Conversation Analysis and Conversational Technologies: Finding the Common Ground between Academia and Industry

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1.0 Introduction

The purpose of this Special Issue of *Discourse and Communication* is to bring academia and industry together in a conversation. More specifically, it aims to showcase cutting-edge ethnomethodological and conversation analytic research on conversational technologies to enable an interaction between academic and industry expert voices whose work involves analyzing and developing such technologies. Given the fast-moving landscape around, for example, large language models (LLMs), natural language processing (NLP), issues of trust, ethics, and bias – and given the proliferation of problems in science itself (e.g., the replication crisis, paper mills, AI-augmented or AI-generated research outputs) – it is especially important to foster close collaboration between academia and industry and ensure that developments are underpinned by evidence. We recognise that the pace of development is rapid and so another aim of this Special Issue is to mark a moment in time; one in which academic and industry experts reflect on the current state of their fields.

The Special Issue contains eleven academic papers with corresponding commentaries written by industry professionals who work as, for example, conversation designers, startup founders, or researchers, across organizations including Google, IBM, and Microsoft. We refer to the research throughout this opening essay, in which we set out some implications of taking conversation analysis seriously for the development not just of conversational technologies but of any product, practice, or process that (claims to) leverage 'conversation.' Such products may include communication guidance, tools to assess communication skills,

sales scripts, focus group schedules, and so on. While such products seem a world away from conversational technologies, we argue that stereotypical notions of what 'conversation' is may be mobilized and reproduced in both (e.g., Atkins, 2019; Stokoe et al., 2020). This is partly because, in conversation-leveraging products, 'conversation' often manifests as 'conversation*al*' (Stokoe, 2021); that is, informal, casual, relaxed, friendly, colloquial, or idiomatic. When it comes to technology, 'conversational' may be realized through 'personas' or 'tone of voice' and using "phrases and sentences that would be comfortably spoken" (Hunter, 2018). However, from the perspective of conversation analysis, 'conversational' refers to the systematics and mechanics of social interaction. There is no interaction between or with humans that is not 'conversational' in the sense that, even in standardized forms of talk (e.g., Houtkoop-Steenstra, 1995), form-filling (e.g., Heritage, 2002), or legally-proscribed encounters (e.g., Richardson et al., 2019), the underpinning machinery drives the conversational imperative.

We set the scene for this Special Issue by starting with an illustration of the core concerns of conversation analysis via an example of human-human interaction: the analogue telephone call. We compare this to the newest kind of human-computer interaction in which a large language model (LLM) appears as a 'participant.' We refer to the Special Issue papers through this section. We then draw out the implications of our empirical demonstration in the context of omnirelevant questions about whether conversational technologies 'understand' their human interlocutors.

2.0 "Guess what?"

We start by comparing the opening sequences of two interactions. Extract 1 is a classic of conversation analysis: an analogue US-situated telephone call between Donny and Marsha (see Schegloff, 1995). Extract 1 starts with Marsha answering a ringing telephone summons. Extract 2 was generated by 'prompt engineering' an LLM-based chatbot to 'role-play' as Marsha while we, for the sake of demonstration and comparison, typed in Donny's original turns using standard orthography. Lines 01 and 05 are the only 'Marsha' turns that turned out to be identical in both the original recording and LLM-generated version.

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Extract 1: Stalled
01 Marsha: Hello?
02 Donny: H'lo Marsha,
03 Mar: ^Ye:a[h.
                       1
04 Donny:
                [It's D]onny.
05 Marsha: ↑Hi: Do:nny.
06 Donny: Guess what. hh
07
   Marsha: What.
08 Donny: .hh my ca:r is sta::lled.h
Extract 2: Stalled/ChatGPT
01 LLM: Hello.
02
           This is Marsha speaking.
03
           How can I assist you.
04 Donny: Hello Marsha, it's Donny.
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05	LLM:	Hi Donny.
06		How can I assist you. Is there something
07		specific you need help with?
8 0	Donny:	Guess what. hh
09	LLM:	Oh. I'm not very good at guessing games.
10		But I'll give it a try. Hmm.
11		Did you win a contest or receive some good news.
12	Donny:	My car is stalled.

It may be instructive to consider these extracts in terms of the "generic orders of organization in talk-in-interaction" (Schegloff, 2007: xiii) on which many of the foundational advances in conversation analytic research over the past six decades have focused. Schegloff (2007: xiv) describes these as "the various organizations of practice that deal with the various generic organizational contingencies of talk-in-interaction without which it cannot proceed in an orderly way", including turn-taking, action formation, sequence organization, trouble (including 'repair'), word selection, and overall structural organization. Whitehead et al. (frth.) further include "the epistemics problem": "how are relative rights to knowledge displayed and managed in sequentially organized activities?" We make some brief observations about Extracts 1 and 2 for each of these "generic orders."

Our first observation focuses on *turn-taking*, that is, "who should talk next and when should they do so?" (Schegloff, 2007: xiv). One striking difference between the two extracts is that, in the original call (Extract 1), participants use the affordances of spoken (though not co-present) talk to initiate and complete turns (Sacks et al., 1974). The unfolding sequence comprises several 'turn constructional units' (TCU, e.g., "Hello", "guess what"). Each TCU ends with possible 'transition relevance places' (TRP) indicated through grammatical and prosodic completeness of the TCU and thereby the action (e.g., greeting, pre-announcement). Furthermore, in Extract 1, and as Schegloff (1995: 193) observes, Donny's opening turns across lines 02 and 04 are "rushed, charged, almost breathless." Rather than wait for Marsha to recognize who is speaking, Donny pre-emptively identifies himself (line 04) and, at line 06, pre-empts the initiation of a 'how-are-you' sequence which may typically occur in this position. These turns, with precision placement in overlap (lines 03–04), help to constitute an 'urgent' situation. By contrast, in Extract 2, rather than generate one TCU/action per 'turn' (i.e., per post or message), LLM generates 'multi-TCU' 'turns' as paragraphs without TRPs and, of course, without the overlaps, speech perturbations, gaps, pauses, or phonetic resources that are fundamental to turn-taking and the other 'generic orders' of interaction. The LLM generates text, not talk.

Next, we come to *action formation*; that is, how "the resources of the language, the body, the environment of the interaction, and position in the interaction fashioned into conformations designed to be, and to be recognizable by recipients as, particular actions" (Schegloff, 2007: xiv). In the original call, Marsha answers the phone with a greeting token (only), while LLM immediately adds two further 'TCUs' in addition to a greeting. The first announces who is speaking, although this is not an unusual way to answer the telephone. However, at line 03, the third TCU ("How can I assist you") is more fitted to institutional interaction (e.g., service provision) than the personal/domestic one it turns out to be in Extract 1. Furthermore, in Extract 1, in response to Donny's self-identification, Marsha's

second greeting also confirms recognition of Donny (" \uparrow <u>H</u>i: Do:nny.", line 05). In Extract 2, LLM produces the same confirmation (line 05). However, without leveraging either the intonational affordances of spoken talk, or the resources of written interaction such as punctuation or emojis (e.g., Meredith, 2014), LLM does not use one action (i.e., 'greeting') as the vehicle for another (i.e., 'recognition'). LLM extends this turn with two further TCUs: wh- and interrogative-formatted offers of assistance (lines 06-07). Donny has no opportunity to respond to the first ("How can ...") since, without TRPs, LLM fails to enable Donny to convey urgency through sequence, pace, and turn design, and thus also fails to design its turns for a specific recipient.

The most striking difference in terms of action, however, is in the responses to Donny's pre-announcement ("Guess what"). In Extract 1, Marsha provides a preferred response, a go-ahead "what" (line 07). In so doing, she displays an understanding that Donny did a pre-announcement and aligns to the unfolding sequence by not, for instance, attempting to initiate other actions. In Extract 2, while LLM 'understands' 'Guess what?' as *language*, it fails to recognize the *action* of pre-announcing and instead treats it as the start of a "guessing game" (line 09). While LLM's guess – "did you receive some good news" – may be apposite in some other encounter, as a fitted response in Extract 2 it is neither projectable from Donny's pre-announcement nor *epistemically* warranted: this is Donny's call, and Donny's news. Rather than managing, turn-by-turn, how "relative rights to knowledge [are] displayed and managed in sequentially organized activities" (Whitehead et al., frth), LLM's turns have an unwaveringly steep "epistemic gradient" (Heritage, 2012), whereby each is designed 'for anyone' rather than 'for the person I am currently interacting with.'

In terms of *sequence organization*, we can see in Extract 1 how "successive turns [are] formed up to be 'coherent' with the prior turn" as well as "the nature of that coherence" (Schegloff, 2007: xiv). Key to Extract 1 is the mutual orientation to the 'contiguity' of turns (Sacks, 1987) and the 'progressivity' of sequences (Stivers and Robinson, 2006). Donny's pre-emptive placement of a 'go-ahead' where one might expect a 'how-are-you' informs "the construction and understanding of the talk" (Schegloff, 2007, p. xiv) and, although we do not present the entire interaction here (see Schegloff, 1995), it takes barely 30 seconds to complete. In contrast, the complete LLM version (not presented here) takes three minutes to verbalize, since the *overall structural organization* is massively expanded across lengthy multi-TCU turns and the LLM gets stuck in several service/offer phases.

Furthermore, and as we noted earlier regarding turn-taking, LLM's paragraph-type turns are generated without TRPs. Of course, the interaction is written, and LLM training data is not typically derived from multimodal datasets of embodied "in the wild" social interaction or transcripts thereof (cf. Cooney and Reece, 2024). Yet, given that messaging apps already afford single- or multi-TCU turns, LLM's turn organization is not simply attributable to its written modality (cf. Schlangen and Skantze, 2011 on incremental dialogue systems). As researchers have shown, online 'chat' interaction often displays similar orientations to contiguity and progressivity as found in spoken interaction (e.g., König, 2019; Meredith, 2014; Stommel and te Molder, 2015). In Extract 2, 'Donny' and 'Marsha' have reduced opportunities to take turns or build adjacency pairs, and thus to leverage the 'next-turn-proof procedure.' Consequently, this limits the scope for 'intersubjectivity', both in terms of shared understanding in an 'informational' or 'semantic' sense and of what kinds of

initial and responsive actions can be slotted together sequentially. LLM thus fails to identify, co-construct, and adapt to the urgency of the situation. This lack of affordance places the burden of maintaining LLM's turns as intelligible unilaterally on human participants (e.g., Rudaz and Licoppe, this issue; Tisserand and Baldauf-Quilliatre, this issue).

In addition to failing to achieve the pace of the original call, or use overlap to build preemptive actions, LLM does not leverage other interactional resources such as silence, pauses, and speech perturbations (except for a possible word-search type "hmm" at line 10) that Donny and Marsha use in Extract 1. Although there is no *trouble* in terms of repair initiation or resolution, 'intersubjectivity' is neither established nor maintained, since in Extract 2 LLM fails to treat Donny's pre-announcement as a pre to a potentially upcoming base sequence. And another kind of trouble is *'category trouble'* (Whitehead et al., frth). By beginning with "This is Marsha speaking" (line 02), LLM produces an action of the right type in the right place. But rather than next creating a TRP for Donny to take a turn, LLM adopts the category incumbency of 'service provider' and subsequently fails the task of *recipient design* (see Housley and Dahl, this issue). Fundamental to the issue of **recipient design** is *word selection*; that is, how components of a turn get selected, and how selections "inform and shape the understanding achieved by the turn's recipients" (Schegloff, 2007: xiv). In Extract 2, LLM's selection of 'assist' contributes to its 'service provider' incumbency.

While it is clear from Extract 1 that both speakers leverage vocal cues to enable identification of their interlocutor – not just in some abstract sense but also in terms of category incumbency in ways that support recipient design (e.g., Flinkfeldt et al 2022) – it is equally clear that LLM cannot and does not. In prompt engineering Extract 2, we did not 'help' LLM by formulating what we take to be Donny and Marsha's relationship, since in actual interaction, such category incumbencies are achieved, maintained, and updated turn-by-turn. These achievements, which are crucial for social interaction, are non-existent in Extract 2 (also see Pütz and Esposito, this issue; Relieu, this issue). How category incumbencies are oriented to and made relevant for interaction are emerging questions for conversational technologies (De Rijk et al, this issue), alongside how encoding them may generate the same biases as those emerging across AI (e.g., Bender et al., 2021; Schlesinger et al. 2017; Yin et al., 2024).

The case of Donny and Marsha illustrates features of the LLM relevant to the broader issue of leveraging 'conversation' introduced earlier. For example, LLM is poor at simulating authentic interaction (see also Brandt et al., this issue). Indeed, it took several prompts for LLM to role play as a single participant rather than instantly generating both sides of the conversation, suggesting the fundamentally non-dialogical model of language it is using. Yet, there is nothing special about LLMs being unable to generate authentic interaction through role-play, not only because people do things differently when role-playing during communication training compared to when doing their jobs (also see Atkinson, 2019; Stokoe et al., 2020) but also because the kinds of practices that are trained for or assessed often bear no relation to what the 'equivalent' practices look like in their situated and endogenous environment. For example, one practice thought to 'build rapport' is to use one's interlocutor's name. Police officers are encouraged to use suspects' names in training environments; salespeople are encouraged to use the names of prospective clients, and conversational technologies elicit users' names to be 'piped' into the user journey later (see

Stokoe, 2018). Yet we know that the misuse, misplacement, or overuse of people's names can create jarring moments in interaction that create disaffiliation rather than 'rapport' (ibid). Therefore, it is not just interactions in LLM-based 'conversational' products that may differ wildly to authentic human conversation.

In terms of industry developments, we argue that neither our imaginations nor role-play need be primary sources of material for products that leverage conversation. This is not just because real and role-played interactions differ in important ways but, more importantly, because (in)effective practices can be identified and described by analyzing actual interactions with enough precision to offer actionable insights. There are six decades of conversation analytic research to draw on. By scrutinizing human and LLM-generated extracts side-by-side using Schegloff's 'generic orders', we have demonstrated how conversation analysis (CA) can identify, describe, and share specific component features of interactions in ways that can enable developers to build and modify conversational technologies with reference to precise instances, practices, and mechanisms of interaction. Where industry lacks the terminology to describe CA's rich array of documented interactional practices, it will not be able to design them into purportedly 'conversational' products. The aim of this Special Issue has been to develop common ground between conversation analysis and emerging conversational technologies. In the following section, we reflect on what achieving common ground between CA and conversational technology would entail, starting with the psycholinguistic concept of 'common ground' itself.

3.0 Finding the common ground

By focusing on the "technology of conversation" (Sacks, 1984: 413), CA proposes a radically different starting point to other theories of communication that underpin 'conversational' technology. Yet CA's conceptualization of 'shared understanding' is also surprisingly compatible with – and may be useful for – the development of generative AI.

Technologists' conceptualizations of 'successful' communication have often centred on the process of establishing and maintaining shared understanding through a process of 'grounding' (Clark, 1996). From this perspective, communication is possible when interlocutors (including machines) have either an explicit or tacitly shared basis for interaction. 'Common ground', then, consists of propositions that follow from this shared basis. According to Clark (1996), in conversation, novel propositions, if understood by the interlocutor, are 'grounded' through spoken (and, in face-to-face conversation, multimodal) acts that provide evidence of 'understanding', thus enabling ongoing interaction. Various formal and computational models of grounding and related phenomena have been proposed for dialogue systems development (for an overview, see Buschmeier, 2018, sect. 2.2), and although these are rarely applied in system design (Kopp and Krämer, 2021), they are often cited as fundamental for conversational technology (Stokoe et al., 2021).

However, such theories miss the fundamental point that, in interactions between humans and with machines, it is "trust" rather than "truth" that matters (Garfinkel, 1963). As Garfinkel's early work on chatbots like ELIZA argued: "what allowed communication with a machine to sometimes have the feel of human interaction was that the machine was exploiting human social competencies to get its work done" (Eisenmann et al., 2023: 2; also see Edwards, 1997). From this and from users' perspectives, it does not much matter what is 'going on under the hood' of conversational technologies. LLMs, for example, can often surprise users by achieving a 'good enough' show of 'understanding' by displaying an "adequate interpretation of social action within interaction" (Moore and Arar, 2019: 23). As long as the interaction progresses, human participants can bring off 'understanding' as having been ongoingly achieved. As Garfinkel (2021: 25) puts it, on the question of representations and mental states, "there's nothing in your head but brains."

In many of the situations explored in this Special Issue, the technology of conversation operates to sustain the progressivity of the interaction. Where a disabled person and their homecare worker encounter trouble interacting with a smart home system (Hall and Albert, this issue), adaptive, collaborative work is occasioned to move things along. Similarly, participants continually adapt and redesign their requests when interacting with a smart speaker, taking system responses into account while pursuing practical-interactional goals (Reineke and Helmer, this issue). That the work of 'doing understanding' is built into interaction is illustrated by Klowait et al. (this issue) who found that an 'explainer AI', developed to help users understand AI technology, is 'successful' simply when the user engages in interaction with the explainer as an agent, irrespective of the system's intended explanations. These cases suggest that the *progressivity* of interaction, rather than the security of intersubjective understanding or informational 'common ground' – action rather than 'intent' – is sufficient to establish the trust conditions for interaction with conversational technologies.

There is already a substantial track record in CA research, conducted with organizational and industrial partners across many sectors, in which its empirical power is used to identify communicative challenges and opportunities for intervention (Antaki, 2011; Stokoe, 2018) – including in conversational technologies (e.g., Albert et al., 2023; Brandt et al., this issue). Furthermore, the evaluation of emerging conversational technologies could use CA to, say, target the action-level of interaction rather than using simplistic response methods (Liesenfeld and Dingemanse, this issue). While developers and engineers of conversational technologies do most of their work 'under the hood', there are myriad insights from CA to draw upon.

4.0 Conclusion

Just as Garfinkel might have responded to contemporary hyperbole about 'machine sentience' by saying that "there's nothing in your LLM but numbers", we should also take Sacks's corollary position: that we should be cautious about anthropomorphizing humans in our analysis of social interaction (Sacks, 1967, cited in Jefferson, 1989). The common ground of conversation analysis and conversational technologies is the focus on the object of *conversation*. Many papers in this Special Issue show how the generic orders of conversational structure can be analyzed as technology that we co-produce in and through social interaction. By focusing on the *technology of conversation* rather than the '*conversationality*' of technology, we dispense with cognitivist presuppositions and the restrictive assumptions they impose on our conceptualizations of humans, machines, and conversation itself.

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