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THE EFFECT OF BACKCHANNEL UTTERANCES AS A STRATEGY TO FACILITATE IDEA GENERATION IN A COPRESENCE SITUATION: RELATIONSHIP TO THINKING TASKS

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Abstract

This study investigated the effect of backchannel utterances (BU) as a strategy to facilitate idea generation when a listener was copresent with a speaker who was engaged in idea generation. Twenty-four female undergraduate students participated in the main experiment, which used a think-aloud method. Independent variables were frequency of BU from listeners, and the task category of idea generation (prediction and resolution). Dependent variables were the number of ideas generated, speaking time, motivation of speakers, and speakers' perception of listeners' interest in, agreement with, and admiration of speakers' ideas. The main results of 2 × 2 (frequency of BU × task category) ANOVAs were as follows: 1) The main effect of BU was significant for all dependent variables. 2) The interaction between the two factors was significant only for the number of ideas generated, that is, the effect of BU was larger for the prediction task.

An additional experiment was conducted to obtain a baseline of the number of ideas generated. Twelve female undergraduates engaged in the same tasks in the main experiment without listeners. The performance level was close to that of the low frequency condition. This result eliminated the possibility that low frequency BU inhibited idea generation.

The present findings showed the effectiveness of BU as a strategy for facilitating idea generation. The interaction of BU and task category was interpreted in terms of the possibility that the two kinds of tasks involved different thinking processes. Because the interaction was found only for idea generation, it was suggested that BU had two influencing pathways: one facilitated positive social cognition and motivation, which led to speaking more, and the other activated idea generation itself.

Key words: idea generation, thinking, backchannel utterance, copresence, communication

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1. Introduction

The ability to generate a variety of ideas to solve a problem is expected to become increasingly necessary. Although the ability to think divergently can be developed through training, manipulating or improving the idea generation environment may also be effective in facilitating the generation of ideas. With this approach in mind, a review of the existing research on idea generation shows two general areas of study. One is research on the development of idea generation techniques, such as the Brainstorming Method (Osborn, 1953), "KJ Method" by Jiro Kawakita (Kawakita, 1970), and "NM Method" by Masakazu Nakayama (Nakayama, 1977). The other is research on the development of system tools to support idea generation, such as groupware, outline processors, and knowledge acquisition support tools (Kobayashi, 1996).

One approach for supporting idea generation is to manipulate the way people engage in communication. For example, when discussing the method for solving a problem within a group, it has been shown that the number of ideas generated by the group as a whole is greater when there is frequent turn taking, compared to when there is not (Fujihara & Sannomiya, 2002). In addition, in tasks involving the generation of multiple ideas regarding the cause of an event, repeatedly presenting participants with 10 examples of "the kind of answers other people gave," after they had turned in their answers, resulted in improved quality and quantity of ideas generated in new causal inference tasks (Sannomiya, Shimamune, & Morita, 2000). Furthermore, regarding communication media, face-to-face communication has an advantage over communication via computer at the stage of idea generation, because the listener's response is immediate during physical copresence (Sannomiya & Kawaguchi, 1999; 2000). When a speaker is thinking aloud about a topic, anxiety may be alleviated and motivation to think increases, in situations of immediate physical copresence, compared to situations of no copresence. Motivation to think and alleviation of anxiety for a task in a copresence situation may result in part from a listener's backchannel utterances (BU).

BU are generally defined as short messages from a listener that do not interrupt the speaker's turn (Tajima, 2002). In Japanese conversation, BU are used to facilitate the speaker's utterances. For example, Mizutani (1988) found through observations of everyday conversation that the Japanese way of inserting BU into the speaker's utterances facilitated the speakers to speak more. Matarazzo, Saslow, Wiens, Weitman, & Allen (1964) noted that a listener's head nodding and BU increase speaking time. Thus, studies have demonstrated that BU facilitate speakers' utterances, but it remains unclear whether they may also facilitate idea generation.

In two preparatory surveys, we asked 63 undergraduate and graduate students, "What kinds of listener responses facilitate idea generation?" Among the 159 free responses, the most common was "agreement" (31) and second most common was "BU" (21) (in contrast to English, there is a commonly used term for this in Japanese: "aizuchi"). We asked a different group of 60 undergraduate and graduate students, "Do a listener's backchannel utterance ("aizuchi")

affect the way a speaker thinks?" Responses were chosen using a 5-point scale, where 5 indicated "very much" and 1 indicated "not at all." Fifty-four (90%) of the students responded with either 5 ("very much") or 4 ("quite a lot").

Very little research has been conducted on the relationship between BU and idea generation. Ohmori and Doi (2000) found that when a chairperson added BU more frequently during a meeting, the participants generated a larger number of ideas. However, there were at least three problems with their experiment. First, participating pairs each had a different topic for the meeting because the researchers had asked participants to choose their own discussion topics. As a result, the differences in topics became a confounding factor in the comparison between the effects of high and low BU frequencies. Second, they told participants to think of ideas to use as answers for the task *before* the experiment rather than having them generate ideas during the task. At the time the experiment began, there were already differences in the number of ideas between the two groups, therefore the experiment was no longer an investigation of the effect of BU on idea generation. Rather, the results have to be interpreted in terms of how the chairperson's BU encouraged the expression of ideas that the participants had brought with them. Third, the way of counting ideas was problematic. To count the number of ideas generated in the participants' utterances, the researchers counted "concepts." For example, in their count, the utterance "Even if there is not enough rice because production is down, well, some was imported but, maybe something is not right about the way they are going about it" included six "concepts": "there is not enough rice," "production is down," "some was imported," "something is not right," "it relates to importing," and "the way they are doing it." However, it is difficult to view the "concept" which they used as indicative of idea generation.

In contrast, Sannomiya, Kawaguchi, Yamakawa, & Morita (2003) conducted the following experiment to investigate the effect of BU on idea generation and surmounted the problems in the study of Ohmori and Doi (2000). First, the participants were divided into pairs. One partner, thinking aloud, generated answers (ideas) to an assigned idea generation task and the other person was the listener. The reason they used such a think-aloud task was to create a situation in which it was not unnatural if the listener did not add BU. Listeners added BU with either high or low frequency.

The speakers were given the idea generation tasks during the experiment, not beforehand. In that way, the speakers had to generate answers to the tasks on the spot. Every speaker provided answers to two tasks, the order of which was counterbalanced across participant pairs and the frequency condition, to ensure that the task did not vary with the frequency condition. In their study, the number of ideas generated was considered the number of different answers to the task. Finally, by asking speakers (after they had finished each task) whether any ideas that had come to mind had not been included in their answers, the researchers verified that all ideas generated during the experiment had been expressed. Sannomiya et al. (2003) showed that frequent BU had the effect of increasing not only speakers' speaking time, but also the number of ideas they

generated in that time. Thus, it may be that BU have the function of supporting idea generation.

Nevertheless, a more detailed investigation is necessary. For example, how did the speaker engaged in the activity of thinking recognize the listener's BU? Although Sannomiya et al. (2003) considered listeners' BU expressing their interest, agreement, or admiration for the ideas the speaker was presenting, it needs to be verified whether the speaker recognized the BU as they were intended and if motivation was actually enhanced by frequent BU. In addition, the influence of task category is an issue. For the idea generation tasks in Sannomiya et al. (2003), participants were tasked with generating as many answers as possible to each of two questions such as "What will happen in Japan if the number of aged people increases even more?" and "How can we deal with the increasing volume of trash in Japan?" However, the former task needs predicting results and the latter needs devising solutions. Is it reasonable to assume that the effect of frequent BU would facilitate idea generation in the same way in a prediction task and a resolution task? These points are to be examined.

Therefore, in this study, the tasks used to investigate the effect of the frequency of a listener's BU on the idea generation of a speaker in a copresence situation were divided into two categories: prediction tasks and resolution tasks. Furthermore, in addition to the dependent variables from the study of Sannomiya et al. (2003)—speaking time and number of ideas generated—we also investigated the speaker's recognition of the listener's interest, agreement, and admiration, as well as the motivation of the speakers.

2. Method

2.1. Experimental design

(1) Independent variables: BU frequency (high/low), task category (prediction/resolution)
These two factors were within-participant.

(2) Dependent variables: speaker's recognition of the listener's interest, agreement, and admiration; motivation of the speakers; speaking time; number of ideas generated

2.2. Problems used in the idea generation tasks

Two categories of tasks were used. One category was to predict results and the other was to devise solutions to a problem. Specifically, we created the following problems for the task content, expecting that the university student participants would have some interest in and knowledge of these issues.

Prediction tasks:

What will happen in Japan if the number of aged people increases even more? (Aging problem)

What will happen in Japan if juvenile delinquency increases even more? (Juvenile delinquency problem)

Resolution tasks:

How can we deal with the increasing volume of trash in Japan? (Trash problem)

What should be done about the sluggishness of the Japanese economy? (Economy problem)

2.3. Participants

Twenty-four Japanese female third-year undergraduates participated in the study. They were divided into two groups of 12: one group of speakers (the group thinking aloud) and one group of listeners. Students interested in solving the thinking tasks were assigned the role of speaker.

2.4. Procedure

Speakers and listeners were given their instructions separately. The role of speaker was to generate as many answers as possible for each task within 5 minutes and tell them to the listener (i.e., think aloud). The 5-minute time limit was imposed because a preliminary experiment confirmed that speakers usually ran out of ideas within 5 minutes. Listeners were told that they were not to express their own opinions, but to respond to the speakers with BU, such as "uh, huh," "right," and "good" (in Japanese "un-un," "sou-sou," and "sore-ii," respectively), as frequently as possible for the high frequency condition. For the low frequency condition, they were to refrain from reacting to what the speaker said and be as silent as possible. In addition, they were forbidden from nodding while they kept silent, because nodding alone might produce a similar effect to BU. However, on the other hand, from our preliminary experiment we learned that it was extremely unnatural to forbid nodding while making BU, so in this experiment, that was allowed. Therefore, in the present study, BU are understood to be accompanied by nodding.

The experiment included 4 sessions, one for each of the following combinations:

1) high-frequency BU/prediction task

2) high-frequency BU/resolution task

3) low-frequency BU/prediction task

4) low-frequency BU/resolution task

The session order for each participant was counterbalanced so that each participant experienced each of the four combinations of task category and frequency.

The speaker and listener sat at an angle of about 90 degrees to each other. The speaker was video recorded and all utterances (including the listeners') were voice recorded. We had the speaker stop after speaking for 5 minutes. At the end of every session, in order to see how the speakers had recognized the listeners' interest, agreement, or admiration, we had them answer the following questions on a 5-point scale from "very much" to "not at all":

"Did the listener show interest in your ideas?"

"Did the listener agree with your ideas?"

"Did the listener praise your ideas?"

In addition, we asked the speakers to use the same 5-point scale to answer the question

"Did the way the listener responded motivate your thinking?" and we asked them to tell us about any ideas they had come up with but not uttered. We also asked just the listeners' introspection about the sessions.

3. Results and Discussion

Among the four task problems, it became evident for the juvenile delinquency problem and the economy problem that some participants were not able to answer the questions adequately. That is, for the juvenile delinquency problem, rather than answering the question "What will happen in Japan if juvenile delinquency increases even more?" there was a tendency for participants to first try to think about reasons why juvenile delinquency was increasing, and many did not arrive at any predictions of the scenario results. Further, regarding the economy problem, rather than answering the question "What should be done about the sluggishness of the Japanese economy?" there was a tendency to talk about concrete situations arising from the economy being sluggish, for example, things like the increase in homelessness. As a result, many participants were also unable to give adequate solutions in this task.

Thus, we decided to exclude responses related to these two problems from our analysis, and examine only the responses from the aging problem (a prediction task) and the trash problem (a resolution task). Therefore, because the BU frequency and the task category were not necessarily within-participant factors, we treated them as between-participant factors when we performed the ANOVA. In spite of the data exclusion, the counterbalance of the order of the prediction and resolution tasks was still effective.

3.1. BU frequency

In order to confirm the effectiveness of the manipulation of the independent variable, we counted the number of BU from the video recordings. The BU frequencies for each condition are shown in Table 1.

There was a clear difference between the high and low frequency conditions, which verified that the experimental condition had been effectively performed.

TABLE 1.
Average frequency of BU and standard deviations by experimental condition

	High frequency	Low frequency
	M (SD)	M (SD)
Prediction task	62.50 (18.28)	0.83 (1.60)
Resolution task	63.83 (23.30)	0.67 (0.82)

3.2. Recognition of listener interest, agreement, and admiration

The scores for listener interest, agreement, and admiration for each condition are shown in Table 2. In terms of the ANOVA results for BU frequency × task category, only the main effect of BU frequency was significant (interest: $F(1, 20) = 41.82$, $p < .01$, agreement: $F(1, 20) = 64.27$, $p < .01$, admiration: $F(1, 20) = 60.86$, $p < .01$). For both task categories, the speaker's recognition of listener interest, agreement, and admiration all increased when the listener made frequent BU.

3.3. Motivation of the speakers

The scores for motivation of the speakers for each condition are shown in Table 2. The ANOVA results for BU frequency × task category showed that only the main effect of BU frequency was significant, $F(1, 20) = 76.08$, $p < .01$. For both task categories, the speaker's motivation to generate ideas for the problem increased when the listener added frequent BU.

3.4. Speaking time

Participant speaking time never exceeded the 5-minute time limit. The scores for speaking time for each condition are shown in Table 2. The ANOVA results for BU frequency × task category demonstrated that only the main effect of BU frequency was significant $F(1, 20) = 5.69$, $p < .05$). For both task categories, speaking time to express her ideas was greater when the listener added frequent BU.

3.5. Making speech protocols for counting ideas

A speech protocols (transcripts of all utterances recorded) were made to count the ideas generated; an example follows. The listener's BU are in parentheses and the underlining indicates "one idea." (A transliteration of the original Japanese—in a local dialect—is followed by a rough English translation without BU, since they cannot be used in an equivalent way.)

Table 2.
Dependent variable means and standard deviations by BU frequency and task category

	High-frequency		Low-frequency	
	Prediction task	Resolution task	Prediction task	Resolution task
	M (SD)	M (SD)	M (SD)	M (SD)
■ Listener interest	4.33 (0.75)	4.50 (0.50)	2.17 (0.69)	2.00 (1.16)
■ Listener agreement	4.33 (0.47)	4.50 (0.76)	1.83 (0.69)	2.00 (0.82)
■ Listener admiration	3.83 (0.69)	4.33 (0.75)	1.50 (0.76)	1.50 (0.76)
■ Motivation	4.50 (0.50)	4.17 (0.69)	1.67 (0.75)	1.83 (0.69)
■ Speaking time (sec.)	262.00 (25.19)	238.50 (33.66)	199.67 (46.00)	209.33 (58.89)
■ Number of ideas generated	10.83 (1.46)	7.17 (0.69)	6.33 (1.60)	5.67 (0.75)

Original Japanese:

Nihonshakai no koureika ga sara ni susumu to, (Un) mazu wa, (Un) uun nenkin ga, (Ununun) Amari moraenakunaru. (Aa, unun) to, (Un) sore dake zeikin wo, (Un) wakai uchi ippai harawanaikan, (Aa, unun) te iu koto ga okoru kana. (Ununun) un, eeto hokani wa, ato koureisha wo koureisha ga sasaenaikankattari, (Aa, un) suru to omou shi, (Un) soshitara yappari muri ga tataruken, (Unun) koureisha ga (Un) shisetsu toka ni hairu kikai mo ooku naru. (Unun) Honde mata sou iu shisetsu de hataraku hito mo ippai iru kedo, (Ununun) mata hitode ga tarintoka iisou. (Ununun souya na) Souya na uun, un hoka no kangae … sore wa mou ima demo iwareyou koto ya kedo, (Ununun) mou chotto mata sarani (Un) susumu to nani ga okorukatte, (Aa) kangaeru to, nani ga okoru darou na.

English Translation (BU omitted):

If the number of old people in the population grows in Japanese society … the first thing is that, well, it will be hard for them to get all of their pension … and … while we are young we'll have to pay tons of tax, that kind of thing will happen, maybe. Uh … and maybe something else, then … I think, there will be things like old people having to take care of each other, and so, of course, it's going to be hard, more old people will go into places like old people's facilities. And so, we'll need a lot of people to work in those facilities, and it'll be another case of people saying there aren't enough people to go around … yeah, it'll probably be like that … Uh … other ideas … now that's all that can probably be said but … to say what will happen as it gets worse in the near future … I wonder …

When extracting the ideas from this text, the following rules were used.

1) In a prediction task, a description of a predicted result ("~ga dou naru") is to be considered an idea.
2) In a resolution task, a description of an action for resolution ("~wo dou suru") is to be considered an idea.
3) The content of the idea is not to be questioned.
4) The idea is to be extracted from the speaker's words (no inference of unspoken meaning from context).
5) No differentiation is to be made between the speaker's own ideas and ideas the speaker obtained from other sources.
6) In a prediction task, an expectation expressed with a form like "~ni nattara ii" is to be considered an idea.
7) If detailed, concrete examples are given for an idea, the examples are not considered separate ideas; only the original idea is to be counted.

Following these rules, the ideas extracted from the aforementioned example were:

1) Nenkin ga amari moraenaku naru. (It will be hard to get all of their pension).
2) Zeikin wo wakai uchini ippai harawanakereba narani. (While we are young, we will have to pay a lot of taxes).
3) Koureisha wo koureisha ga sasaenakereba naranaku naru. (Old people will end up having to be taken care of by old people).
4) Koureisha ga shisetsu ni hairu kikai ga ooku naru. (More old people will go into facilities).
5) Shisetsu de hataraku hitode ga tarinaku naru. (There will not be enough people to work in those facilities).

3.6. Number of ideas generated

The number of ideas generated under each condition is shown in Table 2. The ANOVA results for BU frequency × task category showed significant main effects for BU frequency $F(1, 20) = 31.32$, $p < .01$) and task category ($F(1, 20) = 16.34$, $p < .01$) as well as a significant interaction $F(1, 20) = 7.86$, $p < .05$). Further tests for simple main effects for each task category revealed significant effects for prediction $F(1, 20) = 35.39$, $p < .01$) and resolution $F(1, 20) = 3.93$, $p < .05$).

These results demonstrated that high frequency of BU had the effect of increasing the number of ideas generated. Further, the interaction showed that BU frequency effect was influenced by task category, and this effect was more pronounced for the prediction task than the resolution task.

3.7. Unexpressed ideas

However, doubt may remain regarding whether these data represent the actual number of ideas generated, or rather, just the number of ideas expressed. That is, there remains the possibility that speakers under the low-frequency condition had thought of ideas but simply did not express them to the listeners. We thus asked our participants whether they had had unexpressed ideas.

As for unexpressed ideas, one instance in high-frequency condition and three in low-frequency condition were reported by participants. Based on the descriptions of these instances, it was found that the idea in the high-frequency condition and two of the low-frequency ideas had actually already been expressed, and included in the counting of the number of ideas generated. The remaining low-frequency unexpressed idea concerned the trash problem. In the words of the participant, “I wonder why stuff like plastic that can only be disposed of by burying is made at all? I have stuff like plastic around, too. I thought to myself, years in the future people will probably be surprised when they discover plastic piled up like ancient shell mounds, I wonder what they will think?” Because this description was not a resolution to the task problem, it could not be counted as an idea and did not need to be added to the number of unexpressed ideas.

Therefore, these data on the number of ideas generated can be treated as the actual number of ideas, not just the ideas expressed.

3.8. Listener introspection

(1) The high-frequency condition

Listerners' introspection about the speakers are as follows: "The speaker seemed happy!" "She was relaxed," "It seemed easy for her to talk and her talking was animated." "She talked without stopping!" "She was enthusiastic!" "She got into it!"

Listerners' introspection about themselves are as follows: "It was easy to be the listener," "Without knowing it, I got an impulse to say something," "I almost talked," "I wanted to add some opinions," "When I added BU, I really got interested in what she said."

(2) The low-frequency condition

Listerners' introspection about the speakers are as follows: "The speaker's voice sounded monotone," "Her talking was unanimated," "Her talking was flat," "It was as if she were talking to herself," "She had no energy," "There were weird pauses," "It seemed hard for her to talk" (3 people), "(But) she was still able to talk, which was good!"

Listerners' introspection about themselves are as follows: "It was hard," "It was tough," "It was unpleasant," "It was difficult," "Just listening to the speaker without responding, gradually, I lost interest in what she was saying," "I didn't get much of what she said" (3 people).

What stands out in these comments is that the BU affected not only the speakers but also the listeners themselves. Interestingly, they reported that their levels of interest and understanding changed in response to their own BU. On the one hand, when consciously adding frequent BU, they became interested in what the speaker was saying and wanted to participate themselves. On the other hand, when constraining their BU, they lost interest and even their level of understanding fell. This suggests that frequent BU may have the effect of enhancing the utterer's level of understanding of and interest in what the speaker is saying.

Conversely, given that idea generation was facilitated by frequent BU, it is possible that it could have been inhibited by the absence of such BU. The speaking situations in this study differed in nature from ordinary conversation, in that the participants thought aloud in the performance of the tasks when answering problems. In ordinary conversation, if a speaker noticed a lack of response from a listener, she would likely stop talking. That did not happen in this experimental situation, in which participants were doing their best to accomplish the tasks. Nevertheless, the suspicion remains that the absence of BU from the listeners may have had a constraining effect on participants' idea generation. In order to investigate that possibility, a baseline for idea generation would have to be determined, such as the number of ideas generated in a situation without a listener. Thus, we decided to do a supplementary experiment to determine that baseline. Because it would be unnatural for participants to think aloud without a listener, we had listeners write their responses instead of speaking.

3.9. Supplemental experiment: Idea generation without a listener

For this investigation, we looked at generating ideas without a listener. As a comparison

TABLE 3.
Number of ideas generated in writing (without a listener)

	M (SD)
Prediction task	6.92 (1.93)
Resolution task	5.50 (1.76)

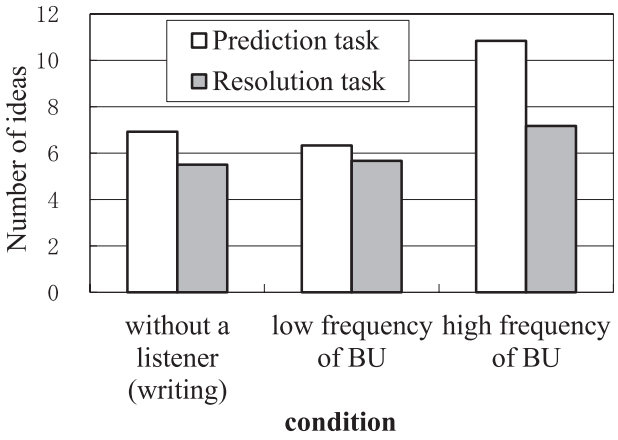

FIGURE 1.
Number of ideas generated in each condition

group of participants, 12 Japanese female third-year undergraduates were recruited. A prediction task (the aging problem) and a resolution task (the trash problem) were assigned to them. The order of the problems was counterbalanced among the participants, and we asked them to write down as many answers as possible within the same time limit of 5 minutes. These results are shown in Table 3, and the numbers of ideas generated under all three conditions are shown in Fig. 1.

For both tasks, there was no difference between the low-frequency BU and no-listener conditions (prediction: $t(16) = 0.61$, resolution: $t(16) = 0.21$), indicating that the low-frequency BU cannot be said to have inhibited participants' idea generation. A comparison of the results of the high-frequency BU condition to those of the no-listener condition indicated no significant difference for the resolution task, $t(16) = 0.27$, whereas for the prediction task, the high-frequency BU condition was significantly higher ($t(16) = 4.13$, $p < .01$).

4. General Discussion

The speakers interpreted the BU of listeners as interest in, agreement with, and admiration for their ideas, and their motivation to speak, their speaking time, and the number of ideas they

generated all increased. These results tended to hold across task categories. The present findings regarding the increase in speaking time in the presence of BU supported those of Sannnomiya et al. (2003) and Matarazzo et al. (1964), as opposed to the findings by Ohmori and Doi (2000) that speaking time inexplicably decreased under the condition of high-frequency BU. Matarazzo et al. thought that the reason for the increase was a tendency for frequent BU to increase speakers' feelings of approval, so the speakers more actively engaged with the listener. Matarazzo et al.'s experiment, however, did not involve having participants perform idea generation tasks. Their suggestion that BU might be a motivator for speech behavior came from having subjects talk freely about things they wanted to say.

The present study confirmed that BU have the effect of facilitating idea generation based on evidence that frequent BU increased the number of ideas generated. However, another possible interpretation is that rather than frequent BU facilitating idea generation, a paucity of BU may have inhibited idea generation. Subsequently, we performed a supplemental experiment to identify the baseline for idea generation, this time using written responses and no listener for the experimental conditions. We found that the resulting baseline for idea generation was close to the number of ideas generated under the low-frequency BU condition, which confirmed that, for the tasks used in these experiments, the low-frequency BU condition did not have an inhibitory effect and that, as expected, the high-frequency condition had a facilitation effect.

The simplest interpretation of the relationship between BU and idea generation would likely be an explanation based on reinforcement theory. That is, the use of BU functions as a positive reinforcer for idea generation. However, there is a problem with that line of thinking. When we already have an idea in mind and have to decide whether to talk about it or not, there might be times where we choose to talk about it because we received positive reinforcement. However, whether a certain idea comes to mind or not cannot be said to be a voluntary behavior, so it is unreasonable to think that more ideas were generated by positive reinforcement. In the same way, it is unreasonable to interpret the withholding of BU as a kind of punishment for idea generation. The effect of BU on generating ideas needs to be understood rather on the cognitive and affective levels than on the behavioral level. In response to the listener's BU, the speaker recognizes that the listener appreciates her, which somehow relates to a heightening of her motivation to think and the activation of divergent thinking. Here, we take the view that the listener's use of BU had the effect of stimulating the cognitive activity of generating ideas in the speakers.

In addition, regarding the number of ideas generated, the facilitation effect of BU frequency on idea generation was influenced by task category, and this effect was more pronounced for the prediction task than for the resolution task. Although both task categories demand divergent thinking, it is possible that the thinking process demanded of the speaker differs by task category. On one hand, the prediction task is an unconstrained divergent thinking task, for which predictions about the future in the aging of Japan's population needed to be generated freely. On

the other hand, the resolution task is a constrained divergent thinking task, which required only the generation of ideas linked to the resolution of the trash problem. In the unconstrained divergent thinking task, the participants engaged in pure idea generation, while in the constrained divergent thinking task, they had to generate ideas and, at the same time, check whether the ideas met the task requirement, which for this task was "Does this really lead to a resolution for the trash problem?" Therefore, we presume that frequent BU may have a facilitation effect only for the process of engaging in pure idea generation. However, such an interpretation is tentative at this stage, because the mechanism of idea generation is not well elucidated, and the categories and peculiarities of tasks are not necessarily clear. Thus, this question remains a subject for future investigation.

In existing idea generation research, not much consideration has been given to task category. Finke, Ward, & Smith (1992) pointed out that many of the task topics studied in cognitive science research were not tasks in which experimental participants would feel it necessary or important to get deeply involved. In addition, the results of the present study showed that a slight difference between two categories of idea-generating tasks could affect the results. Thus, in future idea generation research, more attention may need to be paid to the nature of the tasks.

Further, in contrast to the number of ideas generated, the main effect of task category and the interaction between BU frequency and task category were not found for the other dependent variables (i.e., the recognition of the listener's interest, agreement, and admiration, the motivation of the speaker, and the speaking time). A probable explanation would be that while the listener's frequent use of BU increased the speaker's motivation for thinking, facilitated her speaking, and lengthened her speaking time (via the social cognition of obtaining the listener's interest, agreement, and admiration), this does not necessarily ensure an increase in the product of her cognition (i.e., the number of ideas). The fact that the interaction of task category and BU frequency was demonstrated for the number of ideas generated, but not for the other dependent variables (the perception of the listener's interest, agreement, and admiration, the motivation of the speaker, and speaking time), suggests that the effect of BU on social cognition, motivation, and speaking may differ somehow from the effect of BU on thinking. The former did not show any effect of task category, while the latter did. In other words, the effect of backchannel utterance frequency on positive social cognition and motivation/facilitation of behavior, and on the activation of idea generation, may have two separate influencing pathways.

Another unexpected but extremely interesting result worthy of future study came from the listeners' reflections, which suggested that their BU affected their own motivation to listen to the speakers and their level of understanding.

Finally,we would like to discuss the issue of copresence with the listeners. People have expected that copresent situation facilitates a speaker's idea generation, relative to not-copresent situation such as distance communication via computer. However this expectation presupposes the listener cooperatively acts on idea generation of the speaker. It is necessary for the speaker

to feel the listener encourages, supports, and accepts her thoughts through behaviors such as BU, head nodding, leaning forward, and making eye contact when listening to her. These listener's behaviors take place often unconsciously, but if the listener is merely "there" without these behaviors, idea generation cannot be facilitated. Unless speakers have a necessity to perform the task as in the case of the present experiment, speakers may give up thinking and expressing ideas. In contrast, with listeners' copresence and their intelligent utilization of collaborative behaviors such as BU, not only the amount of speakers' speech, but also their generation of ideas, will be facilitated.

5. Conclusion

In this study, we investigated the effect of listeners' BU frequency on speakers' idea generation in a copresence situation where the listener and speaker were in immediate physical proximity. An experiment comparing the use of high- and low-frequency BU in two categories of task produced the following results:

1) In both tasks, the number of ideas generated was larger for the high-frequency BU group than for the low-frequency group, and an interaction between BU frequency and task category indicated that the effect was more pronounced in the prediction task.
2) There were no interactions on the speakers' recognition of the listeners' levels of interest, agreement, and admiration; the motivation of the speakers; and their speaking times. Rather, they were larger under the high-frequency BU condition than the low-frequency condition, for both task categories. These facts show that BU frequency effect on social cognition, motivation, and speaking behavior may be different from that on cognitive product, that is, idea generation.
3) Introspection of the listeners suggested that their motivation to listen to the speaker and their understanding of what was said were affected by their own BU.

As to the interpretation of the results in 1), it was hypothesized that the facilitation effect of BU frequency acted only on the process of idea generation, and that the facilitation effect decreased for the resolution task because, compared to the simple generating of ideas (divergent thinking) in the prediction task, a validity check had to be performed.

In order to find the way of using BU more effectively for supporting idea generation, further research to better understand the function of BU is necessary.

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