in parallel tracks. We argue that dialogical cognition connects recent state-of-the-art developments in the cognitive sciences, which see cognition as ecological and distributed, with Linell's core interest in human-specific modes of existence. As such, Linell's framework can be used to bridge the gap between scientific accounts of agency and an understanding of the human condition as profoundly interdependent, vulnerable, and indeed dialogical.

### 3. Cognitive concepts in Linell's work

In this section, we review the development of cognitive reflections in Linell's work. The section is divided into two subsections, which are devoted to Linell's proto-dialogical thinking<sup>1</sup> (section 3.1), and the period of dialogism (section 3.2), respectively.

#### 3.1. A structuralist sheds his slough

In *Aspects of the Theory of Syntax*, Noam Chomsky famously claimed that “in the technical sense, linguistic theory is mentalistic, since it is concerned with discovering a mental reality underlying actual behavior” (Chomsky 1965, p. 4). However, as pointed out by Seuren, Chomsky's grammar in the mid-1950s functioned “merely as an algorithmically organized generative rule system generating the infinite set of sentences of a language on the basis of a finite corpus of sentences that are judged well-formed by native speakers” (Seuren 1998, p. 253). The generative and mentalistic aspects of Chomsky's work did not originate from a single point, and in his 1974 doctoral thesis from Uppsala University, *Problems of Psychological Reality in Generative Phonology*, Linell dissected Chomsky's theory at this joint between generativism and mentalism.<sup>2</sup> This manoeuvre is important and interesting for two reasons: First, it gives us an insight into the argumentative structure that Linell uses to establish a theoretical alternative, and second it is the earliest hint of how Linell considered various cognitive issues.

As for the first of these two points, Linell's argumentative structure in establishing theoretical alternatives is more explicit in the 1974 version of the discussion on psychological realism<sup>3</sup>. Linell demonstrates that “the generative theory of abstract morphemes is built upon metaphysical assumptions [...] that are neither necessary nor probable” (Linell, 1974, p. 5), and based on this observation his chapter 4 is an “Outline of an alternative linguistic metaphysics.” In other words, Linell's relies on an argumentative structure where he first identifies the metaphysical assumptions of a given theoretical tradition, and then develops an alternative through a negation of these assumptions. In later work (e.g., Linell, 1998, 2005, and 2009), this trope takes Linell from monologism to dialogism, but back in 1974 the trope is more modestly used to question and transcend the generative framework. It basically scaffolds Linell's redefinition of what is considered to be an adequate theoretical starting point for understanding grammar:

A native speaker's internalized grammar is hardly a self-contained abstract psychological structure (as the Chomskyan approach may suggest); it is something which the speaker uses for communication with other people and with himself, and it is shaped by its functions in communication. Linguistics therefore needs a behavioural perspective on language. What the speaker (and the listener) do in communication is ‘performing acts according to rules’ (Searle, 1969: 22). Accordingly, the basic unit of linguistic analysis is the *speech act* (cf. Searle, *ibid.*). (Linell 1974, p. 27)

It is remarkable that Linell, in the very first pages of this volume, evokes “a behavioural perspective on language” as this theme comes to dominate his work in the 1980s and (especially) the 1990s. At this early stage, however, the “behaviour” conjured up by Linell is still couched in terms of the analytical philosopher's schematisation of behaviour as acts that accord to rules. While such views made their way into pragmatics, Linell's dialogism would soon adopt a much more nuanced view on human behaviour (cf. section 3.2 below).

The second point pertains to Linell's view on cognition. Basically, in the 1970s, the cognitive question for Linell is how language is enabled by specific cognitive mechanisms: memory, production, perception, and comprehension of speech

<sup>1</sup> The term ‘proto-dialogical’ refers to the period before he adopted the term dialogism as a description of his position. Many of the dialogical tenets are present—in an embryonic form—already in the 1970s.

<sup>2</sup> His thesis was published by Cambridge University Press in a strongly revised version as *Psychological Reality in Phonology* (Linell, 1979). In this section, we will draw on both versions. In short, the discussion on psychological realism pertains to the degree that constructs presented in a theory correlates with psychologically real phenomena in the cognitive system of those who exhibit the linguistic behaviour under scrutiny. For instance, is the MERGE function in minimalist grammars merely a theoretical construct used to make a grammatical model work, or IS MERGE a process that takes place in the minds or brains of language users? As noted by Goldrick (2011, p. 632), “psychological realism adopts the theoretical perspective of cognitive psychology to understand language-related behavior.”

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sounds and speech acts (Linell, 1979, p. 3). In rejecting Chomsky's "naive optimism" in favour of a position of "moderate realism", Linell argues that a linguistic theory must rely on "many types of 'external' evidence" (Linell, 1979, p. 5). Linell thus rejects both Chomskyan autonomy—according to which language depends on a unique linguistic module (in the brain and/or in the mind)—and structural autonomy which holds that language cannot be explained psychologically for which reason only structural methods suffice. Anticipating future terminology, Linell here expresses a scepticism towards two "monological" theories, in favour of a theoretical position that acknowledges the need for messier types of empirical evidence.

In other words, faced with the Scylla of structuralist immanence and the Charybdis of Chomsky's abstract mentalism, Linell embarks on a project of developing a theory of phonology that is cognitively plausible. We will not pursue the finer details of this Linellian phonology, but merely discuss Linell's perspective on cognition, as seen from a contemporary perspective (i.e., with a good portion of hindsight bias). Linell's solutions draw heavily on mentalist conceptualisations from cognitive psychology (which, in fairness, was the only accessible theoretical construct at the time). For instance, Linell assumes that empirically observed pronunciation variations are due to the fact that "for each word form there is [...] one phonetic plan which is psychologically central [...] The plan (intention, goal) is what is constant, while manifestations vary." (Linell 1979, p. 47f.). Linell thus pedestals mental concepts as that which specifies and determines behaviour ("phonological acts"). On a cognitive level, thus, Linell (1979) adopts a mentalist stance as well as an individualist stance (the latter in the sense later defined by Linell in his description of "the ontology of monologism" (Linell 2009, p. 44–47)). However, there are two important provisos to this characterisation. First, while Linell superficially seems to accept a mentalist stance, he explicitly grounds it in perception:

That word forms are perceptual structurings seems to be a reasonable metaphysics. [...] No real phonological structuring of a (linguistically defined) string is more abstract than a possible perceptual structuring of a possible pronunciation of that string. Only what can be heard (what are possible auditive percepts) are possible phonological structurings. (Linell 1974, p. 34)

In the context of Linell's critique of generative phonology, such a passage serves to undermine the hyper-abstract phonological forms posited by Chomsky and Halle (1968). But at the same time, it indicates a much more nuanced position that acknowledges the interplay between cognitive processes and the world within which the cognitive agent lives. Linell evokes Neisser's (1967) concept of "figural synthesis," and he even references James Gibson in his general discussion of 'meaning' in a long footnote (Linell 1974, p. 160f.). In this discussion, Linell explicitly adopts a critical view on mentalist theories of meaning:

If 'meanings' are 'things (images) in the minds' of speakers, one is very close to claiming that the content of a message concerns mental conceptions of external extralinguistic object (etc) rather than these objects themselves. If so, the theory shows a relatedness to, for example, theories of visual perception according to which one does not see external objects but rather mental pictures of these. Such theories are conceptually unsound (Linell, 1974, p.161)

Today, one can lament that this insight was not given more emphasis at the time, especially as the ecological perspective espoused by Gibson and others is now a major inspiration for recent unorthodoxies in the language sciences<sup>4</sup>. However, such a reaction builds on the luxury of having half a century's distance to the events. Linell interpreted Gibson as having "another—somewhat more speculative but highly interesting—constructivist approach" (Linell, 1974, p. 163). At the time Gibson's framework was not sufficiently developed to offer a starting point for a perceptually guided theory of phonology, perhaps especially because Gibson's view on language (1966, p. 90–96) comes over as quite irrelevant for the kind of linguistic metaphysics that Linell was developing at the time<sup>5</sup>. Interestingly, in the 1979 book, Gibson has disappeared, and Neisser only appears in a single footnote. Much later—in Linell (2022) – Gibson is explicitly listed as a "source of inspiration" and as a scholar who has a "dragning mot dialogiskt tänkande om interaktion" ["an attraction to dialogical thinking about interaction"] (Linell, 2022, p. 421).

The second proviso to be mentioned here is that Linell's apparent cognitive individualism is counterbalanced by evoking *situational interpretations* on an interactional level (Linell 1979, p. 35). Thus, to Linell the situated interplay between speakers determines the meaning of utterances, which is therefore irreducible to intra-grammatical categories and processes. This is an important precursor to Linell's later work on interaction (e.g., Linell, 1998) and his dialogism in general. To capture these situational aspects, Linell's strategy is straightforward Gricean speech act theory and conversational implicatures. From a contemporary perspective, the evocation of Grice is underwhelming, but within the context of a debate on structuralist vs. generative phonology, it is a remarkably innovative starting point.

<sup>4</sup> cf. the contributions to the Language Sciences special issue *Ecologies of Language, Communication, and Development*, edited by (Raczaszek-Leonardi et al.) Language Sciences.

<sup>5</sup> For instance, Gibson assumes that "vocal speech [...] contains symbols which carry the meanings of things in the common environment of all individuals. These enable men to think of the same things, to have concepts in common, and to verify their concepts jointly" (Gibson, 1966, p. 90).

### 3.2. Dialogism: a general epistemology for cognition and communication

Linell's academic trajectory is characterised by his audacious, critical perspective on monological models that ignored the interdependence of language, cognition, and the world. Echoing Bakhtin, he emphasises that his ideas are not spawned solely from his own, autonomous thinking, but are indeed products of words in other people's mouths and contexts (cf. Bakhtin, 1981). In this section, we delve into how Linell, predominantly through Bakhtin and Voloshinov, refines the concept of *dialogism*. We argue that Linell's dialogism appeals, or ought to appeal, to audiences beyond the realms of communication studies, discourse studies, semiotics, and literary critique. Thus, his refinement encompasses a radical reinterpretation and reassessment of previous versions of dialogism, which also makes it germane to cognitive science.

Linell's conception of dialogism was enriched by the intellectual milieu of which he became part in 1981 in Linköping. At Linköping University, he became a professor of communication at the interdisciplinary unit *Communication Studies*. This versatile research environment not only welcomed Linell's curiosity in the behavioural perspective on language but also bolstered its direct relevance to an array of research disciplines including social and cultural psychology, micro-sociology, communication, and anthropology. Linell remarks: "So, if you are a humanist, you cannot be a specialist in just one disciplinary approach to the single human being or his or her body, or whatever. I have worked in an interdisciplinary environment [...] and that was an advantage for me, I think, because without that it's doubtful that I had found dialogism." (Trasmundi, 2024, this issue).

In Linköping, Linell developed the main ideas of his dialogism, and he continued to refine and qualify this framework in the following decades. He made his most crucial contribution to this field when he was part of the Werner-Reimer-Stiftung at Bad Homberg in Germany in the years 1988–1993. The group consisted of other dialogical and radical thinkers such as Thomas Luckmann, Ivana Markova, and Ragnar Rommetveit. His books *Approaching Dialogue* (1998), and *Rethinking Language, Mind, and World Dialogically* (2009) were direct results of the group's frequent meetings.

#### 3.2.1. Cognition in Linell's dialogism

In *Approaching Dialogue* Linell meticulously crafts a framework for analysing, empirical conversations grounded in his theoretical understanding. His exploration of the natural use of language catalysed the development of behaviour-based theories of language (Linell, 1998). His integrated view of language and structure is made evident in his empirical work, sparking critiques against the concept of language as merely an inventory of forms, a view he perceives as extreme and flawed. The underpinnings of Conversation Analysis (CA) are significantly present in *Approaching Dialogue*, but Linell deviates from the stringent CA methodology by rejecting the relegation of context. Against CA, he maintains that conversations are perpetually embedded within an indispensable organisational structure. Through numerous examples he gives life to concepts like 'communicative projects', 'activity types' and 'dialogue analysis', and the main aim of the book is indeed to present natural data of people's communication practices, with an emphasis on contextual and interactional features of human discourse. The book's assemblage of conversational examples illustrates the integration of language and behaviour, which contributes to theoretical assumptions about the interconnection of mind, body, and language in real-life practices. Linell explicitly links conversation to cognition, and in particular to multiscale and social processes, for instance when he applies distributed cognition to explore coordination between team members in a group (Linell, 1998). Theoretically, he explains his interdisciplinary, and at the time radical, agenda as an attempt towards a partial reconciliation of monological and dialogical perspectives. This agenda was shaped by the fact that monologism and dialogism were both too narrowly conceptualized and applied:

Monologism, being more akin to the approaches of the natural sciences, would basically focus on individual speakers as complex biological organisms, processing information and "producing" speech, actions and meaning. Dialogism has its roots primarily in the realm of the humanities and social sciences, looking primarily at dialogue itself. (Linell, 1998, p. xv)

Instead of rejecting any of those approaches, his attempt to reconcile them also allowed for a qualification of dialogism that had far-reaching implications. To Linell, a basic dialogical understanding of human communication and cognition required that isolated scientific domains and disciplines, were dissolved, and as such his work can be seen as an invitation to interdisciplinary thinking:

I begin to explore the possibilities and limitations in dialogism as a general epistemology for cognition and communication. [...] It is largely interdisciplinary in nature, and has been written in such a way that it can be used at advanced undergraduate courses in linguistics, sociopragmatics of language, communication studies, sociology, social psychology and cognitive sciences. (Linell, 1998, p. xi)

Linell's interdisciplinary ideas coincided with similar groundbreaking developments in cognitive science. Thus, in the 1990s, concurrent with Linell's emphasis on real-life linguistic behaviour, the cognitive anthropologist Edwin Hutchins advocated for studying cognition "in the wild" (1995a), meaning outside the experimental laboratory. Hutchins elucidates the distributed nature of cognition as it emerges in interactions and through coordination within a wider cognitive system. His interest falls on the interaction within the system rather than on internal information processing within individuals. This approach is in line with Linell's dedication to overcoming monologism and individualism through dialogism and his attempt to underscore context-specific, embodied behaviour as opposed to brain-bound, mental (linguistic and cognitive) operations.



Linell's initial motivation stemmed from his discontent with structural linguistics and its focus on abstract language systems. However, in his pursuit to broaden the lens on language and behaviour (e.g., by adopting the concept of languaging from Maturana and others), he ventured beyond linguistics for inspiration. Unlike Hutchins, who mainly stayed within the boundaries of cognitive science, Linell inspected multiple territories seeking to amalgamate the core principles of distributed/embodied cognition with embodied advancements in phenomenology, interaction studies, and dialogue theories.

A subsidiary aim of *Approaching Dialogue* is to test the implications of dialogism as a general epistemology for cognition and communication. Specifically, Linell portrays the dialogical approach as a radical alternative to existing theories of (i) cognition as mentalistic and monological information processing, (ii) communication as information transfer, and finally (iii) language as a code (cf. Linell, 1998). Aiming towards an epistemological synthesis, Linell couches human language and cognitive behaviour in socio-cultural and dialogical terms. He proposes a radical rethinking of both theory and methods pertaining to human sense making, paving the way for interdisciplinary research that builds on distributed and dialogical approaches. In *Rethinking*, he further asserts: "Individuals do not disappear in dialogism. But here the individual is a social being who is interdependent with others, not an autonomous subject or a Cartesian *cogito*" (Linell, 2009, p. 46ff). Additionally, in *Rethinking*, Linell engages systematically with cognitive theories in relation to dialogism. The title itself invites readers to reevaluate and refine our past scientific thinking and practices:

*Rethinking* is a general overview of dialogical theories of human sense-making [...] The world as understood dialogically comes out as dynamic, multi-aspectual and with potentials for different interpretations. When, on the other hand, we aim at formulating unambiguous theories or following general laws, we are indulged in monologizing activities, performed for special purposes [...] Recurrent topics in this dialogical account of language, mind and world are the relations between situations and cultures, selves and others, interactions and thinking, knowledge and communication, minds and bodies etc. (Linell, 2009, p. xvii)

While Linell successfully intertwined language and cognition in *Approaching Dialogue*, he primarily accentuated the differences between monologism and dialogism by resorting to discursive and contextual elements in human interaction. In contrast, *Rethinking* explores burgeoning concepts of cognition and agency outside the humanities, asserting their significance in establishing a general epistemology for human sense-making. Consequently, he investigates pieces of research beyond traditional dialogue studies. Particularly Chapter 7, "A relational interworld beyond individual minds", and Chapter 17, "Dialogue and the Brain", scrutinise cognitive and ecological aspects of human sense-making. In these chapters, Linell critically engages with works by prominent scholars from different fields such as cognitive sciences, phenomenology, ecological psychology, philosophy, communication studies, anthropology, and linguistics. He draws on their work to examine whether his dialogism could potentially serve as the commensurability needed for a comprehensive non-individualistic epistemology of human cognition and communication. His framework encompasses phenomenological embodiment theories, cognitive theories, biological theories, and language models. Thus, the framework dissolves the dichotomy that separates mind, body, and world: "A general dialogical framework has something to offer to cognitive science and evolutionary psychology, not in the least because dialogue and dialogical interaction appear to be more fundamental than language" (Linell, 2009, p. 368).

In summary, Linell unlocks dialogism from its confinement to a specific domain of literature, language, and semiosis, just as he dismantles the ingrained hierarchies within and between scientific disciplines. His work can be interpreted as a dialogical invitation to break down scientific boundaries. However, this invitation was not reciprocated by other disciplines and was also not fully accepted in the cognitive sciences during that era. In 2024, we can, however, acknowledge Linell's significant contribution of dialogism as a comprehensive epistemology for both language and cognition.

### 3.2.2. *The cognitive silence and the general reception of Linell's main contribution*

Linell scrutinised cognitive processes in both vocalisation and interaction in ways that were both bold and detailed, yet this was not systematically picked up on by cognitive scientists and communication researchers. Upon reviewing his work, it becomes clear, that he has been increasingly concerned with human cognition already from the 1990s. The titles in his bibliography, spanning from 1971 to 2023, are replete with terms like 'mind', 'sense-making', 'brains', and 'thinking'. However, the term 'cognition' never appears, except for one co-authored 2001 article: "Arguing in conversation as a case of distributed cognition: Discussing biotechnology in groups" (Linell et al., 2001). In Trasmundi's interview with Linell (cf. Trasmundi, 2024, this issue), he admits that although he is a linguist by training, he never felt fully at home or significantly authoritative in this domain. He acknowledges his identity as a language scientist, and he considers his humanistic background to be both a strength and a limitation. Thus, his dialogical heritage shapes his interests in terms of interdisciplinarity and meta-theoretical assumptions about human sense-making. However, he primarily emphasises the language aspect of the language-cognition marriage, both rhetorically and empirically.

There is a striking resemblance between his disillusionment with linguistics and his discontent with cognitive science, paradoxically forcing him into a less dialogical mode of engagement. He remarks, "my effect on the Swedish community of linguists has not been too successful or extensive, I think. Because people go on doing what they have always done. But that—I guess—is part of the reason why I want to call myself a language scientist and not a linguist" (Trasmundi, 2024, this issue). This shift away from linguistics was a necessary move. Further, he asserts that he never felt home in the cognitive sciences either. Cognition, he argues, is interdependent with socioculturally and linguistically channelled understandings. This, he posits, is often deemed secondary or even irrelevant to explanations of human agency in cognitive science. Instead of dealing with trust and caring in interactions, evolutionary psychology and cognitive science emphasise how adaptive behaviour—at a

level concerning most living organisms—could explain functional agency in general. This basic explanation of adaptive and functional behaviour across species did not capture the species-specific dynamics of human sense making. To counter that, Linell critically foregrounded dialogue and backgrounded cognition. Likewise, he swapped cognition with thinking:

Thinking is both internal cognition (in the mind) and external (environment-oriented), because it's about "navigation", bringing meaning and order to both internal consciousness and external orientation, so to speak, finding one's way in the world. [...] Another reason to prefer the term thinking is that it is not just about intelligence like cognition, or some form of content-orientation, we must also affirm emotion and volition. Therefore, thinking is more than cognitivists have tended to mean by cognition, I would say. (Trasmundi, 2024, this issue)

Irrespective of his explicit attempts to link dialogism to 'thinking' and hence to the cognitive and behavioural sciences, his overall rhetorical decisions and publication strategies have significantly influenced how his work has been received and evaluated. His audience has predominantly consisted of researchers in communication and discourse studies, semiotics, learning, and Conversation Analysis. In these areas, reviewers often highlight his unique contributions to epistemological and ontological issues related to human communication. However, only peripheral attention is usually given to the implications of Linell's work beyond these domains. Therefore, we will now turn to a more elaborate discussion of these implications for cognitive science.

#### 4. Dialogical cognition

In this section, we will discuss what a dialogical approach has to offer cognitive science. A starting point is the observation that *theoretically* Linell went further than Hutchins in his attempt to reconcile interdisciplinary perspectives, yet *empirically* he failed to fully exploit the potential of dialogism to explore how cognition functions in socially coordinated behaviour. In this section, we pursue the links between dialogism and cognitive science from a theoretical vantage point; in the next section, we attend to this relation as an empirical question, primarily by drawing on our own research which we see as an extension of Linell's dialogism into the realm of (distributed and ecological) cognitive science.

Cognitive science emerged in the post-war period of the 1950s, and upon its instigation it adopted the mind-as-computer metaphor that was propagated with the advent of the computer technology (Boden, 2006). Based on the computational metaphor, the scientific program of first-generation cognitive science sought to establish the computations needed to provide a given behavioural output, based on relevant input. In a linguistic context, for instance, Chomsky's (1965) program is archetypically computational, as it establishes the symbolic operations that turn a sentence into a surface structure. In contrast, the real-life behaviour of the speaker-hearer is theoretically irrelevant:

When we say that a sentence has a certain derivation with respect to a particular generative grammar, we say nothing about how the speaker or hearer might proceed, in some practical or efficient way, to construct such a derivation. These questions belong to the theory of language use—the theory of performance. (Chomsky, 1965, p. 9)

It has already been shown that Linell was dismissive of Chomsky's linguistic program, but his arguments against it are generalisable to also cover the broader cognitive framework. Thus, from a dialogical point of view, reducing the object of study to processes in individuals is hugely reductionist. Accordingly, the dialogist would question the assumption that human behaviour can be exhaustively explained in terms of mental or cerebral processes. In this respect, Linell is actually in line with contemporary critics of the cognitivism of the 1970s, for instance Ulric Neisser (1976, p. 7): "Lacking in ecological validity, indifferent to culture, even missing some of the main features of perception and memory as they occur in ordinary life, such a [cognitivist] psychology could become a narrow and uninteresting specialized field." Given that this early critique was launched by an insider—Neisser was the author of the influential *Cognitive Psychology* (Neisser, 1967)—we adopt Neisser's three points as a benchmark for gauging whether Linell's approach is capable of moving cognitive science beyond the "narrow and uninteresting specialized field" described by Neisser.

First, the dialogical program exhibits 'ecological validity' in the sense that it insists that the object of study must be situated communicative projects and activities, and that interactional or behavioural data must be interpreted in relation to the context: "'Contextualism' means that sense-making processes and situated discourse are *always* interdependent with contexts. [...] Context-sensitivity is not a peculiarity of only some communicative or cognitive events; it is a *universal* property of these practices" (Linell, 2009, p. 16). A dialogical cognitive science, thus, is a science of cognitive events in real-life settings. Such a science studies complex, messy, ambiguous, and multifaceted events far beyond the 'scientific method' of testing explanatory hypotheses in the psychologist's lab. The methodological implications of this dialogical approach entails an interdependence between sense-making processes and contextual factors. This approach recognises that context-sensitivity is not specific to certain events but is a universal property inherent in communicative and cognitive practices, challenging those scientific methods that confine themselves to controlled laboratory environments.

Second, a dialogical cognitive science will extend this context-sensitivity from the immediate settings of the communicative or cognitive event under scrutiny to also encompass cultural dimensions. In his work, Linell rejects a number of 'monologisms', including the container view on culture as a stable background in which human beings are immured. Instead,



he insists to see “cultures and societies as dynamic, living and partly open, with their tensions, internal struggles, conflicts between majorities and minorities, etc.” (Linell, 2009, p. 46). This principle extends to the cognitive domain in, among others, distributed cognition. Hutchins makes it clear that from a distributed point of view, “human cognition is not just influenced by culture and society, but that it is in a very fundamental sense a cultural and social process” (Hutchins, 1995a, p. xiv). Linell captures the cultural dynamics of communicative and cognitive events by pointing to their *double dialogicality*: “In and through communicative and cognitive activities, there is dialogue within both situations and traditions; participants in the activities in question engage in both situated interaction and sociocultural praxis” (Linell, 2009, p. 52). This trans-situational dialogicality is parallel to Hutchins’s assertion that cognition can be distributed over time and over social formations (cf. Hollan et al., 2000).

Third, whereas traditional computational science is preoccupied with Marr’s (1982, p. 25) representational-algorithmic level, Neisser highlights the importance of perception and memory in ordinary life. A computational cognitive science requires perception and memory, partly to pick up information that is turned into symbolic patterns, partly to store such patterns for later use. While, the physical or corporeal implementation of perception and memory is irrelevant to the computational theory, hardcore cognitivists also appreciate the complexity of the environment that gives rise to complex behaviour.

In contrast, Linell sides with *embodied* views on cognition. First, in several cases he draws on Gibson’s theory of perception (e.g., in Linell, 2009, p. 332f.). Gibson’s view that the environment is relationally meaningful—that is, ‘meaning’ is not imposed on meaningless sense impressions, but directly perceivable by an animal evolutionarily attuned to the environment—is compatible with the dialogical emphasis on subject-object relationality and Merleau-Ponty’s interworld. Second, Linell also endeavours into the realm of the workings of memory and the physical brain. He does so by drawing on the work of Edelman, Clark, and Damasio (Linell, 2009, pp. 352–355). We will not go into details here, but merely notice that Linell goes to great lengths to demonstrate that the brain’s neurophysiological makeup supports a dialogical view on the human existence. This point resonates with insightful work by Anderson (2014) and Di Paolo and De Jaeger (2012).

This overview demonstrates the veracity of Linell’s conclusion that “a general dialogical framework has something to offer to cognitive science and evolutionary psychology” (Linell, 2009:368). However, following this conclusion, a very puzzling question remains: Having established a theoretical apparatus for approaching cognition from a dialogical starting point, why has Linell not pursued a more rigorous empirical program for studying human cognition?

Our short answer to this question is that Linell’s humanistic roots both have sensitised him to appreciating the contingencies and dynamics of human sense making and cognition *and* have impeded him from buying into a *necessary* condition for pursuing a cognitive analysis, even if he conceptually and methodologically accepts a distributed view on cognition. Thus, as explicated by both Marr, Gibson, and Hutchins, one cannot understand cognitive processes, unless one has established the task that is being pursued. In Gibson’s words, “an analysis of vision must begin with the task at hand, that of guiding action and detecting environmental properties” (Gibson, 1979, p. xxi). In a similar vein, Marr (1982, p. 25) suggests that the starting point for the computational analysis are the questions, “what is the goal of the computation, why is it appropriate, and what is the logic of the strategy by which it can be carried out?” Finally, in *Cognition in the Wild*, Hutchins explicitly adopts Marr’s tri-stratal approach where “the first level is the computational theory of the task that the system performs. This level of description should specify what the system does, and why it does it” (Hutchins, 1995a, p. 50)<sup>6</sup>.

Obviously, to establish the task of a cognitive system, one has to radically depart from the focus on the sense-making dynamics between the participants in the situation. Thus, the cognitive analysis consists in juxtaposing a *task environment* on the one hand, and a *task performance* on the other. As argued elsewhere (Trasmundi, Baggs, Toro and Steffensen, 2024), “a task environment can be described independent from the agent(s), whereas a task performance can only be deduced from the agents’ actual behaviour.” Linell’s dialogism is fully dedicated to the behavioural and sense-making aspects of what we here call task performance, but engaging in analyses of the task environment, which in principle can be assessed independently of situated behaviour, is anathema to the dialogist. Even if the task at hand is deduced from observations of behaviour (e.g., as done in our analysis of medical decision making in relation to the catheterisation of a patient (Trasmundi and Steffensen, 2016)), it falls outside of the scope of dialogism.

In conclusion, Linell has provided us with an exceptional conceptual framework for analysing behaviour under a cognitive lens, but without engaging in the analysis of cognitive tasks carried out by the participants in a given sociocultural context, his rich methodology cannot be fully unfolded in the analysis of cognitive events. In the next section, we will demonstrate the empirical potential for using a more elaborate framework for dialogical cognition as a method for analysing naturalistic video data.

## 5. Dialogical cognition as an empirical program: a case study

Linell’s distinction between ‘thinking’ and ‘cognition’ warrants attention. Cognition, he notes, is not a distinctly human phenomenon but features across all organisms and species (Linell, 2009). Therefore, cognitive science has not exclusively modelled *human cognition* in its foundational work, but more broadly *cognition* as adaptive, situated behaviour, exhibited by all species (see also, Trasmundi and Linell, 2017). In contrast, thinking is a uniquely human activity that emerges in the

<sup>6</sup> In Hutchins (1995b), this is called a procedural description.

intersection between culture, embodiment, and language. Linell's work builds on a conversation-analytic approach to thinking in social interaction. Nonetheless, his analyses primarily focus on interactional aspects without adequately engaging with the task environment that constitutes the socio-cultural setting of the participants. Our proposition in this section involves exploring task performance in task environments, which yields insights into the interconnection between cognitive and interactional dynamics.

This section thus aspires to demonstrate how current work in ecological cognitive science allows for the integration of empirical cognitive science and dialogism. This demonstration is accomplished through references to current cognitive ethnographic work, embedded in the framework of dialogism. Our example of task performances in a medical task environment underlines how human behaviour is a result of dialogical oscillations between human-environment and human-human interactions that draw on multiscale phenomena beyond the local here-and-now timescale. Further, and in accordance with the ways that Linell's approach is capable of moving cognitive science beyond Neisser's "narrow and uninteresting specialized field" (cf. above), our empirically grounded argument focuses on three areas: (i) the interpretation of task performance within the task environment (i.e., a *situated context*), (ii) the extension of the situated context to encompass cultural dimensions (i.e., *double dialogicality*), and (iii) the embodied nature of cognition where perception is non-representational and draws on previous experience and local needs for engaging and picking up some information as directly meaningful, cf. Gibson (1979) and Baggs and Steffensen (2023). To illustrate these three steps in our argument, we draw on a study taken from Trasmundi (2020). The example serves to illustrate how medical practitioners struggle with rigid task environments that restrict flexible behaviour. For instance, Trasmundi (2020) highlights how healthcare practitioners often describe their cognitive work metaphorically, because they are unable to point to crucial moments where their decision making impacts the overall course of events. They thus describe interactions as *crashing*, *broken*, *heated* etc., and such examples reveal an untapped potential for investigating actual task performances in task environments and compare them with local sense making: "Healthcare practitioners instantly know when an error has occurred, but the conditions and the path that lead to such damaging outcomes are often blurred to them or at worst impossible to recall" (Trasmundi, 2020, p. 1).

The limitations of practitioners' first person descriptions in capturing the dynamics of decision-making and problem solving events underscore the need for a more robust analytical approach. In response to this, our method, Cognitive Event Analysis (Steffensen, 2013; Steffensen et al., 2016; Trasmundi, 2020), is a tool for delving into the nuances of how agents navigate and redefine problems, transcending their own perceptions of problem-solving processes.

### 5.1. Cognitive event analysis

Cognitive Event Analysis (CEA) originated from the need to understand human interaction and sense-making in ecological and multi-scalar contexts, rooted in ecological and dialogical frameworks. CEA investigates sense-making as coordination between agents and an environment extended in time and space. It extends its unit of analysis to the organism-environment system, focusing on the multi-scalar nature of interaction (Steffensen and Pedersen, 2014). CEA is thus an ecological method exploring how distributed cognitive systems achieve cognitive outcomes through real-time dynamics and non-local conditions for coordination.

Empirically, CEA investigates cognitive trajectories of cognitive systems. A trajectory represents a dynamic path of activity that unfolds as agents navigate through a problem space toward a cognitive outcome (Steffensen et al., 2016). The critical transition point defining this path represent a change in the relation between agent and environment. In CEA, these critical transition points are termed "event pivots," and they play a pivotal role in shaping specific cognitive trajectories (Steffensen, 2013: 201). The visual representation of a CEA trajectory is presented in Fig. 1.

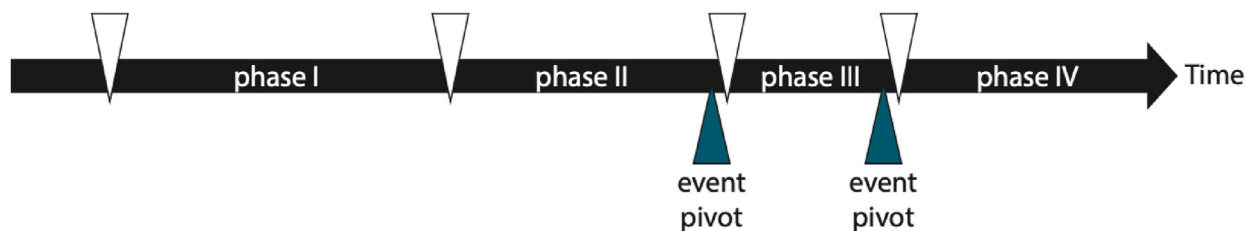


Fig. 1. An example of cognitive event trajectory and event pivots.

Exploring such cognitive trajectories, activity paths, and event pivots requires detailed investigations of behavioural dynamics. The analytical focus thus remains on the microscopic dynamics of inter-bodily dynamics, such as prosody, gesture, and movement, emphasizing changes in the overall cognitive system. The following Fig. 2 outlines a five-step procedure in CEA as defined by Steffensen et al. (2016).

Procedure	Description
Cognitive Event Identification	Identification of a cognitive event, typically an organism-initiated change in the layout of affordances in the organism environment system, in a video record of a naturalistic or experimental data set. The event may be defined from an observer's or a participant's point of view
Event Pivot Identification	Identification of the critical transition point (or "phase transition") without which the cognitive event would not be an event
Data Annotation	Segmentation and annotation of (peri-pivotal) video sequence, using multiple (hierarchical or coordinated) tiers, with or without a constrained set of annotation values
Cognitive Trajectory Segmentation	Segmentation of video sequence into <i>functionally</i> and/or <i>behaviourally</i> defined phases
Cognitive Trajectory Analysis	Analysis of how specific segments of the cognitive trajectory (particularly the event pivot) are enabled by preceding segment and behavioural tendencies

Fig. 2. 5-steps procedure of CEA (quoted from Steffensen et al. (2016)).

While we employ video data to investigate real-time inter-bodily dynamics, we will transform audio-visual content into meaningful written representations. We use an adapted version of Gail Jefferson's transcription system designed for Conversation Analysis (cf. Pedersen, 2015). Essential elements from Jefferson's transcription system, applied in this example, are summarized Table 1.

Table 1

Transcription system (quoted from Pedersen (2015)).

Transcription system	
CAPITAL LETTERS	Indicate remarkable loudness of verbal utterances
Degree signs around a word, e.g. ˈhi	Illustrate verbal utterances articulated in a special low volume (tone of voice)
Left square bracket [	Illustrates the onset of overlapping verbal utterances
Numbers in closed parentheses (1.2)	Specify the length of silence in seconds and tenths of seconds
(.)	Micro pause (<0.2 seconds)
=	Latched talk/rush through
<u>Underlined words</u> or sounds	Indicate if utterances are articulated with a special prosodic emphasis.
Ascending or descending arrows ↑ ↓	Illustrate rising or falling local intonation
Pro:::longation	Indicates prolongation of preceding sound
.	Stopping fall in tone
.hh	Hearable in-breath
hh	Hearable out-breath
(xxx)	Non-audible speech
[laugh]	Non-verbal utterances
[comment]	Transcriber's comment

## 5.2. Double dialogicality in a distributed cognitive system

In our example we highlight how observations of multiple, temporal scales are needed to account for cognitive behaviour, which involves what practitioners say, do, feel, and accomplish. In order to explore this complex cognitive task performance, we delve into the reciprocal relationship between organizational structure, culture, and agency, an intertwining that Linell termed as double dialogicality. Despite the theoretical richness of double dialogicality, we focus here on empirical data that illustrate how medical culture impacts real-time interactions, and concurrently, how this culture is shaped by the interactional dynamics.

The case at hand originates from an ethnographic study conducted by Trasmundi in a medical, emergency ward in Denmark (cf. Trasmundi 2020). The case involves a 92-years old woman, who has been hospitalized with a hip fracture. The medical team consists of an experienced nurse, who has been working at the ward for several years and a novice doctor, who has only been working at the ward for a couple of days (for an overview, see Fig. 3). Given her experience, the nurse has an organizational knowledge about how procedures are usually carried out, whereas the doctor comes directly from the medical school and has no knowledge about the work procedures at the hospital.



Fig. 3. Overview of the setting (quoted from Trasmundi (2020, p. 172)).

We focus on the team's execution of a standard procedure: how they administer a femoral nerve block (FIC block). The procedure involves three fixed steps which thus define the task environment: (1) the doctor identifies the needle insertion site through palpation and marks it, usually with a pen; (2) following step 1, the marked skin area is disinfected before needle insertion; (3) finally, the doctor performs the FIC block by inserting a needle at the point indicated. Typically, the third step is complicated because the ink mark is erased when alcohol is applied in the second step to disinfect the area. This erasure of the mark usually requires the doctor to memorise the mark's original location when they reach in step 3. However, in this case, the nurse notices an alternative technique in step 2, prompting her to inquire about its execution. Below follows a full transcription of the interaction:

## DANISH ORIGINAL

1. 43:52:00, N: har du lavet sådan en afmærkning i huden  
 2. 43:54:10, ps. (0.5)  
 3. 43:54:60, D: ja: kan du se det  
 4. 43:55:50, N: ja (.) hvordan har du gjort det  
 [...] (25.5) [The patient complaints about pains in her hip]  
 5. 44:22:40, N: men øh hvad har du lavet den der afmærkning med  
 6. 44:25:10, D: jeg har taget en øh prop fra ø:h de der saltvandssprøjter  
 7. 44:27:80, ps. (1.2)  
 8. 44:29:00, N: okay  
 9. 44:29:20, ps. (1.5)  
 10. 44:30:70, N: det var ret smart  
 11. 44:31:20, ps. (0.8)  
 12. 44:32:00, D: ja men fordi [ellers så forsvind (.) narj men det er fordi eller  
 så forsvinder det jo når man tegner det med kuglepen ik  
 [det tror jeg aldrig jeg har set før  
 13. 44:32:40, N:  
 14. 44:36:50, ps. (0.8)  
 15. 44:37:30, N: ja når du vasker a[f  
 16. 44:38:10, D: [når jeg vasker af ik  
 17. 44:38:90, N: ja  
 18. 44:39:30, D: så øh (.) nu skal du se så er det denne her jeg kommer ned så  
 19. 44:40:60, N: det har jeg nemlig os (.) tit tænkt på

## ENGLISH TRANSLATION

1. 43:52:00, N: did you make such a mark in the skin  
 2. 43:54:10, ps. (0.5)  
 3. 43:54:60, D: ye:s do you see that  
 4. 43:55:50, N: yes (.) how did you make it  
 [...] (25.5) [The patient complaints about pains in her hip]  
 5. 44:22:40, N: but eh with what did you make that mark there  
 6. 44:25:10, D: I took a eh a plug from e:h those saline needles  
 7. 44:27:80, ps. (1.2)  
 8. 44:29:00, N: okay  
 9. 44:29:20, ps. (1.5)  
 10. 44:30:70, N: that was pretty clever  
 11. 44:31:20, ps. (0.8)  
 12. 44:32:00, D: yes but because [otherwise they disap (.) no: but it is because  
 otherwise it disappears you see when you draw with a pen right  
 [I do not think I have ever seen that before  
 13. 44:32:40, N:  
 14. 44:36:50, ps. (0.8)  
 15. 44:37:30, N: yes when you wash it o[f  
 16. 44:38:10, D: [when I wash it off right  
 17. 44:38:90, N: yes  
 18. 44:39:30, D: so eh (.) now you will see then it is this one I put down so  
 19. 44:40:60, N: I have actually also (.) often thought about that

Our scrutiny of the cognitive trajectory that characterizes the task performance is analytically split in four phases using CEA procedures: (1) cognitive interest, (2) explanation, (3) observation as insight, and (4) contextualization of learning<sup>7</sup>. The trajectory is presented in Fig. 4 below, and each phase is elaborated in the analysis.

<sup>7</sup> For an elaborate analysis of the entire task performance, see Trasmundi (2020). For an elaboration of the Cognitive Event Analysis method underlying the analysis, see Steffensen et al. (2016).



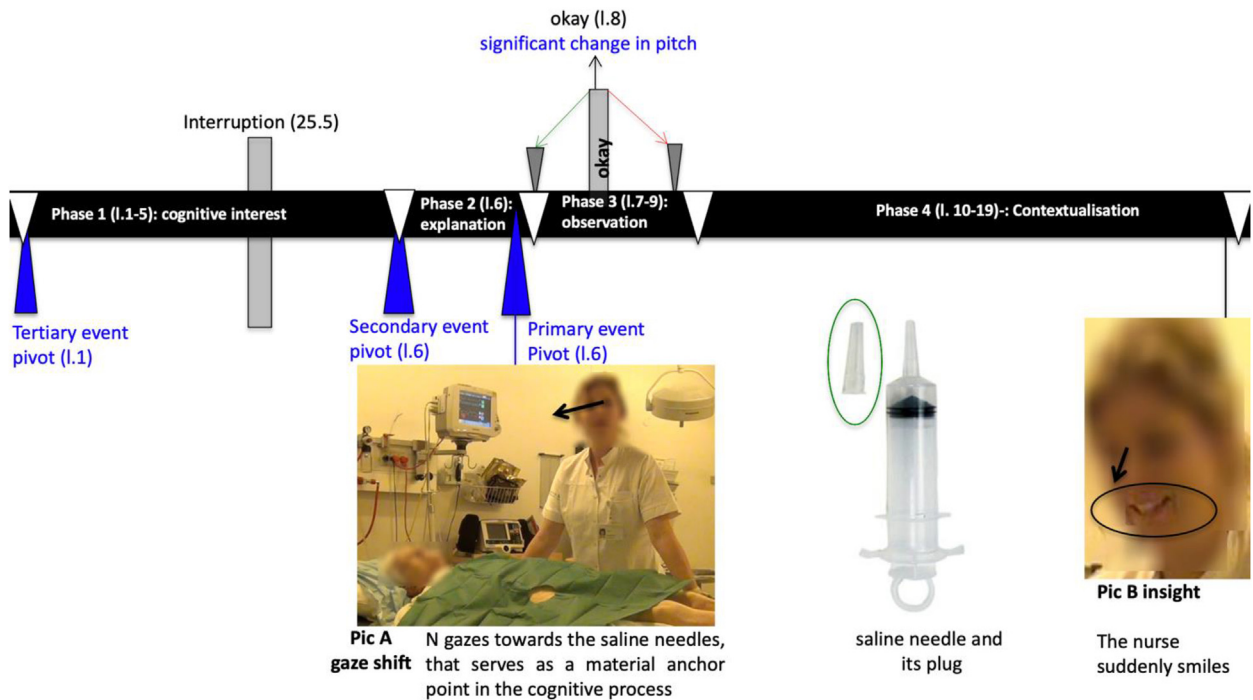


Fig. 4. Phases in the Cognitive Event Trajectory (revised based on the Figure in Trasmundi (2020, p. 174)).

As mentioned above, Phase 1 opens with the nurse perceiving that the doctor enacts an unusual marking technique. The doctor's performance prompts the nurse to ask about the doctor's strategy (l. 1), and the following conversation follows (here rendered in English only; the Danish rendition can be seen above):

1. 43:52:00, N: did you make such a mark in the skin
2. 43:54:10, ps. (0.5)
3. 43:54:60, D: ye:s do you see that
4. 43:55:50, N: yes (.) how did you make it
- [...] (25.5) [The patient complains about pains in her hip]
5. 44:22:40, N: but eh with what did you make that mark there

The doctor has not realised the novelty of her method as she is new in the hospital and has not observed how the procedure is usually performed. In l. 6, the doctor responds to the nurse's request (phase 2):

6. 44:25:10, D: I took a eh a plug from e:h those saline needles

From the doctor's explanation, the nurse can make the link between the general challenge in the ward in making a permanent mark in the patient's skin and the solution enabled by the plug from a readily available saline needle. The cognitive operation of connecting a general problem and a specific solution comes to the fore in the nurse's shifting behaviour. Specifically, the nurse, upon hearing this explanation, directs her gaze towards the needles located behind the doctor, facilitating a perceptually guided cognitive shift. The physical presence of the needles significantly contributes to the nurse's cognitive sense-making process. In l. 7, a pause of 1.2 s emerges, allowing her time for reflection (phase 3):

7. 44:27:80, ps. (1.2)
8. 44:29:00, N: okay
9. 44:29:20, ps. (1.5)

During the first pause (l. 7), the nurse moves her gaze from the doctor towards the saline needles and fixates her gaze at them for a moment before she utters a quick “okay” in l. 8. This confirmation is succeeded by another pause of 1.5 s in l. 9, leading her to the conclusion, that this procedure was clever (phase 4):

10. 44:30:70, N: that was pretty clever  
 11. 44:31:20, ps. (0.8)  
 12. 44:32:00, D: yes but because [otherwise they disap (.) no: but it is because  
 otherwise it disappears you see when you draw with a pen right  
 [I do not think I have ever seen that before  
 13. 44:32:40, N:  
 14. 44:36:50, ps. (0.8)  
 15. 44:37:30, N: yes when you wash it o[f  
 16. 44:38:10, D: [when I wash it off right  
 17. 44:38:90, N: yes  
 18. 44:39:30, D: so eh (.) now you will see then it is this one I put down so  
 19. 44:40:60, N: I have actually also (.) often thought about that

Approximately 38 s elapse from the moment the nurse perceives the deviant task performance and asks the doctor (phase 1) until she connects the new and ‘clever’ approach to the challenges of her current task environment (phase 4).

In summary, various dynamics within the cognitive event trajectory indicate that the nurse links material resources, such as the needles and wording, to the innovative procedure (marking) and, consequently, to the procedural challenge within the department’s standard practice: the ink disappearing in the second step. Once the nurse perceives the connection between the marking technique and the needle plugs as a solution to common procedures, she actively participates in embodied cognitive work. One of the many embodied modalities at play here is her nurse’s pitch dynamics. Thus, the cognitive transition is accompanied by a distinctive change in her pitch pattern when the nurse utters “okay” in line 8 (see Fig. 5 below).

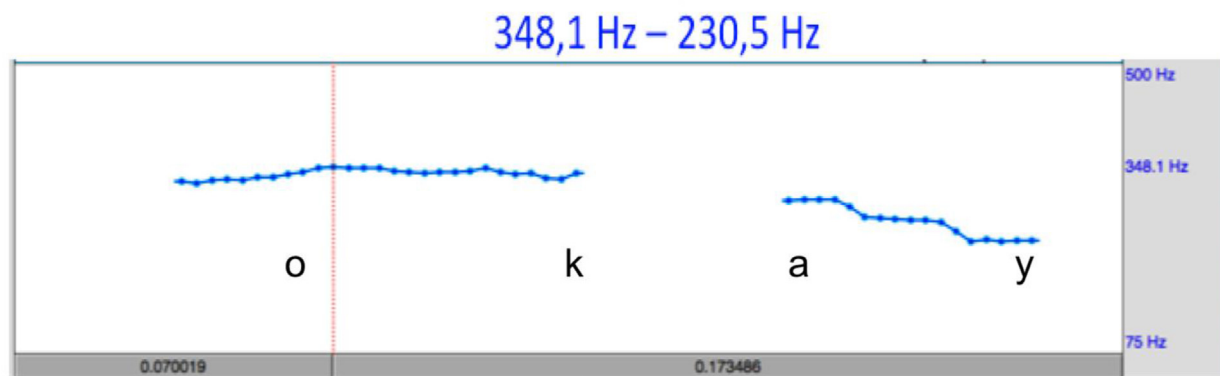


Fig. 5. The nurse’s pitch for ‘okay’ is 118 Hz higher than her average in the example (quoted from Trasmundi (2020, p. 178)).

Throughout the whole event, her average pitch is around 250 Hz. Her second-highest pitch point is at the end of her initial question in phase 1 in l. 1 where it reaches 300 Hz. Her 0.2-second utterance of “okay” in l. 8 peaks at a pitch of 348.1 Hz, indicating a cognitive transition (i.e., the realisation of an insight) and further emphasised by 1.2-second and 1.5-second pauses. Before the first pause, the nurse had not yet recognised the potential applicability of this procedural approach on a broader scale. However, after the second pause, she arrives at the crucial insight that the doctor’s performance addresses a procedural issue in the ward, extending beyond the immediate situation: “I have actually also (.) often thought about that” (l. 19).

The example thus illustrates how cognition is embodied and doubly dialogical, suggesting that a dialogical approach to cognition can enrich cognitive science. In particular, it can correct the tendency in cognitive science to generalise from a limited domain of constructed problems (Sanches de Oliveira and Baggs, 2023). As demonstrated in our analysis, it is not readily apparent that such limited methods are applicable in broader contexts of natural task performances. As discussed in work on ecological problem solving (e.g., Steffensen and Vallée-Tourangeau, 2018), problems are rarely isolated and subject to binary choices, as they appear to be in many experimental settings. In real life, they are messy, unclear, and nested in a broader context of multiple timescales (Pedersen, 2010; Trasmundi, 2019). Our proposal has been to develop Linell’s dialogical

framework by intertwining it with the research questions raised in cognitive ethnography, for instance through the explicit framework of Cognitive Event Analysis.

From a dialogical, as well as an ecological, point of view, the cognitive complexity of cases like the one described here emerges from the interplay between, on the one hand, relatively stable rules and skillful understandings of task execution within a professional context, and, on the other hand, the interpersonal, embodied, and affective dynamics that influence the cognitive trajectories within the situation. In the case study presented here we have emphasised the need to perceive medical culture, not in monological terms, nor as an unchanging backdrop or discourse, but as partly flexible and dynamic. The friction between well-known procedures and behavioural norms and the creative outlook on alternative solutions allows for effective strategies to solidify and influence cultural dynamics. The example thus serves as empirical support for the notion that embodied and sensory dynamics are integral components of dialogical cognition. Cognitive events are enacted through the operations of dialogical systems (Steffensen, 2012; Trasmundi and Steffensen, 2016), in which health professionals can use each other's actions and the material environment to reach insights into the adequacy of medical procedures.

Professional action involves language, tools, organisational procedures, shared expertise, cultural values, and social rules. On that view, action is enabled by more than what is visible for us in the here-and-now. It is impossible to understand current events in a specific organisation without understanding the history of that organisation and how it is managed. That is why the nurse perceives the outcome of the dialogical system differently from the doctor, who is unaware of the novelty of her task performance within the current workplace. Trasmundi (2020, p. 221) underlines the importance of integrating dialogism with cognitive ethnography of medical performance when she turns to the gap between phenomenological thinking and cognitive agency in the ward: “some task performances were completed in an undesirable fashion even though such performances were not phenomenologically experienced as error-prone or problematic for task performance.” We thus emphasise the pivotal need for linking first and third person perspectives in ways that make cognitive ethnography and dialogism two sides of the same coin (cf. Lebahn-Hadidi et al., 2021).

## 6. Conclusions

In a sense, this article is based on a counterfactual premise, posing the question of what the result would have been if Per Linell had aimed to develop his scientific program into a contribution to cognitive science. How would a dialogical theory of cognition look like? In grappling with these questions, we have indicated some key elements of Linell's contribution that are of relevance to cognitive science. The first is Linell's insistence on the double dialogicality of human speaking, thinking, acting, and perceiving. First, human activity is dialogical in that it depends on the surrounding environment: Perception, for instance, is neither constructive nor reconstructive, but relational and exploratory because it guides human action vis-à-vis the environment (Anderson, 2014; Gibson, 1979). Eschewing the conversational overtones, dialogicality between human and world underlies human activity. As argued in this article, Linell has developed a mature program for studying the human activity within this dialogical relation, but he has not provided us with the conceptual tools for understanding the environmental pole of the relation. We have argued that the notions of task environment and task performance allows us to get a grasp both the agentive and the environmental pole in ways that provide us with a systemic understanding of human action and perception.

Second, dialogicality also has a trans-situational dimension: human agents draw on traditions, lineages, and sociocultures (e.g., language and social normativity) as they act and perceive, and for this reason, they engage in a trans-situational dialogue with the past. In our own work, we have emphasised the *interactivity* of human cognition, that is, it both depends on situated, embodied coordination, and on the sociocultural constraints on this coordination (Steffensen, 2013; Steffensen et al., 2023). As already Bakhtin—from whom Linell adopted the term ‘dialogism’—saw, human speech and thinking is inherently polyphonic: “Every word smells of the context and contexts in which it has lived its socially intensified life; all words and forms are filled with intentions” (Bakhtin, 1981). This is no less true of how we walk, how we breathe, how we feel, or indeed how we perform medical procedures. As human beings, we are constrained by the “socially intensified life” of the social practices in which we speak, think, act, and perceive.

Perhaps the most significant contribution to cognitive science is Linell's insistence on the interdependency of human beings: “Dialogism takes ‘interactions’ (and similarly: activities and situations [...]) to be relational complexes, whose relata cannot be regarded as preexisting entities [...] but must be *understood from within the relational interdependencies*” (Linell, 2009, p. 15). In our work, we have followed this line of thought and suggested to conceive of ‘interaction’ as a cognitive process with unfolds within a dialogical system (Steffensen et al., 2023; Trasmundi and Steffensen, 2016). Basically, we would argue that dialogical cognition entails that dyads can be meaningfully considered as cognitive units, fully in line with how Hutchins (1995) attends to *distributed cognitive systems*, or indeed how Goffman accentuated *situated activity systems* (Goffman, 1961). Such a view on the dyad is part and parcel of the dialogical perspective, and hence a dialogical theory of cognition would attend to the cognitive process as a dyadic achievement—indeed constrained by third parties and sociocultures, as argued by Linell. Paradoxically, while Linell has taken such assumptions about dyadic interdependency as his starting point for the past forty years, cognitive science (beyond the distributed approach) has only recently argued that we need to move “beyond single-mindedness” (Dingemans et al., 2023).

A dialogical perspective on interactivity—which we understand as “an ontological substrate that can be described both as cognition, as language, as ecological niche construction, and as behaviour” (Steffensen, 2013, pp. 218–219)—entails some methodological virtues where we believe that Linell's *modus operandi* has much to offer cognitive science. First, Linell

eschews all attempts to construe abstract models as explananda. Linell's dialogism paves the way for a methodology that is qualitative, yet rigorous; interpretive, yet unspeculative. This is also the ethos of cognitive ethnography, including cognitive event analysis, which adds to the commensurability between dialogism and (qualitative) cognitive science.

In recent years, cognitive scientists have been hoarding E's in describing their approach. The consensus seems to settle on 4E—where cognition is seen as Embedded, Enacted, Embodied, and Extended (Newen et al., 2018)—but cognition is also acknowledged to be Emotional and Ecological, and probably something Else too. Adding to these E's, cognition is also described as situated (Robbins and Aydede, 2009) and distributed (Hutchins, 1995a). Adding to this anagram game, we suggest that 'Dialogical' should enter the pool. Following Linell's lead, we have demonstrated that one can study individual, dyadic, and social cognitive phenomena as deeply and doubly dialogical. While there is still a considerable amount of work to be done along these lines, we have argued that cognitive scientists of the E's, D's, and S's need to pay attention to the dialogical dimensions of human thinking.

### CRedit authorship contribution statement

**Sarah Bro Trasmundi:** Writing – original draft, Writing – review and editing. **Sune Vork Steffensen:** Writing – original draft, Writing – review and editing.

### Data availability

The authors do not have permission to share data.

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