How Do We Talk in Table Cooking?: Overlaps and Silence Appearing in Embodied Interaction

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Abstract. Cooking and eating on a table is known as a Japanese dining style. As we cook "monja-yaki" on a table, how do we communicate with others? This paper indicates that cooking acts cause utterances to overlap and generate silence more frequently than when not cooking. The order of overlaps in table cooking is shown in two aspects: (1) accidental overlaps are not always repaired in cooking, and (2) co-telling of how to cook sometimes allows utterances to overlap. Besides, while cooking, there occur some kinds of sequence organization with bodily actions: (1) adjacency pairs are organized not only by language but also bodily actions, and (2) even if adjacency pairs are not sufficiently organized with language, bodily actions could complement the absence or insufficiency. Such orders of sequence organization of actions may make silence occur more frequently. Repeated occurrences of overlaps and silence in cooking may result from embodied interaction.

Keywords: Table cooking · Overlap · Silence · Repair · Co-telling · Embodied sequence organization · Adjacency pair

1 Introduction

1.1 Japanese Table Cooking Style

It is often the case that we participate in conversations with our body engaged in some activities. A table talk is one of the most frequent examples of interaction accompanied by bodily motions in our daily life. In a table talk, each participant has to coordinate one's own utterances and eating acts, as well as the others' utterances and one's own utterances [1]. That is why a table talk is a very complicated and intelligent activity.

In Japan, we often cook and eat dishes on a table (not in a kitchen), such as *nabe-ryori* (one-pot meal), *yakiniku* (grilled meat), *okonomi-yaki* (Japanese-style pancake with various ingredients), or *monja-yaki* (Japanese-style pancake thinner and laxer than okonomi-yaki). Cooking and eating on a table is known as a traditional Japanese dining style. In this research, we call a dining style of this sort *table cooking*. The Japanese often say that a table cooking such as nabe-ryori enhances social relationships among the participants. However, how we can coordinate cooking and talking simultaneously has not been studied yet.

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In coordinating cooking and talking, there seems to occur a little different order of interaction from when eating and talking. In eating, we have to use one mouth both to eat dishes and to talk with the other participants. Mukawa [2] and Tokunaga [3] found that we tend to try to speak even when our mouth is filled with food, so that eating acts may not hamper our conversation. Such preference for coordinating conversations may be because eating is an individual activity while talking is an interactive one. On the other hand, in table cooking, we have to coordinate both cooking and talking, with the other participants. In addition, not only the conversation but also co-cooking seems to have some kinds of sequence organization as interaction.

In this paper, we investigate situatedness of interaction in cooking acts by examining the relationship between overlaps of utterances and silence and cooking acts, and clarify the "order of interactions" brought about by a table cooking.

1.2 Multiparty Interaction in Cooking Monja-Yaki

A table cooking of monja-yaki (often called "monja") is very interesting to observe. In analyzing interaction in table cooking, there are unlimited variables to observe, e.g. the kind of dish cooked on the table or cooking tools used that influence the way and the process of cooking. For instance, in cooking nabe-ryori (one-pot meal), it is likely that one of the participants monopolizes cooking. That is because only one pair of chopsticks and/or one ladle is often used in cooking nabe-ryori, and one of the participants becomes a "chair person" (called "nabe-bugyo" in Japanese) of cooking.

On the other hand, monja-yaki needs to be cooked by several participants, because the process of cooking monja-yaki is complicated. While one is pouring the ingredients into a hot plate, another has to hash them up so that they can be cooked well. Monja-yaki is more difficult to cook than nabe-ryori, and that difficulty could make troubles or encourage participants to teach each other how to cook. The "order of interactions" generated by a table cooking of monja-yaki depends on the number of participants and/or the relationships among them. It is possible that general features of multimodal interaction, e.g. the order of turn-taking, influence the way we cook and talk. In this paper, we observe a table cooking of monja-yaki by the three participants close to each other. Those who are not necessarily close to each other would show another order of interactions in table cooking.

1.3 Overlaps and Silence in Cooking

The first author invited two friends to a restaurant and conducted an experiment of cooking monja-yaki. Observing the interaction as a participant, the first author got an impression that a table cooking may cause overlap of utterances and cause silence to occur more frequently than when not cooking.

While cooking, we have to engage in both cooking acts and a conversation. Never can we cook without gazing at cooking tools or ingredients of the dishes. Therefore, we look at the others' faces less frequently than while not cooking. Generally, in Japanese conversations, a hearer gazed at by the current speaker is likely to be the next speaker [4], and it is indicated that the participants' gaze exchanges can realize smooth

turn-taking. Cooking on a table could hamper smooth turn-taking, which may result in the increase of overlaps and silence.

There seems to be another reason, too, for which our utterances tend to overlap in a table cooking. When several participants are engaged in cooking, all the participants do not always have equal amount of knowledge about how to cook. In a multiparty interaction, where more than two participants are involved, two or more advanced participants sometimes tell their knowledge collaboratively to less advanced one(s). This type of tutoring is called "co-telling". In co-telling, it is known that two participants frequently co-create one sentence, repairing each other's utterances, and that is why overlapping utterances are often produced (e.g. [5]).

In addition, while cooking and talking, there seems to be some kinds of sequence organization by both language and bodily actions. For instance, when asked a question or offered something by others while cooking, instead of answering them with language, the participants often responded to them with some actions. Schegloff [6] pointed out that sequence of actions could be dealt with by conversation analysts. In such cases, we may speak less frequently than when not cooking, which leads to the increase of longer gaps or silence.

Despite many overlapping utterances and silence for a long time, we do not feel that cooking acts disturb conversations. Although turn-taking rules are designed to prevent too many overlaps and too long gaps or silence [7], there are likely to be lots of overlaps and silence in conversations, especially when we are engaged in cooking.

In this paper, first, we analyze how often overlaps and silence occur in three phases, e.g. when people choose the dishes from the menu, wait for arrival of dishes, and cook monja-yaki. Second, referring to transcripts, we analyze some interesting cases of sequence organization with overlaps or gaps in cooking.

2 Method

2.1 The Data

The first author (called S) invited two friends (called U and H) to a monja-yaki restaurant in Kanagawa, Japan. We recorded our conversations on the table with two ultra-small digital video cameras and three voice recorders (Fig. 1). Three-party conversation is appropriate for observation of a table talk, for conversations by three participants are not likely to be split into more than one group [2]. In order to generate daily life conversations and not to put pressure on the participants to talk without any silence, we did not tell the participants what topics to talk about.

Fig. 1. Capture image of video data and top view of the table.

2.2 Excerption and Annotation

The conversation data was excerpted and divided into three phases: (1) seeing the menu and deciding what to eat, (2) waiting for the dishes to arrive, and (3) cooking monja-yaki. In phases (1) and (3), the participants talked with their bodies engaged in seeing the menu or cooking monja-yaki. In phase (2), the participants could focus on talking without any bodily acts, except non-verbal communications, such as gestures or exchanging glances. We compare the phases with bodily acts and the other from a viewpoint of the frequency of overlaps and silence.

Using annotation software ELAN[1], we made annotations of utterances and cooking acts for each participant. We also composed Japanese transcripts [8] of some suggestive examples. Overlapping utterances are put in [ ] in the transcripts[2].

2.3 Combination of Quantitative Analysis and Conversation Analysis

In this research, we analyze the interactions by means of both quantitative analysis and qualitative analysis, i.e., conversation analysis (CA). As for quantitative analysis, the length and the number of overlaps and silence are calculated and compared among the three phases mentioned above. Regarding qualitative analysis, some noteworthy examples concerning overlaps and silence are transcribed in detail, following the traditional method of transcription in CA.

It is notable that in this research both quantitative and qualitative analyses contribute to each other, indicating remarkable perspectives of analysis. For instance, calculating the frequency of overlapping utterances, we can see whose utterances are likely to overlap more frequently than the others', or which combination of the participants generates more overlaps. If two skilled participants' utterances overlap more frequently in the cooking phase, co-telling of how to cook may be occurring many times there. Or, in transcribing fine-grained interactions, similar phenomena are observed several times in the same phase and that tendency may be represented in the quantitative patterns as well. We try to combine the results of quantitative analysis with the CA findings suitably.

3 Overlaps

3.1 Quantitative Analysis

In this section, calculating the total hours and the number of overlapping utterances about each phase (Table 1), we analyze the frequency of overlaps. Overlaps are the time when more than one participant is talking for 100 ms or more[3].

[1] http://tla.mpi.nl/tools/tla-tools/elan/

[2] Transcript symbols are explained at the end of this paper.

[3] Although overlapping of back-channeling expressions is ruled out as examples of overlapping utterances in general, we call all the overlaps including back-channeling expressions "overlapping utterances" in this paper.

Table 1. Length and number of overlaps in each phase.

(1) Deciding what to eat	S&H	S&U	H&U	S, H&U	Total
Length of overlaps (sec.)	7.73	3.18	7.05	0	17.96
Length of overlaps among total length of utterances by the concerned participants (%)	7.02	3.37	6.34	0.00	12.89
Number of overlaps (time(s))	16	7	17	0	40
Number of overlaps among total number of utterances by the concerned participants (%)	14.16	7.61	15.32	0.00	25.95
Average length of overlaps (sec.)	0.48	0.45	0.41	-	0.45

(2) Waiting for the dishes	S&H	S&U	H&U	S, H&U	Total
Length of overlaps (sec.)	3.11	2.62	4.04	0.33	9.43
Length of overlaps among total length of utterances by the concerned participants (%)	4.63	3.04	6.16	0.00	9.44
Number of overlaps (time(s))	8	9	5	2	20
Number of overlaps among total number of utterances by the concerned participants (%)	12.12	10.84	9.09	0.02	19.61
Average length of overlaps (sec.)	0.39	0.29	0.81	0.16	0.47

(3) Cooking monja-yaki	S&H	S&U	H&U	S, H&U	Total
Length of overlaps (sec.)	5.92	12.42	3.91	0.87	21.38
Length of overlaps among total length of utterances by the concerned participants (%)	6.08	10.28	3.01	0.00	14.08
Number of overlaps (time(s))	13	19	10	3	39
Number of overlaps among total number of utterances by the concerned participants (%)	13.13	16.96	8.55	0.02	25.61
Average length of overlaps (sec.)	0.46	0.65	0.39	0.29	0.55

First, we calculated the length and the number of overlaps among the total length and the number of utterances by all the participants (Fig. 2). In phases (1) and (3), the percentages of the length and the number of overlaps were respectively higher than those in phase (2). It is possible that the participants were forced to turn their gaze on the menu or the dishes being cooked and they had difficulty in exchanging glances and coordinating their utterances.

Second, the length and the number of overlaps of each participant were calculated (Fig. 3). In phase (1), the percentages of the length and the number of all the participants were almost the same. In phase (2), all the percentages except the length of participant H were lower than phase (1). In particular, the number of overlaps of S in phase (2) is much less than that of the previous phase, and it is the same as that of U. In phase (3), the length and the number of S, and the number of U were especially high. While only the percentage of the length of H was lower than the previous phase, that of the number of hers was as high as in phase (1).

In general, our hypothesis that overlaps are more frequent while cooking than when not cooking was mostly supported. Then, why are overlapping utterances more likely to occur while cooking or looking at a menu? In the following sections, with several

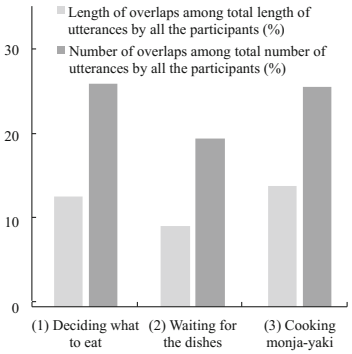

Fig. 2. Length and number of overlaps among total utterances.

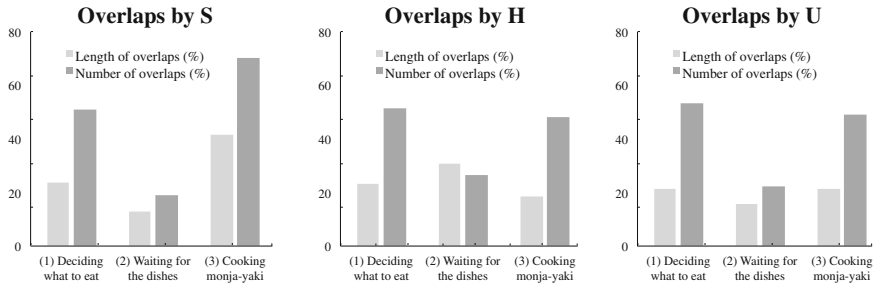

Fig. 3. Length and number of overlaps by each participant.

transcripts, we will indicate the order of overlaps in a table cooking in two aspects: (1) accidental overlaps do not always need to be repaired in cooking, and (2) co-telling of how to cook sometimes causes utterances to overlap.

3.2 Accidental Overlaps and Insufficient Repair

Although the frequencies and lengths of overlapping utterances in phases (1) and (3) were somewhat similar, the qualitative features of the overlaps were different between the two phases.

Overlapping utterances can be classified into five types (Fig. 4), from a viewpoint of when the latter utterance starts and stops overlapping with the former[4]: (a) Simultaneous Start (two utterances are started simultaneously, and either of them is completed before the other), (b) Included in the Other (the latter is started after the former is started, and the latter is completed before the former is completed), (c) Turn-taking

[4] In this paper, "simultaneously" means that the latter utterance is started less than 100 ms after the former utterance is started, and "One utterance is started after (completed before) the other" means that one utterance is started (completed) 100 ms or more after (before) the other.

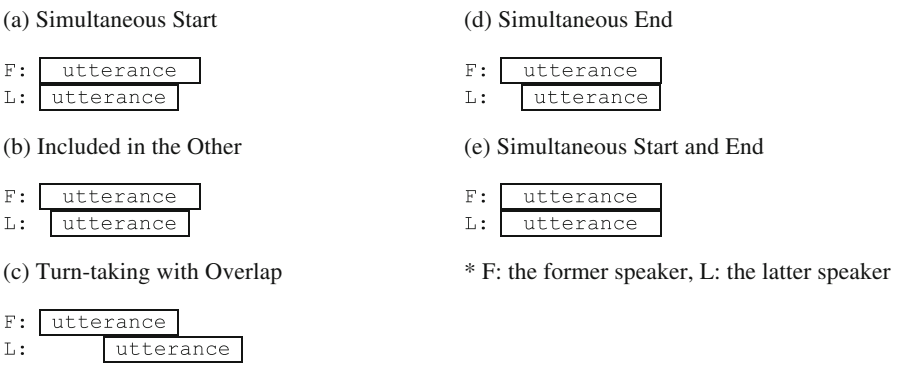

Fig. 4. Five types of overlapping utterances.

with Overlap (the latter is started after the former is started, and the former is completed before the latter is completed), (d) Simultaneous End (the latter is started after the former is started, and the two utterances are completed simultaneously), (e) Simultaneous Start and End (two utterances are started and completed simultaneously) (modified after [9]).

Among the five types, type (a) and (e) have a different feature from the others. In general, when a hearer starts to overlap with the speaker's utterance, the latter speaker, more or less, intends or expects to make his/her own utterance overlap with the former's utterance. However, as for type (a) and (e), two utterances consequently "accidentally" overlap, for neither of the two speakers can anticipate the beginning of the other's utterance. When two participants start to speak at the same time, one of them or both of them may not be heard or understood completely. In such cases, the speaker him/herself or the others often "repair" the insufficiently understood utterances [10].

Nevertheless, in table cooking, it may not be frequent that an accidental overlap of utterances (type (a) or (e)) is repaired either by the participant who made the trouble or by the other participant(s). In fact, in our experiments of conversations with monja-yaki, all the accidentally overlapped utterances were not repaired. Of all the overlaps, 3 examples in phase (1) and 4 examples in phase (3) were type (a). There were no

Table 2. Number of accidental overlaps in phases (1) and (3).

	Total of overlaps (time (s))	Accidental overlaps (time (s))	Repaired accidental overlaps (time (s))	Not repaired accidental overlaps (time (s))
(1) Deciding what to eat	40	3	3	0
(3) Cooking monja-yaki	39	4	2	2

examples of type (e) in phases (1) and (3). While all the 3 examples of (a) in phase (1) were properly repaired, 2 in phase (3) were not repaired (Table 2), which is likely to be one of the interesting aspects of interactions in table cooking.

In the transcript of phase (1)-1 (Excerpt 1), when an example of type (a) appears, self-repair is smoothly accomplished (in the transcripts, overlapping utterances are put in [ ], and [[indicates the point at which two or more utterances start simultaneously).

Excerpt 1 (Phase (1)-1).

01 H: watashi mon- (.) monja ni sichauto (0.4) monja no chigai ga wakaranain desuyone (.)
"When I, I try to have monja, I don't recognize the difference of monjas."
02 H: imi wa(h)ka(h)ri(h)masu? ((turning her eyes on participant S))=
"Do you understand?"
03 U: =[[e: douiu koto]::?(0.4)
"Well, what does it mean?"
04 S: =[[nan no chigai?]
"Difference of what?"
05 U: aji no [chigai tte kanji?]
"Is it the difference of the taste?"
06 H: [zenbu monja] tte monja (.) ni naru
"All monjas will be monjas."

Answering the question "Imi wakarimasu? (Do you understand?)" by H in the second line, U in the third line and S in the fourth line started to speak simultaneously. Judging from her eyes on S and the polite expression "wakarimasu", H in the second line seems to have addressed S[5]. However, soon after H in the second line, U in the third line and S in the fourth line began to ask questions, in order to clarify H's question. U said, "E, douiu koto? (Well, what does it mean?)" and S said, "Nan no chigai? (Difference of what?)" These two utterances overlapped accidentally, and their utterances may not have been properly heard by H. 400 ms after U in the third line, U in the fifth line tried to repair the trouble for herself, saying, "Aji no chigai tte kanji? (Is it the difference of the taste?)" Since the expression of U in the third line was more abstract than S in the fourth line, U in the fifth line may have combined her previous question with more specific question of S's. The question by U in the fifth line, which was a yes-no question, seems to have been easier for H to answer than U in the third line and S in the fourth line, which were wh-questions. Realizing it was necessary to repair incomprehensibility due to the overlap of utterances and to make the question easier to answer for H, U succeeded in repairing for herself.

On the other hand, in the transcript of phase (3)-1 (Excerpt 2), the trouble caused by an overlap was left without being repaired by any participants. The trouble was due to overlapping utterances of type (a).

[5] Participant S is one year older than H and U, and H usually uses polite expressions to S, not to U. Though U is also younger than S, U does not use polite expressions to S so often.

Excerpt 2 (Phase (3)-1).

01 U: ruisan wa (.) e (.) monja tte kansai? (.) kanto? (.)
"Rui*, well, are monjas from the Kansai ((region))? Or the Kanto ((region))?"
Gaze : (1)(2)(3)(2)

02 S: kanto [dayo]
"((It is from)) the Kanto."
03 U: [a:]: (0.6)
"Oh."
Gaze : (2)(1)

04 S: [[kansai na] i
"((There are)) not ((any monjas)) in Kansai."
05 H: [[tsukishima?]
"((Is it from)) Tsukishima?"
Gaze : (1)(4)(2)(1)

06 : (8.4) ((No one answered H or repaired the trouble.))

* Rui is participant S.

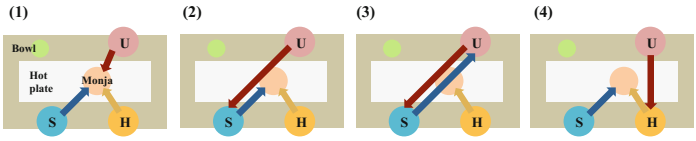

Fig. 5. Gaze direction (all the participants) in the transcript of phase (3)-1.

In this transcript, the participants were engaged in turning their eyes on the monja-yaki cooked on the hot plate. Caused to look at the monja, the participants do not seem to have focused on smooth turn-taking, exchanging glances with each other. First, all the participants were looking at the monja ((1) in Fig. 5). U in the first line addressed S and asked a question to him, "Monja tte Kansai? Kanto? (Are monjas from Kansai? Or Kanto?)" At the same time as U started to ask the question, U turned her eyes on S ((2) in Fig. 5), and immediately, S also turned his eyes on U ((3) in Fig. 5). U seems to have looked at S in order to have S answer her question, and S was preparing to answer it, with his eyes on U. S, however, turned his eyes on the monja again, before U completed the question ((2) in Fig. 5). S in the second line answered U, saying, "Kanto dayo. (It is from the Kanto.)" While S was answering it, S's eyes remained on the monja. As soon as S finished answering, U also turned her eyes on the monja ((1) in Fig. 5). 0.6 ms after U in the third line responded to S, S in the fourth line and H in the fifth line started to speak simultaneously. S told an additional answer to U, "Kansai nai (There are not any monjas in Kansai)" and H was to tell new information about the birthplace of monja, "Tsukishima? (Are monjas from Tsukishima[6]?)". This was an accidental overlap, but no one answered H or repaired the trouble. S was speaking while H in the fifth line was speaking, so S may not have heard H clearly and answered

[6] Tsukishima is the place in Tokyo (in the Kanto region), which is said to be the birthplace of monja-yaki.

her. On the other hand, U seems to have noticed H saying something. Just after H started to speak, U looked at H in a moment (less than 300 ms) ((4) in Fig. 5). Nevertheless, U neither answered H nor asked H to repeat the utterance. S and H were looking at the monja while they were speaking. Hearing S and H, U turned her eyes on H, S, and finally the monja in a short time. It is possible that U's intention to realize smooth turn-takings was diminished on account of S and H concentrating on cooking, and U gave up talking about it with S and H. This kind of closure of topics may be typical of interaction in table cooking.

In phase (3), a different interaction of overlaps of type (a) was also observed. In the transcript of phase (3)-2 (Excerpt 3), two overlapping troubles in the sixth, seventh, and eighth lines were not repaired. One of the troubles is due to overlapping utterances of type (a).

Excerpt 3 (Phase (3)-2).

01 H: monja tte saki guzai nose- (0.2) nanka (0.4) gusha tte yarun deshita k[ke?]
"In ((cooking)) monja, first, the ingredients are put...well...
((Are they)) to be in a muddle?"
02 S: [sou]ssuyo(.)
"That's right."
03 U: gusha tte yarun dakke (0.6) a[re dayone(.)konaida tsukutta no-]
"To be in a muddle?" "Say, the other day I made..."
04 S: [ano:: (.) shita ni:: shiru] ga arunde: (0.6)
"Well, the paste is below the ingredients,
05 S: sore wo [nokoshi-]
so leave it ((in the bowl))..."
06 U: [toriaezu] (0.6) [[dasun dayone]
"For the present, ((we)) have to put ((them on the hot plate))."
07 S: [[sore wo nokoshite da]su- a chotto matta](.)
"Leave it and put ((them)), oh, wait a moment."
08 H: [[° a sumimasen (.) ya- (.) yaru °]
"Oh, sorry, d, ((I)) will do ((it))."
09 S: are ga iru (.)
"((We)) need that."
10 U: a:[abura da]
"Ah, oil."
11 H: [abura [abura abura (.) abu-]
"Oil, oil, oil, oi..."
12 S: [abura wo (.) abura ga]
"Oil, oil..."

In this transcript, the participants were about to start cooking monja-yaki, confirming and deciding how they should cook it. First, H, not so skilled, asked a question about what to do first in cooking monja, "Gusha tte yarun deshitakke? (Are they to be in a muddle?)" S in the second line, a little more skilled, answered H, saying, "Soussuyo. (That's right.)" While S agreed to H's remark, U in the third line doubted whether H was really correct, and raised a question, "Gusha tte yarun dakke? (To be in a muddle?)" 600 ms after, U continued to tell her opinions, by telling her recent experience of eating monja, "Are dayone, konaida tsukuttano (Say, the other day I made…)" However, right after U began to tell the story, S in the fourth line started to tell the information about how to cook monja, without hesitating to overlap with U. As S did not seem to stop speaking, U gave up telling her experience. Why was S allowed

to override U's story telling? While U's utterance in the third line is merely intended to tell her previous experience, S's utterance in the fourth line is a directive or an instruction, which is a talk-in-the-service-of-cooking. A talk regarding what to do next in the process of cooking is more or less urgent. If S had waited for a transition relevance place [7] to come until U finishing telling her experience, S might have missed the exact timing to give the directive. Similarly, in endodontic instructions with video broadcast, it is shown that detailed questions posed by the students take precedence over general lessons and they are allowed to break the flow of the instructor's talk [11].

U in the sixth line started to help S in the fifth line to tell what to do for the present[7], and the two utterances were partly overlapped. The latter part of U in the sixth line, S in the seventh line and H in the eighth line started to speak simultaneously and were also overlapped. U and S were trying to negotiate what to do at the present, U saying, "Dasun dayone. (We have to put them on the hot plate.)" and S saying, "Sore wo nokoshite dasu… (Leave it and put them…)" Just after the utterance, S found that the hot plate had not been oiled yet and said, "A chotto matta. (Oh, wait a moment.)" At the same time, H was trying to suggest to S that H should participate in cooking instead of S. However, because of the trouble of oil, H in the eighth line was not heard properly and all the participants were forced to begin solving the trouble (S in the ninth line, U in the tenth line, H in the eleventh line and S in the twelfth line). As a result, the suggestion by H was not shared with the others, and no one tried to repair the trouble.

In phase (3), among all the overlaps of type (a) (4 examples), 2 examples were not properly repaired by anyone. On the other hand, in phase (1), all the 3 examples were adequately repaired (all of them were self-repaired). While table cooking, if two participants start to speak simultaneously, the trouble of overlapping may not always be repaired properly. That may be because dealing with cooking acts is regarded as preferable to coordinating all the utterances. Especially when an urgent utterance such as a directive overlaps in the process of cooking, the overlap seems to remain unrepaired.

3.3 Overlaps Accompanied with Co-telling

Another reason why overlaps occur more frequently while cooking may be that more skilled participants tell how to cook monja-yaki to the less skilled. While cooking, the participants taught how to cook to each other several times. In this section, we show a case that two more skilled participants (S and U) told how to cook to the other (H), and then the utterances of the former two overlapped. This type of tutoring is called "co-telling". In a three-party conversation, when two speakers co-tell something to the third person, their utterances seem to overlap frequently [5].

In the transcript of phase (3)-3 (Excerpt 4), S and U co-told H how to cook monja.

[7] At this point, the utterances of S in the fifth line, U in the sixth line, and S in the seventh line are overlapped and this overlapping is regarded as co-telling of how to cook. As for "co-telling" in table cooking, we will mention in detail in the next section.

Excerpt 4 (Phase (3)-3).

01 S: kore (.) [ano : : : (.) dote wo tsukura] naito
"This, say... ((you)) have to make a 'dote'*."
02 U: [dote tsukutte (maru tsukutte)]
"Please make a 'dote', (make a circle)."
Gaze : (1)(2)(1)(3)(4)(3)(5)

* A "dote" means a bank in Japanese.

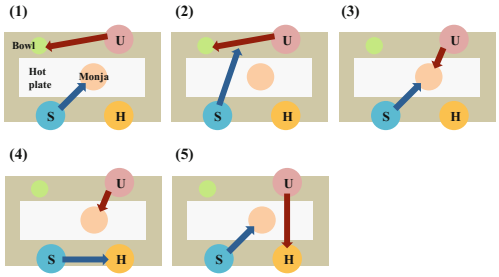

Fig. 6. Gaze direction (S and U) in the transcript of phase (3)-3.

First, U (the most skilled) found that it was time to make a "dote" (a bank) and pour the ingredients, and reached her hand to the bowl of the ingredients. Seeing a series of her cooking acts ((1) and (2) in Fig. 6), S (intermediately skilled) tried to tell H (not so skilled) to make a "dote". However, S in the first line was not able to vocalize the word "dote" quickly. He started a "word search (e.g. [12])", trying to express it with a gesture and saying, "Kore anoo… (This, say…)" Then, U in the second line moved her gaze from the bowl to the monja ((3) in Fig. 6), and said, "Dote tsukutte. (Please make a 'dote'.)" This utterance of U was meant to be a collaborative instruction to H. As a result, the two utterances overlapped by 1500 ms. In the situation that the more skilled had to tell H how to go on cooking as soon as possible, S and U realized "co-tellership" of instruction. That is why their utterances were allowed to overlap here and not repaired by anyone.

In phase (3), among all the overlapping utterances (39 examples), 4 examples were regarded as co-telling. On the other hand, in phase (1), there were no examples of co-telling. This result indicates that, in a three-party table cooking of monja-yaki, which is difficult to cook, overlapping while cooking may be partly responsible for two more skilled participants' co-telling about how to cook.

In fact, as was mentioned in Sect. 3.1 (Table 1), in phase (3), the length and the number of overlaps between S and U, who are more skilled than H, were much larger than those of the other combinations. In phases (1) and (2), on the contrary, the overlaps between S and U were not so frequent, compared to the other combinations (though the number of overlaps between them in phase (2) was more than the others). Further analysis is needed that investigates how many examples of overlaps by S and U resulted from collaborative instructions.

4 Silence

4.1 Quantitative Analysis

In this section, we analyze the frequency of silence in the three phases. We define "silence" as the time when none for 100 ms or more. The total length of silence in each phase (Table 3), the percentages of silence among total length of each phase (Fig. 7), and the average length of the silence in each phase (Fig. 7) were calculated.

Table 3. Total length of silences in each phase.

	(1) Deciding what to eat	(2) Waiting for the dishes	(3) Cooking monja-yaki
Total length of silence (s)	93.33	59.91	256.9
Length of silence among total length of each phase (%)	39.74	37.72	62.21

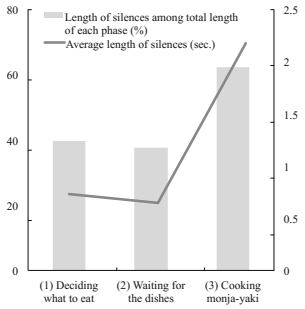

Fig. 7. Total length and average length of silences.

In phase (3), the percentage of silence was higher than in the other phases. Similarly, the average of silence in phase (3) was longer than in the other phases. It is indicated that silence occurs more often while cooking monja-yaki than when not cooking.

Although in both phases (1) and (3) the participants talked with their bodies engaged in some acts, silence in phase (1) was not so often, as well as in phase (2). In phase (1), the participants had to look through the menu, talk about what to eat, and decide it in a short time. It is possible that silence for a long time was not allowed because of the urgent task of decision-making.

On the other hand, silence in phase (3) occurred more frequently than the other phases. Our hypothesis that cooking acts make us silent was roughly supported. Even when long time silence occurred in cooking, we were not necessarily embarrassed. In phase (3), we observed several interesting examples of sequence organization related to cooking actions. In the next section, we will analyze two examples of sequence organization with bodily actions "adjacency pair".

4.2 Embodied Sequence Organization in Cooking

In the cooking phase, we observed several cases of sequence organization that consist of both utterances and bodily actions. Goodwin (e.g. [13]) has investigated how the visibility of our body accomplishes sequential embodied interactions. Mondada [14] stated that "sequentiality is a general principle governing not only talk but also action."

Adjacency pair [15] is a typical concept of sequence organization. Clark [16] proposed "projective pair", in order to expand adjacency pair into the wider concept including not only language but also actions. Schegloff [6] also discussed "sequences of actions", in which talk is accompanied by embodied action organized sequentially like adjacency pairs. In order to discuss sequences of actions, Schegloff offered an example in which one participant said, "Butter, please." and another participant passed butter to him. Mondada [14] transcribed embodied interactions called "multiactivity" in a surgical operating room, and revealed how "coagulation" in the operation is "collectively achieved" by a surgeon and an assistant, sequentially organized as "a paired action". Enomoto [17] analyzed passing and receiving interactions by a shopkeeper and a customer in a convenience store. She confirmed that, in bodily sequence organization of passing and receiving, each phase of first pair parts[8] appropriately occurs before that of second pair parts in the same way as adjacency pair in talk.

In table cooking, there seem to occur several types of sequence organization by both oral utterances and bodily actions. In this section, we analyze two examples typical of interactions in table cooking.

The transcript of phase (3)-4 (Excerpt 5) is an example where a projective pair involving bodily actions that is an instance of "offer-acceptance" occurred.

Excerpt 5 (Phase (3)-4).

01 S: ((S finished spreading oil all over the hot plate.)) hai
"OK."
02 H: ((Putting the oil bottle back and not having anything to do, H stretched out her hand to receive the turner from S, but H put her hand back for a while without receiving it.))
03 S: ((Noticing H trying to receive the turner, S began to pass it to H.)) °hai°
"Here you are."
((Right after this, H received the turner from S.))

In this scene, participant H offered to receive a turner from participant S, and S accepted the offer and passed it to her. First, H poured oil onto the hot plate from the bottle, and S was spreading it all over the hot plate with the turner. Finishing it, S said, "Hai. (OK.)", meaning that it was time to move on to the next cooking phase. At the same time, putting the oil bottle back and having nothing else to do, H stretched out her hand to receive the turner from S, without saying anything. S was about to put the

[8] "First pair part (i.e., the first part of a pair)" and "second pair part" are concepts suggested by Schegloff et al. [13] that compose an "adjacency pair". The first pair part is an utterance produced by a speaker and should be followed by the second pair part, an utterance by another speaker.

turner back onto the table, but noticing that H was ready to receive the turner, S began to pass it to H. Just after saying, "Hai. (Here you are.)" quietly, S passed it to H.

In this interaction, there occurred an adjacency pair of offer-acceptance by not oral utterances but bodily acts of the two participants. In fact, in the third line, S said "Hai." and this utterance may have been meant to be acceptance by language. However, even if S had passed the turner to H without saying anything, it would not have been regarded as the absence of the second pair part. The utterance of S in the third line was not so loud and seems to have been an additional one. Fundamentally, this interaction was organized with two kinds of bodily actions, H's offering to receive the turner and S's passing it to H.

H's outstretched hand seems to be interpreted as an "offer" to receive the turner, rather than as a "request" to give her it here. In the previous scene, H had already tried to receive the turner from S and the attempt was to fail. H is a year younger than S, and she seems to have been embarrassed to have elderly S conduct cooking acts, so H "offered" to take turns to spread the oil.

The next example is a little more complicated than the previous one. In the transcript of phase (3)-5 (Excerpt 6), H asked S a question, and S did not answer it at all.

Excerpt 6 (Phase (3)-5).

((While U was speaking, H began to pour oil onto the hot plate. Just after it, in response to H, S started to spread the oil all over the hot plate with a turner.))
01 H: konna mon desuka (ne)
"Is the oil enough?"
((This is a polite expression, with which H seems to have been addressed S.))
((On asking the question, H turned her eyes on the rack of seasoning in a moment, and gazed at the hotplate again.))
02 S: ((Without saying anything, S continued spreading the oil.))
03 H: ((H is holding the oil bottle.))
04 H: ((After a while, H stopped holding the bottle and put it back.))

In this scene, H was pouring oil onto the hot plate, and S was spreading it all over the hot plate. H asked a question "Konnamon desukane (Is oil enough?)", with a polite expression, which is interpreted to have been addressed to S (in the first line in Excerpt 6). However, instead of answering it, S continued spreading the oil for a while. This would be regarded as an absence of an answer from the viewpoint of adjacency pair of "question-answer". Nevertheless, H did not repeat the question to S, but instead kept on watching S to spread oil silently.

Why did H not repeat the question to S? When H asked the question, S was not able to answer it immediately, because S was not sure about whether the amount of oil was enough or not. Holding the oil bottle, H expected S to answer it before long, but H watched S spreading oil and became sure that the oil was sufficient, and then H stopped holding the bottle and gazing at the hot plate. In this interaction, because H assumed that oil was enough, watching the condition of the hot plate, the absence of S's answer to H's question was not regarded as a trouble.

In table cooking, (1) adjacency pairs are organized not only by language but also with bodily actions, and (2) even if adjacency pairs are not sufficiently organized with language, it is often the case that bodily actions complement the absence or

insufficiency. Such orders of sequence organization of actions may make gaps or silence occur more frequently than in the other phases.

5 Conclusion and Future Work

In this paper, we analyzed how a table cooking influences the order of interaction. We indicated that cooking acts cause overlaps of utterances and generate silence more frequently than when not cooking. Showing several transcripts, we analyzed the order of overlaps in two aspects: (1) accidental overlaps are not always repaired in cooking, and (2) co-telling of how to cook sometimes allows utterances to overlap. In addition, we indicated some kinds of sequence organization with bodily actions: (1) adjacency pairs which are organized not only by language but also with bodily actions, and (2) even if adjacency pairs are not sufficiently organized with language, bodily actions could complement the absence or insufficiency. Repeated occurrences of overlaps and silence in cooking may result from the order of embodied interaction.

Our experiment has presented evidence suggesting that interactions in table cooking are situated in cooking acts. We conjecture that bodily motions irrelevant to the contents of a conversation generate an order of interaction different from a normal conversation; we are not necessarily supposed to exchange glances with each other, which would be a "social rule" in normal conversations, because of the obligation to engage in cooking acts. In addition, since monja-yaki is not so easy to cook and need to be cooked by more than one participant, we cannot help instructing each other or confirming how we should cook, instead of the most skilled one monopolizing cooking. In a three-party table cooking of monja-yaki, each participant making a commitment to cooking acts, there seems to be a kind of interactions in which a goal is achieved by all the participants.

As for sequence organization with bodily actions, there are a lot of subjects we have yet to take up and discuss. For example, how many types of sequence of actions could be regarded as an adjacency pair? Adjacency pair is the concept with which we have analyzed sequence organization in verbal conversations. Then, when dealing with sequence organization of bodily actions, we may have to revise the previous concept of adjacency pair or generate new concepts we could use appropriately. In verbal communications, we hear the others' utterances and gaze at them in order to realize smooth turn-takings. On the other hand, in bodily interaction, we must see the others' hand or body parts constantly (cf. sign language), and then it will matter where the participants are seated. In conversations, overlaps of utterances are regarded as inadequate, but in spatial interaction, how many participants can simultaneously act and interact with each other? For instance, Mondada [14] showed that a second pair part of actions of "coagulation" in an operation room can be "collectively accomplished" by a surgeon and an assistant, either "simultaneously" or "slightly dissociated". We will have to examine a lot of issues and form new theories different from those of conversations.

We will continue the study of multiparty interactions in table cooking and accumulate fundamental knowledge for analyzing dining table environment.

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Appendix: Transcript Symbols

[	The point of overlap onset.
[[	The point at which two or more utterances start simultaneously.
]	The point at which two overlapping utterances end.
=	No break or gap.
(0.0)	Elapsed time by tenths of seconds.
(.)	A brief interval within or between utterances.
::	Prolongation of the immediately prior sound.
°word°	The sounds softer than the surrounding talk.
(h)	Plosiveness with laughter.
(word)	Dubious utterances or words.
(( ))	Transcriber's descriptions.

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