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The Effects of Connected Speech Instruction on Second or Foreign Language Learners' Perceptive Skills and Connected Speech Production: A Systematic Review of the Literature (2000-2021)

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Abstract. This systematic review paper attempts to present the current database on the effects of explicit connected speech instruction on English as a Second Language (ESL) or English as a Foreign Language (EFL) learners' perceptive skills and connected speech production. A total of 22 studies were gathered across the digital database through selective searching of key terms. Using the format of the review by Thomson and Derwing (2014), the following information was tabulated: participants' demographics, theoretical paradigm, scope of training, training input, duration of instruction, nature of assessments, and whether or not there was a significant improvement in learners' perceptive skills and connected speech production. The findings have generally shown a consensus among the studies that explicit instruction of connected speech was effective and had positively contributed to the improvement of learners' perceptive skills and connected speech production. This paper adds to the corpora of literature on connected speech in ESL and EFL contexts and raises awareness of the significance of connected speech instruction in ESL or EFL learning contexts.

Keywords: explicit instruction; connected speech; second/foreign language learners; perceptive skills; connected speech production

1. Introduction

Although many phonologists believe that connected speech is not a feature that non-native speakers of English need to have in their speech, the need to learn it is imperative (Alameen, 2014). Having some knowledge about connected speech

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processes (CSPs) helps English as a Second or Foreign Language learners understand competent or native speakers' speech better and enable them to also communicate more fluently.

The way in which English is written on the page can mislead learners who go through formal learning of the language. Wong (1987) contends that learners of English often learn with their eyes rather than their ears, and this consequently causes language learners to believe that words should be pronounced as they appear in the written form, that is, words ought to be separated by blank spaces. However, this is not the way that competent or native English speakers converse in real communication.

Competent or native speakers use connected speech. The difference between the ways competent and native speakers, and language learners speak could potentially cause misunderstandings. Researchers, teachers and linguists need to highlight this gap and explore avenues to help learners to listen, comprehend and communicate more effectively. Perceiving and understanding connected speech are important in learning a language without which acquiring the language and speaking it fluently will be difficult.

Although connected speech has a crucial role in effective communication, CSPs have received little attention in ESL and EFL pedagogy literature (Alameen, 2014) and this includes studies that systematically review the state of the literature. It was the lack of systematic literature review (SLR) studies in this field of research that has urged the researchers to review the literature in this area. Generally speaking, literature review papers play an important role in obtaining updates and understanding the issues and research gaps in a particular field. They also help in saving researchers' time and effort in the search for the literature on the topic (Elrowayati et al., 2020). Therefore, this paper aims to fill the gap and search for studies on connected speech in the ESL and/or EFL context to find out what has been researched. Specifically, this paper conducts a literature review on the studies carried out on the effects of explicit connected speech instruction on English as a Second or Foreign Language learners' perceptive skills and connected speech production published between 2000 and 2021.

Thomson and Derwing (2014) stress the importance of answering research questions and identifying the gaps in research methodologies while reviewing the literature. Accordingly, this paper summarises studies on the effects of explicit connected speech instruction on ESL or EFL learners' perceptive skills and connected speech production to find out the answers to the following research question: What has been researched on the effects of explicit connected speech instruction on ESL or ESL learners' perceptive skills and connected speech production?

2. Method

To obtain the answer, the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) checklist was used. PRISMA provides an updated checklist of 27 items to specifically guide how systematic reviews and meta-analyses are to be developed. The guide specifically helped in collecting, organizing and analysing the articles.

2.1 Searching Strategy

The search for relevant articles was done digitally. The study focused on digital libraries that included Web of Science (WOS), Pro Quest, SCOPUS, ERIC, Science Direct and JSTOR. In addition, EndNote and Google Scholar were also used for collecting and gaining comprehensive lists of related articles.

Several keywords were employed in the search process. The keywords 'suprasegmental phonemic features' or 'connected speech' or 'listening comprehension' (AND) 'explicit instruction' were used for the search. For the digital libraries, the keywords were used with Boolean (AND) and (OR) to connect the keywords and their alternative synonyms. Initially, this method of searching produced many relevant and interesting articles which also included duplicated items. In order to avoid duplication during the selection process of articles, all gathered articles were filtered using the inclusion and exclusion criteria shown in Table 1. After filtering the articles, the obtained list of articles was considered the final list that included the most relevant articles without overlapping or duplication.

2.1.1 Inclusion and Exclusion Criteria

In this paper, three criteria had been used for paper selection. Firstly, the scope of this review was limited to published research and studies on the effects of explicit connected speech instruction on ESL or EFL learners' perceptive skills and connected speech production. Secondly, the time scope of this SLR paper covered research studies published from 2000 until 2021. Thirdly, a search for journal articles was conducted using university databases and Google search engines as mentioned in the previous sub-section.

Table 1. Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Papers published in journals or theses.	Unpublished papers or papers published in a conference proceeding
Related to teaching one or more features of connected speech as part of suprasegmental features, or covered both segmental and connected speech features.	Related to teaching segmental features only with no reference to connected speech.
Studies in which L2 learners were provided with connected speech instruction. The studies presented an evaluation and a discussion of the explicit instruction of connected speech.	Studies without connected speech instruction. The studies did not present an evaluation or discussion of explicit instruction of connected speech.
Related to English as a Second Language or Foreign Language.	Not related to English as a Second Language or Foreign Language.

As a result of the selected searching strategy and the selection criteria, 22 studies were obtained. Figure 1 shows the flow chart demonstrating the selection of studies suitable for inclusion in the review.

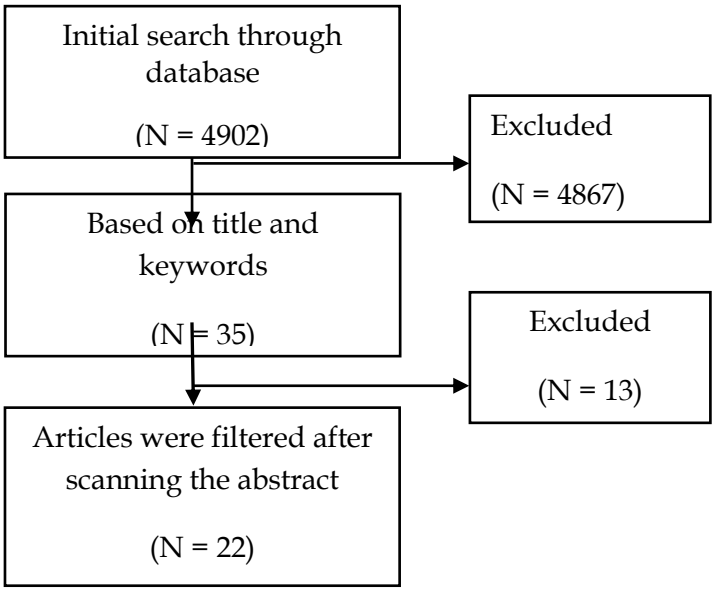

Figure 1: Flow chart demonstrating the selection of studies

From Figure 1, it can be seen that the total collected studies is 22. Table 2 specifies the demographic backgrounds of the selected studies.

Table 2. Studies selected based on the inclusion and exclusion criteria

No.	Author(s)	Year	Title	Reference type	Country of study
1	Abe, H.	2015	Effects of Form-Focused Instruction on the Acquisition of Weak Forms by Japanese EFL Learners	Doctoral dissertation	Japan
2	Ahmadian, M., & Matour, R.	2014	The Effect of Explicit Instruction of Connected Speech Features on Iranian EFL Learners' Listening Comprehension Skill	International Journal of Applied Linguistics and English Literature, 3(2), 227-236	Iran
3	Alameen, G.	2014	The Effectiveness of Linking Instruction on NNS Speech Perception and Production	Thesis	Iowa, U.S.A.
4	Ashtiani, F. T., & Zafarghandi, A. M.	2015	The Effect of English Verbal Songs on Connected Speech Aspects of Adult English Learners' Speech Production	Advances in Language and Literary Studies, 6(1), 212-226.	Iran
5	Carreira, J. M.	2014	How Can We Enhance EFL Learners' Listening Fluency? Teaching Connected Speech to Japanese University	In T. Muller., J. Adamson., P.S. Brown., & S. Herder (Eds.). Exploring EFL	Japan

			Students Using Songs	Fluency in Asia (pp. 297-311). Palgrave Macmillan: London.	
6	Cho, H.	2019	The Effects of Teaching Linking in Korean EFL Listening Class	KOAJ Korean Open Access Journal: 음성음운형태론연구, [*Studies in Phonetics, Phonology and Morphology*], 25(2), 273-297.	Korea
7	Couper, G.	2003	The Value of an Explicit Pronunciation Syllabus in ESOL Teaching	Prospect, Vol. 18, No. 3	New Zealand
8	Couper, G.	2006	The Short and Long-Term Effects of Pronunciation Instruction	Prospect, Vol. 21, No. 1	New Zealand
9	Demirezen, M.	2016	Assimilation as a Co-articulation Producer in Words and Pronunciation Problems for Turkish English Teachers	Kuram Ve Uygulamada Egitim Bilimleri Educational Sciences: Theory & Practice, 16(2), 477-509.	Turkey
10	Euler, S. S.	2014	Assessing Instructional Effects of Proficiency-Level EFL Pronunciation Teaching under a Connected Speech-Based Approach	Studies in Second Language Learning and Teaching, 4(4), 665-692.	Germany
11	Gokgoz-Kurt, B.	2016	Attention Control and the Effects of Online Training in Improving Connected Speech Perception by Learners of English as a Second Language	Thesis, Pro Quest Publications	U.S.A.
12	Hamouda, A.	2017	Saudi EFL English Majors' Speech Comprehension and Production: Does Explicit Instruction in Connected Speech Features Makes a Difference?	Hamouda, A. (2017). Saudi EFL English Majors' speech comprehension and production: Does Explicit Instruction in Connected Speech Features Make a Difference? *[Journal of Education, Assiut]*, *33*(2.2), 1-63.	Saudi Arabia
13	Jang, J., & Lee, J.	2015	Comparing Two Types of Explicit Pronunciation Instructions on Second Language Accentedness	Linguistic Research, 32, 15-32.	Korea
14	Khaghaninezhad, M. S., & Jafarzadeh, G.	2014	Investigating the Effect of Reduced Forms Instruction on EFL Learners' Listening and Speaking Abilities	English Language Teaching, 7(1), 159-171.	Iran

15	Kuo, Y.	2010	Using Partial Dictation of an English Teaching Radio Program to Enhance EFL Learners' Listening Comprehension	Asian EFL Journal Professional Teaching Articles, 47, 4-29.	Taiwan
16	Kuo, Y.	2010	Using Partial Dictation of an English Teaching Radio Program to Enhance EFL Learners' Listening Comprehension	Asian EFL Journal Professional Teaching Articles, 47, 4-29.	Taiwan
17	Mirfatemi, F., Sadeghi, A., & Niyazi, M. P.	2020	Impact of Supra-Segmental Features on Reading Comprehension in First and Second Language: A Comparative Study of Iranian EFL Learners	Language Teaching Research Quarterly, 20, 19-42.	Iran
18	Musfirah, S.	2019	Improving Students' Listening Comprehension by Teaching Connected Speech	Englisia, Vol. 6, No. 2, 64-74	Indonesia
19	Ngoan, B. T, & Giang, B.T.	2021	The Explicit Instructions on Connected Speech to the First Year English Major Students' Perception and Production at School of Foreign Languages- Thai Nguyen University	TNU Journal of Science and Technology, 226(03), 72 - 79.	Thailand
20	Nokes, J.	2018	Whaddya Call That Again? Materials for Teaching Connected Speech	Second Language Studies, 36(2), 27-153.	Hawaii, U.S.A
21	Rahimi, M., & Chalak, A.	2017	The Effect of Connected Speech Teaching on Listening Comprehension of Iranian EFL Learners	Journal of Applied Linguistics and Language Research, 4(8), 280-291.	Iran
22	Suwartono, T., & Mayaratri, P.	2019	Songs Helped Them Learn the English Connected Speech	Jurnal Bahasa Lingua Scientia, 11(1), 59-68.	Indonesia

Table 2 shows that most studies on connected speech instruction were conducted in Iran (five studies), the U.S.A (three studies), followed by Japan, New Zealand, Indonesia, Taiwan and Korea (two studies each); and Thailand, Turkey, Germany and Saudi Arabia (one study each). It is worth noting that most studies were conducted in the last decade (from 2010-2021), while only one study was conducted in 2003 and one in 2006. This is an indication that the number of publications on connected speech has increased in the last eleven years.

3. Results of the Review

To answer the research question, 'What has been researched on the effects of explicit instruction of connected speech on ESL or EFL learners' perceptive skills and connected speech production?', the content of the studies was summarised. Adapting a format by Thomson and Derwing (2014), data from the 22 experimental studies were tabulated based on the following: participants' demographics, theoretical paradigm, scope of training, instruction type

(traditional or computer-based), duration of instruction, nature of assessments and whether or not there was a significant improvement in the learners' skills. In addition, this study also tabulated the proficiency level of the participants and the sample number as part of the demographic information, which were not included in Thomson and Derwing (2014).

3.1 Demographic Backgrounds of the Studies

To understand the research landscape of the studies on explicit connected speech instruction, the demographic backgrounds of the studies were collected and compiled according to several themes.

3.1.1 Participants' Age Group

The following table shows the frequency and percentage of studies based on the age groups of the participants.

Table 3. Frequency and percentage of studies based on age groups of participants

Age groups	Frequency	Percentage
Teens	7	32%
Adults	13	59%
Both teens and adults	1	4.5%
Not stated	1	4.5%
Total	22	100

As indicated in Table 3, 32% (7) of the studies involved teens (12-17 years old), while 59% (13) of the studies involved adults (18-50 years old) as the participants. One study involved both groups of age range while one study did not state the age group.

3.1.2 Participants' Gender

The following table shows the frequency and percentage of studies based on the gender of the participants.

Table 4. Frequency and percentage of studies based on gender of participants

Gender	Frequency	Percentage
Both	9	41%
Not stated	9	41%
Male	3	13.5%
Female	1	4.5%
Total	22	100%

As shown in Table 4, 41% (9) of the studies involved both male and female learners, but 41% (9) of the studies did not mention the gender of the participants. Meanwhile, 13.5% (3) of the studies researched male learners only and 4.5% (1) of the studies focused on female learners only.

3.1.3 First Language

The following table demonstrates the frequency and percentage of studies based on the first language of the participants.

Table 5. Frequency and percentage of studies based on participants' first language

First Language	Frequency	Percentage
Chinese	7	32%
Korean	6	27%
Persian	6	27%
Japanese	5	23%
Arabic	4	18%
Turkish	3	14%
Thai	2	9%
German	2	9%
Hindi	2	9%
Serbian	2	9%
Polish	2	9%
Malay	2	9%
Spanish	2	9%
Portuguese	2	9%
Finish	1	4.5%
Swedish	1	4.5%
Italian	1	4.5%
Nepali	1	4.5%
Vietnamese	1	4.5%
Tamil	1	4.5%

Table 5 shows that 32% (7) of the studies studied Chinese speakers of English. 27% (6) of the studies studied Korean and similarly, 27% (6) of the studies studied Persian speakers of English. 23% (5) of the studies studied Japanese, 18% (4) of the studies studied Arabic and 14% (3) of the studies studied Turkish speakers of English. Each of these L1s was investigated by 9% (2) of the studies: German, Hindi, Serbian, Polish, Thai, Malay, Spanish and Portuguese. 4.5% (1) of the studies each investigated these L1s: Finnish, Swedish, Italian, Nepali, Vietnamese and Tamil. Chinese, Korean and Persian speakers seem to have been studied more than the other L1s. 27% (6) of the studies were conducted on different nationalities rather than focusing on one nationality.

3.1.4 English as a Second or Foreign Language

The following table shows the frequency and percentage of studies based on the L2 variety of the participants.

Table 6. Frequency and percentage of studies based on the L2 variety of the participants

English Language Variety	Frequency	Percentage
ESL	6	27%
EFL	14	64%
Not stated	2	9%
Total	22	100%

A total of 64% (14) of the studies examined the importance of explicit instruction of connected speech in English as a Foreign Language and 27% (6) examined English as a Second Language. 9% (2) of the studies did not state the English language variety.

3.1.5 Proficiency Level

The following table shows the frequency and percentage of studies based on the proficiency level of the participants in the experimental studies.

Table 7. Frequency and percentage of studies based on the participants' level of proficiency

Proficiency Level	Frequency	Percentage
Elementary	2	9%
Pre-intermediate	2	9%
Intermediate	8	36%
Upper-intermediate	2	9%
Pre-intermediate, intermediate, and upper intermediate	2	9%
Advanced	1	5%
Not stated	5	23%
Total	22	100%

In relation to proficiency level, the studies focused on mostly intermediate (36%, 8), followed by upper intermediate (9%, 2), pre-intermediate (9%, 2), elementary (9%, 2) and a mixture of pre-intermediate, intermediate and upper intermediate learners (9%, 2). Approximately 5% (1) of the studies focused on advanced learners, while 23% (5) of the studies did not state the proficiency level of the learners.

3.1.6 Sample Number

The following table shows the number of participants in the experimental and control group, the total number of participants in each study, the range of the number of participants and the frequency and percentage of studies with the same range of the number of participants.

Table 8. Distribution of participants during experimentation

Author(s)	No. of participants		Total no. of participants	Range of no. of participants	No. of studies with the same range of no. of participants	Percentage of studies with the same range of no. of participants
	Experimental	Control				
Euler (2014)	10	4	14	14-30	4	18%
Couper (2003)	15	-	15			
Musfirah (2019)	30	-	30			
Mirfatemi, Sadeghi, & Niyazi (2020)	15	15	30			
Kuo (2010)	31	-	31	31-40	7	32%

Carreira (2014)		35	-	35			
Demirezen (2016)		38	-	38			
Ahmadian & Matour (2014)		20	20	40			
Cho (2019)		40	-	40			
Ashtiani & Zafarghandi (2015)		20	20	40			
Ngoan, & Giang (2021)		20	20	40			
Nokes (2018)		41	-	41	41-50	4	18%
Alameen (2014)	15	15	15	45			
Hamouda (2017)		24	24	48			
Khaghaninezh & Jafarzadeh (2014)		50		50			
Rahimi & Chalak (2017)		25	27	52	51-100	5	23%
Gökgöz-Kurt (2016)		33	25	58			
Abe (2015)		60		60			
Jang & Lee (2015)	21	19	22	62			
Couper (2006)		21	50	71			
Kuo, Kuo & Lee (2016)	33	36	32	101	> 100	1	4.5%
Suwartono & Mayaratri (2019)		-	-	-	Not stated	1	4.5%
Total						22	100%

Table 8 shows the number of participants. The studies were grouped into six based on the number of participants: 18% (4) of the studies had 14-30 participants, 32% (7) of the studies had 31-40 participants, 18% (4) had 41-50 participants, 23% (5) had 51-100 participants, 4.5% (1) had 101 participants and 4.5% (1) of the studies did not state the number of participants.

A total of 14% (3) of the studies had more participants in the experimental group than the control group; 14% (3) of the studies had more participants in the control group than the experimental group, while 27% (6) had equal number of participants in both groups. However, 9% (2) of the studies did not provide the exact number of participants in the two groups but only mentioned the total number of participants in the studies.

Alameen (2014), Jang and Lee (2015), and Kuo, Kuo and Lee (2016) had two experimental groups and one control group. The two experimental groups were exposed to two different teaching methods. This may have increased the possibility of obtaining different results for the different groups.

3.2 Research Design

The following table shows the frequency and percentage of studies based on the different research designs.

Table 9. Frequency and percentage of studies based on the research designs

Research Design	Frequency	Percentage
Experimental design (with a control group)	7	32%
Experimental one-group design and survey	5	23%
Experimental design (with a control group) and survey	4	18%
Quasi-experimental design (with a control group)	3	13.5%
Mixed Method (qualitative analysis of questionnaires and quantitative analysis of the literature)	1	4.5%
Mixed Method (explanatory sequential design)	1	4.5%
Experimental one-group design	1	4.5%
Total	22	100%

The reviewed studies adopted different varieties of research design. Table 9 shows the research designs employed by the researcher(s) of each study. A total of 32% (7) of the studies used an experimental design (with a control group), 23% (5) used an experimental one-group design and a survey, 18% (4) used an experimental design (with a control group) and a survey, 13.5% (3) used a quasi-experimental design with a control group and 9% (2) used a mixed method design. One of these two studies analysed two questionnaires qualitatively and the literature on the topic quantitatively. The other study used an explanatory sequential design by conducting a quantitative analysis of the data followed by a qualitative analysis for further explanation. 4.5% (1) of the studies used an experimental one-group design.

3.2.1 Control Group

As many as 68% (15) of the studies used a control group while 32% (7) of the reviewed studies did not use a control group.

3.3 Theoretical Paradigm

The following table shows the frequency and percentage of studies using a particular theoretical paradigm.

Table 10. Frequency and percentage of studies using a particular theoretical paradigm

Theoretical Paradigm	Frequency	Percentage
Nativeness + accentedness	2	9%
Intelligibility + comprehensibility	20	91%
Total	22	100%

Not many studies stated a clear theoretical point of view. For this reason, a method of assessment was used to determine the theoretical designs of those studies. This review study adopted a framework by Thomson and Derwing (2014) in which the theoretical paradigm is defined based on two factors: nativeness and intelligibility. When the goal of the study is to make learners

speak as semi-native speakers, the study is categorized as a nativeness study. On the other hand, if the study focuses on measuring second language speech comprehensibility or intelligibility, the study is classified as an intelligibility study. According to Thomson and Derwing (2014), comprehensibility comes under the intelligibility category. As illustrated in Table 10, 91% (20) of the studies focused on intelligibility and comprehensibility of speech, and only 9% (2) of the studies adopted nativeness and accentedness as their theoretical paradigm.

3.4 Scope of Training

The following table shows the frequency and percentage of the studies based on the scope of training.

Table 11. Frequency and percentage of studies based on the scope of training

Scope of Training	Frequency	Percentage
Suprasegmental features	17	77%
Segmental and suprasegmental features	5	23%
Total	22	100%

As shown in Table 11, 77% (17) of the studies dealt with suprasegmental features of connected speech, while 23% (5) of the studies examined connected speech as well as segmental features of speech. It is noted from the review that whether the study focused on one feature of connected speech or several of them, the feature taught had an effect on the type and duration of instruction.

3.4.1 Training Input

Table 12 shows the input type used in the training.

Table 12. Input type used in training

Input Type	Elements
Segmental	Phonemic practice, minimal-pair practice
Suprasegmental	Intonation: stress, tone, pitch, rhythm, rhythmic language, prosody accents and intonation
	Stress: word stress, sentence stress, syllables
	Connected Speech Processes: contractions, assimilations (coalescent assimilation, regressive assimilation, assimilation of place of articulation, assimilation of voicing, word-boundary palatalization, co-articulatory information, sounds and positional variation), reductions, strong and weak forms of English and elision patterns Linking: vowel-to-vowel linking (V-V), r-linking and r-intrusion, consonant-to-vowel linking (C-V), consonant-to-consonant linking (C-C), consonant-to-glide linking (C-G). Resyllabifications.
Not stated	(5 studies)

3.4.2 Input Classification

The following table shows the frequency and percentage of studies based on suprasegmental input.

Table 13. Frequency and percentage of studies based on suprasegmental input

Input Type	Frequency	Percentage
One feature of connected speech	5	23%
Connected speech and other suprasegmental features	12	54%
Connected speech features only (features not specified)	5	23%
Total	22	100%

In reviewing the input of the intervention in the targeted studies, some notes need to be recorded. 23% (5) of the studies focused on one feature of connected speech. 54% (12) of the studies focused on a number of connected speech and other suprasegmental features while 23% (5) of the studies focused on a number of connected speech features only. These studies merely mentioned 'connected speech features' without stating which features were included in the training. For the studies by Ashtiani and Zafarghandi (2015), and Suwartono and Mayaratri (2019), the input was songs and any connected speech features that exist in the songs were included in their findings.

3.5 Instruction Type

The following table shows the frequency and percentage of studies based on the instruction type.

Table 14. Frequency and percentage of studies based on the instruction type

Instruction Type	Frequency	Percentage
Traditional classroom	18	82%
Computer-assisted pronunciation training (CAPT)	3	13.5%
Not stated	1	4.5%
Total	22	100%

As illustrated in Table 14, the majority of the studies (82%; 18) used the traditional approach, while 13.5% (3) of the studies adopted computer-assisted pronunciation teaching (CAPT). However, 4.5% (1) of the studies did not state which type of instruction was used.

3.6 Duration of Instruction

The following table shows the frequency and percentage of studies based on training duration.

Table 15. Frequency and percentage of studies based on training duration

Training Duration	Frequency	Percentage
1 week	0	0%
2 weeks	4	18%
3 weeks	1	4.5%
4 weeks	1	4.5%
5 weeks	2	9%
6 weeks	1	4.5%
7 weeks	2	9%
8 weeks	3	14%
9 weeks	0	0%
10 weeks	1	4.5%
11 weeks	0	0%
12 weeks	1	4.5%
13 weeks	0	0%
14 weeks	0	0%
15 weeks	2	9%
16 weeks	1	4.5%
Not stated	3	14%
Total	22	100%

Despite the significant improvement that many studies mentioned, most of them had relatively short training duration (2-8 weeks) which may have negatively affected learners' learning output. However, 23% (5) of the studies had a longer duration of training (10-16 weeks). The study by Khaghaninezh and Jafarzadeh (2014) continued for 10 weeks. Hamouda (2017) states the "first semester" to refer to a 12-week period of training. The study by Couper (2003) roughly implied a 16-week period but this was not clearly stated in the paper. Studies carried out by Carreira (2014) and Euler (2014) lasted for 15 weeks, which can be considered as a satisfactory period of time for improvement to take place. However, in both papers, the details about how the weekly learning input was presented to the learners were not clearly provided by the authors. 9% (2) of the studies had a relatively long period of evaluation (Kuo, 2010 - 4 months and Abe, 2015 - two months) although the period of treatment lasted for eight weeks in the former study and four weeks in the latter. This was because both studies had an immediate and a delayed post-test. On the other hand, 14% (3) of the studies did not provide details regarding the duration of traditional instruction of connected speech which may make it difficult for prospective researchers or teachers to adopt their methods.

3.7 Training Session

The following table shows the frequency and percentage of studies that stated or did not state the number of training sessions and duration of the sessions.

Table 16. Frequency and percentage of studies that stated or did not state the number of training sessions and duration of sessions

Statement on the number of training sessions and duration of training	Frequency	Percentage
Number of training sessions stated	16	73%
Number of training sessions not stated	6	27%
Total	22	100%
Duration of session stated	15	68%
Duration of session not stated	7	32%
Total	22	100%

As many as 73% (16) of the studies stated clearly the number of sessions in the instruction period, but 27% (6) of the studies did not provide such information. The duration of every single session was clearly stated in 68% (15) of the studies, but was not stated in 32% (7) of the studies. The minimum number of instructions given was three sessions, while the maximum was 32 sessions. The duration per session was between 25 minutes to 3 hours.

3.8 Nature of Assessments

3.8.1 Types of Assessments

Table 17 shows the frequency and percentage of studies using the different types of assessments.

Table 17. Frequency and percentage of studies using different types of assessments

Assessments	Frequency	Percentage
Both listening and speaking	5	22.5%
Listening comprehension, dictation and speaking	2	9%
Reading aloud and speaking	2	9%
Reading comprehension and listening comprehension	1	4.5%
Listening comprehension and dictation	3	14%
Listening comprehension and cloze test	2	9%
Attitude questionnaire and survey of the literature	1	4.5%
Listening	3	14%
Reading aloud	1	4.5%
Speaking in a mixed method study	1	4.5%
Pronunciation task (the exact task not specified)	1	4.5%
Total	22	100%
Studies above that used a survey in addition to the other tasks	10	45%

The nature of the assessment varied in the reviewed studies. Many studies employed a combination of tasks while the rest depended on one task to assess the learners' learning outcome. 22.5% (5) of the studies utilised listening and speaking tests to assess both the perception and production abilities of the learners. A speaking task was also used with listening comprehension and

dictation in 9% (2) of the studies. A reading aloud test was used with a speaking test in 9% (2) of the studies and a reading comprehension test was used in combination with a listening comprehension test in 4.5% (1) of the studies. A dictation task accompanied a listening comprehension test in 14% (3) of the studies. 9% (2) of the studies employed a cloze test accompanied by a listening comprehension test to evaluate learners. 4.5% (1) of the studies used a questionnaire to analyse teachers and learners' attitudes towards connected speech instruction and to examine the frequency and percentage of articles on pronunciation, pronunciation and suprasegmentals, suprasegmentals and technology to find out researchers' attitudes towards these topics. A few of the studies employed only one assessment tool: listening in 14 % (3), reading aloud in 4.5% (1) and speaking in 4.5% (1) of the studies. 4.5% (1) of the studies also used a pronunciation task, but the exact test was not specified. In addition to the tasks mentioned above, 45% (10) of the studies also conducted a survey in order to examine learners' perspectives on connected speech instructions.

3.8.2 Assessors

The following table shows the frequency and percentage of studies based on who the assessors were.

Table 18. Frequency and percentage of studies based on assessors

Assessor(s)	Frequency	Percentage
Researcher(s)	14	64%
Researcher(s) with software	2	9%
Researcher(s), an assistant and software	2	9%
Researcher and an assistant	1	4.5%
Researcher and native speaker	2	9%
Assistant and native speaker	1	4.5%
Total	22	100%

In most of these studies, the researchers themselves taught the learners during training and assessed their abilities. In the rest of the studies, the researchers taught the learners and assessed their abilities with the help of a software and/or an assistant or a native-speaker instructor. However, in 4.5% (1) of the studies, the researchers were not themselves the teachers of the instruction or assessors of the tasks.

3.9 The Effectiveness of Explicit Connected Speech Instruction

Another result that this systematic review seeks to report is the effectiveness of explicit connected speech instruction in improving learners' perceptive skills and connected speech production in the ESL/EFL context. Results from the collected studies were hence examined and summarised. The following table shows the frequency and percentage of studies based on the effectiveness of explicit connected speech instruction.

Table 19. Frequency and percentage of studies based on the effectiveness of connected speech instruction

Improvement/effectiveness	Frequency of studies	Percentage of studies
Improvement in perceptive and productive skills	7	32 %
Improvement in perceptive skills	9	41%
Improvement in productive skills	5	22.5%
Improvement in learners and teachers' attitudes towards connected speech instruction	1	4.5%
Total	22	100%
Improvement in learners' perception and awareness of connected speech (in the studies above that used a survey in addition to the other tasks)	10	45%

All studies claimed that explicit instruction of connected speech was effective and positively contributed to the improvement of learners' perceptive skills and/or connected speech production. 32% (7) of the studies evaluating learners' perceptive and productive skills found that training led learners to improve in both skills. 41% (9) of the studies which focused only on the learners' perceptive skills showed that the learners improved after training. 22.5% (5) of the studies which focused on productive skills found improvement in learners' productive skills after exposure to connected speech instructions. 4.5% (1) of the studies, which surveyed teachers and learners' attitudes towards connected speech instruction, found that both perceived connected speech as an important topic to be taken into consideration in the teaching and learning materials. This study also found that researchers had an interest in doing research on pronunciation. Finally, all studies which surveyed the learners in addition to other tasks found that their perception and awareness of connected speech improved after training and they had positive attitudes towards explicit instruction of connected speech.

4. Discussion

The discussion of the findings of this review and the gaps in research methodologies are presented below.

4.1 Demographics

This section discusses the demographic information of the participants in the reviewed studies. In terms of age group, most studies on connected speech focused on adults while a lesser percentage involved teenagers. This may be because many studies employed ESL or EFL learners who are university or college students as participants whose ages averaged 19-25 years old. It is recommended to prospective researchers to study younger ESL or EFL learners.

The majority of the studies examined both male and female participants but did not compare them. Future studies may be keen to compare male and female learners to examine the claim that females tend to produce more connected speech than males and gender could be a significant feature in perceiving and producing connected speech. According to Fant (1997: pg. 35), "There are several

minor components in the production process that add towards a seemingly chaotic detail pattern preserving. It tends to be greater for females than for males".

As for the first language of the participants, Chinese, Korean, Persian and Japanese speakers, who are foreign language learners had been studied quite extensively. More studies investigating foreign language learners from other L1s or the same L1 that has been studied but with a different dialect are needed. This kind of research not only benefits language learners but can also indicate patterns of cross-linguistic development with respect to language learning and culture-specific issues. Most of the studies reviewed here examined EFL learners and very few studied ESL learners; hence, there is a need for more studies on ESL learners.

On language proficiency, most studies examined English learners at an intermediate level. This could be attributed to the features of connected speech that can be difficult to master for beginners and elementary-level learners, and at the same time unchallenging features to be learned by advanced-level learners. For example, Kurt, in her study (2016), states that "For the purposes of the study, the lowest and the highest proficiency levels were not included in the study as the target content would be either too hard or not challenging enough for them to study" (p. 61). Whereas, the pre-intermediate, intermediate, and upper intermediate levels are the appropriate levels to learn suprasegmental features for ESL/EFL learners.

In terms of the number of participants, on average, the studies involved 31-40 learners. There were some studies that were restricted to a smaller number of participants. In 27% of the studies, the number of participants in the control group and experimental group was equally distributed. This may lead to a fairer comparison between the groups. More learners in each group are preferred to add to the validity of the findings (Creswell, 2012). An issue that was encountered in reviewing the studies is the lack of information about the control group in some studies.

4.2 Research Design

Most researchers adopted an experimental research design with or without a control group in conducting the studies. This is an indication that this kind of research design is the most preferred to study the effects of explicit instruction on learners.

A control group is a very important component in an experimental study to find out to what degree the intervention has had any effect on the participants in the experimental group. Not all studies had a control group although they provided lengthy training on connected speech. In this case, it would be difficult to decide if a significant improvement happened as a result of connected speech instruction or otherwise. The learners may have improved regardless of connected speech instruction. Although the use of a control group in an experiment might pose an ethical dilemma as some learners are deprived of

instruction owing to being assigned to the control group, it is recommended as it can provide deeper insights into the phenomenon.

With regard to theoretical paradigms, the speech learning model (Flege, 1995) and perceptual assimilation model (Best, 1995) highlight the importance of second language speech theory; however, when it comes to classroom context, many studies examined lacked a clear theoretical stance. Thus, following Thompson and Derwing (2014), the current paper took into consideration the intelligibility and nativeness factors for analysing the theoretical foundation of the reviewed studies.

The number of studies that were classified as intelligibility or comprehensibility studies dominated, while only a few studies can be classified as nativeness studies. This essentially indicates the fact that the priority of language teachers is to make second language speech understandable and easy for the listeners to comprehend rather than make them speak as native speakers – although the latter is a desirable target for many teachers (Ahmadian & Motour, 2014; Levis & Pickering, 2004). Future studies can also examine whether a study is concerned with intelligibility/comprehensibility or nativeness or both.

As for the scope of training, the findings showed that more studies focused on suprasegmental features only, while fewer studies dealt with both segmental and suprasegmental features. In other words, there seemed to be a slightly greater focus on teaching suprasegmental features in particular rather than on both segmental and suprasegmental features. Most studies on connected speech examined a number of its features such as reduction, assimilation and elision probably because these features usually occur in combination in speech so they are preferably taught together to give the best results in improving learners' perception and production skills.

In discussing the training input, except for a few studies like those by Carreira (2014), and Ngoan and Giang (2021), which described interesting activities that can be used in a connected speech training course, many studies lacked details about the input of their instruction. A few studies provided explanations about the assessment or a sample lesson plan while others gave brief explanations for the lessons and the supplementary materials used in their different types of instruction. Some studies did not mention what features of connected speech were taught which means that the actual teaching of connected speech was not made explicit. Lacking the details about the specific features of connected speech that were included in the instruction made it difficult to identify the learning steps that learners had gone through during the intervention period. This also made it difficult for future researchers to replicate the studies. Inadequate details on the instruction also posed challenges to language teachers if they plan to apply the given information in the context of their classroom. Hence, future researchers should consider providing more details about the instruction so that potential researchers or teachers can benefit from their findings. Many studies (among others, Couper, 2003; Kuo, 2010; Mirfatemi, Sadeghi, & Niyazi, 2020;

Euler, 2014; Hamouda; 2017), focused on combined features of connected speech in their materials.

4.3 Instruction Types

Most studies used traditional classroom instruction, while a few studies utilised computer-assisted pronunciation training (CAPT). However, several issues were highlighted in the studies with regard to CAPT such as the use of technology in non-novel ways. Therefore, traditional classroom instruction was still the most utilised type of instruction with the use of technology as audio-visual aid in some studies.

As for the duration of instruction, it is a challenge to determine the length of instruction EFL/ESL learners need to receive. Essentially, the scope of instruction influences the duration of instruction. The more segmental and/or suprasegmental features are taught, the more time is needed to get effective learners' output. Inadequate time allocated for the instruction can affect the progression of the learners' improvement which would take place gradually over a period of time. However, some studies only trained the learners for two weeks, although in many cases, it took longer to help learners to effectively improve their intelligibility skill and listening comprehension in connected speech (Couper, 2003; Thompson & Derwing, 2014). Kuo et al. (2016) mention that for their study, "six weeks of communicative instruction was inadequate to attain significance, future studies with longer teaching periods are suggested (e.g., 12-16 weeks)" (p. 107). In addition, some studies did not mention the duration or number of sessions for instruction. Mentioning such details can help future researchers to replicate these studies and teachers to understand more about how input is presented to the learners. Although the duration and number of sessions allocated for instruction varied across the different studies, all researchers claimed that there was a significant improvement in learners' perceptive and productive skills after the intervention.

4.4 Nature of the Assessments

Many studies utilised both listening and speaking tests to assess both the perception comprehension and production abilities of learners. However, there are some studies that used only one type of data assessment method such as a listening test or a reading test. For speaking assessment, it was found that reading aloud was dominantly used to assess the intelligibility and nativeness of learners' pronunciation. Any task may have its disadvantages. For example, reading aloud may not represent learners' production fully as it may not show their grammar and vocabulary retrieval nor does it provide natural evidence of speakers' pronunciation. A spontaneous speech sample may have to be used to reassess the impression gained from the analysis of the reading task (Celce-Murica et al., 2010).

Another concern that researchers should pay attention to is the validity of the tests. As observed by Thompson and Derwing (2014), some assessments lacked ecological validity; for example, improvement in the reading aloud test might not indicate improved pronunciation in the context of the real world. Although

this does not mean researchers should not use reading-aloud tasks, they ought to be more careful in interpreting and generalising the results.

Most studies had a pre-test and post-test, but very few studies used a delayed post-test. A delayed post-test can be administered to find out the long-term retention associated with specific connected speech intervention. This is to make sure that the learners' improvement lasts for a long time and that they start using the new knowledge by practising it. However, a delayed post-test is not always easily done. Since actual delayed assessment is not always feasible, Euler (2014) suggests getting learners to conduct self-assessment of their further development through emails and current instructor's comments on their pronunciation. However, any improvement in learners' pronunciation at this stage might not be a consequence of their previous learning of connected speech. Thus, using a pre-test and post-test seems to be the minimum required to investigate learners' improvement in the production or perception of connected speech.

There is also a concern about the types of questions in pre-and post-tests. Most studies used the same questions in both tests. This is probably because comparing learners' answers to the same questions during different periods of time (before and after the intervention) can provide us with more reliable results for the studies.

In some instances, the researchers' way of measuring learners' improvement in pronunciation was not that clear. The notions of 'correct vs. incorrect' were not well defined. To help determine correct or incorrect production, Euler (2014), for example, prepared printed transcriptions of all speech samples with probable CSPs labelled. However, some connected speech features may not occur in real speech. Asking someone to speak into a microphone also creates an unnatural environment for connected speech features such as assimilation to occur though some other features like vowel reduction and linking may still happen (Euler, 2014). Khaghaninezhad and Jafarz (2014), for example, rated the learners' speech based on the number of reduced forms they produced. Because there are no necessarily correct or incorrect responses, these methods of assessment were also possibly unreliable.

Another issue that arose was that some studies did not report inter-rater reliability although they were multiple raters for the listening tasks. The assessment could also be subjective. For example, some raters in Euler's (2014) study considered hesitation as a discourse phenomenon, while others considered it speech deviation; some others did both in varying degrees. Inter-rater reliability and clearer criteria in assessing the learners should be considered in future studies.

In most investigations, the researchers themselves carried out the intervention. This can create bias in the results. Getting an instructor who is not involved in the study is a better option to avoid bias.

Thomson and Derwing (2014) note that individual differences are not prominently featured in the literature on second language pronunciation. The same was observed in this review. Individual performance was not discussed in the reviewed studies. However, as Thomson and Derwing (2014) state, "individual differences could play an important role since the mean learning trajectories for a sample concerned may not reflect a single language learner of the sample" (pg. 8). Therefore, developing an understanding of how individual differences affect learning trajectories can make the results more translatable and generalisable to new contexts and learners.

4.5 The Effectiveness of Explicit Connected Speech Instruction

The findings of the reviewed studies indicate that explicit connected speech instruction is quite effective and leads to improvement in learners' perceptions and productions of connected speech. However, there are a number of issues that need to be considered for future investigation. Firstly, the number of connected speech features to be taught should be considered. Some studies reviewed in this paper dealt with a limited number of connected speech features which was reasonable since great improvement usually occurs when learners focus on a limited number of features. Teaching many features of connected speech to the learners takes time and the learners too need time to practise to be able to produce intelligible and comprehensible language. Thus, when more phonological features are included, the length of training needs to be considered in designing a study. Secondly, for the studies that used the nativeness paradigm, the effect seen was in the improvement of accent. It is not clear to what extent the instruction assisted in the improvement of intelligibility. Since intelligibility and comprehensibility are also important in communication, improvement in intelligibility and comprehensibility should also be considered in studies on nativeness (Thomson & Derwing, 2014). In general, all studies reviewed showed the importance of connected speech instruction in improving EFL or ESL learners' perceptive and productive skills.

5. Conclusion

This paper reviewed 22 articles on the research landscape and effects of explicit connected speech instruction on EFL or ESL learners' perceptive skills and connected speech production. The review is motivated by a specific research question and adopted the framework proposed by Thomson and Derwing (2014).

To answer the research question, the paper summarises the following: demographic information of the participants, theoretical paradigm, scope of training, training input, instruction type, duration of instruction, nature of assessment given to the participants and whether or not there was a significant improvement in the learners' language skills. The demographic information reveals, among others, that the studies had been conducted mostly on adults rather than young learners and EFL learners rather than ESL learners. The most employed design was experimental research design, either with or without a control group. Most studies examined suprasegmental features rather than a combination with both segmental features and features of connected speech.

Most of the reviewed studies examined both perceptive and productive skills. The traditional classroom approach was more often employed while a few used the CAPT method. Regarding the effectiveness of explicit connected speech instruction, the review shows that all studies that examined learners' language skills found explicit instruction of connected speech benefitted learners' perceptive and productive skills.

Following the findings of the reviewed studies, a few gaps are worth highlighting. These include studies that did not employ any theoretical framework although they had been categorised based on the 'nativeness' or 'intelligibility' paradigm (Thomson & Derwing, 2014) in this paper. Many studies did not have a control group which made finding out the efficacy of a teaching method difficult. Some studies had a very short training session which may not be helpful to the learners. Although some studies lasted for a long time, no detailed information was reported regarding the training given while some did not provide details of the assessments. These made it difficult for other researchers to replicate the studies and for teachers to implement the suggestions in their classrooms.

Consequently, a few conclusions can be drawn. Firstly, in the last eleven years, explicit connected speech instruction has not been a totally neglected area in second language teaching and research setting. The review shows that the field is growing rapidly and has become an area of interest. Secondly, the topic has been researched on both adults and young learners in both EFL and ESL contexts. Thirdly, the focus on suprasegmental features and the assessment of both perceptive and productive skills in most studies show that researchers are aware of the importance of suprasegmental features and how perceptive and productive skills are interrelated. However, researchers may like to refocus their attention on a number of other issues such as the methodology of conducting and reporting the research. Incorporating a research paradigm can help a researcher orient his or her research in which 'nativeness' and 'intelligibility' are two notions that may be considered. Adding a control group is also necessary for a reliable finding of the efficacy of a teaching method. To ensure effective instruction, the length of intervention should also be taken into account based on the type of input and instruction. Although the traditional teaching method has been sufficient for teaching connected speech, the integration between traditional classroom teaching and the use of computers could be considered as CAPT offers certain opportunities such as access to individual learning and native speakers' accent which can be difficult to get otherwise. In terms of reporting, details regarding the connected speech training and assessments can assist future researchers in designing their studies and teachers in obtaining pedagogical ideas.

The review indicates that there are differences in the way studies were conducted including the instruction used. While these in themselves do not pose a problem in generalising the findings, notable variability in the reporting standards of empirical studies, as noticed in the reviewed studies, may limit the replicability of the studies. However, this review can confidently conclude that

explicit instruction of connected speech can lead to improvement in the perception, comprehension and production of connected speech. Since this review is limited to 22 studies and might not represent the whole body of literature on explicit connected speech instruction, further reviews with the inclusion of more studies on connected speech are suggested.

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