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EFL learners' proficiency differences and their CMC interaction during an asymmetrical convergent task

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*This study examined the impact of **EFL** learners' proficiency differences on their dyadic interaction on the internet. The participants included 94 university students, who were divided into four pairs: the higher proficiency sender (**HS**)-lower proficiency receiver (**LR**) pair, the lower proficiency sender (**LS**)-higher proficiency receiver (**HR**) pair, the **HS-HR** pair, and the **LS-LR** pair. They were asked to perform an asymmetrical convergent task. In the first part of the data analysis, the differences in the number of words produced and in the ratio of resolved referential problems were examined between the **HS-LR** pair and the **LS-HR** pair. To provide a more detailed comparison, the differences between the **HS** and the **LS** and between the **HR** and the **LR** were also calculated. In the second part, comparisons were made between the **HS** in the **HS-LR** pair and the **HS** in the **HS-HR** pair, between the **LS** in the **LS-HR** pair and the **LS** in the **LS-LR** pair, between the **HR** in the **LS-HR** pair and the **HR** in the **HS-HR** pair, and between the **LR** in the **HS-LR** pair and the **LR** in the **LS-LR** pair. It was found that the differences between the **HR** in the **LS-HR** pair and the **LR** in the **HS-LR** pair were significant, while those between other groups were not. Finally, the necessity of questioning two common views regarding pair work was indicated, and the potential for a more synthetic model of dyadic interaction was discussed.*

Introduction

The variables that impact **EFL** learners' interaction during tasks[1] are divided into two groups: *task features* (Skehan, 1998) and *task implementation* (Ellis, 2003). Task features relate to how a task is designed. These include, for example, the type of input, topic,

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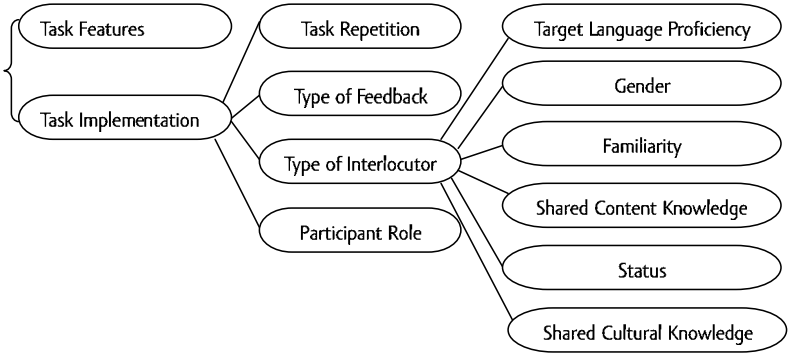
and cognitive complexity. Task implementation concerns how a task is achieved, and its factors include task repetition, type of feedback, type of interlocutor, and participant role. Ellis (2003) indicates that fewer studies have focused on the variables of task implementation than on those of task features. One of the variables of task implementation, the type of interlocutor, is subdivided into six categories by Robinson (2007): target language proficiency,[2] gender, familiarity, shared content knowledge, status, and shared cultural knowledge. The variables discussed so far are illustrated in Figure 1.



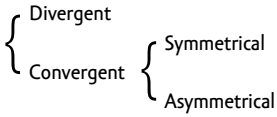
(based on Ellis, 2003; Robinson, 2007)

Figure 1. Type of interlocutor and other variables affecting learners' interaction during tasks

Among these six variables for the interlocutor type, it is important to consider the pedagogical implications of target language proficiency. When teachers assign pair work in class, they usually consider the students' target language proficiency in addition to other variables, such as gender and personality. Some teachers might form pairs consisting of learners of equal proficiency, so that each one may share in activities equally; others might form pairs with substantial differences between the two learners' proficiencies, so that higher proficiency learners might assist those with lower proficiency. However, the impact that proficiency differences between learners have on their dyadic interaction has not been extensively explored. For instance, it is not clear whether learners with higher proficiency benefit from their interaction with those with lower proficiency or whether learners with lower proficiency depend excessively on those with higher proficiency.

The type of task used in this study is called an *asymmetrical convergent* task. In a convergent task, a pair of learners is asked to collaborate and solve a given problem. This is also called a *problem-solving* or a *goal-shared* task. A convergent task can be contrasted with a *divergent* task (Duff, 1986). Discussion and debate are examples of divergent tasks, for which definite goals are not set. Duff (1986) demonstrated that convergent tasks encourage learners to take more turns and produce more c-units[3]. Jenks (2009) shows that this kind of task, designed with an information gap between paired learners, is primed for the meaning negotiation essential for second language acquisition. Pica (2005) and Pica, Kang, and Sauro (2006) indicate that this kind of task is favorable not only for teaching and learning but also as a data collection tool for research on learners' interaction in class because of its pedagogical origins. Pursuant to the results of a communication study among non-native

speakers by Varonis and Gass (1985), a convergent task is subdivided into *symmetrical* and *asymmetrical* types. In a symmetrical convergent task, each learner in a pair has half the information needed to solve the problem built into the task. In contrast, in an asymmetrical convergent task, one of the learners is provided with more information than the other and is expected to show initiative in the activity. The task classification discussed so far is shown in Figure 2.



(based on Duff, 1986; Varonis & Gass, 1985)

Figure 2. Classification of tasks

The dyadic interaction in this study is not *face-to-face* (F2F) *communication*, but rather *computer-mediated communication* (CMC). CMC is a generic term referring to the exchange of messages on the internet, including e-mail, BBS, and chat; it has the features of both oral and written modes (Smith, 2003). The advantages of CMC over F2F communication have been studied. It may encourage more interaction among learners than F2F communication (Kern, 1995) and create an environment with less psychological pressure to use a foreign language (Chun, 1998; Mackey & Gass, 2005). Another of its merits is its usefulness in research, since data collection carried out through CMC is less intrusive than is the traditional recording of F2F interaction (Smith, 2003). The advantages of CMC for EFL learners are evident in "3 hpw" (Swan, 2005, p. 392) situation where they have classes for only three hours per week. Matuura and Miura (1998) conducted a questionnaire survey of 1,200 Japanese university students, soliciting their opinions on their English classes. They discovered that as many as 69% of the students taking English speaking courses were dissatisfied with their classes and that 79% of them preferred a course that could provide more opportunities to communicate in English. It is not easy to offer students ample chances to communicate in the target language in an EFL class, which often runs only a few hours a week and has more than 30 students in one room. In a situation like this, CMC has the potential to complement traditional lessons that emphasize F2F communication.

In spite of the advantages of CMC, few studies have examined the impact of differences in learners' target language proficiencies on their dyadic interaction in CMC. Therefore, in the following section, I review a relevant study on EFL learners' F2F dyadic interaction.

Previous research

Yule and Macdonald (1990) remains one of the most influential pioneering studies on the effect of EFL learners' proficiency differences on their F2F dyadic interaction. It is also unique in its focus on asymmetrical convergent tasks. Since then, a limited number of studies have been conducted on the impact of learners' proficiency differences on their interaction (Kim & McDonough, 2008; Kowal & Swain, 1994; Leeser, 2004; Storch, 2001; Watanabe & Swain, 2007; van Lier & Matsuo, 2000). All of them used divergent or symmetrical convergent tasks, however, partly because a more complicated research design is

required to explore the potential of asymmetrical convergent tasks. The present study follows the general outline of Yule and Macdonald (1990) but also expands it.

The participants in Yule and Macdonald (1990) included 40 graduate students enrolled in an **EFL** course at a university in the **US**. They were formed into pairs. The participants in each pair were given similar maps of a city. One of the participants had a map with a delivery route showing where packages had to be delivered, while the other had a map without the route. The participants who had the map with the delivery route were asked to explain the delivery route to their partners without showing them the map. The participants who did not know the route were encouraged to ask their partners questions and draw the route on their maps. Each pair was also told that one map was older than the other and that some parts of their maps were different from each other. There were four referential problems built into the maps. For example, the old map had one office building, whereas the new one had two additional office buildings; the old map had a hat shop, which, in the new map, was a bicycle shop. The task was considered complete when the receiver of the information could follow the route and successfully locate the delivery spots using the sender's instructions. The pairs were classified into two groups. In 10 out of 20 pairs, the higher-proficiency participant performed the sender's role for a lower-proficiency receiver; in the other 10 pairs, the lower-proficiency participant performed the sender's role for a higher-proficiency receiver. The interactions of these pairs were transcribed and analyzed. The pairs in which the lower-proficiency participant had the sender's role were concluded to have shared more active interaction and achieved a more successful resolution of the referential problems. It was suggested that, in an asymmetrical convergent task, the lower-proficiency student should take the sender's role, whereas the higher-proficiency student should accept the receiver's role.

This research is significant as one of the earliest studies on the effect of learners' proficiency differences on their dyadic interaction and in its use of asymmetrical convergent tasks. It may be unfair to nitpick this innovative work of 20 years ago, but it has some limitations. First, no quantified information on the dyadic interaction, such as the number of words and turns, was recorded, though the study concluded that the interaction was more active in the pairs with the lower-proficiency learner acting as the sender. Second, the pairs' solutions to referential problems were categorized and quantified, but it was not explained how each categorization was determined. Furthermore, the differences between the two groups are established on the basis of an interpretation of raw data rather than statistical measures. Third, the unit of analysis was not the individual learner but the pair. Therefore, the study did not answer the pedagogical questions concerning individual learners, such as whether the learners with higher proficiency benefited from their interaction with those with lower proficiency, or whether the learners with lower proficiency depended heavily on those with higher proficiency.

The present study attempts to compensate for the limitations in Yule and Macdonald (1990). The number of words and the ratio of resolved referential problems are quantified and statistically examined. The referential problems are coded using two coders, and the inter-coder agreement is checked. In addition to confirming the results in Yule and Macdonald (1990), whose unit of analysis was the pair of learners, this study also examines the dyadic interaction between individual learners.

Study

Participants

The participants in the present study included EFL learners (n = 94: 14 females and 80 males) at a university in Japan. Their native language was Japanese, and their major was economics. The mean total raw score on the Secondary Level English Proficiency (SLEP) Test[4] (Educational Testing Service, 1991) was 72.62 out of 150 (SD = 12.96). Participants were divided into two groups according to their scores: higher-proficiency (H) learners (n = 47) and lower-proficiency (L) learners (n = 47). The mean total score on the SLEP test of the H group was 83.04 (SD = 6.87) and that of the L group was 62.19 (SD = 8.38). The difference between the two groups' scores was significant at t (92) = 13.20, p = .00, r = .81, 95% CI [17.71, 23.99]. Note that the notations *H* and *L* were relative: their scores on the SLEP test identified H learners as high intermediate and L learners as low intermediate (Educational Testing Service, 1991).

Procedures

Prior to the data-collection session, the participants were grouped into four pairs: the H sender (HS)-L receiver (LR) pair, the L sender (LS)-H receiver (HR) pair, the HS-HR pair, and the LS-LR pair. Because some participants were absent on the day of the data collection, 72 students attended the data collection session: HS (n = 10; 2 females and 8 males)-LR (n = 10; 2 females and 8 males) pair; LS (n = 13; 2 females and 11 males)-HR (n = 13; 1 female and 12 males) pair; HS (n = 7; 2 females and 5 males)-HR (n = 7; 1 female and 6 males) pair; and LS (n = 6; 6 males)-LR (n = 6; 6 males) pair. Each pair was assigned to an online bulletin board. They had used this bulletin board system in their regular classes and were familiar with it. They knew their partner was someone in the same computer room, but they were not informed who the partner was, because they had all been asked to use a handle on the bulletin board. Consequently, they were not aware of their partner's target language proficiency.

The task was designed following Yule and Macdonald (1990), cited above. The senders in the pairs were given a map with a delivery route showing five spots where packages had to be delivered; the receivers were given a map without the route. The senders were asked to explain the route to the receivers, while the receivers were requested to ask the senders questions in order to ascertain that they were following the correct route and to draw the route on their maps. They were also told that the senders' maps were old, that the receivers' were new, that some buildings on the two maps were different, but that the delivery spots were unchanged. There were two referential problems built into the maps, but the participants were not informed of how many or where they were. The receivers' map had two banks, one of which was the first delivery spot, whereas the senders' map had only one. Similarly, the receivers' map had two hospitals, whereas the senders' map had only one. Therefore, the receivers were expected to ask the senders which bank and which hospital they needed to go to. Because the participants had studied English for six years at secondary school, they were expected to possess sufficient English grammar and vocabulary to complete the task. However, they were not English majors and had only had a few hours of English class after entering university. Thus they were regarded as having limited opportunities to speak English. This task aimed at offering the participants more chances to use English by taking advantage of CMC and improving their English fluency. After 20 minutes,

the participants were asked to stop performing the task even if they had not reached the final destination on the map. The maps were collected, and the dyadic interaction of the pairs was transcribed using a log.

The transcripts of the interaction were analyzed from two perspectives, the number of words and the ratio of resolved referential problems. The number of words is an index of fluency in the target language, while the ratio of resolved referential problems is an index of successful equitable communication. Although the number of words has often been adopted as an index for previous studies on learners' interactions (Nakahama, Tyler, & van Lier, 2001; Pinter, 2006, 2007; Watanabe, 2008; Watanabe & Swain, 2008; van Lier & Matsuo, 2000), the ratio of resolved referential problems is not a commonly used index. Take the first referential problem as an example. As mentioned above, the receivers' map had two banks, and the receivers were expected to ask the senders to which bank they had to deliver the package and to locate the correct spot. When they successfully did so, this problem was categorized as identified and solved. When the receivers noticed the presence of the problem but failed to find the bank they had to go to, the problem was regarded as identified and unsolved. When the receivers did not mention the problem and just passed over it or followed the senders' one-way instruction, the problem was labeled as ignored. The problem when categorized as identified and solved was converted into 100 percent of the right solution; it was converted into 50 percent when categorized as identified and unsolved, and into 0 percent when categorized as ignored. This categorization judgment was based on the transcript and the route that the receivers drew on their maps. The following transcript is an example of the interaction of an **HS**-**LR** pair.

1 **HS**: Start is University. There is on the corner of Grand Avenue and Pitt Street.
2 **LR**: Ok.
3 **HS**: Go straight east. You turn right at the 2nd couner.
4 **LR**: OK.
5 **HS**: There is the bank. Next store is flower store where is next to the bank.
6 **LR**: Is Flower store on your left?
7 **HS**: Right.
8 **LR**: Ok.
9 **HS**: You turn left at the 1st corner. You'll go straight Spring Street when you'll find Post Office.
10 **LR**: Ok.
11 **HS**: It is 3rd store. Next store is Hospital. Hospital is next to Post office.
12 **LR**: Is Post Office on your left or rigth?
13 **HS**: It is on your left. Go straight east Prince Avenue.

In this interaction, I judged that the pairs identified and solved the first problem but ignored the second one. At turn 6, the **LR** tried to ascertain which bank she had to go to. Although it would clearly have been more appropriate for her to use *west* instead of *left*, she seemed to make herself understood and to draw the necessary information from the **HS**. This was supported by the **LR**'s map, which shows that she drew the correct route and reached the first delivery spot. Therefore, I regarded the first problem as identified and solved. At turn 12, the **LR** applied the same strategy that worked well for the first problem. In response to this, at turn 13, the **HS** seemed to give clear instructions to the **LR**. However, the **LR**'s map did not

show that she had reached the third delivery spot. I concluded that time had run out before she understood the **HS**'s explanation and thus, labeled the second problem as ignored.

The ratio of resolved referential problems depends more on a coder's subjectivity than do the number of words. Therefore I asked another coder to code all the transcripts separately. Cohen's kappa coefficients were calculated to measure the inter-coder agreement between the second coder and me: k (n = 36) = .90 for the first problem and k (n = 36) = .92 for the second, which were interpreted as forming a virtually exact match. When our judgments conflicted, we discussed and resolved them.

The data analysis consisted of two parts. The first part aimed to confirm the results in Yule and Macdonald (1990). The differences between the two pairs (**HS**-**LR** and **LS**-**HR**) in the number of words produced and in the ratio of resolved referential problems were examined. To compare the interactions of these two pairs in more detail, the difference in the number of words between the senders in each pair (the **HS** in the **HS**-**LR** pair and the **LS** in the **LS**-**HR** pair) was calculated. This difference was also examined between the receivers in each pair (the **HR** in the **LS**-**HR** pair and the **LR** in the **HS**-**LR** pair).

The second part was focused entirely on individual learners rather than on pairs. The differences between the two groups of **HS** (the **HS** in the **HS**-**LR** pair and the **HS** in the **HS**-**HR** pair) in the number of words produced and in the ratio of resolved referential problems were examined. These differences between the two groups of **LS** (the **LS** in the **LS**-**HR** pair and the **LS** in the **LS**-**LR** pair) were also examined. Similar comparisons were drawn between the two groups of **HR** (the **HR** in the **LS**-**HR** pair and the **HR** in the **HS**-**HR** pair) and between the two groups of **LR** (the **LR** in the **HS**-**LR** pair and the **LR** in the **LS**-**LR** pair). For these examinations, the Mann-Whitney test was used.

Results

In the first part of the data analysis, the differences between the **HS**-**LR** pair and the **LS**-**HR** pair in the total number of words produced and in the ratio of the collaboratively resolved referential problems were examined. Furthermore, the differences between the **HS** in the **HS**-**LR** pair and the **LS** in the **LS**-**HR** pair as well as those between the **HR** in the **LS**-**HR** pair and the **LR** in the **HS**-**LR** pair were investigated. In the second part of the data analysis, the differences between the two groups of **HS**, the two groups of **LS**, the two groups of **HR**, and the two groups of **LR** in the number of words and in the ratio of resolved referential problems were calculated. The sets of data analysis in the present study and their correspondence to the tables are illustrated in Table 1.

Table 1: Sets of data analysis in the present study.

First part of the data analysis		
HS-LR Pair – LS-HR Pair	→	Table 2
HS in the HS-LR Pair – LS in the LS-HR Pair	→	Table 3
HR in the LS-HR Pair – LR in the HS-LR Pair	→	Table 4
The second part of the data analysis		
HS in the HS-LR Pair – HS in the HS-HR Pair	→	Table 5
LS in the LS-LR Pair – LS in the LS-HR Pair	→	Table 6
HR in the LS-HR Pair – HR in the HS-HR Pair	→	Table 7
LR in the HS-LR Pair – LR in the LS-LR Pair	→	Table 8

The results of the comparison between the **HS** in the **HS-LR** pair and the **LS** in the **LS-HR** pair are shown in Table 2 (see Appendix A for the raw data).

Table 2: Differences in the number of words and in the ratio of resolved problems between the HS-LR pair and the LS-HR pair.

	HS-LR (n = 10) *Mdn*	LS-HR (n = 13) *Mdn*	*U*	*p*	*r*
Number of words	87.5	90.0	45.5	.95	.13
Ratio of resolved problems	0.0	0.0	51.0	.28	.22

The total number of words and the ratio of resolved referential problems in the **HS-LR** pair did not differ significantly from those in the **LS-HR** pair.

To perform a detailed comparison of the **HS-LR** pair with the **LS-HR** pair, the difference between the **HS** in the **HS-LR** pair and the **LS** in the **LS-HR** pair in the number of words was also measured. The results are shown in Table 3 (see Appendix B for the raw data).

Table 3: Difference in the number of words between the HS in the HS-LR pair and the LS in the LS-HR pair.

	HS in HS-LR (n = 10) *Mdn*	LS in LS-HR (n = 13) *Mdn*	*U*	*p*	*r*
Number of words	68.0	53.0	45.5	.23	.25

The total number of words in the **HS** in the **HS-LR** pair did not differ significantly from that in the **LS** in the **LS-HR** pair. This difference between the **HR** in the **LS-HR** pair and the **LR** in the **HS-LR** pair was also examined. The results are shown in Table 4 (see Appendix B for the raw data).

Table 4: Difference in the number of words between the HR in the LS-HR pair and the LR in the HS-LR pair.

	HR in LS-HR (n=13) *Mdn*	LR in HS-LR (n=10) *Mdn*	*U*	*p*	*r*
Number of words	22.0	19.0	29.5	.03	.46

The total number of words in the **HR** in the **LS-HR** pair differed significantly from that in the **LR** in the **HS-LR** pair.

In the second part of the data analysis, the differences between the two groups of **HS** (the **HS** in the **HS-LR** pair and the **HS** in the **HS-HR** pair) in the number of words and in the ratio of resolved referential problems were calculated. The results are shown in Table 5 (see Appendix B for the raw data).

Table 5: Differences in the number of words and in the ratio of resolved problems between the HS in the HS-LR pair and the HS in the HS-HR pair.

	HS in HS-LR (n=10) *Mdn*	HS in HS-HR (n=7) *Mdn*	*U*	*p*	*r*
Number of words	68.0	90.0	25.5	.35	.23
Ratio of resolved problems	0.0	25.0	35.0	1.00	.00

The total number of words and the ratio of resolved referential problems in the **HS** in the **HS-LR** pair did not differ significantly from those in the **HS** in the **HS-HR** pair.

These differences between the two groups of **LS** (the **LS** in the **LS-HR** pair and the **LS** in the **LS-LR** pair) were also examined. The results are shown in Table 6 (see Appendix B for the raw data).

Table 6: Differences in the number of words and in the ratio of resolved problems between the LS in the LS-LR pair and the LS in the LS-HR pair.

	LS in LS-HR (n=13) *Mdn*	LS in LS-LR (n=6) *Mdn*	*U*	*p*	*r*
Number of words	53.0	46.5	29.0	.38	.20
Ratio of resolved problems	0.0	0.0	36.5	.78	.07

The total number of words and the ratio of resolved referential problems in the **LS** in the **LS-HR** pair did not differ significantly from those in the **LS** in the **LS-LR** pairs.

These differences between the two groups of **HR** (the **HR** in the **LS-HR** pair and the **HR** in the **HS-HR** pair) were also examined. The results are shown in Table 7 (see Appendix B for the raw data).

Table 7: Differences in the number of words and in the ratio of resolved problems between the HR in the LS-HR pair and the HR in the HS-HR pair.

	HR in LS-HR (n=13) *Mdn*	HR in HS-HR (n=7) *Mdn*	*U*	*p*	*r*
Number of words	22.0	31.0	37.5	.53	.14
Ratio of resolved problems	0.0	25.0	33.0	.24	.26

The total number of words and the ratio of resolved referential problems in the **HR** in the **LS**-**HR** pair did not differ significantly from those in the **HR** in the **HS**-**HR** pair.

Finally, these differences between two groups of **LR** (the **LR** in the **HS**-**LR** pair and the **LR** in the **LS**-**LR** pair) were examined. The results are shown in Table 8 (see Appendix B for the raw data).

Table 8: Differences in the number of words and in the ratio of resolved problems between the LR in the HS-LR pair and the LR in the LS-LR pair.

	LR in HS-LR (n=10) *Mdn*	LR in LS-LR (n=6) *Mdn*	*U*	*p*	*r*
Number of words	19.0	19.5	25.0	.59	.14
Ratio of resolved problems	0.0	0.0	25.0	.53	.16

The total number of words and the ratio of resolved referential problems in the **LR** in the **HS**-**LR** pair did not differ significantly from those in the **LR** in the **LS**-**LR** pair.

Discussion

The analysis in the first part was not consistent with the results of Yule and Macdonald (1990), which indicated that the **LS**-**HR** pair shared more active interaction and a more successful resolution of referential problems during the asymmetrical convergent tasks than did the **HS**-**LR** pair. It seems reasonable to assume that the quantity and quality of interaction would improve when an L learner rather than an H learner is in the driver's seat in an asymmetrical convergent task. This fact might explain why few subsequent studies have attempted to confirm the claims of Yule and Macdonald (1990). In the present study, however, the advantage of the **LS**-**HR** pair over the **HS**-**LR** pair, argued from an interpretation of raw data gathered from learners at a university in the **US**, was not upheld in a statistical examination of learners at a university in Japan.

Despite the discrepancy between the previous study and this one, a detailed analysis using individual learners rather than pairs as the research unit demonstrated that Yule and Macdonald (1990) has a certain validity. The total number of words in the **HR** in the **LS**-**HR** pair differed significantly from that in the **LR** in the **HS**-**LR** pair. This might suggest that the **HR** is not merely a passive receiver of the **LS**'s instructions in the **LS**-**HR** pair but is also an active supporter striving to derive the necessary information. The following transcript is an excerpt from the interaction between **LS** 12 and **HR** 19. As seen in Appendix B, **HR** 19 produced the highest number of words of all **HR**s in the **LS**-**HR** pairs.

1 **LS**: you go to bank. It is next to flower store. and second is flower store.
2 **HR**: Let me see. Is the first place is bank? and Is the second place is flower store? Question. Where I standing? I can't understand.
3 **LS**: and you go straight north by Spring Street. you front of post office is next point.
4 **HR**: Where my start point? Grand Avenue? or Pitt Street?
5 **LS**: sorry. start is university. Bank is next East block
6 **LS**: Grand Avenue.
7 **HR**: ok. I understand. Question. first I walk Grand Avenue. Second turn left. so I walk Spring Street now. ok?

In the above excerpt, although the **LS** assumed the direction giving role, the **HR** rather than the **LS** took the initiative in carrying out the task. It is unknown whether the **HR** realized that his partner was not as proficient in English as he was. However, if he thought himself a better English speaker than his partner, it would have been natural for him to show no hesitation in interrupting the flow of interaction and actively confirming his understanding of the **LS**'s directions. In the excerpt, the **HR** demonstrated that he could multiply his opportunities to use English even when the sender of the information is not as proficient in English as he.

The second part of the study using the individual learner as the unit of analysis rather than the pair did not demonstrate an advantage for any type of group. If the total amount of target language proficiency for a pair of learners had exerted a direct influence on the quantity and quality of communication, the results should logically have been more straightforward. The **HS** in the **HS-HR** pair, the **HR** in the **HS-HR** pair, the **LS** in the **LS-HR** pair, and the **LR** in the **HS-LR** pair should have surpassed the **HS** in the **HS-LR** pair, the **HR** in the **LS-HR** pair, the **LS** in the **LS-LR** pair, and the **LR** in the **LS-LR** pair, respectively. These relationships are illustrated in Table 9. Those in the left column would be logically expected to surpass those in the right column. However, this result was not observed.

Table 9: Expected but unconfirmed results of the second part of the data analysis.

HS in the HS-HR Pair	>	HS in the HS-LR Pair
HR in the HS-HR Pair	>	HR in the LS-HR Pair
LS in the LS-HR Pair	>	LS in the LS-LR Pair
LR in the HS-LR Pair	>	LR in the LS-LR Pair

An excerpt from the interaction between **HS** 13 and **HR** 3 appears below. As you see in Appendix B, **HS** 13 produced far more words than any other **HS** among the **HS-HR** pairs, but this pair could not solve any of the problems.

1 **HS**: you are on Grand Avenue. And you are in front of the University. This is your starting position.
2 **HR**: ok! next hint please.
3 **HS**: Please go straight east on Grand Avenue. Turn right at the second corner. You will reach at Bank.
4 **HR**: yes, bank.

5 **HS**: next. Turn right and you will see Flower Store on your right soon. this store is in front of first corner.
6 **HS**: Are you on Grand Avenue now?
7 **HR**: yes, fower store. please next hint.

The **HR** should have asked the **HS** a question in turn 4 because there were two banks on the **HR**'s map, and his partner's directions were not enough to specify which bank he had to go to. However, the **HR** did not ask any questions; thus there was no chance for meaning negotiation. The **HS** seems to have been uncertain whether his partner followed her elaborate directions, asking him where he was in turn 6. However, the **HR** answered her question only briefly in turn 7. This excerpt might show that the relatively high English proficiency of the participants of a pair does not automatically ensure a rich interaction between them.

Note that this study has some limitations. First, although it used more participants than Yule and Macdonald (1990), it still did not have many **HS**-**HR** and **LS**-**LR** pairs in its second part, possibly resulting in a Type II error[5]. Caution is therefore required in interpreting the results of the statistical analysis in the second part. Second, the task had only two referential problems. This might be why significant differences in the ratio of resolved referential problems were not observed between the pairs.

Concluding remarks

The results of the present study problematize two common views. The first view is that it is beneficial, in pair work using asymmetrical convergent tasks, for **L** learners to be given more responsibility than H learners and that it is also fruitful for **H** learners to support **L** learners. This view was reinforced by Yule and Macdonald (1990). However, the present study does not confirm this view. Instead, it suggests that the random assignment of students to the **LS**-**HR** pair in a class does not necessarily arouse active interaction. I note, though, that an **HS** might behave differently according to his or her partner's proficiency level; this issue requires further investigation.

The second common view is that the higher the sum total of the two learners' target language proficiency the more the dyadic interaction is increased and the more the quality is improved. However, this view was not supported either. This suggests that pairing two H learners does not guarantee active interaction and that, conversely, pairing two L learners does not necessarily result in a lower level of activity.

The differences between the groups were not significant in the present study, except between the **HR** in the **LS**-**HR** pair and the **LR** in the **HS**-**LR** pair. One possible reason for this is that this study depends solely on quantitative data analysis; combining quantitative and qualitative analysis might show other aspects of the dyadic interaction. Jenks (2007, 2009), on the basis of a qualitative conversation analysis, presented typical interactional sequences between learners exchanging missing information in order to complete a convergent task. According to these studies, when the receiver of the information understands the sender's directions, the sequence becomes Sender (provides missing information), Receiver (confirms comprehension), and Sender (provides new missing information). When the receiver does not understand the sender's explanation, the sequence is Sender (provides missing information), Receiver (repair initiation), Sender (amends previous information). Qualitative analysis using frameworks like this can cast fresh light on the interaction between paired learners.

Another possibility is the presence of influential factors other than the learners' target language proficiency. For example, Dörnyei (2002) and Mackey (2006) suggest the learner's motivation level as a potent factor in pair work. However, Dörnyei and Tseng (2009) indicate that learners' motivation to engage in tasks has been scarcely studied.[6] As Gass, Mackey, and Ross-Feldman (2011) suggest, a more synthetic and explanatory model of dyadic interaction might need to be explored in further studies.

Notes

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1. This study's definition of a *task* is taken from Ellis (2000), who considers a task to consist of two constructs: input that learners are exposed to and instructions that learners are expected to achieve. A task is different from an *exercise*. While a task primarily involves meaningful communication, an exercise involves acquiring and producing correct linguistic forms.
2. The term *proficiency* in this study refers to "a learner's general language ability in speaking, listening, reading and/or writing based on some kind of criteria or measure" (Leeser, 2004, p. 58).
3. According to Loban (1963), one independent clause is counted as one c-unit, as is one main clause with subordinate clauses. For example, "I know a boy with red hair" (p. 6) and "I'm going to get a boy 'cause he hit me" (p. 7) are both regarded as one c-unit.
4. **CMC** is a hybrid of speaking and writing modes, but the **SLEP** test, which only has listening and reading sections, was used in the present study for two reasons. First, the **SLEP** test is generally regarded as a measure of overall **EFL** proficiency, which is what the present study required. When teachers group students in pairs, they usually consider their overall **EFL** proficiency rather than just their speaking and writing proficiency. Therefore, to explore the pedagogical implications of the present study, the **SLEP** test was chosen. Second, Wilson (1999) indicates that the total score of the **SLEP** test correlated with speaking and writing proficiency. Approximately 1,600 Japanese high school graduates participated in his research. The correlation coefficients between the **SLEP** total raw score and the interview test score were $r = .63$, while those between the **SLEP** total raw score and the essay test were also $r = .63$.
5. The Type II error "occurs when we believe that there is no effect in the population, when in reality, there is" (Field, 2009, p. 795).
6. Julkunen (2001) is an exception and proposes the concept of *task-specific motivation*.

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Appendix A

Table A1: Number of words and the ratio of resolved problems in the HS-LR pair and the LS-HR pair.

	Number of words	Ratio of resolved problems		Number of words	Ratio of resolved problems
HS-LR a	76	50	LS-HR a	99	0
HS-LR b	101	100	LS-HR b	140	50
HS-LR c	86	100	LS-HR c	90	0
HS-LR d	56	0	LS-HR d	76	0
HS-LR e	104	0	LS-HR e	75	50
HS-LR f	85	0	LS-HR f	132	0
HS-LR g	89	0	LS-HR g	59	0
HS-LR h	94	0	LS-HR h	48	0
HS-LR i	100	0	LS-HR i	104	50
HS-LR j	86	50	LS-HR j	72	0
			LS-HR k	129	0
			LS-HR l	97	0
			LS-HR m	44	0

Appendix B

Table B1: Number of words and the ratio of resolved problems for the participants

		Number of words		Number of words	Ratio of resolved problems
HS-LR	HS 1	66	LR 1	10	50
	HS 2	82	LR 2	19	100
	HS 3	61	LR 3	25	100
	HS 4	46	LR 4	10	0
	HS 5	94	LR 5	10	0
	HS 6	63	LR 6	22	0
	HS 7	70	LR 7	19	0
	HS 8	81	LR 8	13	0
	HS 9	74	LR 9	26	0
	HS 10	60	LR 10	26	50

		Number of words		Number of words	Ratio of resolved problems
HS-HR	HS 11	53	HR 1	61	50
	HS 12	71	HR 2	28	50
	HS 13	148	HR 3	36	0
	HS 14	61	HR 4	91	0
	HS 15	60	HR 5	18	25
	HS 16	63	HR 6	31	25
	HS 17	56	HR 7	7	0
LS-HR	LS 1	77	HR 8	22	0
	LS 2	92	HR 9	48	50
	LS 3	55	HR 10	35	0
	LS 4	49	HR 11	27	0
	LS 5	53	HR 12	22	50
	LS 6	90	HR 13	42	0
	LS 7	43	HR 14	16	0
	LS 8	26	HR 15	22	0
	LS 9	81	HR 16	23	50
	LS 10	52	HR 17	20	0
	LS 11	93	HR 18	36	0
	LS 12	44	HR 19	53	0
	LS 13	30	HR 20	14	0
LS-LR	LS 14	57	LR 11	28	0
	LS 15	62	LR 12	15	50
	LS 16	66	LR 13	15	0
	LS 17	33	LR 14	28	0
	LS 18	28	LR 15	24	25
	LS 19	36	LR 16	9	0