USING AN INDUCTIVE APPROACH TO TEACH PRONUNCIATION

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Considering the significant role that intelligible pronunciation plays in successful second language (L2) communication, it is important to find new avenues that allow pronunciation instruction to become a regular component in L2 classes. A promising method is an inductive approach to teach pronunciation. This approach encourages learners to detect patterns and work out rules for themselves before practicing the target feature in the L2. The teacher acts as a facilitator, providing materials that guide this discovery process. The inductive approach stands in contrast to the more traditional, deductive approach whereby the teacher presents and explains a rule. Research suggests that—while admittedly a little more time-consuming—a major advantage of the inductive approach is that learners are more active in the learning process rather than being passive recipients, which leads to longer maintenance of learning gains. Using an inductive approach in SLA is not new; however, in the past, it has primarily been used in grammar instruction, not for teaching pronunciation. The present teaching tip fills this gap by demonstrating how to design materials for pronunciation training following the inductive approach.

BACKGROUND

In L2 research, the terms *deductive* and *inductive* are often used to describe approaches of teaching grammar (see Ellis & Shintani, 2014). In a deductive presentation, learners are presented with an explanation of the target structure, and typically also with examples to illustrate its form, meaning, and use. In an inductive approach, learners are presented with examples aimed at helping them work out rules for themselves, usually with some guidance from the teacher. Some researchers refer to this approach as "guided induction" (Cerezo et al., 2016; Leow, 2019) or "guided inductive instruction" (Lai et al., 2020; Moranski & Zalbidea, 2022). These terms emphasize the important role of the teacher when grammatical structures or other language features are taught inductively.

Most empirical studies comparing the effectiveness of the deductive and the inductive approach in the context of grammar acquisition show that learners who learn inductively perform better on posttests than learners who learn deductively (e.g., Cerezo at al., 2016; Haight et al., 2007; Tammenga-Helmantel et al., 2016; Zhuang, 2019). For example, in Cerezo et al.'s (2016) study, beginning second language (L2) learners of Spanish received either guided induction on Spanish *gustar* structures, deductive instruction, or no instruction. Results revealed that while both instruction groups improved, the guided induction group improved more overall, especially on productive assessment measures. Moreover, the guided induction group performed better on delayed posttests, indicating that guided induction resulted in better long-term retention than deductive instruction. Similarly, Haight et al.'s (2007) study indicated that using an inductive approach to teach various grammatical structures to beginning L2 learners of French was more effective than using a deductive approach. Like Cerezo et al. (2016), Haight et al. (2007) also found that the inductive approach leads to greater long-term retention of grammatical structures.

In addition to empirical studies examining the effectiveness of the deductive and the inductive approaches for the acquisition of grammar, several studies have compared the two approaches in other areas, including vocabulary (Lee & Lin, 2019; Tsai, 2019), pragmatics (Glaser, 2016; Takimoto, 2008), and alphabet or character acquisition (Bown et al., 2007; Lai et al. 2020). Like grammar acquisition, the majority of these studies show an advantage for inductive instruction. For instance, Tsai (2019) found that the inductive approach was more effective for vocabulary acquisition and Glaser (2016) and Takimoto (2008) both found that it was more effective for the development of pragmatic competence. Moreover, Bown et al. (2007) reported that the inductive approach was more beneficial for Cyrillic alphabet acquisition, and Lai et al.'s (2020) study revealed that it was more beneficial for semantic radical development in Chinese character processing.

There are a few studies that found either no differences between the deductive and the inductive approach (Lee & Lin, 2019) or a slight edge of the deductive approach over the inductive approach (Moranski & Zalbidea, 2022). Several variables may influence the effectiveness of each approach, such as learner proficiency or the nature of the linguistic target. In addition, researchers have operationalized deductive and inductive instruction differently in various studies. In summary, however, we argue that the existing research on the effectiveness of inductive and deductive instruction supports inductive instruction over deductive instruction. The main reason for the advantage of inductive instruction is that it promotes deeper cognitive processing (Leow, 2019; Leow et al., 2016). In addition, researchers have argued that the inductive approach is more motivating for learners (Ranta & Lyster, 1997), which may also result in more favorable learning outcomes. The goal of the present teaching tip therefore is to provide the reader with some ideas of how to teach L2 pronunciation by employing an inductive approach rather than the more traditional deductive approach.

HOW TO TEACH L2 PRONUNCIATION INDUCTIVELY

As outlined above, for the inductive teaching approach, learners are presented with examples that they then use to identify a rule or pattern in the input. This does not mean that the instructor plays no role, but rather, that it falls on the instructor to provide targeted, structured input that makes it possible for the learners to identify rules in the examples. Keeping this in mind, it becomes apparent that the inductive approach particularly lends itself to teaching pronunciation features that are rule-based. Importantly, that means that this method is not the right fit to teach *all* aspects of L2 pronunciation, but it is a good fit for several targets in most languages, for example, for teaching the complementary distribution of the *ich-* and the *ach-*sound in German or of voiced /z/ vs. voiceless /s/ in English, the *liaison* in French, or the change of *y* to *e* and *o* to *u* in Spanish. However, it would not be the best fit, for instance, to teach a new L2 sound from scratch, where the focus might rather be on explaining where in the mouth the sound is produced, modeling tongue placement or the degree of lip rounding, etc. In the following, we will outline the different steps in developing an inductive pronunciation training by using two German pronunciation targets as examples. These are materials that we have developed and successfully used in several L2 German classes. They should be seen as an example of or an inspiration for how to design materials for pronunciation training in *all* L2s.

We are providing two, rather than one, examples of inductive pronunciation training below because we aim to show that while they follow a similar basic order, different types of activities are possible and should be chosen based on the pronunciation target. That is, we present activities for two different pronunciation features that impede intelligibility in L2 German: (1) the German *ich-* and *ach*-sounds and (2) German <ei> and <ie> phoneme-grapheme-correspondence.

(1) The *ich-* and *ach*-sounds (the palatal fricative [ç] vs. the velar fricative [x]) appear in complementary distribution in German, with the *ich*-sounds following front vowels and the diphthongs /ɔɪ/ (German <eu>) and /aɪ/ (German <ei>), and the *ach*-sounds following back vowels and the diphthong /aʊ/ (German <au>). L2 German students usually do not know, however, what a front or back vowel is, so this distribution is generally taught by explaining in which vowel environment each sound is produced. For example, students would be taught to pronounce the *ich*-sound after seeing <i> etc., but to pronounce the *ach*-sounds after seeing <u> etc. Our experience has shown that students do much better at applying and retaining these rules when they discover them for themselves, which is in line with the literature discussed above (Cerezo at al., 2016; Haight et al., 2007; Tammenga-Helmantel et al., 2016; Zhuang, 2019).

(2) German <ei> is pronounced as /aɪ/ and German <ie> is pronounced as /i:/. At first glance, that should not cause problems for L1 English learners of L2 German because both /aɪ/ and /i:/ are sounds in the English language, but the phoneme-grapheme-correspondence causes constant problems due to the incongruity with English <ei> as in *rece**i**pt* (pronounced as /i:/). This frequent pronunciation error significantly impedes intelligibility in L2 German and can break down communication. Since it is a rule-based phenomenon, it lends itself to instruction with the inductive approach.

Step 1: Targeted Audio Input

The first step in designing pronunciation materials that follow the inductive approach is to provide learners with targeted audio input; that is, examples either in the form of recordings or the instructor modeling the pronunciation of certain words or phrases. These targets have to be carefully chosen to allow learners to identify the pronunciation rule. Specifically, with respect to the example of the German *ich-* and *ach*-sounds, the instructor would present at least one word each containing the relevant vowels or diphthongs preceding <ch> by playing a recording of these words and asking learners to decide whether they hear the *ich-* or the *ach*-sound in each of those words. In Figure 1, we provide an example of what that can look like. For German <ie> and <ei>, on the other hand, fewer examples could be provided because this particular pronunciation rule can be identified with less input—seeing that it is less complex than the rule for the complementary distribution of [ç] and [x] (see Figure 1 again). Instead, learners could additionally be prompted to repeat what they hear, directing their attention to the phoneme-grapheme-correspondence, which should help them with Step 2 (see below). Importantly, before moving on to the next step, we encourage the instructor to compare the results of this first activity with the entire group of learners to ensure that the learners can find the rule in the next step. For instance, for the *ich-ach*-sound activity it would be important to make sure that all learners correctly identified the respective sounds in the examples so that they can look at the vowels and diphthongs preceding <ch> to identify the underlying rule in Step 2.

Figure 1.

Examples for enriched audio input activities

1) Was hören Sie? Kreuzen Sie an. What do you hear? Please mark your selection.

	wie in „ach" [x]	wie in "ich" [ç]			wie in „ach" [x]	wie in "ich" [ç]
(1) Nacht	X		(7) möchte			
(2) nichts		X	(8) rechts			
(3) kochen			(9) Sachen			
(4) Kuchen			(10) Bauch			
(5) Bücher			(11) leuchten			
(6) sprechen			(12) weich			

1) Hören Sie und sprechen Sie nach. Please listen and repeat what you hear.

1.1) Pre**i**se anb**ie**ten

1.2) kl**ei**ne Industr**ie**

1.3) v**ie**l W**ei**n

1.4) Arb**ei**t produz**ie**ren

Note. Instructions in green serve as a translation of the German materials for the reader. They were not included in the original materials.

Step 2: Guided Rule Discovery

After completing Step 1, learners should be ready to tackle the process of identifying underlying rules. The instructor's role here is to guide the learners in finding these rules. Figure 2 provides examples of what this process can look like. For the complementary distribution rule (i.e., for the *ich-* and *ach*-sounds), for instance, the instructor would guide learners' attention to the vowel sounds and diphthongs preceding <ch> in each word. The learners are then prompted to identify each vowel or diphthong that triggers <ch> to be pronounced as either [ç] or [x] and write down the spelling of these vowels and diphthongs to complete the rule. For a phoneme-grapheme-correspondence like <ie>-<ei>, the rule discovery process could instead focus on a contrastive comparison with English orthography. Figure 2 shows how learners are first guided to discover the discrepancy between English and German pronunciation of written <ei>, followed by a second step in which German <ie> and <ei> are directly contrasted. Learners can complete this step alone or collaboratively.

Figure 2.
Examples for guided rule discovery.

2) Ergänzen Sie die Regel. Please fill out the gaps below to get the rules.

> Nach den Vokalen ____, ____, ____ und nach dem Diphthong ____ klingt „ch" wie in „ach" [x].
> After the vowels ____, ____, ____ and after the diphthong ____ "ch" sounds like it does in the word "ach" [x].

> Nach den Vokalen ____, ____, ____ , ____, ____ und nach den Diphthongen ____ und ____ klingt „ch" wie in „ich" [ç].
> After the vowels ____, ____, ____ , ____, ____ and after the diphthongs ____ and ____, "ch" sounds like it does in "ich" [ç].

2) Vergleichen Sie mit dem Englischen. Compare German and English.

Wie spricht man „ei" in diesen englischen Wörtern?
How would you pronounce „ei" in these English words?

rec**ei**pt   c**ei**ling

Wie würde man den Laut im Deutschen schreiben? _____
How would you write this sound in German orthography? _____

3) Was ist richtig? Kreuzen Sie an. Choose the correct statement.

Deutsch „ei" spricht man wie...
Pronounce German „ei" as...

   ○ Englisch *ei* wie in *rec**ei**pt*   ○ Englisch *i* wie in *ride*
   ○ English *ei* as in *rec**ei**pt*   ○ English *i* as in *ride*

Deutsch „ie" spricht man wie...
Pronounce German „ei" as...

   ○ Englisch *ei* wie in *rec**ei**pt*   ○ Englisch *i* wie in *ride*
   ○ English *ei* as in *rec**ei**pt*   ○ English *i* as in *ride*

✋ Denken Sie an deutsch „Bier" → englisch „beer". Es hat den gleichen Laut!
Think of the German word "Bier" → "beer" in English. That's the same sound!

Note: Instructions in green serve as a translation of the German materials for the reader. They were not included in the original materials.

Step 3: Application of the Rule: Practice Phase

The guided rule discovery phase as outlined in Step 2 is followed by a final practice phase in which learners are prompted to use the newly identified rule. It is recommended that the instructor ensures that the rule was properly identified in Step 2, so that it is correctly practiced in Step 3. The

instructor could do so by asking the learners to verbalize the rule. Figure 3 provides an example of what the practice phase can look like. For the *ich-ach*-sound, for instance, learners could be prompted to apply the rule identified in Step 2 by underlining all occurrences of the *ach*-sound and by circling all occurrences of the *ich*-sound in a poem (adapted from Hirschfeld et al., 2022; see Figure 3). They would then listen to the poem so that they can check their answers. Afterwards, learners could be prompted to read the poem out loud in partner work and to correct each other's pronunciation of <ch> when necessary while using the rule they identified before. For <ie> and <ei>, learners could be prompted to listen to four minimal pairs that differ in meaning simply by use of /iː/ (German <ie>) or /aɪ/ (German <ei>). This activity not only allows learners to practice the rule and reinforce the newly learned phoneme-grapheme-correspondence in German, but also demonstrates the importance of correct use of <ie> and <ei> in German because learners see that this sound alone can lead to a completely different meaning of the word.

Figure 3.
Examples for practice activities in order to practice applying the rule.

Note: The "Buchstaben-Pärchen"-poem is adapted from Hirschfeld et. al (2022): http://simsalabim.reinke-eb.de/lektion08/aufgabe_f.html. Instructions in green serve as a translation of the German materials for the reader. They were not included in the original materials.

CONCLUSION

There is no one "best" method of teaching pronunciation, but rather, it is helpful for instructors to have different methods in their pronunciation-teaching-toolbox. The inductive approach can serve as one tool in that toolbox. It is a great fit for rule-based pronunciation instruction and learners seem to genuinely enjoy finding rules and applying them. Most importantly, research on using the inductive approach for other domains of L2 learning—such as grammar—suggests that learners' retention is better when they themselves identified a rule based on structured input as compared to when they were given the rule by their instructor. As such, we hope that this teaching tip can serve as inspiration for how instructors can design a pronunciation training using the inductive approach. We hope to see research in the future investigating whether learners do indeed benefit more from inductive pronunciation training than from deductive pronunciation training, but in the meantime, using the inductive approach will definitely raise motivation to practice pronunciation amongst learners.

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