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The Forum

Co-Adaptation in an Ecosystem of Human–Machine Dyadic Interaction: Introduction to the Forum

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INTRODUCTION

In August 2025, The Washington Post published a headline that captured widespread public attention: "It's happening: People are starting to talk like ChatGPT" (Aleksic, 2025). Reporting on findings by Juzek and Ward (2025), the article described how lexical items overrepresented in ChatGPT's output such as *delve* were appearing with increasing frequency in human speech. Striking as this discovery may be, it is not entirely surprising. Artificial intelligence (AI) systems have rapidly permeated everyday life, and large language models (LLMs) such as ChatGPT are now used by millions for writing, learning, planning, and problem-solving. Many users engage with these systems not once, but repeatedly over time.

As humans interact recurrently with LLMs, they create ecosystems of dyadic interaction, or coupled adaptive and self-organizing systems whose behaviors co-evolve across interacting timescales (e.g., from utterances to episodes to courses). Within such ecosystems, co-adaptation between these coupled systems is possible, or even likely. The lexical alignment identified by Juzek and Ward (2025) can be seen as a manifestation of co-adaptation, or the reciprocal adjustments that interacting systems make over time that may manifest as different forms of synchrony, including linguistic alignment.

To understand co-adaptation in ecosystems of human–AI interaction, we first consider what is already known about co-adaptation in human–human interaction.

Co-Adaptation in Human-Human Interaction

In first language acquisition, decades of research has shown that caregivers and children jointly shape one another's utterances. Studies on child-directed speech (e.g., Dale & Spivey, 2006; Snow, 1972; van Dijk & van Geert, 2011) demonstrate that linguistic alignment emerges naturally as interlocutors adapt their speech to maintain engagement, manage joint attention, and build shared meaning. Such synchrony is bidirectional: children, too, influence their caregivers' language, giving rise to a dynamic ecosystem characterized by mutual adjustment.

Similar patterns appear in second language acquisition (SLA). Early work on "foreigner talk" (Ferguson, 1975) and subsequent interactionist research (Gass & Mackey, 2006; Long, 1983) documented how native speakers modify linguistic input for learners, while learners adjust

their own productions based on these modifications. From a Complex Dynamic Systems Theory (CDST) perspective, these micro-adjustments are not peripheral but constitute a primary mechanism through which second language (L2) development emerges (Larsen-Freeman & Cameron, 2008). Recent CDST-oriented empirical studies (e.g., Beccia et al., 2024; Huang et al., 2025) further show that co-adaptation is pervasive yet selective, evolving differentially across linguistic, discourse, and interactional levels and varying across modalities such as email and synchronous classroom talk.

Humans as Socially Coordinated Beings

Linguistic synchrony represents only one layer of human co-adaptation. Research in psychology and neuroscience has shown that collaborating individuals tend to exhibit cognitive and emotional synchronization, aligning their attention, affective states, and mental representations (e.g., Aoyama Lawrence & Weinberger, 2022; Pezzulo, 2011; Vanutelli et al., 2017). Studies on interpersonal physiological and neural synchrony further demonstrate that interacting individuals can exhibit coordinated heart-rate patterns or synchronous brain activation during communication and cooperation (e.g., Li et al., 2022; Marzoratti & Evans, 2022; Schilbach & Redcay, 2025). This suggests that humans are biologically and socially predisposed to coordination.

Indeed, evolutionary accounts propose that cooperation and coordination have long been essential for human survival (Apicella & Silk, 2019). Coordinated activity enabled early humans to collaborate in foraging and problem-solving, while shared psychological states allowed infants to form positive relationships with caregivers and thus secure ongoing protection and attention (Tomasello, 2020). In a nutshell, the socio-ecological challenges humans have faced over millennia 'selected for' coordinative behaviors like linguistic synchronization.

This broader ecological framing raises the question of what co-adaptation looks like when one interlocutor is not *Homo sapiens* but rather a probabilistic, memory-bounded machine.

Ecosystems of Human-AI Dyadic Interaction

In ecosystems of human–AI interaction, one interlocutor is an LLM whose linguistic and cognitive properties differ fundamentally from those of humans. LLMs like ChatGPT are trained on vast, heterogeneous corpora that allow for the generation of contextually-appropriate discourse, performance of a wide range of language-related tasks, and simulation of conversational interaction (Han, 2024). LLMs' behavior is grounded in probabilistic pattern recognition rather than embodied cognition. Therefore, when humans and AI interact, they form ecosystems that are markedly different from those emerging from human–human interaction.

Empirical SLA research on human–AI interaction remains limited. Much of the extant literature has focused on learners' perceptions of conversational agents rather than the interactional dynamics between the user and the system or the ways in which learners' language

use changes over time (Han, 2024; Xiao et al., 2023). Thus, as human–AI dyadic interaction becomes increasingly common over time, it is important to understand how co-adaptation unfolds within these unique ecosystems.

THE PRESENT FORUM

This forum responds to this need by exploring co-adaptation in an ecosystem of learner–ChatGPT dyadic interaction. Accordingly, the contributions in this forum are guided by a shared research question: How does co-adaptation unfold in an ecosystem of learner–ChatGPT dyadic interaction?

To address this question, we tapped into an existing corpus of learner–ChatGPT interactions generated through Revising an Essay with ChatGPT on an Interactive Platform for EFL learners for University (RECIPE4U) (Han et al., 2024). RECIPE4U was deployed in three English writing courses at a Korean university, integrating ChatGPT into course activities through a dedicated interface. In this platform, ChatGPT-3.5 was assigned a hidden persona as an English writing teacher, and learners initiated each session with an open prompt asking learners what they had learned in class. They then interacted with ChatGPT to revise their own essays, paragraph by paragraph, while all conversation turns were logged.

From this larger corpus, we selected a focal learner enrolled in a graduate-level Scientific Writing course who interacted with ChatGPT once per week for all seven weeks of the assignment cycle. In each session, the EFL learner worked with ChatGPT to improve a section of their research writing (e.g., the introduction) by summarizing the content of the week's lecture and consulting ChatGPT for feedback, clarification, and suggestions. The resulting dataset comprises seven written conversations between the learner and ChatGPT; exchanges ranged from eleven to twenty-five turns in length.

Because co-adaptation may manifest on multiple levels, no single analytic approach can fully capture how it unfolds across time. For this reason, the contributions in this forum draw on the same dataset but examine it from distinct analytic vantage points to investigate the unfolding of co-adaptation at various levels, from style to language and content.

In the first piece, Massaro and Wicker look at stylistic (a)synchrony as a function of communicative naturalness. Using the naturalness framework proposed by Waring and Voss (2024), the authors discuss how violations of naturalness on the part of ChatGPT may have impeded co-adaption and ultimately resulted in increasingly divergent conversational styles over the course of the exchange.

Second, Beccia, Park, and Williams conduct process tracing to investigate how co-adaptation emerges (or not) across the seven weeks of dyadic interaction. Guided by a multi-leveled analytic template, the authors track linguistic forms and conversational topics mutually employed by the learner and ChatGPT.

In the final piece, Chen and Ostolaza adopt a mixed methods approach to examine the linguistic trajectories and interactional moves through which co-adaptation emerged. In particular, the authors combine indices derived from Linguistic Inquiry and Word Count (LIWC) with qualitative analysis of turn-by-turn interaction.

Following the individual contributions, Massaro and Beccia conclude the forum with a synthesized discussion of the analyses that highlights key findings. We wrap up by identifying emerging questions and outlining implications for future SLA research on human–LLM interaction.

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