The Effectiveness of L2 Pronunciation Instruction: A Synthesis of 10 Empirical Studies

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Abstract. The number of studies on effectiveness pronunciation instruction (PI) has been increasing during the past decades and produced mixed results, though most of them reports significant improvements. Moreover, what factors might moderate the overall effectiveness of PI on L2 development and to what extent they function are still unclear. The current study synthesizes 10 representative studies exploring the effect of PI on L2 development, especially the overall effectiveness and roles of focus of PI, type of PI and outcome measures on the overall effectiveness. According to the results, suprasegmental instruction contributes to better phonological production and comprehensibility; form-focused instruction outperforms meaning-focused one in L2 pronunciation learning but the effects of combining different types of FFI is unclear; controlled constructed tasks provide more comprehensibility gains than free constructed one. Possible reasons are summarized along with pedagogical implications.

Keywords: Second language; pronunciation; pronunciation teaching; instructed SLA; research synthesis.

1. Introduction

Pronunciation Instruction (PI), defined as "provision of explicit metalinguistic information about articulatory (how to produce) and/or auditory (how to perceive) aspects of new L2 segmental and suprasegmental features (Saito & Plonsky, 2019: 35), is one of the domains of second language acquisition (SLA) worth exploring, considering that after the advent of Communicative Language Teaching (CLT) pronunciation has been neglected by many teachers with the belief that second language (L2) pronunciation development would be promoted through exposure. But along with the paradigm shift in L2 pronunciation research since 2005, extensive studies spring up to test the instructional effect on L2 pronunciation development (Lee, Jang & Plonsky, 2015). Despite reports of significant improvement in many studies, PI research has produced mixed results (Thomason & Derwing, 2015), leaving the overall effects of pronunciation instruction, part of the interest of the present study, unclear. Possible explanations for the divergent outcomes might be the different substantive and methodological features of those studies (Thomason & Derwing, 2015; Lee et al., 2015), such as context (i.e., classroom vs. laboratory), duration of instruction, focus of instruction (e.g., segmental or suprasegmental), type of instruction (e.g., FonF, FonFS, or FonM), type of outcome measures (i.e., controlled response vs. free response), etc. Therefore, review articles are called for to synthesize the relationship between those variables and PI, which is also another part of interest of the present study.

2. Literature Review

Among the few reviews examining effectiveness of PI, three stand out for larger collection of empirical studies, or inclusion of latest studies, or elaboration of analysis.

By coding and analyzing the 15 selected pronunciation teaching studies according to focus of instruction, type of instruction, and type of outcome measures, Saito's (2012) review shows that

instruction is effective not only for speakers' segmental and suprasegmental improvement, but also for listeners' overall judgement of comprehensibility, though in very few cases improvement was not significant probably due to the "brevity of instruction" and "ceiling effects of learners' initial pronunciation proficiency" (P849). Moreover, the review indicates that type of instruction can affect pronunciation performance at different processing levels, with FonF facilitating pronunciation at both the controlled and spontaneous levels, FonFS, only at controlled levels, while FonM (usually the control group), neither. But the author also pointed out some methodological questions of most studies such as the unclear degree of measurements at a spontaneous level as well as the doubtful effectiveness when adopting human rating method alone. Though based on only 15 studies, which were yet carefully selected, Saito's (2012) review may be the first synthesis to review L2 pronunciation instructional effect. What's more, the synthesis reveals not only overall but the specific effectiveness varying according to three aspects, namely, focus of instruction, type of instruction, and type of outcome measures, which inspires the current study a lot.

Compared with Saito's (2012) review, Lee et al.'s meta-analysis and Thomson and Derwing's narrative review in 2015 were relatively up-to-date and include larger collections of studies, though most of which were the same. Examining both overall effects of PI and potential moderators of those effects among studies over 30 years, Lee et al.'s (2015) meta-analysis sets models of research design for reviews like the present one, including study identification method with explicit inclusion/exclusive criteria and smart searching techniques, coding method with interrater reliability measurement, and analysis method with respective introductions to each research questions. The meta-analysis showed a generally large effect for PI (replicates results of Saito's synthesis in 2012) as well as specific effects for longer interventions (also mentioned in Saito's synthesis), with treatments providing feedback, in more controlled condition. But Lee et al. (2015), as stated in their review, failed to undergo fine-grained analysis of the effects of different types of pedagogical practices, for the simple reason that the Methods sections of many studies being reviewed were too general with few details of instructional materials and activities, based on which the meta-analysis calls for future studies to include greater procedural detail. Though without conclusive findings to one or two factors (e.g., type of instruction) due to the lack of respective details in the selected studies, Lee et al.'s (2015) meta-analysis confirms the general effectiveness of PI revealed by Saito (2012)'s findings, and additionally provide overview of moderators of those effects around different contexts, treatments, and outcomes. Most importantly, this review lightens up the way to design the present study.

Thomson and Derwing (2015)'s narrative review was based on most of the studies surveyed in Lee et al.'s meta-analysis. One of the inspirations is the clarification of an ideal quantitative study. According to Thomson and Derwing (2015), an ideal quantitative study should provide enough detail about participant and procedures (also suggested in Lee et al.'s review in the same year), enough samples, and employ a control group, multiple assessment, and is carried out in classroom context considering individual differences in learning. The findings of this narrative reviews are comprehensive compared with the two reviews mentioned above. In terms of research design, most studies followed Nativenass Principle despite Intelligibility Principle is gradually being emphasized. Classroom-based studies take up a large proportion but still many of them use technology like computers. Besides, segmental features were studied more often than suprasegmental ones, while controlled responses (e.g., reading-aloud tasks) more often than spontaneous speech. Regarding pronunciation instruction and significant improvement, Thomson and Derwing (2015) confidently concluded that explicit instruction of phonological forms can have a significant impact. However, they also suggested that the significant impact is likely because most of studies examined only a very limited subset of pronunciation features in more controlled condition. That is why Thomson and Derwing (2015), together with Lee et al. (2015), call for spontaneous speech as outcome measures in examining effectiveness of PI. Therefore, the present study is also interested in whether or to what extent the empirical studies in this field after 2015 have filled the gap noticed by those reviews.

Previous reviews have reached the consensus that the pronunciation instruction can lead to L2 pronunciation improvement, but the moderators of effects need more careful examination. Besides, those reviews synthesized large number of studies over long period of time and put forward suggestions for future studies. However, the body of research of three reviews consisted of only studies before the year of 2015. There is a need, therefore, for an examination of the state of research in more recent pronunciation teaching after 2015. The research questions for the current synthesis are twofold:

1. What overall effectiveness of L2 pronunciation instruction do the studies show?
2. How is the overall effectiveness of L2 pronunciation instruction moderated by (a) focus of instruction, (b) type of instruction, (c) type of outcome measures?

3. Method

The study identification of the present study includes two steps. First, the searching parameters were determined according to research questions and reference to previous reviews. Four criteria were considered in including a study: (i) it had to be a quantitative empirical study; (ii) its participants were provided with instruction focusing on one or more segmental/suprasegmental features; (iii) the pronunciation performance was measured with a pre-post design; (iv) it was published in 2015 or after. Then, the searches were conducted via major databases including Cambridge University Press, Oxford University Press, Elsevier ScienceDirect, JSTOR, SAGE, ResearchGate (key words: second language, pronunciation, and instruction). Ancestry searches were also conducted by examining the references of the candidate studies (e.g., Gordon, 2021). Endnote (a reference management tool) was used to deduplicate and group the studies. The search led to 10 study reports, published from 2015 to 2021.

The studies were coded twice with an interval of two weeks to ensure interrater reliability. The coding and recoding process were guided by three independent variables: focus of instruction, type of instruction and type of outcome measures (Table 1). First, focus of instruction might be on segmental (i.e., vowels, consonants) and suprasegmental (e.g., stress, rhythm, intonation) dimensions of phonology. Second, instruction was classified as focus on forms (FonFS) when it is provided as presentation of grammar points (Gurzynski-Weiss, Long & Solon, 2017), which refers to phonetic properties in pronunciation teaching context, via mechanical drills and choral repetition without much elaboration (Saito, 2012). In contrast, instruction in a communicative teaching context including no explanation of grammar was coded as focus on meaning (FonM) (Gurzynski-Weiss, et, al., 2017). The way to balance FonFS and FonM might be the term "focus on form (FonF)" coined by Long (1991b), meaning that teachers draw students' attention to linguistic elements which incidentally arise in lessons whose primary focus is meaning. Finally, the effect of PI can be measured via controlled constructed tasks (those with almost fixed response, e.g., reading-aloud task) or free constructed tasks (open-end ones allowing for different response, e.g., picture tasks) (Lee et al., 2015; Zhang & Yuan, 2020).

4. Results and Discussion

4.1 Effects of PI

Regarding Research Question 1 about the overall effectiveness of L2 pronunciation instruction, the significant instructional gains of the 10 studies were examined (see Table 2).

Generally, the results show that interventions, particularly form-focused one, led to (a) no effect on accent reducing, and (b) modest or unclear effect on perception development and speech fluency, but (c) significant effect on production development not solely in segmental and suprasegmental features, but also in speech comprehensibility. The improvement found in the control groups of those studies were negligible, and one failed to collect enough data of the control group due to the

absence of participants in the post-test (Levis & Levis, 2018), making the results of the control group less authentic.

The findings add further evidence to the consensus that pronunciation instruction is indeed effective on the whole (Lee et al., 2015; Saito, 2012; Thomson & Derwing, 2015). Admittedly, at the first glance, the results of the current study are partially in contrary to Saito's (2012) review, with the former observed positive effects of PI in several studies with short-term intervention while the later recognized some cases of ineffective instruction owing to the brevity of instruction and ceiling effects of learners' proficiency. However, none of those primary studies with short-term intervention selected by the current study employed a short-term vs. long-term design to confirm the moderating effect of duration of instruction. Moreover, the short-term intervention gains of those studies were usually showed by suprasegmental acquisition (e.g., Gordon, 2021; Gordon & Darcy, 2016). Previous research defined suprasegmental as more likely to affect comprehensibility immediately than segmental instruction (Levis & Levis, 2018), while the importance of segmental-based instruction is usually revealed in the long run (Derwing, Munro, & Wiebe, 1998). To confirm the effects of intervention duration, future studies are expected.

4.2 Focus of PI

When summarizing the phonological scope of training in those studies, results are as follows: First, seven of the primary studies provided segmental-based instruction, leading to general significant improvement in phonetic production or speech comprehensibility. In five exceptional cases segmental-based instruction gave rise to little pronunciation improvement, but no obvious pattern seemed to emerge as their represented a mix of controlled and spontaneous measures, accuracy of phoneme production and speech comprehensibility, form-focused instruction with versus without feedback. The rest two studies suggested opposite results: Olson & Offerman's (2016) study finds Spanish consonants (e.g., /p, t, k/) were improved by form-focused instruction with visual feedback only for more continuous and spontaneous speech and the gains measured by short, controlled utterances were limited, while in Zhang & Yuan's (2020) study segmental group made little statistically significant progress in comprehensibility at the spontaneous level. Second, six of the selected studies focused on suprasegmental features and revealed overall effectiveness on pronunciation development. There are only two exceptional cases, which arrived at nothing in common, with Levis & Levis (2018) found no effect of suprasegmental-based instruction on speech fluency at the spontaneous level, whereas Gordon (2021), no effect on accentedness. Finally, three studies involved both segmental and suprasegmental, either by including several individual aspects of speech at the same time (e.g., stress, intonation plus 4 vowels) or taking segmental and suprasegmental features as two global aspects. Zhang & Yuan's (2020) effect sizes showed little different between segmental and suprasegmental features in comprehensibility at the controlled level. Nevertheless, at the spontaneous level, the effect of PI on suprasegmentals was much larger than on segmentals. Lee et al. (2020) indicated an advantage in immediate gains following suprasegmental-based instruction over segmental-based. Gordon & Darcy (2016) found only suprasegmental-based instruction brought about comprehensibility improvement on controlled tasks.

This finding replicates the results of Saito & Plonsky's (2019) meta-analysis, and also complements Saito's (2012) review, which did not find any clear patterns as for focus of instruction. Two major reasons might be responsible for the less comprehensibility gains obtained by the segmental groups. First, segmental features need more time to develop, as mentioned above (Derwing et al., 1998; Gordon & Darcy, 2016). Second, segmental features are not so global as suprasegmental features, and instruction on one or several segmental features is less likely to contribute to immediate general speech comprehensibility. It is quite challenging for students to transfer segment-based skills to a spontaneous production which requires resource allocation to lexical, syntactic and discourse monitoring rather than sole phonological accuracy (Derwing et al., 1998).

4.3 Type of PI

Control groups of four primary studies only participated in the pre- and post-test without receiving any treatment, apart from the normal educational lessons such as reading, writing class. Instruction for those control groups was marked as "No PI" (Lee et al., 2020; Levis & Levis, 2018; Olson & Offerman, 2016; Zhang & Yuan, 2020). None of the "No PI" groups yielded any significant gains, whether of segmental or suprasegmental features, at a controlled or spontaneous level.

The remaining treatment was coded into three categories: focus on mean (FonM), focus on forms (FonFS) and focus on form (FonF). First, FonM instruction is adopted only in control groups in two studies as participants took communicative lessons without instruction on the target forms. No FonM groups produced significant gains. Second, two studies provided FonFS instruction to the experimental groups, one of which indicated positive effect on both control and free tasks outcome (Lee et al, 2020), while the other denied comprehensibility improvement measured by controlled tasks (Zhang & Yuan, 2020). Finally, FonF instruction was provided in eight studies in control groups and/or experimental groups and was rated as effective particularly to segmental acquisition, and in controlled response. Only two studies presented exceptions wherein FonF-only as control groups produced somewhat negligible effects (Gooch et al, 2016; Lee & Lyster, 2016). Four studies combined FonF with different types of feedback and task-based instruction, but the conflicting results arrived at no obvious pattern. One study combined FonF and FonFS as treatment and equally their experimental groups outperformed the control groups of "No PI" (Levis & Levis, 2018). The combination FonF and task-based instruction in one study reveal significant gains only in comprehensibility and fluency on suprasegmentals measured by spontaneous tasks (Gordon, 2021), but with a research focus on complexity of task, both the control and experiment groups employed FonF+TBI, leaving the present study hesitated to make any judgement about effectiveness of form-focused instruction combined with task-based one. No studies compared the effect of FonF vs. FonFS instruction.

In line with the previous research, the results of the current study also display the advantage of form-focused instruction (FFI) and suggest that FFI yields more L2 pronunciation development than FonM instruction, but the effectiveness of FFI combined with certain types of feedback is conflicting. One of the interpretations of the results is that FFI fits pronunciation teaching better than meaning-focused instruction. For example, Saito & Saito (2017) found the experimental group, which received FFI on stress, rhythm and intonation followed with meaning-oriented lessons aimed at improving presentation skills, advanced more in suprasegmental acquisition and comprehensibility than the control group, which received meaning-oriented lessons for presentation skills but lacking any focus on the target suprasegmentals. This echoes one of the SLA researchers' present consensuses that "meaning-focused instruction alone may not be sufficient to ensure success in L2 learning (e.g., Norris & Ortega, 2000) and that it should be complemented with form-focused instruction (Saito & Saito, 2017:2)". Another way of interpretation is to consider the question: Are some types of FonF more effective than others? Saito (2012) summarized three major instructional options of FonF, namely, focused tasks, corrective feedback, and explicit instruction. The review (Saito, 2012) also called for future studies to tease apart and compare FonF instructional options. As response to the call, many scholars began to assess the most efficient combination to large gains in L2 pronunciation, and the 10 selected studies involved various types of pedagogical techniques of FFI in the classroom (see Table 1), such as corrective feedback, explicit instruction, and combination with task-based instruction (TBI). However, conflicting results are displayed by these experimental groups receiving FFI combined with different elements. Saito (2015) and Lee & Lyster (2016) suggested positive effects of FonF+CF (corrective feedback) on segmental acquisition, the gain of which, in contrast, is negative in Gooch et al.'s (2016) study at the spontaneous level after FFI+recast instruction, and in Olson & Offerman's (2016) study at a controlled level after FonF+visual feedback instruction. It might be that whatever form it is given in,

FonF does not impact learners as much as what the learner does with the corrective feedback, because "Corrective feedback is hypothesized to facilitate acquisition if learners first notice the correction and second, repair their own erroneous utterance" (Sheen & Ellis, 2011: 602). But still, future research on whether or how FFI combined with a certain option facilitates L2 pronunciation is worthy.

4.4 Type of outcome measures

The results of the synthesis identified a balance between controlled and spontaneous assessing tasks, as well as a balance between specific and global assessing goals. One the one hand, seven out of the ten studies employed both controlled-response tasks and free-response tasks, while two studies employed only controlled tasks, and one study, only free tasks. Controlled production tasks in those studies were usually in form of identification task, reading-aloud task, sentence-repetition task, while the free-response tasks were carried out as picture-description task or spontaneous speech. On the other hand, with respect to the aspects being measured, six studies measured the production development of target linguistic forms, either segmental or suprasegmental; five studies measured speech proficiency, with comprehensibility in five studies, fluency in two, and accentedness in one; two studies measured L2 pronunciation perception. Only one study compared the impact of instruction on both global and specific aspects of L2 proficiency. According to the body of research, controlled constructed tasks witness more gains than free constructed ones and comprehensibility advanced more often than fluency and accent.

The reason for the increasing number of studies measuring general speech performance, such as comprehensibility, fluency and accentedness, may the emphasis of Intelligibility Principle upon Nativeness Principle. The two principles later developed into a tripartite distinction among accent, intelligibility, and comprehensibility (Munro & Derwin, 1995). Accent means how different a pattern of speech sounds to a local variety, while intelligibility is defined as the among of utterance understood by the listener, and comprehensibility, the extent to which an utterance can be understood (Derwing & Munron, 2009). Nativeness is difficult to acquire for L2 learners, thus the pedagogical suggestion is that teachers set more realistic goals of improving intelligibility and comprehensibility (Thomson & Derwing, 2015) and learners pay more effort to phonological forms that can greatly improve communication efficiency.

5. Conclusion

By synthesizing 10 empirical studies, the current study is in favor of the consensus that pronunciation instruction is effective to L2 development, and the overall effects are influenced by three moderators. First, suprasegmental instruction contributes to better phonological production and comprehensibility than segmental ones, because segmental phonemes need more time to develop, and they are individual features rather than global. Second, form-focused instruction outperforms meaning-focused one in L2 pronunciation learning but the effects of combining different types of FFI is unclear. Third, comprehensibility rates higher in controlled conditions than in spontaneous ones, and than fluency and accentedness-reducing.

Given these findings, L2 pronunciation teaching will be more effective if teachers (a) instruct on both segmental and suprasegmental features, (a) employ form-focused instruction to trigger phonological awareness of learners in a communicative context with a primary focus of meaning, and (c) set more achievable goals like comprehensibility rather than native-like accent.

Acknowledgement

Table 1. Overview of the 10 selected studies

	Participants	Focus of PI	Duration	Outcome measures	Type of PI
Saito (2015)	49 ESL learners 2 NS teachers 10 NS baseline	seg. /ɪ/	4 hours over 2 weeks	perception test (forced identification) CR (word-reading) FR (picture-description)	FonM (CG) FonF-only FonF+CF
Gooch et al. (2016)	22 ESL learners 5 NS listeners	seg. /ɪ/	4 hours	CR (word-reading) FR (picture-description)	FonF-only (CG) FonF+recast / FonF+prompt
Gordon & Darcy (2016)	3 ESL classes 10 NS listeners	supra. seg. (4 vowels)	4 hours over 3 weeks	CR (sentence-repetition)	FonF-nonexplicit (CG) FonF-explicit (seg.) FonF-explicit (supra.)
Lee & Lyster (2016)	32 ESL learners 21 NS speakers	seg. /i/-/ɪ/	5 hours	CR (forced identification)	FonF-only (CG) FonF+CF
Olson & Offerman（2016）	24 L2 Spanish learners	seg. /p, t, k/	8 weeks	CR (reading-aloud) FR (picture-naming task)	No PI (CG) FonF+visual feedback
Saito & Saito (2017)	20 ESL learners 4 NS listeners	supra. (stress, rhythm, intonation)	3 hours over 6 weeks	CR (reading-aloud)	FonM (CG) FonF
Levis & Levis (2018)	13 ESL learners 20 NS speakers	supra. (contrastive stress)	3 weeks	FR (picture-description task)	No PI (CG) FonF + FonFS
Lee et al. (2020)	115 ESL learners	seg. as global supra. as global	2 weeks	CR (reading-aloud) FR (picture-naming, translating)	No PI (CG) FonFS (perception-based) FonFS (production-based)
Zhang & Yuan (2020)	90 ESL learners	seg. 12 phonemes supra. 6 features	18 weeks	CR (sentence-reading) FR (spontaneous speech)	No PI (CG) FonFS (seg.) / FonFS (supra.)
Gordon (2021)	67 ESL learners	Supra. as global	3 weeks	FR (spontaneous speech)	FonF+TBI

Note. PI, pronunciation instruction; ESL, English as second language; NS, native speakers; CR, controlled response; seg., segmental; supra., suprasegmental; FR, free response; FonF, focus-on-form; FonM, focus-on-meaning; FonFS, focus on forms; CG, control group; CF, corrective feedback, TBI, task-based instruction

Table 2. Summary of effectives of PI

	Type and focus of PI	Outcome measures	Effect
Saito (2015)	FonF-only (seg.)	CR	○
		FR	○
		Perception	○
	FonF+CF (seg.)	CR	○
		FR	○
		Perception	×
Gooch et al. (2016)	FonF+recast (seg.)	CR	○
		FR	×
	FonF+prompt (seg.)	CR	○
		FR	○
Gordon & Darcy (2016)	FonF-explicit (seg.)	CR (comprehensibility)	×
	FonF-explicit (supra.)	CR (comprehensibility)	○
Lee & Lyster (2016)	FonF+CF (seg.)	CR	○
Olson & Offerman (2016)	FonF+visual feedback (seg.)	CR	×
		FR	○
Saito & Saito (2017)	FonF (supra.)	CR	○
		CR (comprehensibility)	○
Levis & Levis (2018)	FonF+FonFS (supra.)	FR (comprehensibility)	○
		FR (fluency)	×
Lee et al. (2020)	FonFS (seg.)	CR	○
		FR	○
		Perception	○
	FonFS (supra.)	CR	○
		FR	○
		Perception	○
Zhang & Yuan (2020)	FonFS (seg.)	CR (comprehensibility)	○
		FR (comprehensibility)	×
	FonFS (supra.)	CR (comprehensibility)	○
		FR (comprehensibility)	○
Gordon (2021)	FonF+TBI (supra.)	FR (comprehensibility)	○
		FR (fluency)	○
		FR (accentedness)	×

Note. PI, pronunciation instruction; CR, controlled response; seg., segmental; supra., suprasegmental; FR, free response; FonF, focus-on-form; FonM, focus-on-meaning; FonFS, focus on forms; CF, corrective feedback, TBI, task-based instruction.

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