An assessment of the auditory speech perceptual skills of young Turkish learners of English: perceptual assimilation model

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Abstract

This paper examines the perceptual capacities of Turkish learners of English in differentiating native and non-native consonantal minimal pairs. Both age groups (i.e. four and six-year olds) performed better in word-initial place distinction. The six-year-olds outperformed the four-year-olds for place and voice distinction, whereas the four-year-olds performed better with word-final non-native voice distinctions. This supports the notion of ‘younger is better’, since their perceptual skills are not yet constrained by their first language parameters. This paper will consider the wider linguistic and pedagogical implications of the data, and assess the applicability of the Perceptual Assimilation Model (Best, 1994).

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1. Introduction

Age has been considered an important factor both in first (L1) and second language acquisition (L2). It has been claimed by the Critical Period Hypothesis (CPH) (Lenneberg, 1967) that ultimate attainment is difficult after puberty, both for L1 (e.g. Grimshaw, et al., 1998) and L2 acquisition (e.g. Flege et al. 2005). Nonetheless, there stands to be no clear consensus in relation to the exact age for the CP, with some L2 studies claiming it to be age 12 (e.g. Birdsong, 2006), while others claiming it to be as young as age 6 (e.g. Long, 1990). L2 studies have often shown that age mainly hinders one’s phonetics and phonological skills due to the traces of foreign accent. The main limitation in the previous studies is that it prioritizes L2 learner’s ‘production’ skills as opposed to ‘perceptual’ skills (e.g. Flege et al. ibid).

In relation to Turkish L2 learners of English, there are limited studies which examine learner’s production as well as speech perceptual skills. For instance, Yildiz (2006) examined the acquisition of the English interdental /θ/ by Turkish child and adult learners. Turkish is often regarded as a ‘[t] language’ (e.g. Yavaş 2006) - i.e. [t] replaces the L2 phoneme /θ/. The L2 data in this study was elicited through both spontaneous (i.e. production) and controlled (i.e. perception) speech. In the spontaneous speech observation [t] substitution was common for both child and adult L2 learners. Interestingly, however, [s] substitution was also observed in controlled speech, particularly with child learners. This finding confirms that child L2 learner’s perceptual abilities outperformed the
adult learners, since [s] substitution is phonetically closer to the target phoneme, with both sharing the [+strident] distinctive feature. The study further suggests the possibility that phonetic deafness and incorrect phonetic input are some of the potential factors responsible for the underachievement of the adult L2 learners.

1.1. First language acquisition

All infants in L1 acquisition are automatically born with a perceptual capacity that is especially designed for listening to speech. In other words, speech perception units specific to language are assumed to exist innately in a new born (e.g. Eimas, 1982). Further, according to the Ecological Theory (Gibson, 1979) the infant is biologically pre-adjusted to the ecological niche into which it is born. All humans experience a silent period before starting to produce certain sounds. Newborns respond differently to human voices than to other sounds, they show a desire for the language of their parents over other languages by the time they are two days old, and they can recognize their mother’s voice within a matter of weeks. As of one month of age children start to distinguish among certain sounds. For instance, infants are very sensitive to the vowel contrasts in their L1 by 6 months of age; and also sensitive to their L1 consonant contrasts by 10–12 months (Best & McRoberts, 2003). Perceptual development is concerned with both speech perception as well as the visual perception. In perceptual development infants can differentiate speech sounds as early as 1 to 2 months of age. Contrary, visual capacities are limited in early infancy. Lecanuet (1993) indicated that the auditory activities appear in the matrix in the last three months of pregnancy, when middle ear structures are normally completed. Visual activities on the other hand cannot begin to construct perception until after birth.

The speech sound signal contains a number of acoustic cues that are used in speech perception. Speech sounds that are differentiated by the cues belong to different phonetic categories. For example, one of the most widely used cues in speech is voice onset time (VOT). VOT is a primary cue signalling the difference between voiced and voiceless stop consonants, such as /b/ and /p/. In one of the earliest studies, which were conducted within the VOT framework, Eimas et al. (1971) focused on sound contrasts, including consonantal distinctions. Infant discrimination capacity was shown for voicing distinctions, such as between [ta]/[da] or [pa]/[ba]. The overall research findings indicate that although infants are born with the ability to discriminate the universal set of phonetic distinctions, this ability declines as the L1 develops (e.g. Strange, 1980). The implications of this perceptual limitation through time cannot be dismissed, particularly in relation to L2 acquisition.

1.2. Second language acquisition

The notion of ‘earlier is better’ has been considered a major factor in L2 acquisition and this is also supported by the CPH. According to Penfield & Roberts (1959), a child’s brain is more flexible compared with that of an adult, and before the age of 9 a child is better able to accomplish the ability of learning an L2. Moreover, the auditory perceptual abilities of infants (both in native and non-native context) are at a high level in their early infancy, and they can discriminate a variety of speech sounds (phonemes) that are used not only in a native sound context, but also within non-native sounds (Kuhl et al., 1992). However, as the infant passes the critical period his/her ability to discriminate phonemes becomes language specific and this in return may hinder their L2 perceptual skills.

1.3. Perceptual Assimilation Model

There are several models that can account for speech perception, such as the Perceptual Assimilation Model (PAM) (Best, 1994). The PAM holds that the pronunciation difficulty encountered by L2 learners is determined by perceptual limitations. The PAM indicates that L2 listeners classify L2 sound contrasts into categories according to their similarities and dissimilarities, within the native and non-native sound context (e.g. Pilus, 2003). These classifications signify how the contrasts are assimilated into native categories, whether L2 sounds are perceived as speech or non-speech sounds.
The PAM explains the L2 contrasts under 3 categories (Pilus, ibid: 3): 1) Two-Category (TC): members of the L2 contrast assimilate to two different native categories, that is, one member assimilates to one native category and the other one to another category; 2) Category goodness (CG): each member of the L2 contrast assimilates to the same one native category with one of the members being more deviant from the native sound than the other; 3) Single Category (SC): both L2 phones assimilate to one phoneme in the native category and both are equally deviant from the native sound.

These L2 contrasts are graded according to their degree of contrasts between the L1 and L2 sounds. For instance, if the L2 sounds differ from each other discrimination of the two L2 sounds are possible (TC). If the L2 sounds are similar discrimination is assumed to be moderate (CG). Discrimination in (SC) contrast is predicted to be poor as the two sounds are either equally different from, or similar to the native sound. Discrimination in TC contrast is therefore easier to predict, than CG and SC contrasts.

2. English vs. Turkish Phonology

This study will focus on the discrimination of English consonant minimal pairs by Turkish child L2 learners. Turkish exhibits the following consonants /p, b, m, f, v, t, d, s, z, n, r, l, ğ, ş, j, k, ı, h/, while the consonant inventory of English is the following /p, b, m, f, v, θ, θ, t, d, s, z, n, w, r, l, ğ, ş, j, k, ı, h, ı/. The English consonants in bold are not exhibited in the Turkish phonemic inventory. The phonological final devoicing rule in Turkish is of particularly importance, as this may affect the learner’s perceptual skills and lead to negative transfer, as they may not be able to differentiate word-final voicing contrasts. According to this rule, Turkish does not permit voiced consonants at word-final position, such as /b, d, ı/. For example, the final voiced stop consonant in the Arabic loanword kitab ‘book’ is devoiced in Turkish and modified to kitap.

3. The Study

3.1. Subjects and Instruments

The subjects consisted of ten four-year-olds and ten six-year-olds, thus there were 20 children in total. The four-year-olds consisted of 6 male and 4 female students, while the six-year-olds consisted of 8 male and 2 female students. The data was collected at the student’s school and they were all learning English as a Foreign Language. In this study a read aloud word list was implemented to the subjects (see Table 1 for the target lexical items). The list consisted of twenty minimal pairs which were categorized under voice and place distinctions. The pairs were further grouped under native and non-native minimal pairs, and word-initial and word-final positions.

3.2. Research Questions

Based on the literature review the rationale of this study is to address the following research questions: 1) Which minimal pair distinctions are Turkish child learners of English better at perceiving: place distinction or voice distinction? 2) Are the subjects’ perceptual skills better in word-initial or word-final position for the minimal pairs? 3) To what extent are the perceptual skills of Turkish child learners of English constrained by their L1 perceptual skills? 4) Which age group’s perceptual skills are better? 5) How effective is the PAM in analyzing L1 transfer?

3.3. Results and Discussion

This section will address each research question respectively:
**Question 1.** Which minimal pair distinction are Turkish child learners of English better at perceiving: place distinction or voice distinction?

The findings of the data analysis (see Table 1) indicate that the four-year-olds performed better in word-final position, since they scored 75% for voice distinction within word-initial position, and 78% for the voice distinction within word-final position. Contrary, the six-year-olds scored 91% for voice distinctions within word-initial position, and 72% for the word-final position. The scores reveal that the six-year-olds are better in word-initial position, and least successful in word-final position, as they seem to be sensitive to the Turkish final devoicing rule, thus unable to distinguish [+voice]/[-voice] distinctions in word-final position. The findings for the place distinction reveal that the four-year-olds scored 67% for the word-initial position, and 55% for the word-final position. Contrary to this, the six-year-olds scored 86% for word-initial and 77% for the word-final positions. The general results shows that the six-year-olds are better in place (both initial and final position) and voice distinction (word-initial only), while the four-year-olds perceptual skills are better in word-final voice distinction.

**Question 2.** Are the subject’s perceptual skills better in word-initial (onset) or word final (coda) position of the minimal pairs?

The results show that both age groups are better in place distinction in word-initial position. This is an important finding as it indicates that both age groups rely on visual cues, since they can mimic the appropriate manner. In phonological theory, this is expressed by the Optimality-Theoretic constraint MIMIC-MANNER (Yip, 1993). This indicates the importance of native input for young L2 learners.

**Question 3.** To what extent are the perceptual skills of Turkish child learners of English constrained by their L1 perceptual skills?

As discussed in the first research question, the four-year-olds are better in perceiving voice distinction in word-final position. This finding indicates that the four-year-olds’ L1 parameters, such as the final devoicing rule, is not yet set, as it is with the six-year-olds. This finding is crucial in the examination of age effects in L2 perceptual skills, since L2 acquisition may need to begin earlier than the age of six.

**Question 4.** Which age group’s perceptual skills are better?

The six-year-olds seem to possess better perceptual skills on the whole, and this may be attributed to the fact that they have received more input than the four-year-olds, both in L1 and L2. However, when we considered the role of L1 transfer in question 3, it was found that the six-year-olds were unable to perceive voice distinctions in word-final position, as well as the four-year-olds. Although this is not a longitudinal study, it is possible to predict that the four-year-olds may outperform the six-year-olds in the long-run, both for place and voice distinctions.

**Question 5.** How effective is the PAM in analyzing L1 transfer?

The non-native TC contrast such as /b/-/d/ is perceived better by both age groups. They assimilate /b/ to /t/ and /d/ to /d/ in their L1. CG contrast by contrast indicates that each member of the L2 contrast assimilates to the same category. For instance, the non-native voicing distinctions in word-final position such as /t/-/d/ assimilated to one native phoneme /t/, particularly with the six-year olds (see Table 1). The four-year-olds perceptual skills appeared not to be fully constrained by their L1 phonology, such as the final devoicing rule, thus they are better at CG contrasts. The PAM is useful particularly in addressing research questions 3 (i.e. the role of L1) and 4 (i.e. age effects in L2 acquisition).

### 4. Conclusion and Teaching Implication

The general findings have revealed that the six-year-olds’ perceptual skills are better than the four-year-olds. However, since this is not a longitudinal study, it is difficult to predict if the six-year-olds will be better off in the long-run. The fact that the four-year-olds were better in perceiving non-native word-final voice distinction proves the notion of ‘earlier is better’, thus foreign language education should begin as young as four years old, not six. Moreover, native input should be provided particularly to young learners, since their L1 parameters are not yet set so they can better perceive both native and non-native phonemes. The pedagogical implications of this paper will, we hope, provide new insights to foreign language education specialists.
Table 1. Voice and Place Distinction

<table>
<thead>
<tr>
<th>Gender</th>
<th>4 Year Olds</th>
<th>6 Year Olds</th>
<th>4 Year Olds</th>
<th>6 Year Olds</th>
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References


