

## Effects of Corrective Feedback on Second Language Pronunciation Development

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### Abstract

Given that the pedagogical potential of corrective feedback (CF) for second language (L2) pronunciation development has received rapidly increasing interest in recent years (e.g., Saito & Lyster, 2012 in *Language Learning*), it is timely and prudent to provide a piece of scholarly work which focuses on synthesizing and presenting the current state of affairs. According to existing descriptive studies, both teachers and learners equally consider the provision of CF to be a crucial component of L2 pronunciation development, especially when the errors in question hinder successful communication. More recently, a growing number of scholars have investigated the acquisitional value of pronunciation-focused CF by conducting quasi-experimental studies with a pretest-posttest design in both classroom and laboratory settings. Whereas the results have generally shown that pronunciation-focused CF facilitates the development of both segmental and suprasegmental accuracy, the effectiveness of such CF techniques appears to be subject to a great deal of individual variability. Specifically, the potentials of pronunciation-focused CF can be maximized (a) when L2 learners have enough phonetic knowledge, conversational experience and perceptual awareness of target sounds; (b) when CF provides model pronunciation forms (e.g., recasts rather than prompts); and (c) when the target of instruction concerns communicatively important and salient features.

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## Effects of Corrective Feedback on Second Language Pronunciation Development

In the field of second language acquisition (SLA), it has been well-attested that corrective feedback (CF) on learners' linguistic errors is instrumental to the process and product of successful second language (L2) learning. The benefits of CF are theoretically attributed to its ability to promote learners' awareness, noticing and understanding of linguistic form, especially when using their L2 for meaning conveyance (e.g., in task based language learning, content-based classrooms) (Ellis, 2016; Long, 2007; Mackey, 2012). Furthermore, others have emphasized that CF provides ideal opportunities for learners to practice their L2 in communicatively-authentic discourse, which in turn enhances their accurate, fluent and automatic in the long term (Lyster, Saito, & Sato, 2013).

Over the past 30 years, the literature on CF has been largely concerned with the learning of L2 morphosyntax, and has generated a number of insightful findings for researchers and teachers alike. For example, Li (2010) conducted a meta-analysis of 34 intervention studies focusing on CF and morphosyntax learning using pre/post test designs. Their results showed that CF positively influenced L2 learners' performance with medium effects when it was consistently directed to certain morphosyntactic errors. Similarly, focusing on 15 classroom-based CF studies, Lyster and Saito's (2010) meta-analysis demonstrated that CF treatments led to medium-sized learning gains which were durable over an extensive period of time. Outside of morphosyntax, research has demonstrated the comparable effectiveness of CF for development in other domains of language as well, including L2 vocabulary (e.g., Dilans, 2010) L2 pragmatics (Nguyen, Pham, & Pham, 2012), and L2 pronunciation, which has received rapidly increasing interest in recent years (e.g., Saito & Lyster, 2012a, 2012b).

Given the increasing focus on the latter domain (CF and L2 pronunciation), it is timely and prudent to provide a piece of scholarly work which focuses on synthesizing and presenting the current state of affairs. Though a number of meta-analytic and narrative reviews have been published on the role of CF in SLA, this chapter is the very first attempt to provide a focused review for CF and L2 pronunciation in particular. The information provided by such a review could be useful for practitioners who are interested in how to use CF to assist L2 pronunciation learning in classroom settings; and for scholars with a wide range of backgrounds, including both those who are interested in instructed L2 speech learning in general (e.g., Derwing & Munro, 2015), and those who are interested in theory-driven pedagogical techniques (including CF) across different dimensions of language (grammar, vocabulary, phonology) (e.g., Solon, Long, & Gurzynski-Weiss, 2016).

In what follows, I will provide a critical review on pronunciation-focused CF with three objectives in mind. First, I will explain what kinds of CF practices have been adopted in L2 pronunciation teaching and the instructed SLA literature, as well as how teachers and learners perceive them in various classroom settings. Next, I will synthesize the data from a range of recent quasi-experimental studies in order to elucidate the complex role of CF in L2 pronunciation development according to a range of affecting factors, including L2 learners' readiness (the presence/absence of explicit phonetic knowledge, conversational experience and perceptual awareness), types of CF (recasts vs. prompts), and instructional targets (segmentals vs. suprasegmentals). Finally, I will close the chapter by addressing, in particular, three topics worthy of future investigations: (a) the role of L2 learners' social and cognitive individual differences in the effectiveness of CF; (b) the need to integrate multiple analytic methods for

assessing the effectiveness of CF; and (c) the differential impacts of CF for L2 speech perception vs. production learning.

### **How Has Pronunciation-Focused CF Been Used and Perceived in Classroom Settings?**

In a broad sense, second language pronunciation proficiency can be considered as comprising four different dimensions of learners' sound production:

1. Segmental accuracy: Pronouncing new consonant and vowel sounds using L2 forms instead of using their L1 counterparts or interlanguage forms (a mixture of L1 and L2 forms)
2. Syllabic accuracy: Processing a range of syllable structures (e.g., Consonant-Consonant-Vowel [CCV]; CCVC; CCVCC) without deleting any consonant sounds or inserting any epenthetic vowels to consonant clusters
3. Word stress accuracy: Assigning targetlike word stress via enunciating stressed syllables with longer, louder or/and higher pitch
4. Intonation accuracy: Demonstrating adequate intonational cues in the L2, using rising and falling tones at sentence boundaries

Pronunciation-focused CF is generally provided by teachers, conversational partners and/or computer software when L2 learners make pronunciation errors belonging to one or more of the above dimensions; thus, it is considered to be “production-based” by nature (see the section of Future Directions for a more detailed discussion on the role of CF during L2 perception training). During the 1950's, the dominant pedagogical practice (i.e., the audiolingual method) placed a strong emphasis on the mastery of pronunciation accuracy, particularly with reference to native speaker models. According to this method, providing explicit CF was considered fundamental to L2 pronunciation learning and teaching, as any deviation from native norms needed to be amended immediately to prevent learners from fossilizing their errors. In the 1990's, however, researchers began to cast doubt on the importance (and possibility) of pursuing such nativelike pronunciation forms in the first place. In fact, there emerged ample research evidence showing that few L2 learners can actually attain nativelike pronunciation proficiency, and that accent is a normal characteristic of L2 speech (e.g., Flege, Munro, & MacKay, 1995). Subsequently, a number of scholars have considered the attainment of adequately comprehensible (but still mildly accented) speech as a more “realistic” and “achievable” goal (e.g., Derwing & Munro, 2015; Isaacs, Trofimovich, & Foote, 2017).

To date, researchers have exhaustively elucidated which pronunciation features should be taught and learned as a primary focus based on their relative impact on L2 speech comprehensibility. Such communicatively-important features include word and sentence stress (Field, 2005; Hahn, 2004), prosody (Derwing, Munro, & Wiebe, 1998; Kang, Rubin, & Pickering, 2010), and segmentals with high functional load (Munro & Derwing, 2006; Suzukida & Saito, forthcoming). Though fewer in number, certain scholars have begun to explicate how we can teach these pronunciation features in the most efficient and effective way, especially by incorporating a range of focus-on-form techniques into the instruction, including via CF.

There are several ways to provide CF in L2 pronunciation pedagogy. For example, in explicit phonetic instruction, teachers can ask students to read aloud the target sounds and provide guidance on whether their pronunciation is sufficiently comprehensible and intelligible (i.e., isolated CF). To help ensure the accuracy of the feedback, some teachers can also rely on

computer-assisted pronunciation teaching tools (e.g., de Bot, 1983; Hincks, 2003; Hincks & Edlund, 2009). Corrective feedback can also be operationalized as teachers' post-hoc comments on the segmental, syllabic and prosodic accuracy on students' audio recordings as a part of at-home assignments (e.g., Dłaska & Krekeler, 2013; Lord, 2005).

In the field of instructed SLA, researchers are generally interested in studying CF as a way to draw students' attention to phonological form during communication in a more spontaneous, naturalistic and interactive fashion (i.e., integrated CF). Following Lyster and Ranta's (1997) oft-cited CF coding scheme, such CF can be delivered as recasts, which provide both negative (signaling the presence of errors) and positive evidence (presenting targetlike pronunciation forms). Some examples for pronunciation-focused recast episodes are as follows:

Saito (2013)

Student: I like **running** (mispronounced as [lʌn]) outside.

Teacher: **Running** [ˌɹʌnɪŋ]

Student: **Running** [ˌɹʌnɪŋ]

Sheen (2006)

Student: Ho-, **Holland** (mispronounced as [hɒlənd])

Teacher: **Holland** ([hɒlənd]), yeah.

In order to push L2 learners to modify their unclear pronunciation or mispronunciation, CF can also take a form of prompts, which provide negative evidence but without supplying model pronunciation forms. One example for such prompt techniques is clarification requests.

Gooch, Saito, & Lyster (2016)

Student: **pray** (mispronounced as [pleɪ])

Teacher: Sorry? Can you say that again?

Student: **pray** ([preɪ])

Whereas recasts and prompts are thought to occur without interrupting the natural flow of communication, the provision of CF can also be more direct, taking the form of didactic, explicit correction, as in this example below in a French L2 classroom:

Lyster (1998)

Student: le renard gris, le loup, le coyote, le bison et la gr...**groue** (*the gray fox, the wolf, the coyote, the bison and the cr . . . crane*)

Teacher: Et la **grue**. On dit "**grue**" (*And the crane. We say "crane"*)

To date, there have been a number of published studies descriptively probing the frequency of CF episodes during teacher and student interaction in various communicatively-oriented classrooms all over the world. Brown's (2016) recent meta-analysis, showed that teachers likely provide CF on students' grammar errors (42.7%) significantly more often than to their vocabulary (27.6%) and pronunciation (22.4%). Although pronunciation-focused CF does not frequently occur (especially compared to grammar-focused CF), students seem to be able to perceive the corrective intension of pronunciation-focused CF with greater ease and precision. In Lyster's (1998) oft-cited observational research on teacher-student interaction in French

immersion classrooms in Quebec, for example, the audio-recorded data showed that young students corrected their pronunciation errors more following pronunciation-focused (62%) than grammar-focused CF (22%). In fact, this strong sensitivity to pronunciation-focused CF (i.e., repair ratio > 70%) has been found across learners with different ages, proficiency and experience backgrounds in different classroom settings, such as adult L2 learners in an English-as-a-Second-Language (ESL) classrooms in New Zealand (Ellis, Basturkmen, & Loewen, 2001) and English-as-a-Foreign-Language (EFL) classrooms in Korea (Sheen, 2006).

Furthermore, some scholars have directly surveyed L2 learners' perceptions about receiving pronunciation-focused CF through stimulated recalls. For example, Mackey, Gass and McDonough (2000) found that when asked to watch video recordings of their task-based interaction with native-speaker interlocutors, two groups of learners (learners of ESL and Italian as a foreign language) recognized pronunciation-focused CF more accurately than morphosyntax-focused CF (see also Carpenter, Jeon, MacGregor, & Mackey, 2006; Kim & Han, 2007). Importantly, Mackey et al. (2000) argued that the learners' high-level awareness of their phonological errors might be due to the fact that inaccurate pronunciation has "more potential to seriously interfere with understanding" than morphosyntactic errors do (p. 493). Correspondingly, there is ample evidence that listeners tend to rely more on phonological information (40-50% of variance) than on lexicogrammatical information (30-40% of variance) during their assessment of accented L2 speech (Saito, Trofimovich, & Isaacs, 2016, 2017).

Other research examining the perceptions of pronunciation-focused CF has yielded interesting nuances on the topic related to learning context. For instance, it has been found that students in foreign language classroom settings likely prefer to receive CF (and explicit instruction) on their linguistic errors overall (e.g., Schulz, 2001). Yet, such a tendency seems to be weaker among students who are immersed in the target language speaking environment (Loewen et al., 2009). Additionally, in meaning-oriented classrooms, it has been shown that teachers generally have a more conservative attitude towards providing CF. According to previous observation studies, teachers in such contexts tend to correct only those errors which greatly hamper communication, arguably because they want to prioritize students' communication without too much interruption (Yoshida, 2008), and seek to avoid raising their anxiety levels by overly correcting them in front of their peers (Lasagabaster & Sierra 2005).

In addition to work on perceptions of CF, scholars have also explored learner and teacher *beliefs* about pronunciation-focused CF. For example, Baker and Burri (2016) interviewed five experienced ESL teachers in New Zealand who all point to CF as a crucial component in L2 pronunciation teaching, especially when their students' errors hinder successful L2 communication. Huang and Jia (2016) administered a questionnaire to total of 75 students and 25 teachers at a university in China surveying their beliefs on CF. The results pointed to the shared belief of the necessary role of CF in L2 pronunciation learning, but revealed differences in their preferred CF strategies. Specifically, students preferred more indirect and less intrusive CF (e.g., recasts) while teachers preferred more pedagogically-oriented CF (e.g., prompts or explicit correction).

Taken together, the observational and stimulated recall analyses presented in the aforementioned descriptive studies have generally indicated that L2 learners can notice the corrective and pedagogic message available in pronunciation-focused CF more unambiguously, promptly and easily than grammar-focused CF (see Mackey et al., 2000). In addition, while some teachers may be cautious about whether or not to provide CF in meaning-oriented classrooms, it seems a majority of L2 learners are willing to receive CF and work on improving their errors for

the ultimate goal of successful L2 communication. In addition, given that SLA is strongly linked to L2 learners' awareness of their interlanguage forms (Schmidt, 2001), the increased saliency of pronunciation-focused CF revealed across these studies seems to evidence its relative suitability for L2 development. In what follows, I will turn the review to answering whether, to what degree and how CF actually impacts on L2 pronunciation development.

### **How Beneficial Is Pronunciation-Focused Corrective Feedback?**

To test the associations between CF and acquisition, many classroom and laboratory studies have been conducted using quasi-experimental, pretest-posttest designs. These studies have generally shown that L2 learners can improve their pronunciation accuracy after receiving explicit pronunciation training (including CF) compared to learners not receiving any pronunciation-focused activities (e.g., Derwing et al., 1998; Hincks, 2003; Hincks & Edlund, 2009; Lord, 2005). The overall message of these studies is that explicit phonetic instruction (which includes CF) makes a difference in the development of L2 pronunciation (for a review, see Lee, Jang, & Plonsky, 2015).

More recently, a growing amount of attention has been directed toward examining precisely which components of explicit instruction are relatively crucial for L2 pronunciation development, using corrective feedback as an independent variable. As a part of stand-alone pronunciation training, Dłaska & Krekeler (2013) asked a total of 169 L2 learners of German to listen to and compared their own recorded utterances with native speaker models. Those in the experimental group also received feedback from instructors on their pronunciation performance while those in the control group did not. According to native listeners' judgements, the comprehensibility of the experimental group's speech (sentence reading) significantly improved compared to the control group.

Focusing on 66 Japanese learners of English with a varied length of residence experience in Canada (1 month to 13 years), Saito and Lyster (2012a) examined the effectiveness of pronunciation-CF on the acquisition of English [r] in a meaning-oriented classroom. All the participants engaged in a range of focused tasks where they were guided to use the target feature accurately (English [r]) while focusing on task completion (e.g., English debate activities). Throughout the training, those in the experimental group constantly received recasts from their instructor on unclear production or mispronunciations of English [r]. The results of pretests and posttests showed that the participants significantly improved their English [r] production at both controlled (word and sentence reading) and spontaneous (timed picture description) speech levels. In a follow-up study, Saito (2015a) revisited the same dataset, finding strong practice effects; that is, the more CF the participants received, the more they self-corrected their interlanguage pronunciation forms following the CF moves, and the more gains they demonstrated during the project.

When it comes to L2 suprasegmental learning, Parlak and Ziegler (2016) examined how provision of pronunciation-focused CF could facilitate 64 Arabic L1 learners' acquisition of L2 English lexical stress. In their study, the participants engaged in an interactive role-play task via either face-to-face or oral synchronous computer-mediated communication. The experimental group received recasts on their lexical stress errors for certain target words, while the control group only performed the tasks. Results of acoustic analyses of the participants' pretest-posttest performance (sentence reading, information exchange task) showed that the experimental group appeared to pay more attention to the duration aspects of their speech (but not to pitch and intensity) to improve their L2 English lexical stress patterns.

Interestingly, whereas the existing literature generally supports the role of explicit phonetic instruction and CF in L2 pronunciation development, the degree of improvement seems to vary between participants to a great degree (e.g., Saito, 2015a). To this end, scholars have also begun to further push the research agenda ahead by expounding the mechanisms underlying the effectiveness of pronunciation-focused CF. Similar to L2 morphosyntax CF research (e.g., Lyster et al., 2013), a growing number of studies have been conducted to examine what degree, when, why and how the effectiveness of pronunciation-focused CF is subject to individual variability. In what follows, I will provide an overview on the potentials and limits of pronunciation-focused CF for improved L2 pronunciation proficiency according to commonly investigated learner internal and external factors.

### **Learner Readiness**

One crucial factor moderating the effectiveness of pronunciation-focused CF concerns L2 learners' relevant experience with and knowledge of the target features—i.e., learner readiness. Using a design similar to Saito and Lyster (2012a), Saito conducted two experimental studies to test the impact of pronunciation-focused CF on L2 segmental and suprasegmental learning (Saito, 2015b for English [r]; Saito & Wu, 2014 for Mandarin tones). Different from the original study, which was conducted with somewhat experienced L2 learners who had ample opportunities to use the target language in an L2 speaking environment (Japanese learners in Canada), the follow-up studies (Saito, 2015b; Saito & Wu, 2014) featured L2 learners in foreign-language contexts, where such conversational experience is lacking. In contrast to Saito and Lyster (2012a), the results of Saito (2015b) and Saito and Wu (2014) showed (a) that engaging in meaning-focused activities led to significant improvements in pronunciation performance, but that (b) the benefits of adding pronunciation-CF remained unclear.

Saito (2015b) attributed the lack of significant CF effects to the participants' insufficient explicit phonetic knowledge regarding how to repair target phonetic features on their own. Indeed, the post-hoc analysis of the video-recorded data showed that many of the participating students repeated the teachers' recasts throughout the treatment. However, they did so by simply substituting their L1 counterpart for the target sound—i.e., the Japanese tap [ɾ] instead of English [r]. Saito and Wu (2014) also argued that pronunciation-focused CF strongly implies modified output (e.g., students are strongly pushed to self-correct their interlanguage forms after pronunciation errors), which may be particularly overwhelming for inexperienced L2 learners with otherwise occupied, limited cognitive resources.

To further examine the relationship between readiness (operationalized as learner proficiency/language experience), CF, repair and L2 pronunciation development, Saito and Akiyama (2016, 2017) tracked the longitudinal speech development of Japanese learners receiving CF from native speaking interlocutors during computer-mediated dyads. Results indicated that while the inexperienced learners (who had studied L2 English only in EFL classrooms without any experience abroad) repeated their conversational partners' pronunciation-focused recasts, they nevertheless failed to demonstrate any significant improvement in terms of global L2 pronunciation proficiency (Saito & Akiyama, 2017). In contrast, not only did the experienced learners (i.e., more than one year of experience being abroad) successfully repeat their conversational partners' recasts, they improved their pronunciation performance as well (Saito & Akiyama, 2016).

To date, several L2 morphosyntax studies have investigated how CF effectiveness can be influenced by learners' initial levels of proficiency, experience and knowledge of target

structures. Drawing on well-established developmental sequences of certain grammatical features, Mackey and Philp (1998) linked the effectiveness of CF to learners' initial proficiency levels. According to the results, CF (recasts) positively influenced learners who were developmentally ready to acquire the target feature (Stage 3), but not those who lacked developmental readiness (Stage 2) (for similar findings in the acquisition of English possessive determiners, see Ammar and Spada, 2006).

From a theoretical perspective, SLA is comprehension-driven in that early-stage L2 learners establish and refine their linguistic representations through the noticing and understanding of input. These representations are then drawn on to produce targetlike output in the later stages of SLA (Ellis, 1997 for a computational model of SLA; Flege, 2016 for the Speech Learning Model; VanPatten, 2002 for Input Processing). Consequently, many scholars have argued that providing CF on learners' production errors, which serves as one kind of output enhancement, *can* promote SLA, but only when L2 learners are developmentally ready (i.e., have sufficient proficiency, experience and explicit knowledge of the target language). This is arguably because CF is believed to help consolidate what L2 learners have already learned rather than lead to the acquisition of entirely new knowledge (e.g., DeKeyser, 2007; Lyster et al., 2013; Nicholas, Lightbown, & Spada, 2001).

### **Explicit Phonetic Knowledge**

Reviewing the results of the above-mentioned studies (Saito, 2015b; Saito & Wu, 2014), we can draw the tentative conclusion that pronunciation-focused CF can positively impact acquisition when L2 learners are ready for it, i.e., have enough explicit phonetic knowledge for the CF to interact with. A valid question to ask is "whether it is worth providing pronunciation-focused CF to lower proficiency learners." On a pedagogical front, it is crucial to further examine what teachers should do to help less experienced, less proficient and less ready learners make the most of pronunciation-focused CF.

There is some evidence that providing explicit phonetic instruction before CF treatment may help these less experienced learners. For example, in Saito (2013), inexperienced Japanese learners (with little experience abroad) first received phonetic instruction on the articulatory properties of the target feature (English [r]), and were then guided to exaggerate the acoustic properties of the sound (with extra lip rounding, tongue retraction and phonemic lengthening). Results indicated that learners in the group receiving CF (pronunciation-focused recasts on their mispronunciations) during post-instruction tasks significantly outperformed non-recast groups on all the outcome measures (perception, controlled/spontaneous production).

From a theoretical standpoint, it is important to ask what precisely constitutes explicit phonetic knowledge. L2 speech scholars have debated whether phonetic knowledge is principally realized on a perceptual basis (i.e., perceiving and distinguishing new sounds from L1 counterparts) (e.g., Flege, 2016) or on an articulatory basis (i.e., knowing how to use articulators to produce new sounds) (e.g., Best & Tyler, 2007), though both positions agree that the perception and production dimensions are inter-connected (see Bundgaard-Nielsen, Best, Kroos, & Tyler, 2012). Pedagogically speaking, this has led to another kind of discussion on the relative importance of teaching the auditory vs. articulatory aspects of new sounds during explicit phonetic instruction (Celce-Murcia, Brinton, Goodwin, & Griner, 2010).

In the L1 speech literature on children with reading difficulties, it has been observed that adding articulatory training to phonological awareness development paradigms can be beneficial (e.g., Joly-Pottuz, Mercier, Leynaud, & Habib, 2008). It has been shown that intensive auditory



training could lead L2 learners to enhance their performance at both perception and production levels (e.g., Bradlow, Pisoni, Akahane-Yamada, & Tohkura, 1997); and that focusing on both listening exercises and articulatory explanation in explicit phonetic instruction is facilitative of L2 pronunciation learning (e.g., Saito, 2013).

Notably, some studies have revealed that an exclusive focus on articulatory phonetics may not necessarily lead to clear positive gains (Kissling, 2013). Further, recent empirical evidence has hinted that individual differences in L2 pronunciation learning may be unrelated to the presence/absence of their explicit articulatory knowledge (e.g., Saito, 2018, 2015a). Rather, it has been shown that successful L2 speech acquisition could be strongly tied to different amounts of learners' perceptual acuity (Kissling, 2014) and phonological awareness (Saito, 2018). The findings here are in line with major theoretical stances suggesting that learners' ability to perceive acoustic properties of new sounds is instrumental to L2 (Flege, 2016) as well as L1 (Kuhl, 2000) speech learning.

### Types of CF

In the L2 morphosyntax CF literature, there has been extensive debate on which types of CF techniques are relatively beneficial for SLA (e.g., Goo & Mackey, 2013 vs. Lyster & Ranta, 2013). The discussion has been mainly concerned with how explicit or implicit CF should be (Ellis & Sheen, 2006), and to what degree it should be input-providing vs. output-prompting (Lyster et al., 2013). According to a series of meta-analytic (e.g., Li, 2010) and narrative (e.g., Lyster et al., 2013) reviews, explicit/output-prompting feedback (providing metalinguistic information and eliciting self-modified output while correcting) may be particularly effective in classroom settings, where a teacher typically interacts with a large number of students, and where L2 learners are reported to have difficulty noticing the corrective message in more implicit CF. In laboratory settings on the other hand, where L2 learners can receive individualized attention from their interlocutors, all CF techniques seem to be equally salient and effective.

To my knowledge, there is only one empirical study that has compared different types of pronunciation-focused CF in a meaning-oriented classroom. In the context of relatively advanced-level Korean learners of English, Gooch et al. (2016) partially replicated Saito and Lyster (2012a) by testing the effectiveness of two different types of CF—recasts vs. prompts (a combination of clarification requests [*pardon?*] and elicitation [*can you say that again?*])—for speech development. The primary motivation of the study was to examine the role of positive evidence in speech development (recasts = positive and negative evidence; prompts = negative evidence only). In addition, the classroom interactions were video-recorded to provide additional data for more qualitative/online analysis.

While quantitative analysis revealed similar performance between the two CF groups, analysis of the video-recorded data revealed that the participants reacted differently to recasts and prompts. Whereas the recast group showed more attention to using more targetlike English [r] by repeating the instructor's model pronunciation, the prompt group produced a high percentage of hybrid forms containing elements of both Korean [r] and English [r], arguably because they were pushed to modify their errors while lacking a model of the targetlike form. In short, the findings suggest that the effectiveness of pronunciation-focused CF can be attributed to both positive and negative evidence.

## Types of Target Features

Many scholars have stressed that L2 pronunciation teaching syllabi should focus on those pronunciation features which most affect comprehensibility and intelligibility<sup>1</sup> (Isaacs et al., 2017)—a position concordant with the opinions of many teaching professionals as well (Baker & Burri, 2016). In Derwing et al.'s (1998) oft-cited study, adult ESL learners demonstrated more gains from explicit instruction (including CF treatment) focused on L2 suprasegmentals (word and sentence stress, intonation) than from that on L2 segmentals. The authors attributed the relative effectiveness of suprasegmental-based instruction to the general observations among researchers that L2 suprasegmental accuracy is more directly linked to listeners' understanding of L2 speech (see also Kang et al., 2010 for cross-sectional evidence).

With respect to pronunciation-focused CF, Saito and Lyster (2012b) surveyed an instructor who was asked to provide CF selectively to Japanese learners' English [r] or English [æ] during four hours of meaning-oriented instruction. Although pretest-posttest results found that students improved regardless of the target of instruction, the instructor pointed out that it was more difficult to correct English [æ] than English [r]. This was because the students' mispronunciation of the former sound was not as salient nor as detrimental to communication as that of the latter. Extending Baker and Burri (2016) and Derwing et al. (1998), the results of Saito and Lyster (2012b) suggest that pronunciation-focused CF could be a beneficial pedagogic activity, especially when it targets pronunciation errors which greatly affect L2 comprehensibility and intelligibility.

Similar observations have been reported for morphosyntax, with the noticeability of target features determining whether and how CF can be facilitative of SLA. CF studies in this domain have focused on the acquisition of relatively easy/simple (English past tense, *-ed*) vs. difficult/complex (English comparative, *-er*) features (Ellis, 2007), and the acquisition of exemplar- (regular past tense) vs. item-based (irregular past tense) features (Yang & Lyster, 2012). These studies have shown that the effectiveness of CF (regardless of its degree of explicitness) is particularly strong when target features are easy and salient (e.g., irregular past tense). For more difficult and complex features, it may be necessary to rely on more explicit CF which contains metalinguistic information.

### How Should We Expand Pronunciation-Focused CF Research?

Compared to grammar, vocabulary and pragmatics CF studies, there still exists much room for research on the complex relationship between CF and L2 speech learning. To close, I would like to suggest several topics worthy of future investigations, including (a) the relationship between CF-efficacy and cognitive and social individual differences; (b) the inclusion of multiple outcome measures to assess the efficacy of CF; and (c) perception-based CF.

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<sup>1</sup> A reviewer pointed out that the distinction between comprehensibility and intelligibility needs to be clarified in this chapter. Comprehensibility (i.e., ease of understanding) has been generally operationalized via rater judgements in existing L2 speech literature (see Derwing & Munro, 2015). Although intelligibility refers to listeners' actual understanding of L2 speech, this construct has been differently analyzed using a wide range of measures without a clear methodological consensus (for a review, Isaacs, 2008). In essence, comprehensibility and intelligibility are two different phenomena. Having said that, in this paper, I use these terms "together" (i.e., comprehensibility and intelligibility). In so doing, I intend to refer readers' attention to one global dimension of L2 pronunciation proficiency in a broad sense (i.e., how much L2 can make themselves successfully understood despite foreign accentedness) (see Saito & Plonsky, forthcoming).

### **Cognitive and Social Individual Differences and CF Effectiveness**

While we have shown in this chapter that providing CF can positively affect L2 pronunciation learning, it should nevertheless be considered and investigated as a multifaceted phenomenon. Indeed, as discussed previously, the effectiveness of pronunciation-focused CF can vary substantially according to a range of independent variables (e.g., learner readiness, explicit phonetic knowledge, types of CF, target features). Among these variables, a growing amount of attention has been given to cognitive and social individual differences. Research in this area has shown that the process and product of L2 speech learning is influenced not only by experience-related factors (e.g., how L2 learners have practiced the target language), but by learner-internal factors as well (e.g., to what extent they are cognitively and socially adept at L2 speech learning).

For example, L2 learners with greater phonemic coding abilities (i.e., analyzing and remembering unfamiliar sounds) have been shown to produce better segmental accuracy in naturalistic (Granena & Long, 2013) and classroom (Saito, 2017) settings. Music aptitude (tonal and rhythmic imagery) also seems to play some role, especially for L2 suprasegmental learning (Li & DeKeyser, 2017). Moreover, whereas the relationship between motivation and acquisition has remained controversial (Moskovsky, Racheva, Assulaimani, & Harkins, 2016), there is some evidence that certain kinds of motivation have an impact on L2 pronunciation learning, especially when the motivation is highly context-specific and strongly associated with L2 learning experience (e.g., Nagle, 2018 for Ideal L2 Self; Saito, Dewaele, & Hanzawa, 2017 for International Posture).

These studies suggest a tentative conclusion that the effectiveness of CF may indeed be mediated by certain cognitive and social individual differences. This conclusion has thus far been supported by grammar-focused CF studies focused on explicit aptitude and explicit CF (e.g., Yilmaz & Granena, 2015; cf. Li, 2013), and on anxiety and CF (Sheen, 2008). Following this line of thought, it would be intriguing for future studies to examine to what degree L2 learners with different aptitude, motivation and emotion profiles can differentially benefit from pronunciation-focused CF.

### **Multiple Outcome Measures**

Many intervention studies have confirmed the effectiveness of instruction for L2 pronunciation development. However, Lee et al.'s (2015) recent research synthesis pointed out a range of methodological limitations in need of attention. Notably, in these primary studies, learner gains have been assessed predominantly via controlled speech tasks (e.g., word and sentence reading), using only lexical items exposed to learners during training. Rather than relying on such assessment methods, the impact of instruction (including CF treatment) should be probed by taking into account the complex, multidimensional nature of L2 speech learning.

To this end, it is worth looking at how L2 speech learning takes place in naturalistic settings. In essence, the initial stage of acquisition is lexically-driven. For example, L2 learners' pronunciation of frequently-occurring words (comprising 90-95% of the lexical items: Adolphs, & Schmitt, 2003) may become easily comprehensible and intelligible, as these words are likely encountered and practiced repeatedly. In their longitudinal study with late L2 learners, Munro and Derwing (2008) found that a substantial amount of learning was observed especially when they were asked to pronounce common rather than infrequent words. The authors claimed that the word frequency factor could predict the extent to which L2 learners can develop "more accurate cognitive representations of the common items" (p. 495).

Once L2 learners increase their vocabulary size beyond the range of these most frequent words, they are forced to attend to fine-grained phonemic discrimination and identification (e.g., [i] vs. [ɪ], [p] vs. [b], [r] vs. [l]). As such, these learners become capable of accurately comprehending and producing speech by drawing on a large lexicon containing many confusing minimal pairs (e.g., “beat” vs. “bit,” “pit” vs. “bit” “read” vs. “lead”). In terms of processing abilities, L2 learners of English have some initial difficulty accessing these newly developed phonetic representations, especially in meaning-focused communication. As L2 learners gain more experience through ample practice opportunities, they can increase their control over their phonetic knowledge so that they can use it more accurately, fluently and automatically.

In light of the sequence of acquisition here, I argue that it is crucial to adopt multiple outcome measures to capture the intricate characteristics of L2 learners’ developing phonetic knowledge. Given that L2 speech learning can be considered as a transition from vocabulary to sound learning, the impact of instruction and CF should be measured by examining the extent to which L2 learners can not only pronounce new sounds with trained lexical items, but also generalize their newly-acquired phonetic knowledge to novel and untrained lexical items not encountered during the training sessions. Additionally, learners’ processing abilities should be analyzed by way of both controlled (e.g., word and sentence reading) and spontaneous (e.g., picture description and oral interview) measures. As has been the case in L2 grammar studies (e.g., Lyster & Saito, 2010), the pedagogical potential of CF should be most salient and obvious when it is assessed via tasks which can best mirror the way L2 is actually used naturalistically (i.e., free constructed responses).

### **Effectiveness of Perception-Focused CF**

Whereas most of the discussion has thus far focused on CF and learners’ pronunciation errors, feedback has been found to be similarly instrumental to acquisition when it targets L2 learners’ perception errors (e.g., Lee & Lyster, 2016a; Logan, Lively, & Pisoni, 1992; McCandliss, Fiez, Protopapas, Conway, & McClelland, 2002; for a meta-analytic review, see Sakai & Moorman, 2018). During such perception-based treatment, L2 learners engage in a range of receptive activities where they are asked to identify and discriminate new target sounds without much pressure to produce them. In many training studies, providing CF (whether their answers are “correct” or “incorrect”) has been a part of the treatment (e.g., Bradlow et al., 1997; Logan et al., 1992). Interestingly, McCandliss et al. (2002) demonstrated that the effectiveness of perception training significantly declined when the participants did not receive any feedback during the treatment.

To further examine the role of CF in L2 perception training, Lee and Lyster (2016a) implemented a range of activities to improve Korean learners’ awareness of the English [i] and [ɪ] contrast. During the treatment, the participants consistently received CF from their instructor on whether they had made errors in perception. The results convincingly supported the benefits of perception-focused CF, as it enabled the learners to successfully restructure, confirm and consolidate their developing phonetic representations in the target language. Lee and Lyster’s (2016b, 2017) follow-up studies further examined the effectiveness of different types of CF on L2 perception development. According to the follow-up research, Korean learners demonstrated the largest and most robust gains when CF specified the target and nontarget forms involved in the error (e.g., “hit” but not “heat”). The authors argued that this combined CF treatment could be considered as the ideal type to strive for, as it allowed L2 learners to compare the phonetic properties of the target phonemic contrast (English [i] vs. English [ɪ]), without having to retrieve

target and nontarget forms from their own memory. In contrast, only indicating the error (e.g., showing “wrong” on the computer screen) turned out to be the least effective strategy, an interesting finding given that this form of perception-focused CF has been frequently employed in previous L2 perception training studies (e.g., Logan et al., 1992).

As discussed earlier, many theoretical accounts have agreed that learners’ performance in perception reflects the current state of their L2 phonetic representations/proficiency, and that perception development can serve as an anchor for any aspect of L2 speech learning (e.g., Flege, 2016). Examining the CF-acquisition link enables researchers to control various elements of input (amount, quality and timing of positive and negative evidence) as independent variables. To further the research agenda on successful L2 speech learning, therefore, it would be experimentally, theoretically and pedagogically reasonable to include examinations of how L2 learners process various types of CF during perception-based training.

### **Conclusion**

According to existing descriptive studies, both teachers and learners equally consider the provision of CF to be a crucial component of L2 pronunciation development, especially when the errors in question hinder successful communication. More recently, a growing number of scholars have investigated the acquisitional value of pronunciation-focused CF by conducting quasi-experimental studies with a pretest-posttest design in both classroom and laboratory settings. Whereas the results have generally shown that pronunciation-focused CF facilitates the development of both segmental and suprasegmental accuracy, the effectiveness of such CF techniques appears to be subject to a great deal of individual variability. Specifically, the potentials of pronunciation-focused CF can be maximized (a) when L2 learners have enough phonetic knowledge, conversational experience and perceptual awareness of target sounds; (b) when CF provides model pronunciation forms (e.g., recasts rather than prompts); and (c) when the target of instruction concerns communicatively important and salient features. A strong call is made for future studies to explore how pronunciation-focused CF can be implemented in the most efficient and effective manner. Such studies could examine, for example, how L2 learners with various motivation, emotion and aptitude profiles can differentially benefit from CF when engaged in various types of training activities (perception vs. production-based training); and when their performance is assessed via multiple outcome measures (tapping into their transition from perception to production; from controlled to spontaneous processing abilities; from vocabulary to sound learning).

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