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One Signer at a Time? A Corpus Study of Turn-Taking Patterns in Signed Dialogue

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Abstract

It is not contentious that spoken dialogue is organised as a rapid exchange of turns with very minimal gap or overlap; underpinned by the real-time and highly predictive nature of human language processing. By contrast, research on patterns and mechanisms of turn taking in *signed* interaction is very scarce, to the extent that there isn't even broad consensus on whether signed dialogue is best characterised under a one-signer-at-a-time model. In this paper, we present a preliminary corpus study of turn-taking patterns in signed dialogue in British Sign Language (BSL) using the BSL Corpus Project. Our results are broadly compatible with one-at-a-time signing, albeit obscured by non-semantic signer movements. However, we also identify examples that do not fit this model which require further study.

1 Introduction

Sacks et al.'s (1974) seminal paper presented an abstract model of turn-taking in spoken conversation, capable of organising an orderly exchange of turns at talk in a flexible way, bottom up, with two or more participants. There are several corpus studies that confirm the prevalence of this *one-speaker-at-a-time* model mostly by demonstrating just how short gaps and overlaps between turns are (see e.g. Brady, 1968; Weilhammer and Rabold, 2003; Heldner and Edlund, 2010). There have been objections too (see e.g. Heldner and Edlund, 2010), but see Levinson and Torreira (2015) for strong counter arguments. This model of everyday conversational organisation has also been shown to be strongly universal (Stivers et al., 2009; Enfield et al., 2010).

By contrast, there is a paucity of research on both turn-taking patterns and mechanisms for projecting the end of turn in *signed* interaction. The lack of direct signal interference from simultaneous signing (c.f. overlapping audio signals in speech) raises the question of whether signed interaction is more tolerant to overlap. Coates and Sutton-Spence (2001) introduce the possibility that signed dialogue may be organised into both one-at-a-time signing and the use of a "collaborative floor". Subsequent work has explored the former (e.g. de Vos et al., 2015; De Vos et al., 2016; Lepeut, 2022; de Vos et al., 2022) but the latter remains largely ignored, in favour of drawing direct parallels with spoken dialogue.

de Vos et al. (2015) propose ignoring preparatory movements at the start of utterances, signers holding signs in place at the end of utterances and the signer retracting their hands; they term these as "stroke-to-stroke" (STS) timings as opposed to "sign-naive" (SN) timings (which include all movement). By discounting these segments of dialogue, they demonstrate that Dutch signers' turn-taking (in Nederlandse Gebarentaal) follows broadly the same patterns as spoken dialogue which therefore means that they can be characterised under a one-signer-at-a-time model. However, they restrict their study to question-answer sequences only, which limits the scope of their study – crucially, for example, there is no analysis of the function or form of overlaps in other types of sequence.

In this pilot study, we aim to investigate turn-taking patterns in BSL by examining data from the BSL Corpus Project (BSLCP) (Schembri et al., 2013). Our findings are consistent with those of de Vos et al. (2015), but we also find – as yet anecdotal – evidence that overlaps are less disruptive in signed interaction; and point forward to some future research directions.

2 Materials: The BSL Corpus Project

The data for this study comes from the BSLCP, collected between 2008-2011. The conversation section[1] of the BSLCP consists of 122 30-minute, unscripted dialogues between pairs of deaf signers of various backgrounds from different parts of the UK totalling approximately 60 hours. For each dialogue, there are three video recordings: a

[1]Other sections, with the same participants, include interviews, monological narratives and lexical elicitation.

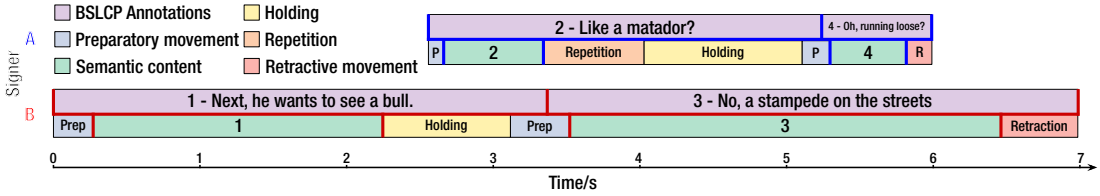

Figure 1: Example repair sequence from pilot BSLCP Study

close-up of each participant and a wide shot of both. Of these, 29[2] dialogues are annotated with roughly 500, precisely-timed glosses for each participant, along with a free translation of each utterance, yielding 4-5 minutes of annotated dialogue per pair. We use a subset of these for this study.

3 Procedure

Videos and annotations were downloaded from the BSLCP website with a research licence. A Python library - Pympi (Lubbers, 2015) - for working with ELAN data was used to combine annotations into a single file for each conversation with uniform tier names. This restructuring allows the files to be processed automatically. It proved necessary to manually adjust the timings for each file, as well as clipping the annotations at the end of the last annotated turn[3]. This produced a subcorpus of 37 minutes of dialogic data across 8 conversations.

Pympi then allows the automatic detection of turn transition times from the comparison of two tiers of turn data. This identifies gaps, overlaps, pauses and `'within-overlaps'` in the data. For this investigation, pauses were ignored, as the two turns either side of a pause can be considered as a single turn. Overlaps were ascribed a negative time value and gaps retained a positive time value. `Within-overlaps`, where there was no swap between the signers, were also given a negative time value but were kept separate from other overlaps.

4 Results

The conversations that were analysed as part of this study and the observed timings are summarised in Table 1. When considering only transitions where the primary signer changed, the mean transition time was -551ms. When considering all turns, the mean transition time was -968ms. The distribution of timings can be seen in Figure 2.

5 Discussion

As Table 1 and Figure 2 show, the timings obtained are, on the whole, consistent with the findings from de Vos et al. (2015). They observed a median of -607ms and a mean of -812ms when using SN timings, comparable with the annotations in the BSLCP. Using STS timings, their results shift positively (i.e. gaps rather than overlaps) to be much closer to the universal averages found by Stivers et al. (2009). We expect that a similar STS analysis on our data would yield comparable results.

	Examples	Mean Duration
Conversations	8	4m 38s
Turns	480	5.40s
Gaps	53	566ms
Overlaps	117	1056ms
Within-Overlaps	211	1304ms

Table 1: Turns and turn transitions in pilot BSLCP study

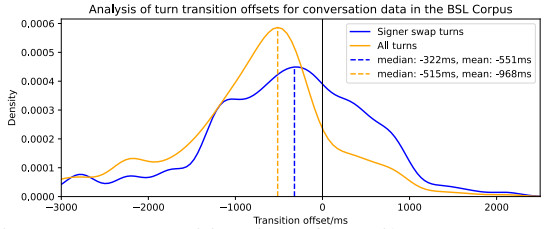

Figure 2: Turn transition times from pilot BSLCP Study

These findings support the hypothesis that BSL signers adhere to one-at-a-time turn taking norms. However, the significant number of (what appear to be non-interruptive) `within-overlaps` suggests that signed interaction may be more resilient to overlaps. Further research is needed into both the form and function of the `within-overlap` turns to establish how much of these might be characterised as *backchannels* or *interjections*. We illustrate this issue with a repair sequence from our BSL data with added STS annotations (Figure 1).

Utterances 1-3 now appear to occur sequentially, with gaps between each turn. However, even with an STS analysis, utterance 4 is still in complete overlap with utterance 3. This demonstrates the problems with SN timings but also that even using STS timings, there remains `within-overlaps` without an explanation. It is not clear, in this example, what effect the overlap has on the interaction.

Can these overlaps be characterised as backchannels? Or more generally, how disruptive (or not) are they? How are they sequentially integrated? What effect do the 'non-semantic' movements (ignored by STS timings) have on turn taking?

[2]Where annotations are available for *both* participants.

[3]To discount sections of annotations with just one signer.

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