RESEARCH ARTICLE

Revisiting Fossilised Pronunciation Errors: An Exploratory Study with Turkish EFL Teachers

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ABSTRACT - Intelligible pronunciation is essential to effective communication in the target language. However, segmental and suprasegmental pronunciation features might pose difficulty at varying degrees for non-native speakers, including Turkish EFL learners. Investigations into this phenomenon might illuminate targeted pedagogical interventions for enhanced learner pronunciation. Since teachers are assessors, evaluators, and mediators of student interaction and involvement in language classrooms, exploring their perceptions might provide practical insights into implementable classroom activities for better learning outcomes. To this end, this mixed-methods study reports on Turkish EFL teachers' perceptions of fossilised pronunciation errors from quantitative and qualitative perspectives. The quantitative data were collected from 40 participants via an online survey, whereas the qualitative data comprised semi-structured interviews with 10 participants. The survey results indicated the prevalence of fossilised pronunciation errors at segmental and suprasegmental levels. The qualitative findings yielded valuable insights into teachers' perceptions and observations of pronunciation errors, their causes and challenges, teaching strategies and methods for tackling them, and recommendations for improvement. Further research is needed to understand fossilised pronunciation errors better from diverse perspectives.

1.0   INTRODUCTION

Many learners aspire to acquire communicative competence in their second or foreign language learning journeys. Despite the manifold dynamics that might be at play, intelligible pronunciation plays a considerable role in effective communication with people from diverse linguistic and cultural backgrounds (Derwing & Munro, 2022). However, it has been reported that pronunciation is challenging for many learners in various educational contexts (Levis & Sonsaat, 2019; Tanner & Henrichsen, 2022). Some reasons cited for its challenge are differences in phonetic inventories between native and target languages, vowel/sound quality, dialectical variations, transfer effects from typologically different languages, lack of exposure/feedback, age/neuroplasticity, and motivation/attitude (Clara, 2013; Gabryś-Barker, 2017; Sardegna et al., 2018; Vančová, 2019). These challenges result in varied pronunciation errors at segmental and suprasegmental errors. These errors might be entrenched in language learners' linguistic inventories when not corrected or remediated (Pennington & Rogerson-Revell, 2019). They may persist even after extensive exposure to the target input, suggesting their fossilisation (Rahal, 2018).

Fossilisation refers to the process in which linguistic mistakes (e.g., grammar and pronunciation) are practiced and cannot be quickly remediated (Wei, 2008). These errors result from the developmental nature of the language learning process. More specifically, language learners develop an interlanguage (IL) by overgeneralising some linguistic rules in the target language and preserving some in their native language (Andersen, 1984). These erroneous generalisations or simplified language rules lead to fossilisation in different language levels, such as grammar, syntax, vocabulary, and pronunciation. Selinker (1972) argued that fossilised linguistic structures, "even when seemingly eradicated" (p. 221), "are still somehow present in the brain, stored by a fossilisation mechanism in an interlanguage" (Demirezen & Topal, 2015, p.794). Accordingly, when language learners perpetually commit the same pronunciation errors, this might indicate phonological fossilisation. Phonological fossilisation poses a significant obstacle to achieving intelligible pronunciation by negatively impacting learners' overall communicative competence (Demirezen & Topal, 2015; Dolan, 2020; Moranski, 2012).

In Türkiye, where English is taught as a foreign language (EFL), many researchers have reported that Turkish EFL learners commit pronunciation errors at segmental and suprasegmental levels (Topal & Altay, 2022; Topal, 2023; Uzun, 2022). The underlying reasons for these errors might be curricular exclusion, instruction knowledge gaps, learner indifference and disinterest, and institutional policies, to name a few (Topal, 2022, 2023; Yagiz, 2018). However, many practicing teachers have noted that language learners repeatedly make the same pronunciation mistakes (Dikilitaş & Geylanioğlu, 2012; Ercan, 2018; Mahzoun & Han, 2019; Turgay, 2021). Some English core sounds that Turkish EFL learners persistently mispronounce are consonants such as /θ/-/t/, /ð/-/d/, /w/-/v/ and vowels such as /æ/-/e/, /ɜ/-/e/, /ɔ/-/aʊ/, /u/-/oʊ/, /æ/-/ʌ/ (Topal & Altay, 2022; Topal, 2023). Several researchers have also reported pronunciation problems of Turkish EFL learners at the suprasegmental level, including primary stress, pitch, juncture, rhythm, intonation, and connected speech (Demirezen, 2009b, 2012; Topal, 2017, 2018a, 2018b 2023; Uzun, 2022; Yurtbaşı, 2015). Reporting

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such pronunciation problems over the years might suggest segmental and suprasegmental fossilisation. In this sense, it is crucial to address these pronunciation errors so that language learners can improve their pronunciation and gradually achieve communicative competence. However, it may require patience, persistence, and targeted interventions.

Previous research on pronunciation in the Turkish context were mostly of diagnostic nature, identifying the problematic sounds for Turkish EFL learners (Arikan & Yilmaz, 2020; Demirezen, 2009, 2012, 2015; Ercan, 2015). Concerning fossilised pronunciation errors (FPEs), Demirezen (2005) explored /v/ and /w/ as fossilised consonants for Turkish EFL teacher trainees. Similarly, Demirezen (2006) investigated [æ] and [ɛ] as fossilised vowels for Turkish EFL teacher candidates. Hişmanoğlu (2007) analysed [ɔ:] and [oʊ] as FPEs for Turkish EFL learners. Demirezen (2008) examined /æ / and /ʌ / as FPEs for Turkish English language teachers. In another study, Demirezen (2009a) tackled /ŋ/ as another fossilised pronunciation error in the teacher education context. Another study revealed that the schwa phoneme (/ə/) posed difficulty for Turks (Demirezen, 2010). Demirezen and Topal (2015) investigated FPEs from the perspectives of Turkish EFL teachers, reporting their willingness to address these features in the classroom. In another study, Demirezen (2022) focused on /ð/ as a fossilised phoneme for Turkish and Indonesian ELT majors. As these studies illustrate, the main focus was on segmental pronunciation features in primarily teacher education contexts, failing to include EFL learners across other education levels (e.g., primary and secondary). Despite abundant research on pronunciation in the Turkish context, research on FPEs was limited to the studies mentioned earlier, requiring further investigation into the issue. Another gap was the inclusion of teacher perspectives into FPEs using mixed-method research. An additional gap in previous research was the lack of comprehensive treatment of FPEs among Turkish EFL learners.

All things considered, it is necessary to outline the state of the FPEs among Turkish EFL learners to design remedial interventions and assist learners in enhancing their FPEs. To this end, this study intended to explore the most common FPEs among Turkish EFL learners, the causes of these errors, how FPEs are handled in classrooms, and pedagogical strategies to tackle them. Therefore, the following research questions will be addressed:

RQ (1): What are the most common FPEs observed among Turkish EFL learners?

RQ (2): What are Turkish EFL teachers' perceptions and observations of FPEs in their classrooms?

RQ (3): What causes do Turkish EFL teachers express for FPEs, and how do they deal with them in their classrooms?

RQ (4): What pedagogical strategies and interventions do Turkish EFL teachers adopt in mitigating the impact of FPEs?

RQ (5): What do Turkish EFL teachers recommend for future research directions on FPEs?

1.1 Conceptual Framework for Fossilisation

Before mentioning the theories related to fossilisation, it is necessary to describe the IL briefly. IL theory proposes that learners of a second language construct a unique linguistic system that shares features of their native and target languages (Selinker, 1972). This system evolves and changes as learners are exposed to the target language input and interact with native speakers. IL may exhibit errors, simplifications, or overgeneralisations as learners navigate this process (Corder, 1975). It is a dynamic system that varies among individual learners and is influenced by factors such as age, prior language experience, motivation, and exposure to the target language (Selinker & Lamendella, 1978).

Several theories might be associated with fossilisation. The Fossilisation Hypothesis (Selinker, 1972) suggests that most English language learners (ELLs) will not reach native-like fluency in their target language, regardless of how much instruction and exposure they receive. According to Selinker (1972), the five percent of ELLs who achieve native fluency have reactivated their cognitive latent language structure, a biological arrangement already formulated in the brain (Lenneberg, 1967). The latent psychological structure, which contains five key processes (i.e., native language transfer, transfer of training, second language learning strategies, second language communication strategies, and overgeneralisation of target language rules), is commonly used by ELLs to transfer native language to the target language, leading to errors in pronunciation. Selinker's (1972) research underscores the relevance and applicability of his findings, making them invaluable for educators and researchers in the field.

The Contrastive Analysis Hypothesis (CAH) by Lado (1957) posits that the biggest obstacle to second language acquisition is the interference of the learner's native language systems on the target language systems (Celce-Murcia et al., 2010; Gass, 2013). Although it has been criticised for being oversimplified and lacking empirical evidence (Gass, 2013; Han, 2004), many linguistic researchers agree that analysing the interference from a learner's native language may be helpful in second language pronunciation acquisition (Celce-Murcia et al., 2014).

The Critical Period Hypothesis (CPH) by Lenneberg (1967) suggests a biologically determined window, typically ending around puberty, during which language acquisition occurs most effectively. According to this hypothesis, attaining a native-like accent becomes more difficult after the critical period. Learners may develop FPEs because they are less capable of adapting to new phonetic patterns beyond this critical period. However, the CPH stresses the significance of targeted and early instruction for pronunciation to reduce the likelihood of fossilisation and assist learners in enhancing their pronunciation abilities.

The Noticing Hypothesis (Schmidt, 1990) is a critical concept in second language acquisition that raises questions about whether learners acquire errors consciously or unconsciously. The hypothesis suggests that conscious awareness through attention is necessary for noticing and learning a second language (Gass, 2013). It emphasises the importance of learners being able to see the difference between their interlanguage and the target language (Gass, 2013). Research has shown that paying attention to and noticing

errors is critical to de-fossilising errors (Brown & Lee, 2015; Tajeddin & Tabatabaeian, 2017). Interactions with instructors, such as recasts and prompts, play a key role in helping learners focus on errors and initiate repair (Brown & Lee, 2015; Gass, 2013).

Han's (2009) Selective Fossilisation Hypothesis (SFH) extensively analyses second language acquisition fossilisation. This hypothesis recognises the influence of the native language and target language input on the learning process and how they interact to shape the interlanguage system. The theory asserts that fossilisation is selective, affects the interlanguage's learning systems, meanings, and functions, and is stimulated by the learner's native language and target language input traits. The SFH sheds light on how fossilisation impacts second language acquisition and how it is affected by the interplay between the learner's native and target languages.

In sum, the highlighted theoretical paradigms explain some of the major theoretical paradigms on which the study is grounded. Selinker's (1972) interlanguage theory reveals that Turkish EFL learners may construct different systems in both languages, and consistent mistakes regarding pronunciation may appear. The Fossilisation Hypothesis (Selinker, 1972) is in line with the study's focus on pronunciation errors, which persist and are, in fact, resistant to explicit exposure and instruction. The CAH (Lado, 1957) points to the possibility of the first language's influence on the second language, so it can also be used to utter Turkish EFL teachers whose features may transfer into the pronunciation of English. The CPH (Lenneberg, 1967) puts a biological argument into play by stating that many of these teachers may be beyond the critical age regarding accent modification. Therefore, errors that they may have developed may be difficult to unlearn. This is underlined by the Noticing Hypothesis, which emphasises the need to bring teachers' attentiveness to their mistakes, a prerequisite for correction. The last is the SFH proposed by Han (2009), which explains why certain types of pronunciation become fossilised while others remain dynamic or open to change. Altogether, these theories constitute the study's approach to investigate FPEs in Turkish EFL learners from teachers' perspectives and provide valuable insights into the phenomenon.

1.2 Fossilised Pronunciation Errors in Second Language Learning

1.2.1 FPEs: A Concise Description

Selinker (1972) termed the concept of fossilisation in the interlanguage of second language learners. Five processes (i.e., language transfer, transfer of training, learning strategies, communication strategies, and overgeneralisation), according to Selinker (1972), "are central to second-language learning, and that each process forces fossilisable material upon surface [interlanguage] utterances, controlling to a considerable extent the surface structures of these utterances" (p. 217), further noting that "combinations of these processes produce what we might term entirely fossilised competences" (p. 217). As Lightbown (1985) added, language "acquisition stops – 'fossilises' – before the learner has achieved native-like mastery of the target language" (p.179).

Fossilisation is classified into two: individual and group fossilisation, wherein the first one pertains to the continuous progress of an individual's development in their IL, while the second refers to a stage where a community language's diachronic development reaches a plateau (Wei, 2008). Fossilisation can also be temporary or permanent (Selinker, 1972). Temporary fossilisation, also known as stabilisation, refers to the phenomenon where learning a new language reaches a plateau, and the development of specific language features is temporarily halted or delayed for varying periods (Wei, 2008). Many researchers have also termed fossilisation differently: 'stabilised errors' (Schumann, 1978), 'typical error' (Kellerman, 1989), 'ingrained errors' (Valette, 1991), and 'cross-linguistic error' (Odlin, 1990).

1.2.2 Types of Fossilisations

Fossilisation may occur at several language levels, from phonological to pragmatic. Grammatical fossilisation, for example, describes a situation in which learners of second language (L2) learners continue to make the same grammatical errors or use incorrect patterns even after being exposed to the language extensively and receiving instruction on it (Selinker, 1993). The persistent misuse of third-person singular -s can be an example of grammatical fossilisation. Syntactic fossilisation, on the other hand, occurs when learners continue to make errors or show an incomplete understanding of specific syntactic structures even after being exposed to the target language for a prolonged period (Selinker, 1993). This fossilisation can be exemplified by some EFL learners' perpetual use of the present progressive tense for habitual actions. Semantic fossilisation occurs when second-language learners consistently misuse words, phrases, or grammar structures despite extensive exposure to the language (Geng & Jin, 2024). Some EFL learners commit collocational errors by continuously using "make a meal" instead of "cook a meal." Pragmatic fossilisation occurs in second language acquisition when learners consistently misinterpret or misuse pragmatic language aspects (e.g., discourse markers and turn-taking) despite extensive exposure to the target language (Trillo, 2002). For example, a learner may not be aware that frequently interrupting a speaker is considered rude or disruptive in the target language culture, leading to pragmatic fossilisation in case of its perpetual use. Last, phonological fossilisation describes the persistent occurrence of pronunciation mistakes in an L2 due to the influence of the first language (L1) during the learning process (Tarone, 1980). For example, Turkish EFL learners tend to pronounce "think"/θɪŋk/ as "tink" /tɪŋk/ since the "th"/θ/ is not present in their phonetic inventories.

1.2.3 The Causes of Fossilisation

Regarding the causes of fossilisation, Selinker (1972) asserted that five central processes trigger fossilisation in an IL. These processes are language transfer, transfer of training, learning strategies, communication strategies, and overgeneralisation. Language transfer, also known as cross-linguistic influence, refers to the process by which learners' L1 knowledge impacts L2 acquisition and use (Wang, 2013). To illustrate, learners from a specific culture that value direct communication may have difficulty adjusting to the indirect communication style of another culture, leading to pragmatic fossilisation by consistently misusing overly direct language. Transfer of training is the process of utilising the skills, knowledge, or behaviours acquired in one situation and applying them to another

(Fernández, 2021). For instance, individuals who have learned to develop vocabulary in their native language through the direct translation method may use literal translations while learning vocabulary in a new language.

Effective learning strategies are essential for acquiring a new language. Still, if not used properly, they can cause interlingual fossilisation, limiting language proficiency and making it difficult to express complex ideas or engage in advanced discourse (Han, 2013). Communication strategies are methods that language learners use to convey meaning and overcome language barriers. Though beneficial, they can sometimes lead to interlingual fossilisation if overused or misused (Han, 2004). For instance, relying heavily on fillers (e.g., "*uh*" and "*um*") or repeating words or phrases can become habitual speech patterns and negatively impact the learner's ability to communicate effectively. Language learners often make the mistake of applying rules from their native or previous language learning experiences to the new language, leading to persistent errors or incomplete mastery of the target language structures (Han & Selinker, 2005). English learners accustomed to consistently conjugating verbs in their mother tongue may mistakenly try to use the same pattern for irregular verbs in English (e.g., *bringed* instead of *brought*).

1.3   Research on FPEs in Turkish and Non-Turkish Contexts

The earliest study on FPEs dates back to 1980s, when Acton (1984) proposed an approach to dealing with such relatively permanent pronunciation errors. Chela-Flores (1997) examined FPEs in relation to rhythm (as one of the suprasegmental features) and addressed the rhythmic differences in English and Spanish. Premarathne (2018) tackled the causes of FPEs for Sri Lankan learners of English. In the Algerian context, Yakout and Amel (2019) analysed /θ/ and /ð/ as potential FPEs. In her thesis, Dolan (2020) recommended specific tools to de-fossilize FPEs for ESL learners. Rahal and Smaoui (2020) studied FPEs in the Tunisian context in relation to the Selective Fossilisation Hypothesis and concluded the existence of FPEs for Tunisian EFL learners. Uddin (2021) examined /e/ as a fossilised pronunciation error among Bangladeshi learners of English. In her descriptive study, Lovenia (2021) found that the external factors (i.e., absence of corrective feedback, lack of input, reinforcement from linguistic environment, lack of instruction, lack of communicative relevance, lack of written input, quality of input, and instruction) proposed by Han (2003) were the case for FPEs among Indonesian EFL learners. In a recent study, Ardini et al. (2022) conducted a comparative study, exploring FPEs at segmental and suprasegmental levels for Javanese English learners. Likewise, Aryati et al. (2023) reported that (/ə/, /i/, /ɒ/) and (/z/, /v/, /θ/, /dʒ/, /tʃ/) were fossilised vowels and consonants for Indonesian EFL learners. A more recent study by Aredidon et al. (2024) examined FPEs in relation to intelligibility among elementary mentor teachers in the Filipino context.

In the Turkish educational context, the studies by Demirezen (2009, 2010, 2012, 2015) and others (Topal & Altay, 2022; Topal, 2023) have focused on identifying fossilised pronunciation errors (FPEs) in Turkish EFL teacher trainees and candidates. These errors include consonants such as /v/ and /w/, vowels like [æ] and [ɛ], as well as other phonemes like /ŋ/ and /ə/. However, these studies have primarily targeted segmental pronunciation features within teacher education contexts, neglecting EFL learners across different education levels. Additionally, there is a gap in the existing research regarding the perspectives of Turkish EFL teachers on addressing FPEs and the comprehensive treatment of these errors among Turkish EFL learners. Further investigation is needed to bridge these gaps.

2.0   METHODOLOGY

2.1   Design

The study employs a convergent parallel design that combines qualitative and quantitative research methods within a single study (see Figure 1) to comprehensively analyse the research question (Creswell & Creswell, 2018). The quantitative strand focuses on gathering data through an online survey that aims to identify the common FPEs at segmental and suprasegmental levels, while the qualitative strand employs a semi-structured interview with a subset of the respondents to gain a deeper understanding of the EFL teachers' perceptions and classroom applications of FPEs. Additionally, the study uses the literature review as a complementary method (Onwuegbuzie & Frels, 2016). This way, the study aims to achieve data triangulation (Patton, 2015) (i.e., online survey, semi-structured interview, and literature review) to enhance the reliability and validity of research outcomes.

Figure 1

The study's workflow diagram
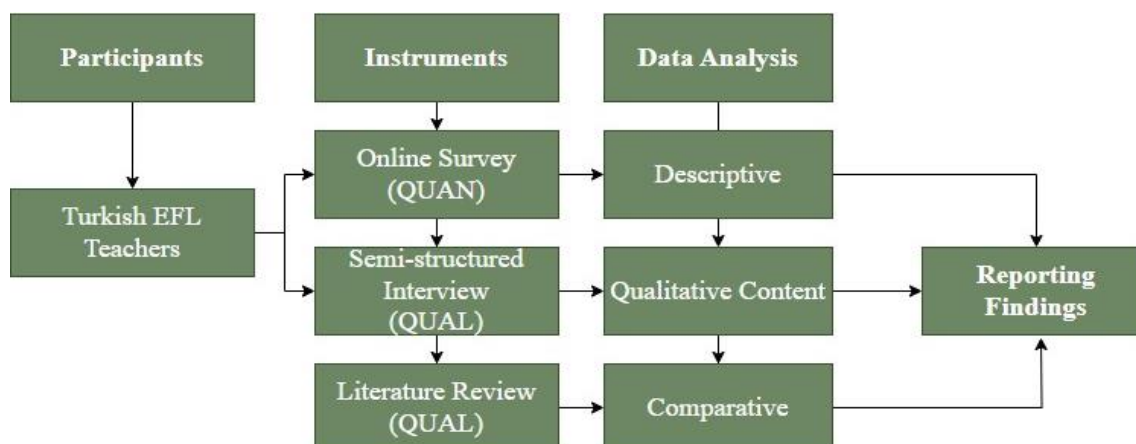
2.2   Participants

The participants encompassed a diverse cohort of Turkish EFL teachers, reflecting varied demographics and professional backgrounds. Among the 10 (five males, five females) participants engaged in semi-structured interviews, a balanced gender representation was maintained, with their age ranging between mid-20s and late-50s. Professionally, the cohort included a mix of experienced and novice teachers, with backgrounds spanning from university-level instruction to private language institutes. Additionally, data from an online survey supplemented the qualitative interviews, providing a broader context with 40 participants (21 females, 19 males) contributing their perspectives on FPEs within the Turkish EFL teaching landscape.

2.3   Data Collection

Two primary methods were used to collect data for this study. First, an online survey (Appendix A) was conducted with 40 participants to assess their views on common fossilised segmental and suprasegmental pronunciation errors. The survey items were adapted from previous research (Demirezen, 2008; Dikilitaş & Geylanioğlu, 2012; Ercan, 2018; Swan & Smith, 2001) and websites (e.g., tedpower.co.uk and boldvoice.com) to identify the most common pronunciation errors. Participants ranked these errors using a 5-point Likert scale (where 1= Never a problem and 5=Always a problem), providing numerical insights into how frequent and severe these challenges are.

Second, semi-structured interviews (Appendix B) were conducted with 10 Turkish EFL teachers to explore their views on the subject. These interviews aimed to reveal the teachers' perceptions and observations of FPEs, perceived causes and challenges, strategies to overcome FPEs, and recommendations for handling FPEs and directions for future research. By combining these data collection methods, the study intended to gain a comprehensive understanding of the research topic from quantitative and qualitative perspectives. Relevant literature was reviewed complementarily to supplement and contextualise the collected data.

2.4   Data Analysis

The online survey's quantitative data were analysed descriptively through IBM SPSS 25 to determine the frequency and ranking of segmental and suprasegmental pronunciation errors as perceived by the participants. The most common FPEs among Turkish EFL teachers were identified by tabulating and averaging the 5-point Likert scale responses. The qualitative data from the semi-structured interviews underwent thematic analysis (Clarke & Braun, 2016) using MAXQDA 24 (VERBI, 2024) software program to identify recurring themes related to perceptions, causes, challenges, teaching strategies, future directions, and recommendations. MAXQDA 24 is a versatile software for qualitative and mixed-methods research, offering the reassurance of managing, coding, and analysing various data types, including texts, audio, video, and images (Niedbalski & Ślęzak, 2022). Its features include advanced coding systems, data visualisation tools, qualitative and quantitative data integration. Researchers choose MAXQDA for its user-friendly interface and comprehensive analytical tools (Kuckartz, 2010). The software's capability to combine diverse data formats strongly supports researchers (Kuckartz, U., & Rädiker, 2022). Users can import files (texts, multimedia) to input data, code content for thematic analysis, and use visual tools to interpret and present findings effectively. Combining the quantitative and qualitative findings aimed to provide a comprehensive understanding of FPEs, offering practical implications for language teaching and learning.

The survey was pre-tested with a small group of participants (n=15) to ensure the reliability of the findings, and Cronbach's alpha was computed (α=.90) to measure internal consistency, yielding a good reliability coefficient (Taber, 2018). Additionally, member checking (Lincoln & Guba, 1985) was employed by sharing the interview findings with participants to validate the accuracy of interpretations. The survey and interview results were corroborated with findings from the literature review, ensuring a comprehensive and robust understanding of FPEs among Turkish EFL teachers.

3.0   RESULTS

This section presents the quantitative and qualitative findings, respectively. The quantitative findings comprise descriptive statistics about the segmental and suprasegmental pronunciation features that Turkish EFL teachers considered potentially fossilised. On the other hand, the qualitative findings consist of participants' perceptions of FPEs (e.g., causes of FPEs, challenges to overcome them, strategies to tackle them, and recommendations for handling them).

3.1   The Quantitative Data

As Table 1 presents, Turkish EFL teachers believed segmental FPEs were problematic for learners at varying levels, between seldom and frequent. More specifically, the perceived FPEs at the segmental level, according to the Turkish EFL teachers, were "/t/-/d/" (M=3.98), "/əʊ/-/aʊ/ " (M=3.98), and "/θ/-/ð/" (M=3.93). Put differently, the participants stated that these sounds, diphthongs, and consonant clusters frequently posed difficulty for learners. On the other hand, the participants opined that discriminating "/ʊ/-/u:/" (M=2.70) and "/l/" (M=2.70) sounds were rarely problematic for their learners. The participants were also asked about learners' additional segmental pronunciation errors they commonly encountered. The obtained responses indicated problems with voiced-voiceless sounds, long-short vowels, silent letters, irregular verb pronunciation, and inflectional endings.

Table 1

Descriptive statistics on segmental FPEs

Statements on Segmentals	M	SD
Discrimination of "/θ/" and "/ð/" sounds (e.g., "think" and "this")	3.93	.810
Discrimination of "/w/" and "/v/" sounds (e.g., "whale" and "veil")	3.60	.490
Discrimination of "/æ/" and "/e/" sounds (e.g., "bad" and "bed")	2.98	.768
Discrimination of "/t/" and "/d/" sounds (e.g., "mad" and "mat")	3.98	.768
Discrimination of "/ʊ/" and "/u:/" sounds (e.g., "book" and "pool")	2.70	.464
Discrimination of "/əʊ/" and "/aʊ/" diphthongs (e.g., "hose" and "house")	3.98	.768
Discrimination of "/ɪ/" and "/i:/" sounds (e.g., "pill" and "peel")	3.35	.917
Discrimination of "/ɒ/" and "/ɔ:/" sounds (e.g., "shot" and "short")	2.98	.768
Discrimination of "/s/" and "/z/" sounds (e.g., "rice" and "rise")	3.70	.464
Discrimination of "/tʃ/" and "/ʃ/" sounds (e.g., "watch" and "wash")	3.68	1.18
Discrimination of "/ɬ/" and "/l/" sounds (e.g., "lentil" and "dental")	2.70	.464
Pronunciation of the "ng" /ŋ/ sound (e.g., "flamingo" and "belonging")	3.75	.506
Pronunciation of the schwa "/ə/" sound (e.g., "awake" and "toward")	3.03	.784
Pronunciation of consonant clusters (e.g., "street" and "instant")	3.98	.768

According to Turkish EFL teachers, the challenge suprasegmental FPEs pose for learners varies seldom and frequently, as illustrated in Table 2. In particular, pitch ranges (M=4.00), intonation (M=4.00), and sentence stress/rhythm (M=3.93) were problematic for learners at the suprasegmental level. However, according to the participants, junctures (M=2.00) posed the slightest difficulty for learners. The participants also reported that stress in compound nouns and phrasal verbs was challenging for learners.

Table 2

Descriptive Statistics on Suprasegmental FPEs

Statements on Suprasegmentals	M	SD
Problems with pitch ranges (e.g., high pitch for I'm going to Harvard, not Yale!)	4.00	0.815
Problems with word stress (e.g., PHOtograph and phoTOgraphy)	3.00	0.815
Problems with sentence stress and rhythm (e.g., The kids are at the park)	3.93	0.797
Problems with contrastive stress (e.g., "with sugar or without sugar?")	3.00	0.815
Problems with juncture (e.g., "the blackbird" vs. "the black bird")	2.00	0.815
Problems with intonation patterns (e.g., falling intonation in statements)	4.00	0.815
Problems with connected speech (e.g., "he asked" more like "heyasked")	3.00	0.815

3.2 The Qualitative Data

Ten English teachers working in different institutions (e.g., public and private schools) with an average of 7.5 years of teaching experience were asked about their opinions in English on the FPEs for deeper understanding. Rather than focusing on whether the teachers had previous training in pronunciation, the researcher selected teachers from diverse teaching contexts to include different teaching experiences with students regarding FPEs. In this sense, the teachers were not homogeneous in terms of pronunciation training. In parallel to their different working environments, the significance of pronunciation varied according to these teachers. Among the responses were effective communication, fluent and natural speech, confidence boost in speaking, better comprehension, successful interactions in different contexts (e.g., international business), better test scores, and overall language proficiency.

The codes that emerged after thematic analysis were grouped into four major themes: perceptions and observations, causes and challenges, teaching strategies and support, and future directions and recommendations. The participants provided varied responses regarding their perceptions and observations of FPEs in their classroom experiences, reflecting the differences in their teaching experiences. These responses can be grouped into three subcategories: segmentals, suprasegmentals, and prevalence of FPEs. First, all participants voiced the prevalence of FPEs among their students to varying degrees. Second, participants expressed the prevalence of FPEs at segmental and suprasegmental levels among their students. More specifically, they voiced the difficulty of individual sounds, such as /ɪ/-/i:/, /v/-/w/, and /θ/, along with diphthongs, consonant clusters, and voiced-voiceless consonants. Third, the participants reported intonation patterns, stress misplacement, and intelligibility as a challenge at the suprasegmental level. Relevant excerpts in verbatim are displayed in Table 3 below.

Table 3

Teachers' perceptions and observations of FPEs

Category	Excerpt
Prevalence of FPEs	• *In my experience, fossilised pronunciation errors are quite prevalent among my students (T1)*
	• *Fossilised pronunciation errors are prevalent among my students, especially with sounds that do not exist in Turkish (T7)*
	• *Fossilised pronunciation errors are prevalent in my classroom, particularly among intermediate and advanced learners (T10)*
Segmental	• *Many Turkish EFL learners struggle with the correct pronunciation of unstressed syllables, often reducing them or inserting schwa sounds where they do not belong (T9)*
	• *One common pronunciation error I have noticed among Turkish EFL learners is the difficulty in distinguishing between /ɪ/ and /iː/, leading to mispronunciations in words like "sit" and "seat" (T1)*
	• *Many Turkish EFL learners tend to struggle with consonant clusters, such as pronouncing "strength" /streŋθ/ as "strenk" /strenk/ (T3)*
Suprasegmental	• *Many of them struggle with certain sounds and intonation patterns, which persist despite repeated correction and practice (T1)*
	• *I often notice students misplacing word stress, particularly in longer words or compound nouns. For example, saying 'airplane' with stress on the second syllable instead of the first (T4)*
	• *Despite targeted instruction, certain errors seem to persist and affect students' overall fluency and intelligibility (T10)*

The participants' responses to the second theme can be categorised into four causes of FPEs: linguistic, educational, psychological, and contextual. Regarding the linguistic factors, participants reported that Turkish phonology, intonational differences between Turkish and English, and a lack of understanding of the phonetic symbols might contribute to developing FPEs among learners. Concerning the educational factors, participants held that limited exposure to authentic input, a lack of targeted instruction and feedback, and inadequate teacher training that includes pronunciation teaching methods may foster the persistence of pronunciation errors. Regarding the psychological determinants, participants asserted that FPEs could be impacted by the age of acquisition, motivational factors, and cultural attitudes toward making mistakes. Regarding the contextual factors, one participant noted limited outside-the-class opportunities for authentic communication that could stimulate FPEs among learners. Relevant teacher responses are presented in Table 4 below.

Table 4

Teacher responses concerning the causes of FPEs

Category	Excerpt
Linguistic	• *I believe the influence of Turkish phonology is a significant factor. Turkish and English have different phonological systems, making it challenging for learners to accurately produce English sounds (T1)*
	• *The influence of Turkish intonation patterns on English pronunciation is significant. Turkish has its own unique intonation patterns, which can affect the rhythm and stress of English (T5)*
	• *The lack of awareness and understanding of English phonetic symbols among students can hinder pronunciation improvement. Without knowledge of phonetic symbols, students struggle to identify and correct pronunciation errors (T10)*
Educational	• *Limited exposure to authentic English input is a major factor. Many students only encounter English in the classroom, which may not reflect real-world pronunciation (T2)*
	• *Lack of targeted pronunciation instruction and feedback contributes to fossilisation. Students need explicit instruction and regular feedback to correct pronunciation errors (T3)*
	• *Inadequate teacher training and professional development in pronunciation teaching methods contribute to fossilisation. Teachers need specialised training to effectively teach pronunciation (T9)*
Psychological	• *Age of acquisition can be a factor. Younger learners may be more adaptable and able to correct pronunciation errors compared to older learners (T4)*
	• *Fossilisation can also be influenced by motivational factors. Students who are less motivated to improve their pronunciation may be more prone to fossilisation (T5)*
	• *Cultural attitudes towards making mistakes and being corrected can influence pronunciation development. In some cultures, making mistakes is stigmatised, leading to avoidance of pronunciation practice (T6)*
Contextual	• *Limited opportunities for authentic communication in English outside the classroom contribute to fossilisation. Without regular practice in real-world contexts, students' pronunciation may not improve (T7)*

Turkish EFL teachers were also asked about the challenges of dealing with the FPEs among learners. The thematic analysis suggested three subcategories: teaching strategies/techniques, educational resources/materials, and individual/psychological factors. Regarding the first subcategory, participants stated that they were challenged by pronunciation-focused instruction, building self-monitoring skills and pronunciation awareness among learners, learner engagement, creating a supporting learning environment, encouraging extracurricular activities, and curricular integration. Concerning the educational resources/materials, participants expressed the difficulty of acquiring effective pronunciation teaching materials and quality professional development opportunities. In the third subcategory, teachers voiced the difficulty of breaking established pronunciation habits and addressing individual differences in pronunciation. Further remarks are shown in Table 5 below:

Table 4

The challenges faced by teachers in overcoming FPEs

Category	Excerpt
Teaching strategies/techniques	• *The main challenge is breaking established pronunciation habits. Many students are resistant to change and find it difficult to correct pronunciation errors once they become fossilised (T1)*
	• *Maintaining consistent focus on pronunciation throughout the course is challenging. With so much to cover, pronunciation often takes a backseat in lesson planning (T2)*
	• *Students often lack awareness of their pronunciation errors. Building students' self-monitoring skills and awareness of pronunciation issues is a continuous challenge (T5)*
	• *Engaging students in pronunciation practice can be challenging, especially when they don't see immediate improvement or relevance to their goals (T6)*
	• *Creating a supportive and encouraging learning environment where students feel comfortable making and learning from mistakes is crucial but challenging (T7)*
	• *Encouraging students to engage in extracurricular activities or self-study to practice pronunciation outside the classroom is challenging (T8)*
	• *Integrating phonetic training into the curriculum and helping students become familiar with phonetic symbols is challenging due to time constraints and competing priorities (T10)*
Educational resources/materials	• *Finding effective teaching materials and resources specifically focused on pronunciation is difficult. There's a lack of comprehensive and engaging materials tailored to Turkish EFL learners (T3)*
	• *Access to quality professional development opportunities focused on pronunciation teaching is limited, making it difficult to stay updated on best practices (T9)*
Individual/psychological factors	• *Addressing individual differences in phonological perception and production is challenging. Some students struggle more than others due to cognitive or hearing differences (T4)*

The participants' responses to the pronunciation teaching strategies and support were grouped into six subcategories: audio-visual support, interactive activities, feedback and assessment, curricular integration, physical activities, and technological support. Turkish EFL teachers maintained that they benefitted from the audio-visual support, including minimal pairs, mouth diagrams, podcasts, radio programs, songs, videos, and minimal pairs. The teachers also stated that interactive/engaging activities, such as role-plays, pronunciation games, and quizzes, were part of their lessons. In addition, individualised written feedback and suggestions were provided to learners. Furthermore, pronunciation was incorporated into listening and reading lessons. Physical activities, such as tongue twisters and rhymes, were also included in their teaching practice. Moreover, teachers exploited technology, such as pronunciation apps and online resources, in their pronunciation classes. Additional teacher remarks are demonstrated in Table 5.

Table 5

Pronunciation teaching strategies used by teachers

Category	Except
Audio-visual support	• *I use minimal pairs exercises to help students distinguish between similar sounds. I also incorporate pronunciation drills and repetition exercises (T1)*
	• *I use visual aids like mouth diagrams to demonstrate correct mouth and tongue positions for specific sounds (T2)*
	• *I encourage students to listen to podcasts, radio broadcasts, and songs in English to expose them to authentic pronunciation (T10)*
Interactive activities	• *We also practice pronunciation through role-play activities and dialogues (T6)*
	• *We also do pronunciation games and quizzes to make learning fun (T7)*

Category	Except
Feedback and assessment	• *I provide written feedback on students' pronunciation errors and offer specific suggestions for improvement (T6)*
	• *I encourage students to record themselves speaking and compare their pronunciation to native speakers (T3)*
Curricular integration	• *I incorporate pronunciation into everyday lessons by emphasising intelligible pronunciation during speaking activities and discussions (T4)*
	• *I incorporate pronunciation into listening and reading activities by focusing on phonetic features and word stress (T8)*
Physical activities	• *I use tongue twisters and rhymes to practice specific sounds and intonation patterns (T5)*
	• *We also practice pronunciation through tongue placement exercises and mouth shaping activities (T9)*
Technological support	• *I use pronunciation apps and online resources to supplement classroom instruction (T7)*

Turkish EFL teachers were further asked about recommendations for pronunciation improvement. The thematic analysis revealed seven subcategories: interactive approaches, technological integration, curricular enhancement, professional development, assessment, instruction, and learner support/autonomy. The teachers recommended that pronunciation courses must include more interactive approaches (e.g., more interactive and communicative activities, and shadowing/mimicry exercises), integrate technology (e.g., interactive and technology-integrated approaches, pronunciation apps, and online resources), reflect an enhanced curriculum (e.g., authentic, real-world materials, and integrated pronunciation instruction), use standardised assessment tools (e.g., standardised pronunciation assessment tools and benchmarks), and include phonetic instruction (e.g., explicit instruction on phonetic symbols and transcription). Teachers also declared that professional development opportunities for pronunciation teaching must be provided, as well as a supportive learning environment and resources for self-directed practice for better learning outcomes. They claimed that following these recommendations might help mitigate FPEs. Additional remarks are provided in Table 6.

Table 6

Teachers' recommendations for pronunciation improvement

Category	Excerpt
Interactive approaches	• *I would like to see more interactive and technology-integrated approaches in pronunciation instruction (T1)*
	• *Incorporating more interactive and communicative activities focused on real-life communication situations can help students apply pronunciation skills in authentic contexts (T5)*
	• *Encouraging learners to actively listen to and imitate native speakers through shadowing and mimicry exercises can help them internalise correct pronunciation patterns (T9)*
Technological integration	• *Incorporating multimedia resources and pronunciation apps could make learning more engaging and effective (T1)*
Curricular enhancement	• *I believe incorporating more authentic, real-world materials into the curriculum would be beneficial. Exposing students to various accents and speech patterns can help them adapt to different communication contexts (T2)*
	• *Integrating pronunciation instruction throughout the curriculum, rather than treating it as a separate component, could help students see the relevance and importance of pronunciation in real communication (T4)*
Professional development	• *Professional development opportunities focused specifically on pronunciation teaching would be valuable for EFL teachers. Enhancing teachers' knowledge and skills in this area can lead to better pronunciation outcomes for students (T3)*
Assessment	• *Developing standardised pronunciation assessment tools and benchmarks can provide clearer guidance for teachers and students alike, helping to set achievable goals and track progress (T6)*
Instruction	• *Incorporating more explicit instruction on phonetic symbols and transcription can help students better understand and produce English sounds accurately (T8)*
Learner support/autonomy	• *Creating a supportive learning environment where students feel comfortable practicing and making mistakes is essential for effective pronunciation instruction (T7)*
	• *Promoting learner autonomy by providing students with resources and strategies for self-directed pronunciation practice can empower them to take ownership of their learning (T10)*

As part of the last theme, the participants' recommendations for further research coincided with their recommendations for pronunciation improvement. More specifically, the participants suggested that prospective researchers might explore the impacts of technology, diverse English accents, teacher training programmes, integrated pronunciation instruction, communicative pronunciation teaching approaches, phonetic instruction, shadowing techniques, classroom environment and learner attitudes, and learner autonomy on mitigating FPEs. The teachers also suggested developing and validating standardised pronunciation assessment tools specific to Turkish EFL learners.

4.0   DISCUSSION

This study explored the current state of FPEs among learners from the perspectives of Turkish EFL learners. FPEs are crucial to examine in different educational contexts because persistent pronunciation errors may (i) cause communication breakdowns and impede natural speech (Nguyen & Hung, 2021; Wang & Wen, 2023), (ii) undermine learners' confidence to engage in spoken interactions by causing anxiety (Ha, 2023; Syed & Hussein Abdelrady, 2021), contribute to foreign accented speech, potentially leading to stereotypes and biases (Levis, 2018; Winke & Gass, 2013), (iii) restrict learners' linguistic abilities in diverse contexts by limiting their communicative competence (Jarosz, 2019), (iv) require teachers to adapt their teaching materials and strategies in overcoming them (Alghazo, 2015; Çetin, 2015), (v) act as a barrier to achieving language proficiency if remained unaddressed for longer periods (Tiwari, 2024). Given this significance, this study addressed the issue from quantitative and qualitative aspects.

The quantitative results indicated the prevalence of FPEs among learners at the segmental and suprasegmental levels. Segmentally, discriminating and pronouncing sounds such as /t/-/d/, /θ/-/ð/, and /əʊ/-/aʊ/ were perceived frequent errors made by students, as found in earlier research (Ercan, 2018; Mahzoun & Han, 2019). However, discerning sounds such as /ʊ/-/u:/ and /ɫ/-/l/ were identified as infrequently problematic, coinciding with earlier studies (Şen, 2019). Further responses revealed that voiced-voiceless sounds, long-short vowels, silent letters, irregular verb pronunciation, and inflectional endings posed persistent challenges for learners, concurring with previous studies (Arikan & Yilmaz, 2020; Kkese, 2019; Kurt, 2019; Nangimah, 2020).

Suprasegmentally, Turkish EFL teachers reported the perceived difficulty of pitch, intonation, and sentence stress/rhythm, as reported previously (Demirezen, 2015; Topal, 2017, 2018a). Previous studies revealed that juncture phonemes were challenging for language learners (Topal, 2017, 2018; Yurtbasi, 2017). However, junctures were considered to pose an insignificant challenge in our study. Additional responses indicated that stress in compound nouns and phrasal verbs was also troublesome for learners, as revealed in earlier work (Demirezen, 2021).

The qualitative results supported the quantitative finding and provided a deeper insight into Turkish EFL teachers' perceptions of the FPEs. Thematically, teachers' perceptions and observations suggested the prevalence of FPEs at the segmental and suprasegmental levels. Also, teachers attributed the causes of FPEs to linguistic (e.g., native-target phonologies), educational (e.g., teaching strategies), psychological (e.g., age and motivation), and contextual (e.g., limited opportunities) factors. These responses coincide with previous research (Demirezen & Topal, 2015) and theoretical bases such as the CAH (Lado, 1957), critical period hypothesis (Lenneberg, 1967), affective filter hypothesis (Krashen, 1982), and SFH (Han, 2009). Additionally, teachers' remarks on the challenges faced in overcoming FPEs were grouped into teaching strategies/techniques (e.g., pronunciation-focused instruction, building self-monitoring skills), educational resources/materials (e.g., the difficulty of obtaining effective pronunciation teaching materials and quality professional development opportunities), and individual/psychological factors (e.g., the challenge of breaking established pronunciation habits and addressing individual differences). Previous researchers supported these arguments with their findings (Choi, 2021; Murphy, 2017).

Moreover, Turkish EFL teachers reported using audio-visual support, interactive activities, feedback and assessment, curricular integration, physical activities, and technological support in dealing with FPEs. These teaching strategies and methods were also cited previously (Martínez Zambrano, 2022; Nishio & Joto, 2022; Pennington & Rogerson-Revell, 2019), thus coinciding with our study. The recommendations for tackling FPEs indicated similarity with how teachers handled these errors in their classrooms. More precisely, teachers suggested interactive approaches, technological integration, curricular enhancement, professional development, assessment, instruction, and learner support/autonomy to deal with FPEs, coinciding with previous work (Martínez Zambrano, 2022; Nishio & Joto, 2022; Pennington & Rogerson-Revell, 2019).

Furthermore, teachers offered recommendations for future research on the topic. Previous studies already attended to teachers' suggestions (e.g., the impacts of diverse English accents, teacher training programs, integrated pronunciation instruction, communicative pronunciation approaches, phonetic instruction, shadowing techniques, classroom environment and learner attitudes, and learner autonomy on overcoming pronunciation errors) (Brinton, 2018; Jahara & Abdelrady, 2021; Ellis, 1994; Kurt, 2019; Meritan, 2020; Mora Viveros, 2022), indicating that teachers are divorced from the international literature. However, similar studies may be conducted to explore the effects of these issues on FPEs in the Turkish context.

In summary, quantitative and qualitative findings iterated the persistence of pronunciation errors among Turkish EFL learners, which can potentially be treated as FPEs. The results also suggested the importance of a comprehensive approach to teaching pronunciation to Turkish EFL learners, which should cover both segmentals and suprasegmentals since both pronunciation features were found to influence intelligibility (Gordon & Darcy, 2022; Levis & Silpachai, 2022). Language teachers and educators should tailor their teaching strategies and incorporate these areas into the curriculum design, instructional practices, and professional development programmes to effectively address the learners' difficulties with English pronunciation. This approach may help learners overcome persistent pronunciation errors and improve their intelligibility and overall pronunciation proficiency.

5.0   CONCLUSION

Adopting a mixed-methods approach, this study explored the views of Turkish EFL teachers on FPEs. The quantitative findings revealed the persistence of segmental and suprasegmental pronunciation errors. Similarly, the qualitative findings supported the quantitative results, indicating teachers' perceptions of FPEs. Survey and interview data iterated the prevalence of FPEs among Turkish EFL learners, suggesting the urgency for targeted and remedial pronunciation instruction. Although teachers' views concurred with previous studies, initiatives must be launched to familiarise teachers with the international research agenda by which the gap between research and practice may be closed.

The study recognises some limitations and, therefore, offers some recommendations. First, more classroom research must be conducted to reveal teacher practices concerning FPEs. In conjunction with this, prospective research may exploit classroom observations and reflective journals to provide insights into how teachers tackle FPEs. Second, cross-sectional studies may be conducted to reach numerous participants from all over Türkiye for better population representation. Third, future researchers might address teachers' recommendations, such as exploring the impact of different variables (e.g., learner differences, motivation, and instructional methods) on mitigating FPEs.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR(S) CONTRIBUTION

Ibrahim Halil Topal (Methodology; Investigation; Visualisation; Writing - original draft; Writing - review & editing)

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APPENDIX A: Online Survey

FOSSILISED PRONUNCIATION ERRORS SURVEY FOR TURKISH EFL TEACHERS

Instructions: Please evaluate the following pronunciation errors commonly made by Turkish EFL learners on a scale from 1 to 5, where 1 = Never a problem, 2=Rarely a problem, 3=Sometimes a problem, 4= Often a problem, and 5 = Always a problem.

Statements	1	2	3	4	5
Segmental Level					
Discrimination of "/θ/" and "/ð/" sounds (e.g., "think" and "this")					
Discrimination of "/w/" and "/v/" sounds (e.g., "whale" and "veil")					
Discrimination of "/æ/" and "/e/" sounds (e.g., "bad" and "bed")					
Discrimination of "/t/" and "/d/" sounds (e.g., "mad" and "mat")					
Discrimination of "/ʊ/" and "/u:/" sounds (e.g., "book" and "pool")					
Discrimination of "/əʊ/" and "/aʊ/" diphthongs (e.g., "hose" and "house")					
Discrimination of "/ɪ/" and "/i:/" sounds (e.g., "pill" and "peel")					
Discrimination of "/ɒ/" and "/ɔ:/" sounds (e.g., "shot" and "short")					
Discrimination of "/s/" and "/z/" sounds (e.g., "rice" and "rise")					
Discrimination of "/tʃ/" and "/ʃ/" sounds (e.g., "watch" and "wash")					
Discrimination of "/ɬ/" and "/l/" sounds (e.g., "lentil" and "dental")					
Pronunciation of the "ng" /ŋ/ sound (e.g., "flamingo" and "belonging")					
Pronunciation of the schwa "/ə/" sound (e.g., "awake" and "toward")					
Pronunciation of consonant clusters (e.g., "street" and "instant")					
Other (Please specify):					
Suprasegmental Level					
Problems with pitch ranges (e.g., high pitch for *I'm going to Harvard, not Yale!*)					
Problems with word stress (e.g., PHOtograph and phoTOgraphy)					
Problems with sentence stress and rhythm (e.g., The kids are at the park)					
Problems with contrastive stress (e.g., "with sugar or without sugar?")					
Problems with juncture (e.g., "the blackbird" vs. "the black bird")					
Problems with intonation patterns (e.g., falling intonation in statements)					
Problems with connected speech (e.g., "he asked" more like "heyasked")					
Other (Please specify):					

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APPENDIX B: Semi-Structured Interview Questions

SEMI-STRUCTURED INTERVIEW WITH TURKISH EFL TEACHERS ON FOSSILISED PRONUNCIATION ERRORS

Background and Experience:

1) Can you briefly describe your teaching experience and the level of English proficiency you primarily work with among Turkish EFL learners?

2) In your opinion, how important is pronunciation in the overall language learning process?

Perceptions and Observations:

3) Have you observed any specific pronunciation errors that are particularly common among Turkish EFL learners?

4) How would you describe the prevalence of fossilised pronunciation errors among your students?

Causes and Challenges:

5) What do you believe are the main factors contributing to the development of fossilised pronunciation errors among Turkish EFL learners?

6) What challenges do you encounter in helping students overcome fossilised pronunciation errors?

Teaching Strategies and Support:

7) What strategies or techniques do you employ to address pronunciation errors in your teaching?

8) How do students typically react to feedback and correction regarding their pronunciation errors?

Future Directions and Recommendations:

9) What changes or improvements would you like to see in the pronunciation instruction and curriculum for EFL learners in Turkey?

10) Are there any research areas or questions related to fossilised pronunciation errors that you believe warrant further investigation?