

# HOW DISAGREEMENT EXPRESSIONS ARE USED IN COOPERATIVE TASKS

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## ABSTRACT

Analysis was made of disagreement expressions in dialogues recorded in a cooperative task experiment. A disagreement expression is defined as the latter utterance of consecutive utterances, which shows disagreement with the former. Subjects used two types of disagreement expressions: to the partner's utterance, and to their own. These were classified into three subtypes according to part of speech: conjunction, interjection, and content word.

The role of disagreement expressions in cooperative tasks was examined. It was found that subjects used disagreement expressions suitable to the occasion to maintain good relation with their partners. It was concluded that using expressions that disagree with one's own previous utterance is an effective strategy for expressing an opinion for which one lacks adequate evidence and for eliciting utterances from one's partner.

## 1. INTRODUCTION

People make appropriate utterances based on the type of dialogue in which they are engaged, such as a lecture or seminar, a meeting, small talk, or chatting. In a lecture or seminar, a speaker can easily form the content of the dialogue in advance because he can take the initiative in the dialogue, while in small talk and chatting this is difficult. During dialogues like these, a speaker must improvise utterances to make the dialogue go smoothly. Moreover, often during such interaction an out-of-context thought will cross one's mind and be uttered. We call these two features improvisation and creativity.

**Improvisation in a dialogue** Dialogues naturally occurs in interaction with a partner. During a dialogue, we have to achieve our aim while we are looking for an action required on the spot each other. Although we try to have a dialogue based on a prior plan about the content of the dialogue, we would fail the dialogue.

**Creativity in a dialogue** During a dialogue, we sometimes conceive a new idea after we hear our partner's utterance. To convey the idea to our partner have influence on our partner's thought. Such a positive feedback is important in a dialogue.

Improvisation and creativity are important in human spontaneous dialogues. We call a dialogue with the above

two features an **emergent dialogue**. We are investigating the emergent dialogues.

We conducted cooperative task experiments [1] and recorded dialogues to examine improvisation and creativity. In the experiments, subjects used several characteristic utterances to show disagreement with their partners' utterances because they had to compose utterances extemporaneously.

As well as agreement expressions [2], disagreement expressions are characteristic utterances in improvisation. Disagreement expressions play an important role in reaching mutual consent in dialogues. Here, we discuss the role of disagreement expressions in cooperative tasks.

## 2. CONSTRUCTION OF A DIALOGUE CORPUS

We conducted cooperative task experiments to construct a corpus of emergent dialogues. In our experiment, pairs of subjects solved ten problems cooperatively. We selected the problems from Ref. 3. Our experiments had the following three features. Details have been given previously in Ref. 1.

1. Two kinds of pairs were employed:  
We formed 38 pairs of subjects who had not met before (SA), and 13 pairs of subjects who had known each other well beforehand (SB).
2. Experimental settings provided two types of feedback information:  
Subjects talked to their partners in separate rooms through microphones. The computer monitors displayed subjects' faces in a visual-and-audio (VA) setting (Fig. 1), while in an audio-only (AO) setting, the monitors did not display their faces. The SA pairs were tested in either the VA or the AO setting, while all SB pairs were in the VA setting.
3. Cooperation improved the score of the task:  
The subjects had to give utterances fully to cooperate well with partners. Consequently we expected that we could record sufficient utterances for the emergent dialogues.

Our corpus consisted of audio recordings and text transcriptions of the dialogues. The text was composed of



Figure 1: Experimental setup: visual-and-audio setting.

Japanese kanji and hiragana. We developed a browser that shows the correspondence between the audio waveforms and the transcribed text; the data structure of the recorded dialogues is shown in Fig. 2.



Figure 2: Data structure of the recorded dialogues.

### 3. DISAGREEMENT EXPRESSIONS IN THE CORPUS

In a pair of consecutive utterances, when the latter utterance shows disagreement with the former, we call the latter a disagreement expression. We observed two kinds of disagreement expressions in the recorded dialogues.

1. When a subject, after her partner's utterance, used a disagreement expression to give a differing opinion,

we called such an expression “disagreement with one's partner's utterance (DP).”

2. When a subject, after his own utterance, added a disagreement expression to modify or reverse her own view, we called such an expression “disagreement with one's own utterance (DO).”

We show these expressions by means of recorded dialogues. (Note that italic words are Japanese.)

#### 3.1. Disagreement with One's Partner's Utterance (DP)

We classified DP into three subtypes, based on part of speech: conjunction, interjection, and content word.

##### A.1 Conjunction connecting an utterance that gives an opinion differing from partner's utterance

*demo*(but)

Example 1

A: *nanka onnanokono kao chotto kewashiikanato omo*  
(I think somehow her face is set in a sulky look.)

B:

A: *ttene*

B: *uun demo nanka mayugekara menikakete*  
(Umm, but from her eyebrows to her eyes, )

A: *fufu*

(Ha-Ha)

B: *fufu niteru*  
(Ha-Ha... Her face is like the man's.)

##### A.2 Interjection showing disagreement or unexpectedness

*iya*(No, Um), *e*(Oh!, Huh?), ...

Example 2

A: *shoujono chichioyaga kuroihoude chigau kanaa*  
(The girl's father is the black one, and ... it might be wrong.)

B: *fufufu*  
(snicker)

A: *uun*

(Mmm...)

B: *iya daijisouni udedmade kakaeterunoha*  
(No, he holds the girl's arms carefully, ...)

##### A.3 Content word showing disagreement with partner's utterance

*chigau*(You are wrong.)

Example 3

A: *chigau chigau*  
(You are wrong.)

B: *shounenni narundesuka soshitara*  
(Are you suggesting the answer is the boy's father?)

### 3.2. Disagreement with One's Own Utterance (DO)

In the same way, we classified DO into three subtypes.

#### B.1 Conjunction connecting an utterance which gives opposing opinions to one's own utterance

*demo*(but), *kedo*(although), ...

Example 4

A: *shounen chotto kawaisoudesuyone*  
(The boy seems to be pitiful, doesn't he?)

B: *fuahaha uun*  
(Ha! Ha! Hmm...)

A: *demo otokonohitotte angai jibunno kodomono houga*  
(But, a man might cherish his own children)

B:

A: *daijini shichau kana nee*  
rather than the other's ones, .... OK?)

B: *uun tokuni onnanokoyashinee*  
(Uh-huh, ... Especially since his child is a girl.)

#### B.2 Interjection showing disagreement or unexpectedness

*iya* (No, Um)

Example 5

A: *n a a shiawaseka*  
(Oh! Happy!)

B: *nitara nankashi un shiawasedatoka hahahaha*  
(If the daughter is like her father, she'll be happy,

A: *ha ha ha n a imasunee*  
(Ha!-Ha! Oh! They say that.)

B: *iya iya iya yoku wakaranain dakedo*  
ha!-ha!) (No! No! I don't know that exactly, though.)

#### B.3 Content word showing disagreement on one's own utterance

*chigaukanaa*(It might be wrong)

Example 6

A: *shounenni miemasu watashi*  
(The answer is the boy's father, I think ...)

B: *soudesuka*  
(I hear you)

A: *shou nanka shoujono chichioyaga kuroihou de*  
(I mean, the girl's father is the black one, and ...)

B:

A: *chigaukanaaun*  
(It might be wrong, umm...)

B: *fufufu*  
(chuckle)

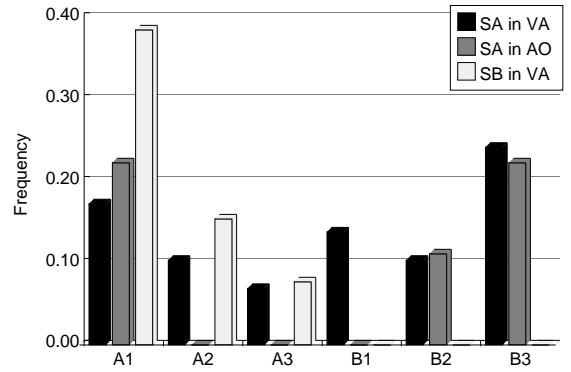


Figure 3: Frequency of disagreement expressions for each dialogue.

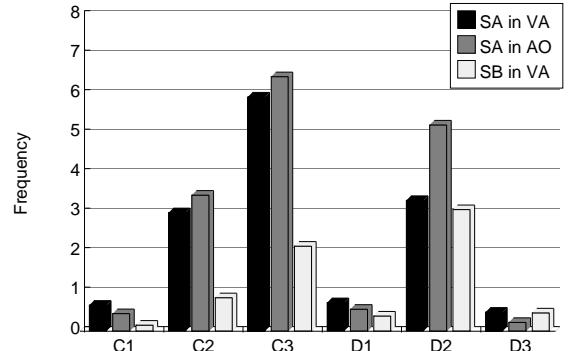


Figure 4: Frequency of agreement expressions for each dialogue. [2]

Before a subject's disagreement expression, only when a partner makes utterances which remind us of disagreement, we decide that the subject has changed her opinion. In fact, the utterances before DO are "Hmm...", "Ha!-Ha!", and "chuckle", which hint at dissent. Without a partner's utterance a subject might repair her opinion voiced by mistake merely. Reasoning in this way, we can rule out the possibility that the subject changed her opinion without relation to her partner's utterances.

### 3.3. Frequency of disagreement expressions

We analyzed the frequency of each disagreement expression in the eighth problem (Q27 in Ref. 3) in our dialogue corpus. Table 1 shows the basic data of the dialogues: average number of characters and average task length. We selected all expressions that showed disagreement in the dialogues. We regarded the repetition of a word (e.g., No! No!) as one expression. Figure. 3 shows the frequency of the disagreement expressions for each dialogue. For a comparison, we show the frequency of the agreement expressions for each dialogue(Fig. 4). Each classification

	SA in VA	SA in AO	SB in VA
average number of characters	453.7	309.9	302.5
average task length (sec)	121.5	96.9	94.5

**Table 1:** Average number of characters and average task length in the eighth problem

(from C1 to D3) in Fig.4 corresponds to that (from A1 to B3) in Ref. 2. The scale of the frequency in Fig. 4 is twenty times as large as that in Fig. 3.

As Fig. 3 and Fig. 4 show, the frequency of the disagreement expressions is quite low in comparison with that of the agreement expressions. In Fig.3, the values for each frequency are 0.83 (SA in the VA setting), 0.56 (SA in the AO setting), and 0.62 (SB in the VA setting).

The SA pairs in the VA setting used each disagreement expression comparatively equally. However, the SA pairs in the AO setting did not use A2 and A3. Moreover, the SB pairs did not use DO (B1, B2, B3) at all.

## 4. DISCUSSION

To maintain good relation between subjects during a dialogue, SA pairs in the AO setting refrained from using disagreement expressions of types A2 and A3, as these show stronger disagreement. It is arrogant for us to use the stronger expressions with a person whom we do not know well.

Emergent dialogues do not require authoritative utterances. In an emergent dialogue, if we continue talking, even using utterances that reflect uncertainty, we can come to understand each other's views. If we can understand each other's views, we consider that our creativity in the dialogue get more active. As Fig. 3 shows, the subjects used not only DP but also DO indeed. We consider that the subjects tried to communicate more fully by using DO.

The disagreement expression “*demo(but)*” was used not only as a conjunction but also as a discourse marker[4]. When one person uses an ambiguous expression to express his opinion, the partner feels comfortable in expressing his own opinion regardless of whether he agrees with the other's ambiguous expression. Conversely, when one person uses a predicative expression, his partner might feel uncomfortable in expressing his opposing opinion.

We conclude that the subjects intentionally used equivocal expressions. This dialogue strategy is against both Grice's maxims of quality and his maxims of manner[5]. However, as the subjects had to find consensus during the dialogues in our experiments, we consider that they chose equivocal expressions to express opinions for which they lacked adequate evidence and to induce their partners to voice their own opinions.

## 5. CONCLUSION

We analyzed disagreement expressions used in our corpus. We showed two types of them: that to partner's utterance

and that to one's own utterance.

We observed three features in the subjects' use of disagreement expressions. Subjects who had not met each other before (SA) used each disagreement expression equally in the visual-and-audio (VA) setting. SA pairs tested in the audio-only (AO) setting did not use the interjection (A2) and content word (A3) types of utterances to show disagreement with their partners. The subjects who had known each other well beforehand (SB) did not use disagreement expressions following their own utterances (DO).

We conclude that there were three reasons that the subjects used equivocal expressions: to express an opinion for which they lack adequate evidence, to elicit their partners' opinion, and to maintain good relation with their partners.

Now we are constructing a dialogue management model for understanding agreement and disagreement based on these analyses.

## 6. REFERENCES

1. H. Yano and A. Ito. Toward constructing a dialogue management model for *kyowa* (collaborative dialogue). In *Proceedings of the 5th IEEE International Workshop on Robot and Human Communication(RO-MAN '96)*, pages 489–494, 1996.
2. H. Yano and A. Ito. How agreement expressions are used in cooperative tasks. In *Proceedings of Natural Language Processing Pacific Rim Symposium 1997(NLPRS '97)*, pages 569–572, 1997.
3. D. Archer. *HOW TO EXPAND YOUR S.I.Q. (social intelligence quotient)*. M. Evans & Co., Inc., New York, 1980.
4. P. Szatrowski. *Nhongo no Danwa no Kouzou Bunseki*. Kuroshio Shuppan, 1993. (in Japanese).
5. H. P. Grice. Logic and Conversation. In P. Cole and J. L. Morgan, editors, *Speech Acts*, volume 3 of *Syntax and Semantics*, pages 41–58. Academic Press, London, 1975.