# Mobile-assisted peer feedback on EFL pronunciation: Outcome effects, interactional processes, and shaping factors

**Abstract:** This article reports on a study examining mobile-assisted peer feedback on EFL pronunciation. The study focused on 10 Chinese EFL students majoring in music. They worked as mixed-proficiency dyads in a peer feedback task mediated by a social networking app (WeChat). The higher-proficiency students acted as feedback givers, and the lower-proficiency students as feedback receivers. Data sources included (a) comprehensibility scores in the pretest, posttest and delayed posttest, (b) recorded peer feedback sessions, and (c) interview transcripts. It was found that the feedback task contributed to the pronunciation improvement for both feedback givers and receivers. 13 interactional moves were identified in the peer feedback sessions. Based on the distribution of interactional moves and the participants' self-positioning, it was found that four dyads displayed clear interactional patterns (collaborative, expert/novice, or dominant/dominant) but one dyad showed a mixed pattern. Four factors were found to shape the interactional processes. The first two factors were *task*-related (i.e. role assignment) and *person*-related (i.e. prior music learning and teaching experience), while the remaining two were *context*-related (i.e. significant others and online resources). The article also discusses pedagogical implications for maximizing the learning potentials of mobile-assisted peer feedback.

**Keywords:** mobile-assisted language learning, peer feedback, peer interaction, EFL pronunciation

## 1. Introduction

With the affordances of ubiquity and connectivity, mobile technologies have afforded rich opportunities to engage learners in "meaningful, authentic language practice experiences" (Kessler, 2018, p. 207). For instance, social networking apps can provide a relaxing environment for learning, thus enhancing learners' motivation and willingness to communicate (Jin, 2018). Additionally, mobile apps offer convenient access to a wealth of authentic materials and resources (Fouz-González, 2017), transcending learning beyond the conventional classroom settings. As such, a growing body of research has explored whether and how mobile apps can contribute to the development of language skills (Kukulska-Hulme & Viberg, 2018). Among the four basic skills, speaking has received the least scholarly attention (Wu & Miller, 2020). This research gap is particularly striking because social media on mobile phones are inherently "interaction driven" and thus provide compelling opportunities for "feedback, negotiation, and output" (Ziegler & Mackey, 2017, p. 86) that can benefit the development of speaking skills. To shed more light on the learning potentials of mobile-assisted peer interaction,

we designed a mixed-methods study to examine the outcome effects, interactional processes, and shaping factors of peer feedback mediated by a social networking app. In the study, the mobile-assisted peer feedback task focused on EFL learners' pronunciation skill because it could offer personalized, instant feedback, which is critical to pronunciation training but seldom provided by the teacher due to large class sizes and limited class time (Chiu et al., 2007; Mroz, 2018). As such, we situate our study in two bodies of previous research: mobile-assisted pronunciation training and peer interaction.

## 2. Research background

### *2.1 Mobile-assisted pronunciation training*

Although a great number of mobile apps are available for learners to improve their pronunciation, there are not many *empirical* studies on the learning effects of these apps (Lan, 2021). Previous studies have focused on either (a) learning apps specifically designed for pronunciation training or (b) dictation and communication apps repurposed for language learning. For instance, Fouz-González (2020) examined the *English File Pronunciation* app (developed by the Oxford University Press) and found that the learning app could improve the learners' abilities to perceive and produce the target sound features. One potential disadvantage of learning apps of this kind is that practice materials are usually pre-defined by developers, leaving little room to customize exercises for individual learners. Therefore, some researchers have explored the use of the automatic speech recognition (ASR) technology embedded in dictation and communication apps, such as *Nuance Dragon Dictation* in Liakin et al. (2015) and *Gmail* in Mroz (2018). If the ASR-embedded apps do not recognize a word, it might be indicative of mispronunciation. In this way, learners can potentially practice all the sound features they want to improve. Both studies have found that the ASR feedback helped improve the learners' pronunciation.

While the findings about the ASR-empowered apps are encouraging, one potential limitation is that ASR feedback itself is implicit and metalinguistic knowledge is required for learners to figure out and work on pronunciation issues (Dai & Wu, 2021). That is why recent scholarly attempts have been made to explore the learning potentials of peer interaction on social apps, as a form of direct and targeted feedback. For instance, in Huang's (2019) study, a group of Chinese EFL students worked on WeChat (a multi-purpose social app). They provided feedback on their peers' pronunciation and received feedback on their own. The study found that the group's performance in the pronunciation posttest was comparable to that of a group receiving teacher feedback via WeChat. Similarly, Lan (2021) asked students to form groups on LINE (a communication app) and provided evaluation on their peers' pronunciation. The peer interaction enhanced learners' motivation, engagement and pronunciation performances. These studies have tended to focus on the *outcomes* of interaction (i.e. the positive effects of mobile-assisted peer interaction), but leaving the interactional *processes* unexamined. It

remains unclear whether the interactional processes would lead to different learning effects. For instance, if a group works in a collaborative relation, would they benefit more from the mobile-assisted task, as compared to those working in a relation less conducive to learning (see the next section for details)? As Rouhshad and Storch (2016) aptly pointed out, "assigning learners to work in pairs does not necessarily mean that the learners will work collaboratively" (p. 270). Therefore, to develop a more sophisticated understanding of the affordances of mobile-assisted peer feedback, it is important to examine both the *outcomes* and the *processes* of interaction—whether and how learning effects are affected by pair dynamics.

*2.2 Pair dynamics in peer feedback*

Interactional dynamics is an important factor for learners to maximize learning potentials in group work (Donato, 1989). One widely used model to understand pair dynamics was proposed by Storch (2002, 2013). The model was based on two parameters from Damon and Phelps (1989): equality and mutuality. Equality "reflects the learners' level of contribution and control over the task" (Storch, 2013, p. 61), while mutuality "reflects the learners' level of engagement with each other's contribution" (Storch, 2013, p. 61). With these two parameters, four types of interactional patterns are possible (see Table 1). A *collaborative* relation entails high equality and mutuality, in which both members make equal contribution to the task and have a high degree of reciprocity. An *expert/novice* relation entails low equality but high mutuality, in which one member controls the task but still encourages active involvement of the other. In a *dominant/passive* relation, equality and mutuality are low because one member dominates the task and the other becomes submissive. In a *dominant/dominant* relation, equality is high but mutuality is low, because both members try to take control of the task but do not engage with each other. Previous studies have suggested that collaborative and expert/novice relations might be more favorable to language learning, while other types of relations might be less likely to contribute to learning (Watanabe & Swain, 2007; Storch, 2019).

**Table 1** Summary of interactional patterns

| Interactional pattern | Equality | Mutuality |
|---|---|---|
| Collaborative | High | High |
| Expert/novice | Low | High |
| Dominant/passive | Low | Low |
| Dominant/Dominant | High | Low |

Research has found that interactional patterns are influenced by a number of factors, which might be person-related (e.g. proficiency levels, Storch & Aldosari, 2013), task-related (e.g. role assignment, Dao & McDonough, 2017), and context-related (e.g. access to online resources, Hsieh, 2020). For instance, previous research has pointed out that mixed-proficiency dyads tend to interact in ways that promise more learning potentials

(Choi & Iwashita, 2016; Sato & Ballinger, 2016). In addition, given a particular proficiency pairing setup, task roles can influence the interactional pattern. In Dao and McDonough's (2017) study, students were grouped into mixed-proficiency dyads and engaged in a communicative task. When the lower-proficiency students acted as information holders (as opposed to information receivers), the dyads were more likely to work in a collaborative or expert/novice relation. Different from these studies that examined interactions without technical assistance, Hsieh (2020) compared how learners interacted with and without access to online resources. Interestingly, passive students in a non-internet-supported setting became more active and engaged when they had access to internet support. As such, the recourse to online resources could empower less proficient students in an otherwise dominant/passive relation.

A large body of research has examined peer interaction in EFL writing tasks (see Storch, 2019 for a recent review). By comparison, relatively little attention has been paid to peer interaction in EFL pronunciation tasks. We managed to locate one study (Tsai, 2019), which identified two interactional patterns (collaborative and expert/novice) in face-to-face peer feedback sessions (facilitated by a pronunciation training software program). The sessions took place in a lab or the researcher's office and a time limit was set. As such, the interactional patterns observed might be different from those in a mobile-assisted setting without resource, physical, or temporal constraints. In addition, Tsai's study focused on the process of peer interaction, but not on the factors that shaped the interaction. As reviewed in the previous paragraph, a range of person-, task- and context-related factors could impact how the interaction played out. These issues are particularly relevant to peer interaction on communication apps (e.g. WeChat, WhatsApp, and LINE) because they are primarily designed for personal and entertainment uses (Hoi & Mu, 2021). To understand the learning potentials of mobile apps, more research is needed to examine how students interact in a mobile-assisted context and what factors affect their interaction.

### *2.3 Research questions*

Based on the previous literature review, three gaps are identified. While mobile-assisted peer feedback on EFL pronunciation is gaining scholarly attention, existing studies have primarily focused on the *outcomes* but not the *processes* of interaction. Interactional patterns were examined in a face-to-face context, but not in a mobile-assisted context. We are unsure whether similar patterns can be found when peers interact on a social app, repurposed for pronunciation training. Still, the *shaping factors* of interaction have not been explored, making it difficult to provide incisive training for students in mobile-assisted peer interaction. To fill these gaps, we conducted a mixed-methods exploratory study, guided by the following research questions (RQ):

**RQ1**: What were the effects of mobile-assisted peer feedback on EFL pronunciation learning?

**RQ2**: How did students interact with their dyadic partners in mobile-assisted peer feedback?

**RQ3**: What were the possible factors that shaped the interaction in mobile-assisted peer feedback?

RQ1 and RQ2 focus on the outcomes and the processes of peer interaction, respectively. RQ3 examines the factors that may influence the interaction. Taken together, the answers to these questions afford a comprehensive understanding of the outcome effects, interactional processes and shaping factors of mobile-assisted peer feedback on EFL pronunciation.

## 3. The Study

### *3.1 Context and participants*

This study initially involved two intact classes of music-majored undergraduates in China. At the time of the study, they were enrolled in a second-year English enhancement course. Due to the COVID-19 pandemic, the course was delivered online. The students stayed at home (geographically dispersed) and met weekly for an online session. One key component of the course was to improve the students' pronunciation. As part of the pronunciation training, peer feedback was assigned as an out-of-class activity, in which students were paired up and interacted via WeChat. WeChat was chosen because it met the following criteria (Mroz, 2018): *cost* (free to use the app and minimal broadband cost compared to long-distance phone calls), *accessibility* (compatible with many platforms, such as iOS and Android), *familiarity* (the most popular social networking app in China), and *technology* (an integrated, multi-purpose app, in which students can talk to each other and read, share, and forward materials at the same time).

Given the exploratory nature of this study, we focused on 10 students in five mixed-proficiency dyads. The proficiency gap within each dyad was controlled (more on this in Section 3.2). The five dyads were selected based on the qualitative method of "maximum variation", i.e., "purposefully picking a wide range of cases to get variation on dimensions of interest" (Patton, 2015, p. 267). The primary selection factor was duration of dyadic interaction; and the supplementary selection factor was gender composition. Accordingly, the feedback sessions of the five dyads ran the whole range of duration—Dyad 1 and Dyad 5 respectively were the longest and the shortest, while Dyads 2, 3 and 4 were in-between (see Table 2). In addition, pairs consisting of the same gender (Dyads 1, 2, and 5) and mixed genders (Dyads 3 and 4) were included. This selection method allowed us to identify meaningful commonalities and contrasts across the variations.

**Table 2** Profile of the participants

| Dyad | Participant (pseudonym) | Duration of the feedback session |
|---|---|---|
| 1 | Zack<br>Paul | 33.1 minutes |
| 2 | Sean<br>Tom | 17.2 minutes |
| 3 | Sue<br>Kevin | 16.4 minutes |
| 4 | Linda<br>Jason | 25 minutes |
| 5 | Cathy<br>Wendy | 4.3 minutes |

*3.2 Procedure*

The procedure was structured in three stages. In the first stage, during a regular online session, all the students took a pretest, which consisted of eight sentences from the textbook (Dai & Wu, 2021). The eight sentences covered the pronunciation difficulties commonly found among Chinese EFL speakers, such as dental fricatives, vowels, and consonant clusters (Deterding, 2006; McAndrews & Thomson, 2017). The students' pronunciation was rated in terms of *comprehensibility* (more on this in Section 3.3), which has been recognized as a useful measure "for assessing improvements in…L2 pronunciation" (Dlaska & Krekeler, 2013, p. 30). Based on the pretest results, the students were rank-ordered within their class. Then, they were paired up based on a constant rank difference so that the proficiency gap within a dyad was kept "as constant as possible" (Huisman et al., 2017, p. 1438). For instance, in Class One with 50 students, the first student was paired up with the 26$^{th}$ student, the second one with the 27$^{th}$ one, and so on. As Sato and Ballinger (2016) pointed out, "pairing learners with different proficiency levels promotes interaction that is more conducive to learning" (p. 15). In addition, grouping students based on the constant rank difference could effectively control the proficiency gap and at the same time ensure the ecological validity of the peer feedback task in a naturalistic class setting (see Dao & McDonough, 2017; Huisman et al., 2017; Shin et al., 2016 for a similar treatment).

In the second stage (one week after the pretest), the peer feedback task and the grouping information were announced. The students with a higher pretest score acted as feedback givers (Role A), while the students with a lower score acted as feedback receivers (Role B).[1] The pretest scores were not communicated to the students, who were only informed of their roles (A or B). The materials for the peer feedback task were the eight sentences in the pretest. The instructor did not ask the students to practice the eight

[1] This role assignment was motivated by the Vygotskian rationale of having a more capable peer to provide scaffolding to a less capable peer when performing a learning task, thus leading to the development of skills and knowledge (Lantolf, 2012).

sentences during the class session. Instead, class time was spent on training the students to use WeChat for collaborative learning. The instructors demonstrated some collaboration strategies so that the students understood how to identify and work on their pronunciation issues (e.g. comparing pronunciation, explaining pronunciation issues, seeking confirmation, pooling knowledge and resources). The instructor also showed the students how to consult resources (e.g. digital dictionaries and pronunciation guides) to improve the effectiveness of peer feedback. Then, the students were asked to conduct peer feedback outside of class in one session at their free time. They communicated in Chinese, using the synchronous audio chat function on WeChat, and recorded their peer feedback sessions. At the end of the task, both feedback givers and receivers read the eight sentences again and uploaded them for grading (i.e. the immediate posttest).

In the third stage (one week after the feedback task), the students unexpectedly took a delayed posttest of the eight sentences. Two weeks later, the 10 students participated in a semi-structure interview. Before the interviews, we listened to their recorded peer feedback sessions and prepared questions pertaining to interactional processes and the students' perceptions about the task. The interviews were conducted in Chinese and lasted between 40 and 60 minutes. The peer interaction and interview extracts citied in this paper were translated by the authors.

### *3.3 Data Analysis*

We adopted a "convergent" mixed-methods approach to data analysis. In other words, we converged "quantitative and qualitative data in order to provide a comprehensive analysis" (Creswell & Creswell, 2018, p. 15). The data sources included (a) the comprehensibility scores in the pretest, posttest and delayed posttest, (b) the recorded peer feedback sessions, and (c) the interviews.

The students' pronunciation was assessed by the *comprehensibility* scores. Comprehensibility was "measured through listeners' scalar ratings of how easily they understand speech" (Isaacs & Trofimovich, 2012, p. 477). The students' recordings were independently rated by two raters, using a 9-point scale (1=not comprehensible at all; 9=very comprehensible). The two raters were Chinese speakers of English (a PhD degree holder and a PhD student in applied linguistics). Previous studies have found that nonnative speakers and native speakers did not differ in rating speech samples (Crowther et al., 2016; Derwing & Munro, 2013). Inter-rater reliability was assessed and ensured by Pearson's correlation ($\alpha = 0.92$). The raters' scores were averaged to generate a comprehensibility score for each speech sample. This quantitative analysis was later triangulated with the qualitative analysis of (a) the students' interviews to check whether they perceived improvement in their pronunciation and (b) the feedback sessions to see whether the pronunciation outcomes were related to interactional patterns.

The students' peer feedback sessions were analyzed in ELAN, an annotation software program for audios and videos (Wittenburg et al., 2006). We coded the peer feedback

sessions for interactional moves (Sato & Ballinger, 2016), using a protocol developed with a hybrid deductive-inductive approach (Fereday & Muir-Cochrane, 2006). We constantly compared the congruency between the analytical concepts in the literature and the interactional moves emergent in the feedback sessions. In this way, we developed nine deductive codes ("repeating", "consulting", "languaging", "encouraging", "requesting", "judging", "directing", "questioning", and "responding") from the literature (Mercer & Littleton, 2007; Hsieh, 2020; Storch, 2002) to capture the interactional dynamics. We added four inductive codes ("demonstrating", "reading", "associating" and "translating") to account for the interactional moves not covered by the deductive codes but recurring in the feedback sessions. Table 3 presents the 13 codes, their descriptions, and corresponding example transcripts. Using this protocol, the second author coded the feedback sessions in ELAN, which were then checked by the first author. Discrepancies were resolved through discussion. After the codes were finalized, we tabulated the interactional moves and calculated the percentage of each move within a peer feedback session. In this way, patterns emerged as some interactional moves were more prominent, while some others were absent altogether in a dyad.

**Table 3** Coding protocol

| Interactional moves | Descriptions | Example transcripts of the peer feedback sessions |
|---|---|---|
| Demonstrating | Demonstrate how syllables and words are pronounced | You read after me: "In this sense…" |
| Reading | Read out the words or sentences | "In this sense…" |
| Repeating | After one round of feedback, the words or sentences are repeated | (Feedback giver: Read the second sentence again.)<br>Feedback receiver: "With your knowledge of agriculture…" |
| Consulting | Digital dictionaries are consulted and dictionary audios are played. | Let me consult the dictionary, a-b-l-a-z-e. (play the audio). Can you hear it? *ablaze*. |
| Associating | The pronunciation of a word or a syllable is associated with another word or syllable | "Dedicated", you can think about the first part in this way: "daddy" |
| Languaging | Explain the pronunciation rules or how a syllable should be pronounced | Open your mouth wide for the /a/ sound. |
| Translating | Translate the English words or sentences into Chinese | "Sweat" means *han-shui* (*sweat*). |

| | | |
|---|---|---|
| Encouraging | Provide positive affective feedback | Trust yourself! You can do it! |
| Requesting | Ask for information or an opinion | Should it be pronounced as /sain/ or /sen/? |
| Judging | Make a judgement about the pronunciation | Good! That's very good pronunciation. |
| Directing | Direct the flow of the feedback session | OK, now let's move on to the next sentence. |
| Questioning | Pose questions in a doubtful or accusatory tone | (In a raised voice) Have you looked up each word in the dictionary? |
| Responding | React to questions | Yes, I've looked up all the unknown words! |

The students' interviews were transcribed and analyzed in two stages. In the first stage, we tried to understand the interactional patterns with reference to Storch's (2002, 2013) framework about group dynamics. Previous studies have mainly relied on researchers' interpretation of interaction transcripts to decide on the interactional patterns (e.g. Mozaffari, 2017). In this study, we resorted to both the feedback sessions and the students' self-perceived roles reported in the interviews (Stiefenhöfer & Michel, 2020). We believed that these triangulated insights would enable us to get closer to the interaction performed and perceived by the students. In the second stage, we focused on the factors shaping the peer interaction in the feedback sessions. We followed Miles, Huberman and Saldaña's (2014) two-cycle coding procedure to code the interview transcripts. First, we independently used descriptive codes to "summarize…the basic topic of a passage of qualitative data" (Miles et al., 2014, p. 74). Next, we created pattern codes (e.g. "online resources") to categorize descriptive codes (e.g. "Baidu Dictionary" and "Youdao Dictionary") based on thematic clusters (Miles et al., 2014). We then met and refined our codes, by moving between descriptive codes, pattern codes, and the interview transcripts. We eventually agreed on four themes (factors) that shaped the interactional patterns (see Section 4.3).

## 4. Results

### *4.1 Outcome effects*

Table 4 reports the comprehensibility scores in the three tests and the improvement percentages. The improvement percentage was calculated as follows: the difference between the (delayed) posttest score and the pretest score, then divided by the pretest score. As can be seen, all the students, regardless of their roles (feedback givers or receivers), improved their pronunciation in the posttest and delayed posttest. In terms of improvement percentages, the feedback givers improved by about 4-17% between the pretest and the posttest, and by about 4-16% between the pretest and the delayed posttest.

The feedback receivers improved by about 37-58% between the pretest and the posttest, and by about 34-52% between the pretest and the delayed posttest. Apparently, the feedback receivers improved much more than the feedback givers. This was understandable because the feedback givers had better pronunciation in the first place and thus less room for improvement.

**Table 4** Comprehensibility scores in the three tests

| Dyad | Participant (pseudonym) | Pretest | Posttest | Improvement between the posttest and pretest | Delayed posttest | Improvement between the delayed posttest and pretest |
|---|---|---|---|---|---|---|
| 1 | Zack | 7 | 8 | 14.3% | 7.6 | 8.6% |
| | Paul | 5 | 7.9 | 58.0% | 7.6 | 52.0% |
| 2 | Sean | 6.1 | 7.1 | 16.4% | 7.1 | 16.4% |
| | Tom | 4 | 6.3 | 57.5% | 5.9 | 47.5% |
| 3 | Sue | 7.5 | 8.8 | 17.3% | 8.7 | 16.0% |
| | Kevin | 5 | 7.4 | 48.0% | 7.1 | 42.0% |
| 4 | Linda | 7.5 | 8.6 | 14.7% | 8.5 | 13.3% |
| | Jason | 5.3 | 7.9 | 49.1% | 7.3 | 37.7% |
| 5 | Cathy | 8.1 | 8.4 | 3.7% | 8.4 | 3.7% |
| | Wendy | 5.9 | 8.1 | 37.3% | 7.9 | 33.9% |

Echoing the quantitative findings, the students indicated perceived improvement in their pronunciation. For instance, in the interviews, the feedback givers appreciated the positive effects of the task: “I have a clearer understanding of the pronunciation” (Cathy); “I improved a lot and [my partner] also improved a lot…I feel that I have helped him, which gives me a sense of achievement” (Zack). The feedback receivers also reported that the task was helpful to improve their pronunciation. As Kevin put it, “I was very amazed; by the third test, I still remembered how to pronounce those words, so the method was very effective.” Similarly, Tom recognized that “the task was very useful, even for me, with poor foundations.”

While the results were encouraging, the improvement appeared to vary from one dyad to another. For the feedback receivers, Paul, Tom, and Kevin achieved more than 40% increase in the delayed posttest, but Jason and Wendy achieved less than 40%. For the feedback givers, Sean, Sue and Linda had over 13% increase, but Zack and Cathy had less than 10%. This discrepancy might be related to the dyads’ interactional processes, the focus of next subsection.

*4.2 Interactional processes*

Table 5 presents the percentages of interactional moves within each dyad. The percentages were calculated as follows: (total duration of a move by a student) / (total duration of all the moves by his/her dyad). To illustrate, if Student B’s Reading move

totaled 2 minutes and all the moves in his/her dyad totaled 20 minutes, then Student B's Reading move accounted for 10% (2/20).

**Table 5** Percentages of interactional moves within each dyad

| Interactional moves | Dyad 1 | | Dyad 2 | | Dyad 3 | | Dyad 4 | | Dyad 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Zack | Paul | Sean | Tom | Sue | Kevin | Linda | Jason | Cathy | Wendy |
| Demonstrating | 22.0% | | 35.9% | | 13.9% | | 15.4% | | 37.0% | |
| Reading | | 12.3% | | 26.0% | | 31.0% | | 15.1% | | 32.6% |
| Repeating | | 40.2% | | 26.8% | | 26.4% | | 5.8% | | |
| Consulting | 1.1% | 0.6% | | | 4.5% | | 0.7% | | | 2.0% |
| Associating | | | 0.7% | | 1.9% | | | | | |
| Languaging | 2.7% | | 0.6% | | 2.7% | | 27.6% | | 1.3% | |
| Translating | | | 1.5% | | | | 2.9% | | | |
| Encouraging | | | | | 2.5% | | | | | |
| Requesting | 1.5% | 2.3% | | 1.8% | | 1.5% | | 0.7% | | 2.5% |
| Judging | 0.7% | | 2.2% | | 5.0% | | 7.3% | | 6.4% | |
| Directing | 14.7% | 1.1% | 3.3% | 1.3% | 8.5% | 1.9% | 5.8% | | 9.7% | |
| Questioning | 0.8% | | | | | | 6.2% | 3.3% | 2.2% | 1.3% |
| Responding | | 0.2% | | | | | 2.9% | 6.4% | 2.2% | 2.8% |

**Table 6** Interactional patterns in the five dyads

| Dyad | Participant | Interactional pattern | Self-perceived roles (Quotes from the interview) | Typical interactional moves in the feedback session |
|---|---|---|---|---|
| 1 | Zack | Collaborative | "we were learning buddies" | Both shared similar percentages of requests and consultation of online resources. |
| | Paul | | "we were mutual learners" | |
| 2 | Sean | Expert / Novice | "a little teacher" | Only the novice made requests. The expert used the moves of associating, languaging and translating to project authority. |
| | Tom | | "I am the student; he is the teacher" | |
| 3 | Sue | Expert / Novice | "a person who teaches" | Only the novice made requests. The expert offered encouragement to the novice. |
| | Kevin | | "a person who learns" | |
| 4 | Linda | Dominant / dominant | "I was tough on him" | Both students posed substantial percentages of questions and responses. |
| | Jason | | "We were like runners in a race" | |

| | | | | |
|---|---|---|---|---|
| 5 | Cathy | Mixed | "a student who acted as a coach, but only slightly better than the other" | The feedback receiver made requests and consulted online resources. Both students posed questions and responses. |
| | Wendy | | "co-participants" | |

Triangulating the typical interactional moves in the feedback sessions with the students' self-positioning (see Table 6), we identified three interactional patterns in Storch's (2002, 2013) framework. Dyad 1 had a collaborative pattern because (a) both students had similar percentages of requests and consultation of online resources and (b) both students perceived themselves to be equal partners. Dyad 2 and Dyad 3 were expert/novice pairs because (a) the novices (feedback receivers) always made requests in the interaction; (b) the experts projected their authority through offering corrective feedback or positive affective feedback; and (c) the novices self-positioned themselves as "a student", while the experts identified themselves as "a teacher." Dyad 4 could be characterized as a dominant/dominant pair because (a) both students posed substantial amounts of (accusatory) questions and reacted to these doubts and (b) both students expressed tense and competitive sentiments ("tough" and "runners in a race") about the interaction. The interactional pattern of Dyad 5 was less straightforward. First, only the feedback receiver made requests in the feedback session (a sign of the expert/novice relation), but both students also expressed and reacted to doubts (suggesting a dominant/dominant relation). Second, in the interviews, the feedback giver believed that she acted as "a coach", while the feedback receiver positioned the two as "co-participants." Therefore, we reasoned that the dyad had a mixed pattern.

### *4.3 Shaping factors*

By triangulating the students' interviews with their feedback sessions, we identified four factors that shaped the peer interaction. The first two factors were respectively *task*-related (i.e. role assignment) and *person*-related (i.e. prior music learning and teaching experience), while the remaining two factors were *context*-related (i.e. significant others and online resources).

#### *4.3.1 Role assignment*

In the peer feedback session, one student acted as the feedback giver and the other as the feedback receiver. This role assignment implied an asymmetrical relation, in which the feedback giver held more knowledge power. That was why some interactional moves indicative of higher authority (e.g. judging and languaging) were exclusively made by the feedback givers (see Table 5). It should be noted that all feedback givers enacted the languaging move, regardless of the interactional patterns. In the interviews, they

explained that they had learned the International Phonetic Alphabet before, which allowed them to explain the pronunciation rules:

> I have learned the Phonetic Alphabet…Before the feedback session, I looked up the pronunciation and wrote down the phonetic notation for the new words. With these notes, I was able to teach my partner how to pronounce them. (Linda)

Interestingly, the percentage of languaging in Linda's dyad was about 28%, much higher than the other four dyads. The prominent proportion of languaging was related to Jason's defensive confidence afforded by significant others and digital dictionaries (more on this in Section 4.3.4), leading to the dominant/dominant relation of the dyad.

*4.3.2 Prior music learning and teaching experience*

The students in this study all majored in music. In the interviews, they reported that their music learning and teaching experience affected their disposition towards the repeating move. A high percentage of this move can be regarded as a sign of active engagement, because both dyadic peers were keen to get involved in repeated exercises. Specifically, Dyad 1 had the highest percentage of the repeating move (40.2%). When asked why they were willing to expend such a high proportion of time on repeating the sentences, Paul explained:

> In the previous semester and the current one, I was trained in the student orchestra. We needed to record music that lasted about eight or nine minutes. For several times, at the last minute of the music score, we got one tiny part wrong, so we had to start the recording all over again. Comparatively speaking, repeating the eight English sentences was no trouble at all.

In another example, Sue's dyad also had a substantial percentage of the repeating move. Sue related the peer feedback session to her piano teaching experience: "I think the way I conducted the feedback session was like teaching a child to play the piano. If you got the musical notes wrong, you repeated them several times." That was why Sue first located some difficult words in a sentence and asked her partner to repeat them (as shown in Extract 1). After the partner was comfortable with the difficult words, Sue asked him to repeat the whole sentence.

**Extract 1**

Sue: OK. Read this part three times.
Kevin: "prominent scholar," "prominent scholar," "prominent scholar." [2]
Sue: OK. Read the whole sentence again.

[2] Quotation marks in the extracts mean that students are reading out (part of) the sentences in the feedback session.

Kevin: “He is a prominent scholar in the field of linguistics.”

*4.3.3 Significant others*

Different from conventional feedback tasks, WeChat was used to mediate the peer feedback session. It was common that the students kept all kinds of social contacts on WeChat. This immediate access to social contacts amplified the influence of significant others (e.g. close relatives) and subsequently influenced the peer interaction. For instance, in Extract 2, Jason (a feedback receiver) challenged his partner’s pronunciation of the word “ablaze”, which signaled the dominant/dominant relation of the dyad. In the interview, he explained that he had asked his uncle for help before coming to the feedback session:

> I asked my uncle to teach me how to pronounce those sentences. My uncle was an English teacher in a primary school. I learned from him to pronounce the eight sentences. I thought my uncle was right. That was why I questioned her pronunciation in the feedback session.

**Extract 2**

Linda: “ablaze with light”
Jason: Are you sure about /əˈbleɪz/?
Linda: I am sure, because this word is from our previous lessons.
Jason: You should check the dictionary.

In another example, Sean (a feedback giver) had a relatively high percentage of demonstrating pronunciation and did not consult any dictionary during the interaction. This choice was influenced by his uncle, whose opinion he held in high regard: “My uncle told me that the trick to pronunciation learning is not to strictly follow the pronunciation in the dictionary, but to imitate the speakers in movies or videos.” Correspondingly, he did not play the audio in the dictionary but frequently demonstrated pronunciation so that his peer could imitate him. As such, Sean’s dyad might miss the opportunities to make the best use of (digital) resources during the peer interaction.

*4.3.4 Online resources*

As explained in Section 4.3.1, the role assignment presupposed that the feedback givers knew better than the feedback receivers. The asymmetrical power relation was paradoxically enhanced and diminished by online resources that were readily accessible in the feedback session. On the one hand, the feedback givers used digital dictionaries to reaffirm their authority. As demonstrated in Extract 3, Zack had the correct pronunciation and played the audio in the digital dictionary to confirm it.

**Extract 3**
Zack: /ˈʧærɪti/. I think I'm correct. Let me check the dictionary. (Playing the pronunciation audio) /ˈʧærɪti/. Yes, OK!
Paul: "Charity"

On the other hand, the feedback receivers drew on digital dictionaries to defend their pronunciation. For instance, in Extract 4, Wendy disagreed with Cathy (the feedback giver). In the interview, Wendy explained that her confidence was afforded by the Baidu dictionary app: "when I checked the pronunciation in the app, I could clearly see how many syllable there were." As Cathy pronounced the word "mystery" in three syllables, Wendy ventured to disagree because the dictionary offered two syllables.

**Extract 4**
Cathy: "We set out to find the truth behind the /misderi/".
Wendy: /mistri/ perhaps?
Cathy: I have checked it and it is /misderi/.
Wendy: I have checked it and it is /mistri/.
Cathy: Where did you look up the word?
Wendy: Baidu App. Let me play it for you.

As another example, Jason placed more confidence in the digital dictionaries than his partner. In Extract 5, Jason insisted that his pronunciation was correct because he had consulted Baidu. When Linda mentioned that she was the feedback giver ("the A-student"), asserting her authoritative role, Jason responded: "are you better than Baidu?" In the interview, when asked what if his partner's pronunciation was different from his, Jason responded: "I would use Youdao [a popular digital dictionary in China] to decide which one was correct." Clearly, Jason trusted digital dictionaries (Baidu and Youdao) more than his partner. This could explain why he and his partner had higher percentages of questioning and responding. Confronted with Jason's challenges and reliance on digital dictionaries, Linda resorted to a substantial amount of languaging to project her authority. As she explained in the interview, she found that "Jason was stubborn," so she had to try using "the pronunciation rules and Phonetic Alphabet to convince" him. This was demonstrated in how she explained the pronunciation of "agriculture" in Extract 5.

**Extract 5**
Linda: "Agriculture." How do you pronounce this word?
Jason: What /ægrikʌlʧə/? Which one? I checked the pronunciation on Baidu. There was no such a word.
Linda: *Nong-ye* [Chinese translation of *agriculture*]. "Agriculture."

Jason: You definitely pronounce the word wrongly. I checked the pronunciation on Baidu.
Linda: I am the A-student.
Jason: You are A, but are you better than Baidu?
Linda: That word is /ægrikʌlʧə/, /kʌlʧə/. When you checked the dictionary, you would find the Phonetic Alphabet…c-u-l, u is pronounced as /ʌ/. When you pronounce this phoneme, you should open your mouth.

## 5. Discussion

Table 7 presents an overview of major findings corresponding to the three research questions. In what follows, we will discuss each research question in relation to the existing literature.

**Table 7** Summary of major findings

| Research questions | Major findings |
|---|---|
| 1. Outcome effects | • Both feedback givers and receivers improved their pronunciation.<br>• Learning effect was more substantial for the feedback receivers in a collaborative or expert/novice relation. |
| 2. Interactional processes | • 13 interactional moves were identified.<br>• Four dyads displayed clear interactional patterns (collaborative, expert/novice, or dominant/dominant) but one dyad showed a mixed pattern. |
| 3. Shaping factors | • Factors were *task*-related (role assignment), *person*-related (prior music learning and teaching experience), and *context*-related (significant others, and online resources). |

Our first research question examined the outcome effects of the mobile-assisted peer feedback. Converging the results of three pronunciation tests and the analysis of the interactional patterns, we found that the learning effect was more substantial (measured by the delayed posttest) for the feedback receivers (Paul, Tom, and Kevin) in a collaborative or expert/novice relation than those in a dominant/dominant or mixed-patterned relation (Jason and Wendy). This finding resonates with the studies conducted in the face-to-face context, showing that collaborative and expert/novice relations are more favorable to language learning (Kim & McDonough, 2008; Storch, 2019). However, this trend was less clear for the feedback givers: Sean, Sue (from expert/novice dyads) and Linda (from a dominant/dominant dyad) achieved larger percentage gains in the delayed posttest than Zack (from a collaborative dyad) and Cathy (from a mixed-relation dyad). Taken together, the lower-proficiency students seemed to benefit more from a collaborative or expert/novice relation than the higher-proficiency students. Despite this discrepancy, it should be pointed out that the mobile-assisted peer feedback

helped all the students improve their pronunciation in the delayed posttest. This was further corroborated by the interview data in that the students explicitly indicated perceived improvement in their pronunciation. These findings suggest that even higher-proficiency students could benefit from giving feedback (Yu & Hu, 2017), because noticing and correcting their peers' non-target-like features might prompt them to observe, compare, monitor and improve their own pronunciation (Sato, 2017). For the lower-proficiency students, they had access to "contingently responsive" feedback, "directly in response to an identified need for assistance" (Storch, 2019, p. 150). As the mobile-assisted peer feedback benefited both feedback givers and receivers, it can be conducted as a useful complement to in-class pronunciation training, which is usually short of time and personalized feedback (Chiu et al., 2007; Mroz, 2018). In the mobile-assisted context, unconstrained by time or place, students have more control over their pace and more opportunities to pool resources to offer and receive immediate, tailor-made feedback that contributes to their pronunciation learning (more on this in Section 6).

The second research question focused on the interactional processes. While previous studies have documented the positive outcomes of mobile-assisted peer feedback on EFL pronunciation (Huang, 2019; Lan, 2021), we extended this line of research by examining how the interactional processes played out. Three out of the five dyads worked in a collaborative or expert/novice relation, marked by a relatively high level of mutuality and engagement. As engagement is closely related to the success of task-based interaction and language learning (Philp & Duchesne, 2016), we have reason to believe that these students were willing and able to work on the task that contributed to their pronunciation improvement. In addition, previous studies have found that mixed-proficiency pairs might display a dominant/passive relation (Kim & McDonough, 2008; Storch & Aldosari, 2013). In this study, all the dyads were mixed-proficiency pairs but no dominant/passive relation was found. In fact, we identified three relations in Storch's (2002) framework, and a mixed relation that could not be put in a neat category. Existing studies have tended to decide on the interactional patterns based on researchers' coding (e.g. Mozaffari, 2017). We extended this practice and drew on both the interaction sessions (coded for 13 interactional moves) and the students' self-perceived roles to examine the pair dynamics. For instance, the students in Dyad 5 had different self-positioning (expert/novice vs. co-participants), and the interactional moves signaling more powerful (e.g. questioning) and less powerful (e.g. responding) roles shifted between them during the interaction. This demonstrates the complex and fluid nature of pair dynamics even within an interaction session (Zhang, 2019). Furthermore, this shows that participants' self-perceptions are "a crucial source of information" for studies on peer interaction (Stiefenhöfer & Michel, 2020, p. 269). Heuristically, it is advantageous to triangulate an emic perspective (i.e. "from the inside, by participants") and an etic perspective (i.e. "from the outside, by researchers") (Walsh & Li, 2016, p. 493). The triangulated insights afford more nuanced

accounts of interactional dynamics emergent in peer interaction, thereby allowing us to tease out interactional patterns that may not be captured by the clear-cut categories in Storch's framework (Tajabadi et al., 2020).

The third research question explored the factors that might influence the peer interaction. Research has found that English proficiency and role assignment are potential person- and task-related factors (Kim, 2020; Storch, 2013). In this study, given a constant proficiency gap among the dyads, role assignment was a more prominent factor to shape pair dynamics (Dao & McDonough, 2017). In line with Storch and Aldossary (2019), the feedback givers were much more likely to enact interactional moves that signaled higher authority (e.g. demonstrating, judging, and languaging). In addition, we found that the students' prior music learning/teaching experience was an important person-related factor that contributed to their willingness to repeat the exercises. Paul's orchestra training experience and Sue's experience of teaching piano lessons led to a high percentage of the repeating move. While existing research has reported the influence of prior English learning experience on pair dynamics in subsequent learning tasks (e.g. Chen & Yu, 2019), our study further showed that prior experience, albeit seemingly unrelated to English learning, could also affect peer interaction.

The remaining two factors were contextually related to the mobile-assisted setting. As students' diverse social contacts (e.g. relatives and classmates) converged on WeChat, peer interaction on the app was more susceptible to the influence from social others. This social affordance could have an impact on the educational affordance (Song & Ma, 2021). As such, the mobile-assisted task allowed the students to exploit more social resources that shaped the peer interaction. For instance, Jason challenged his peer's feedback because he had learned pronunciation from his uncle before the feedback session. Sean's uncle advised him to imitate pronunciation from the videos but not dictionaries. During the feedback session, Sean did not play dictionary audio but frequently demonstrated pronunciation so that his peer could model on him. Clearly, the influence of social others was amplified by the networking app and seeped into the peer feedback session.

Finally, we found that access to online resources shaped pair dynamics, consistent with the observations in Hsieh (2020). As the feedback session was conducted via WeChat, without temporal or physical constraints, the students had ample opportunities to consult digital dictionaries during the session. Indeed, four out of the five dyads consulted online resources. While the feedback givers used the digital dictionaries to reaffirm their authority, some feedback receivers (e.g. Jason) used dictionaries to unsettle the asymmetrical power relation. This led to the interactional moves of questioning and responding, and in Linda's case a substantial percentage of languaging to counter Jason's challenges and regain her authoritative position.

## 6. Pedagogical implications

Our study has three implications for mobile-assisted peer feedback activities outside the class. First, the results show that mobile-assisted peer feedback, like face-to-face feedback, is useful for pronunciation training. Although it has been pointed out that students might use mobile devices for "hedonic uses" (Cheon et al. 2012, p. 1055), we found that the students stayed task-engaged during the mobile-assisted feedback session. Both feedback givers and receivers improved their pronunciation and also indicated perceived improvement, suggesting that they were willing and able to repurpose the social app to advance their learning (albeit to a greater or lesser extent). This is encouraging for teachers who want to engage students in mobile-assisted pronunciation training, unbounded by physical, temporal or resource constraints (Kukulska-Hulme & Viberg, 2018).

Second, if mobile-assisted tasks are conducted, power dynamics need to be carefully managed. In this study, the higher-proficiency students gave feedback to lower-proficiency students. This role assignment presupposed that the feedback givers had relative authority over the feedback receivers. However, this power imbalance was challenged by the feedback receivers resorting to online resources (e.g. digital dictionaries) and social resources (e.g. significant others). As these resources are easily accessible in the mobile-assisted context, tasks must be carefully designed to avoid the dominant/dominant relation, in which dyadic partners compete for an authoritative and powerful position. For instance, in controlled production tasks, audio models can be provided to peers so that they can refer to the target-like version (Foote & McDonough, 2017). These models, to a certain extent, relieve the tensions of arguing what target-like pronunciation sounds like (e.g. Extract 5). In spontaneous production tasks, lower-proficiency students can assume the role of information holders, because previous studies have found that students are more mutually engaged in group work when lower-proficiency students act as information holders (Dao & McDonough, 2017).

Third, we should develop students' critical awareness of the influences of various resources on peer interaction in the mobile-assisted context. As Kim (2020) aptly pointed out, "What each learner brings to the peer interaction is important for understanding the complexity of the interaction" (p. 135). In this study, the students brought their personal music learning and teaching experience, significant others' influences, and their trusted online resources to the peer feedback sessions. Some of these resources facilitated the interaction, while others (albeit immediately accessible) were counterproductive, as discussed previously. Therefore, it is important for teachers to train students to be critical and reflective users of these personal, social and digital resources. Specifically, teachers can guide students to reflect on their mobile-assisted feedback sessions: What resources did we bring to the mobile learning session? To what extent did these resources create or cancel learning opportunities? How should we harness these resources to work with not

against dyadic partners? These questions sensitize students to a constellation of resources that can be effectively pooled for the mobile-assisted peer interaction.

## 7. Conclusion

Our study contributes to a limited but growing body of research on mobile-assisted peer feedback on EFL pronunciation in three aspects (empirical, methodological, and heuristic). First, the study affords an enriched understanding of the learning outcomes, interactional processes, and shaping factors of the mobile-assisted feedback task. These new empirical findings demonstrate that mobile-assisted peer feedback is a meaningful site for pronunciation training and students are able to repurpose the networking app to facilitate their learning. Second, we make a methodological improvement in determining the interactional patterns based on the triangulation of (a) distribution of interactional moves in peer interaction and (b) students' self-perceived roles. Different from previous studies that have relied on researchers' coding and interpretation of interaction sessions, the additional student perspectives allow for a more nuanced, triangulated understanding of interactional processes. Third, we offer a useful set of heuristics (task-, person-, and context-related factors) for teachers to develop students' critical awareness of pooling personal, social, and digital resources for mobile-assisted feedback.

Given the exploratory nature of this study, we focused on five dyads mediated by a mobile app. Although a maximum variation selection method (Patton, 2015) was used to capture the patterns that cut across a range of possibilities and observations, the findings are not immediately generalizable to other student populations. More studies are needed to ascertain whether the outcome effects, interactional processes, and shaping factors can be found in a larger sample size. Additionally, it is important to know how interactional patterns evolve over time (e.g. Chen & Yu, 2019). For instance, if dyads are assigned to conduct mobile-assisted peer feedback multiple times over a semester, will they become more or less collaborative? Through repeated tasks, will they become more receptive to and autonomous in mobile-assisted language learning and proactively use mobile resources to facilitate their learning? The answers to these questions will shed more light on how students can act upon the affordances of mobile technologies (e.g. flexibility, timeliness, and socialization, Kukulska-Hulme & Viberg, 2018) for educational purposes anytime anywhere.

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