

Production of English verbs ending in -ed by speakers from different L1 backgrounds

Produção dos verbos do inglês terminados em -ed por falantes de línguas maternas distintas

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Abstract: Production of verbs ending in -ed is among the most frequent challenges for learners of English. Literature shows that learners tend to use vowel epenthesis or -ed omission to produce these verbs. The present study investigated the production of English verbs ending in -ed by two speakers of Brazilian Portuguese, two of Spanish, two of German and two of English. Each participant individually audio-recorded 96 sentences with one verb in each of them, including 72 verbs ending in -ed and 24 irregular verbs, distractors in this study. The eight participants produced a total of 576 verbs with 25.52% of non-target productions, suggesting that these results were affected by participants' proficiency, which seemed to be higher than the proficiency of participants from previous studies on verbs ending in -ed. Brazilian Portuguese and Spanish L1 speakers tended to use vowel epenthesis and -ed omission in verb production whereas German L1 speakers tended to use -ed omission, producing less marked syllable structures that are similar to their L1s', following the tendency found in previous studies. Verb production was also influenced by change in the context preceding the -ed due to misreading,

L1 and verb orthography. Production of verbs by English L1 speakers showed the *-ed* omission, which was possibly caused by blending and linking of similar sounds during the reading.

Keywords: Production of verbs ending in *-ed*. L1 influence. Syllable simplification strategies.

Resumo: A produção dos verbos terminados em *-ed* está entre os desafios mais frequentes para os aprendizes de inglês. A literatura mostra que eles tendem a usar a epêntese vocálica ou a omissão do *-ed* para produzir estes verbos. Cada participante gravou individualmente 96 sentenças com um verbo em cada, incluindo 72 verbos terminados em *ed* e 24 irregulares, distratores neste estudo. Os oito participantes produziram 576 verbos com 25.52% de produções diferentes da forma alvo, sugerindo que estes resultados foram influenciados pela proficiência dos participantes, a qual pareceu ser maior do que a proficiência dos participantes dos estudos anteriores sobre verbos terminados em *-ed*. Falantes de português brasileiro e espanhol como L1 usaram vogal epentética e omissão do *-ed* na produção dos verbos enquanto que falantes de alemão usaram a omissão do *-ed* na produção dos verbos, produzindo estruturas silábicas menos marcadas e mais próximas das estruturas silábicas das suas L1s, assim como aconteceu em estudos anteriores. A produção dos verbos foi também influenciada pela mudança no contexto que antecede ao *-ed* em função de dificuldades na leitura, língua materna e ortografia do verbo. Já a produção dos verbos por falantes de inglês como L1 mostrou a omissão do *-ed*, a qual foi possivelmente causada pela mistura ou ligação entre sons similares durante a leitura.

Palavras-chave: Produção dos verbos terminados em *-ed*. Influência da L1. Estratégias de simplificação silábica.

Introduction

The present study investigated the production of the English past tense morpheme (*-ed* endings), which, according to pronunciation textbooks (e.g., CELCE-MURCIA; BRINTON; GOODWIN, 1996; CELC-MURCIA *et al.*, 2010; HAGEN; GROGAN, 1992; HANCOCK, 2003; LANE, 1993; MARSLEN-WILSON; TYLER, 1998; PRATOR; ROBINETT, 1985), has three allomorphs: /t, d, ɪd/. The production of these allomorphs has been considered a challenge for many English learners, who seem to struggle to learn the phonological rules for the three allomorphs.

Baptista (2001, 2002) pointed out that vowel epenthesis¹ in simple past tense *-ed* pronunciation is among the most frequent pronunciation difficulties for Brazilian learners of English, thus, as stated by Delatorre and Baptista (2014, p. 59), “[...] is an important issue to be addressed when the investigation involves non-native speakers of English”. Thus, empirical studies have demonstrated that vowel epenthesis (e.g., ALVES, 2004; DELATORRE, 2006a; FERNANDES,

¹ An extra vowel produced on the pronunciation of English regular verbs in the simple past tense.

2009; FRESE, 2006; GOMES, 2009; PEREIRA, 1994) and the omission of the *-ed* (ALVES, 2004; DELATORRE, 2005; DELATORRE; BAPTISTA, 2014; FERNANDES, 2009) are common in the production of English verbs ending in *-ed* by Brazilians, such as ‘liked’ produced as [laked] or [lak] and ‘saved’ produced as [seved] or [seiv]. This phenomenon was also corroborated by Prator and Robinett (1985), who observed that English non-native speakers tend to use an epenthetic vowel or delete the past tense marker on the pronunciation of verbs ending in *-ed*.

However, a lack of studies on the production of verbs ending in *-ed* by English speakers with different first languages (L1s) is still noted, especially if one considers the vast diversity of multilingual speakers of English nowadays, including both native and non-native speakers. Thus, the present study aims to present some insights on this issue by investigating the production of English verbs ending in *-ed* by Brazilian Portuguese (BP), Spanish, German and English L1 speakers.

Empirical studies about the pronunciation of English verbs ending in *-ed*

Studies conducted in Brazil and Nicaragua have investigated only the production of English verbs ending in *-ed* by Brazilians (e.g., ALVES, 2007; DELATORRE, 2004, 2005, 2006a, 2006b, 2008, 2010b; DELATORRE; KOERICH, 2008; GOMES, 2008, 2009, 2010, 2011, 2014; PEREIRA, 1994) and by Spanish L1 speakers (e.g., DAVILA, 2018), respectively; their perception and production (e.g., FRESE, 2006, 2009;); their perception (e.g., ROSSINI *et al.*, 2017; ROSSINI; FRACARO; BRAWERMAN-ALBINI, 2018) and their intelligibility all by Brazilian learners (e.g., DELATORRE, 2017; DELATORRE; SILVEIRA; GONÇALVES, 2017; FERNANDES, 2009, 2010; RIELLA, 2013). Few studies have focused on the effect of instruction or perceptual training on their perception and/or production by Brazilian (e.g. ALVES, 2004; DELATORRE, 2009; DELATORRE; BAPTISTA, 2014; MARIANO, 2009; SILVEIRA; ALVES, 2006) or by Spanish learners (e.g., CABALLERO; ROSADO, 2018) or on the effect of corrective feedback on verb production by Spanish learners (e.g., ROTHHOOF, 2012).

Pereira (1994) was the first study to investigate the production of verbs ending in *-ed* by beginning and advanced Brazilian learners of English. She found that beginners tended to insert an epenthetic vowel in the production of these verbs more frequently than did

advanced learners; there is L1 transfer in the production of clusters formed by the addition of *-ed* morpheme; greater experience with English seems to reduce L1 influence; and orthographic input and/or insufficient instruction may affect the target production of these verbs by Brazilians.

As pointed out by Delatorre and Baptista (2014), there was a ten-year gap in the study of English verbs ending in *-ed* in Brazil. Thus, Delatorre (2004) investigated the production of English verbs ending in *-ed* by audio-recording one English lesson taught by each of the six Brazilian teachers of English as a Foreign Language (EFL) who participated in the study and found that two teachers produced vowel epenthesis in 49 out of 208 verbs (23.55%) whereas 159 verbs (76.45%) were target-like produced. Thus, one of the teachers produced an epenthetic vowel in 39 out of 62 verbs (62.90%) after consonants, such as /k/ in 'asked', 'talked' and 'looked', /s/ in 'dressed' and 'passed', /z/ in 'used' and 'closed', and /v/ in 'lived'; and vowels, such as /i/ in 'married', /a/ in 'tried' and /e/ in 'played' preceding the *-ed*, while another teacher epenthesized only the verb 'studied' (10 out of 33 or 30.30%), attributed to her fossilized pronunciation of this verb. Results also suggest that this difference on vowel epenthesis rates may reflect a difference in proficiency level, since the four teachers who tended to target-like pronounce these verbs had more contact with English by traveling to an English-speaking country and/or studying at graduate-level programs in English in Brazil or in the United States than those two teachers who produced the verbs with epenthesis.

Delatorre (2005, 2006b) investigated the *-ed* production of nine intermediate Brazilian EFL learners and found that out of 712 verbs, 604 (84.83%) were epenthesized, while Delatorre (2006a, 2008) and Delatorre and Koerich (2008) examined the production of 1,780 *-ed* ending verbs by 26 upper-intermediate Brazilian EFL learners and found that 1,391 verbs (78.14%) were epenthesized. Delatorre and Baptista (2014) investigated the effect of instruction in the production of verbs ending in *-ed* by one adult Brazilian EFL learner and found that the rates of vowel epenthesis varied from 68.15% (15 epenthesized out of 22 verbs in semester 1) to 56.25% (18 epenthesized out 32 verbs in semester 3) to 31.25% (5 epenthesized out of 11 verbs in semester 4). Results of all these studies just mentioned demonstrated that there was more epenthesis after consonants

(e.g., /p, v, dʒ/) than after vowels (e.g., /eɪ, oʊ, aɪ/) preceding the *-ed* in verbs such as ‘stopped’, ‘loved’, ‘changed’, ‘played’, ‘snowed’, ‘tried’; after voiceless consonants (e.g., /p, f, s/) than after voiced consonants (e.g., /v, z, n, l/) preceding the *-ed* in verbs such as ‘stopped’, ‘laughed’, ‘missed’, ‘lived’, ‘caused’, ‘trained’, ‘killed’, and in CCC codas (e.g., /mpt, rkt, skt/) than in CC codas (e.g., /md, kt, st/) in verbs such as ‘jumped’, ‘worked’, ‘asked’ versus ‘screamed’, ‘looked’ and ‘crossed’.

Frese (2006, 2009) and Gomes (2008, 2009, 2010, 2011, 2014) found opposite results regarding voicing influence in the context preceding the *-ed* on the production verbs ending in *-ed*. Thus, Gomes (2008) and Gomes (2009, 2010, 2011, 2014) investigated the production of *-ed* ending verbs by 24 and 46 beginning to advanced Brazilian EFL learners, respectively, and found higher rates of epenthesis production after voiced consonants than after voiceless consonants. Moreover, Frese (2006, 2009) investigated the 32 advanced Brazilian EFL learners’ perception and production of English verbs in which the *-ed* was preceded by one of the oral stops /p, t, k, b, d, g/ followed by the glide /j/ in ‘you’ included in carrier sentences such ‘stopped you’, ‘obbed you’, ‘looked you’, ‘hugged you’, ‘spotted you’ and ‘added you’. Frese’s (2006, 2009) results were similar to those of Gomes’, given that voiceless consonants /p, k/ yielded lower rates of vowel epenthesis than voiced ones /b, g/ preceding *-ed*, and the /t, d/ were the easiest preceding *-ed* contexts in both perception and production tests, indicating that there was a correlation between perception and production.

Proficiency level also seems to affect the production of verbs ending in *-ed*. Alves (2007), Gomes (2009, 2010, 2011, 2014) and Pereira (1994) obtained similar results in which beginning participants produced higher rates of vowel epenthesis than advanced participants, suggesting that improvement in proficiency level induced lower rates of vowel epenthesis. In addition, Delatorre and Baptista (2014) suggested that improvement in the pronunciation of verbs ending *-ed* from 31.81% (semester 1) to 43.75% (semester 3) to 68.75% (semester 4) by their participant might be attributed to participant’s proficiency improvement, motivation to learn pronunciation, continued accurate input and explicit instruction along their study. However, Gomes also drew attention to the persistent epenthesis production even among advanced participants with some knowledge of the *-ed* pronunciation rules.

Delatorre's (2010a) study involved two adult female Brazilian EFL learners² who first read 130 sentences, each with a regular past tense verb and second, indicated in a table, for the same verbs, whether they believed they tended to pronounce each verb with or without an epenthetic vowel. The rates of vowel epenthesis produced (87.50%) were considerably higher than the rates of vowel epenthesis indicated (46.15%) by the participants in the table, thus indicating a weak negative correlation between them. In addition, Delatorre's (2010a) results also indicated that the participant with less experience in English, and probably less proficient in the language, chose the epenthesized pronunciation more often in the table (73.84%), indicating she was possibly unaware that the vowel grapheme of the *-ed* morpheme should not be pronounced in most of the verbs (there were only 6 with a /t/ or /d/ context). On the other hand, the more experienced participant³, and probably more proficient in the language, chose the non-epenthesized pronunciation more often (81.54%), indicating she had some notion of the regular verb pronunciation rules. The high rates of vowel epenthesis in verb pronunciation associated with participants' doubts about the pronunciation rules indicate that orthography probably affected the results and that more explicit instruction on the pronunciation of verbs ending in *-ed* was needed.

Evidence for the orthographic influence in the production of verbs ending in *-ed* was found by Delatorre (2005, 2006a, 2010b) and Alves (2007). Delatorre found, in a paragraph reading task, higher rates of epenthesis in verbs such as 'missed' 'planned', and 'played' than in phonologically similar monomorphemic words without orthographic *-ed*, such as 'best', 'found', and 'made'. Another indication of orthographic influence was the less frequent vowel epenthesis production in verbs used in the picture description task than in the paragraph reading task (DELATORRE, 2005, 2006a, 2010b). Alves (2007) found similar results in his investigation of epenthesis production in monomorphemic clusters (12 out of 478 or 2.5%) and final *-ed* clusters (209 out of 468 or 44.7%) / st, ft, pt, kt/ in pairs such as 'last/passed', 'draft/laughed', 'opt/stopped', 'fact/lacked' by a mixed group of 32 Brazilian beginning to advanced EFL learners. Thus, Alves' lower-proficient participants produced epenthesis in both monomorphemic and *-ed* clusters, whereas the more advanced learners produced it only in the *-ed* ending clusters. Gomes (2009, 2010,

² Both participants also had some knowledge of German and the one with more experience with German also had more experience with English.

³ A background questionnaire was administered to obtain this information.

2011, 2014), on the other hand, did not find the influence of orthography in the production of vowel epenthesis in English verbs ending in *-ed*, but she stated that it does not mean that it does not affect oral production, especially when more recent studies have claimed orthography to act as a filter of L2 phonology (YOUNG-SCHOLTEN; LANGER, 2015).

Davila (2018) investigated the production of 44 isolate verbs, four in which the *-ed* was produced as [ɪd, əd], 12 in which it was produced as [t] and 28 in which it was produced as [d], by 48 native speakers of Spanish, all learners of English, 16 high beginners, 16 intermediate and 16 high intermediate learners, in Nicaragua. Davila compared the production of each of the three *-ed* realizations among the three groups of participants and found that the production of verbs, such as 'visited', and 'decided', in which the *-ed* should be pronounced as [ɪd, əd], was not statistically significant different among participants, which she attributed to markedness⁴ since the VC syllable of these verbs, found in English and Spanish, is less marked than the VCCC and VCC syllables found in the pronunciation of verbs, such as 'helped' and 'loved', in which the *-ed* is pronounced as [t, d], respectively. Furthermore, Davila (2018) highlighted the role of L2 proficiency, since high beginners tended to outperform the more proficient participants. She pointed out that the omission of the *-ed* morpheme pronunciation was the strategy participants of all three groups used in the pronunciation of verbs that end as /ɪd, əd/.

Moreover, Davila (2018) found that the difference in the production of verbs, such as 'stopped' and 'played', in which the *-ed* was produced as [t, d], was statistically significant among the groups, indicating that the less proficient high beginners produced more vowel epenthesis or deletion of the *-ed* morpheme than intermediate learners who had more problems in the pronunciation of these verbs than high intermediate learners, demonstrating the influence of proficiency level. Davila also reported that vowel epenthesis was the most frequent strategy in the pronunciation of verbs, such as 'whished' and 'asked'; 'learned' and 'belonged', in which the *-ed* should be produced as [t, d], respectively, whereas the *-ed* deletion, producing verbs in the stem form, was more frequent in verbs, such as 'passed' and 'laughed', which would require the *-ed* production as [t].

⁴ Eckman (1987) proposed the Markedness Differential Hypothesis (MDH) based on markedness relations comparing the L1 and the L2 structures in terms of relative degrees of difficulty. Thus, as observed in Delatorre (2006a), according to the MDH, learners have more difficulty in acquiring foreign language structures that differ and are more marked from those of the native language.

Caballero and Rosado (2018) investigated the effect of instruction on the production of verbs ending in *-ed* by native speakers of Spanish learning English for a period of one year in Colombia. Participants were university students from different majors considered as intermediate (B1⁵) learners of English. They were split into the standard pronunciation teaching group, who received traditional explicit instruction of simple past tense *-ed* pronunciation and drilling, and the neuro-linguistic programming (NLP) group, who received pronunciation instruction by comparing verb pronunciation with the pronunciation of other words, such as “Bert for /t/, Fred for /d/, and David for /ɪd/” (p. 5) or words that have similar sound production as verb endings and repeating verb pronunciation in separate groups in class.

Moreover, Caballero and Rosado (2018) explained that two types of data collection were used. In the first one, they asked five participants in the standard pronunciation teaching group and seven in NLP group to audio-record their reading of a text with 10 target verbs before and after instruction. In the second procedure, 18 participants in the standard pronunciation teaching group and 13 on the NLP group had *-ed* pronunciation instruction previous to the data collection in which they audio-recorded their reading of a list with eight *-ed* ending verbs and a spontaneous speech based on their answers to some questions presented by the researchers.

Caballero and Rosado (2018) found that instruction played a role in the production of verbs in both reading and spontaneous speech tasks and that the NLP was more effective than the standard pronunciation teaching in both tasks. In addition, Caballero and Rosado’s results also suggested that verbs in which the *-ed* was realized as [t] were less accurate⁶ for Spanish learners of English than verbs in which it was realized as [d] in all reading and speaking tasks and data collection procedures for both standard pronunciation and NLP groups. The [ɪd] was more accurately realized by the standard group only in the spontaneous speech in procedure two. The authors also reported that verbs were more accurately produced in the reading task than in the spontaneous speech in procedure two, contradicting Delatorre and Baptista’s (2014) results, as pointed out by Caballero and Rosado.

⁵ According to the Common European Framework of Reference for Language

⁶ They did not clearly state what they considered as inaccurate pronunciation of verbs ending in *-ed*, if either pronounced with epenthesis or in stem form, for instance.

The third study involving Spanish learners of English was conducted in Spain by Roothoof (2012) who observed that production of final /t/ and /d/, that occur in *-ed* ending verbs, seem to be problematic for Spanish learners since the Spanish language does not have them in final position and are frequently realized as fricatives. This study investigated if corrective feedback, either recasts or metalinguistic feedback (MF)⁷, was effective in the production of regular and irregular verbs by three Spanish learners of English. Participants were individually audio-recorded while talking to their teacher who provided them feedback in the production of regular and irregular verbs in the simple past.

Roothoof's (2012) results indicated that the two types of feedback induced similar results for simple past tense verb production since the improvement in their production was similar for the three students and for both regular and irregular verbs. However, Roothoof suggested that the MF feedback seemed to be more effective than the recasts in accurate verb production improvement. The author also observed that participant 3 produced two instances of vowel epenthesis in verbs in which it was not required.

Thus, the objective of this study was to investigate how native speakers of BP, Spanish, German and English produced English verbs ending in *-ed* when recording a sentence reading test. The following section presents participants' profile as well as instruments and procedures to collect and analyze the data.

Method

As the review of literature demonstrates, there is a number of studies that focus on the production of verbs ending in *-ed* involving either speakers of BP and Spanish as L1. Thus, the present study attempts to contribute to the field by comparing *-ed* productions of learners from different L1 backgrounds (Brazilian, Spanish and German native speakers) and production of native speakers of English. This section describes the participants of the present study as well as the instruments and procedures used to conduct the study.

⁷ Roothoof followed Lyster and Ranta's (1997, p. 46-48) definitions of recasts as "the teacher's reformulation of all or part of the student's utterance, minus the error" and metalinguistic feedback as "comments, information or questions related to the well-formedness of the students' utterance, without explicitly providing the correct form".

Participants

Eight participants, two BP, two Spanish, two German and two English L1 speakers contributed to this study. All speakers were invited and agreed to volunteer to the study. Before the data collection session, they read and signed a consent form.

Table 1 – Participants' background

	BP1 ⁸	BP2	S1	S2	G1	G2	E1	E2
Sex	F	M	F	M	F	M	F	M
Age	29	29	55	33	20	42	21	29
Origen	Brazil	Brazil	Argentina	Spain	Germany	Germany	Australia	USA
L1	BP	BP	Spanish	Spanish	German	German	English	English BP
Education	MA	MA	MA	MA	High school	Graduation	High school	High school
Went to an English speaking country	USA – 3 ½ years 21 – 24 years old	England – 1 week 29 years old	USA – 2 weeks 30 years old	England – 2 months 25 – 26 years old	USA – 10 months 16 – 17 years old	Ireland and England – few days 25 years old	—————	—————
Time studying English at school	11 years	12 years	19 years	7 years	13 years	4 years	—————	—————

Source: the authors.

According to participants' answers to the background questionnaire, BP1 reported using English at work for three years and a half in the United States and S2 and G2 reported using English at work for a short period of time in Europe. BP1, BP2 and S1 were teachers of English or worked with translation studies and had daily contact with English at the moment of data collection. Only BP1 reported having studied in an English speaking country for three years and S2 for two weeks but all of them traveled to an English speaking country for some time. Furthermore, Table 1 also revealed that the amount of time participants got in contact with English varied from four (G2) to 19 years (S1). Table 2 displays further information regarding the Brazilian, Spanish and German participants' reported experience with the study of the English language.

⁸ BP, S, G and E mean Brazilian Portuguese, Spanish, German and English native speaker participant, respectively.

Table 2 – Frequency of studying some aspects of English language

Aspect	Most of the time	Sometimes	Almost never
Grammar	S1, S2, G2	BP1, BP2, G1	
Reading	BP1, BP2, S2, G2	S1, G1	
Writing	BP2, S2, G2	BP1, S1, G1	
Speaking	BP1	BP2, S2, G1, G2	S1
Listening	BP1, BP2	S1, G1 G2	S2
Pronunciation		BP2, G1	BP1, S1, S2, G2

Source: the authors.

As can be seen in Table 2, participants reported having little experience with pronunciation teaching, as no participant reported having studied pronunciation ‘Most of the time’, and four selected the answer ‘Almost never’. Most of them reported having had more contact with reading and speaking, or with grammar and writing.

Instruments and procedures for data collection and analysis

The instruments for data collection were a list of 96 sentences and a background questionnaire. The sentence list contained 24 items for each of the three *-ed* allomorphs /t, d, əd/ (total of 72 verbs) and 24 irregular verbs in the simple past tense, distractors in this study. All sentences, which contained a subject, a verb and a noun or an adjective, but no past marker, such as ‘yesterday’ or ‘last year/week’ (See Appendix A), were randomized for the three *-ed* allomorphs, the irregular verbs and the participants’ L1.

To collect the data, participants were individually audio-recorded at *Laboratório de Fonologia Aplicada* (FONAPLI) at *Universidade Federal de Santa Catarina* (UFSC), which has an acoustic booth to record data for acoustic analysis. They read exactly the sequence of sentences presented in Appendix A that were displayed in a Power Point file with one sentence in each slide written in a black 54 size Times New Roman font. Participants were instructed to read the sentences as naturally as possible and only one time, except for the cases when they had doubt about word pronunciation and/or hesitated in reading some sentences. Only the last reading was considered in the data analysis of these repeated sentences.

The acoustic analysis of the verbs pronunciation was carried out with the PRAAT software and took into account only the production of verbs ending in *-ed*, which were phonetically transcribed by the first

researcher and classified as target-like, epenthesized, stem form and other pronunciation (e.g., word replacement, devoicing of the preceding *-ed* context and/or final cluster, preceding *-ed* context change, third person singular).

The questionnaire, with 16 questions, seven open and nine multiple choice questions, was answered by the participants after the recording and elicited participants' educational and linguistic background information. The questionnaire data was used to build Tables 1 and 2, which provided biographic information about the participants', as well as information about their education and experiences learning and using English for professional purposes. Results obtained with these instruments and procedures will be presented and discussed in Section 4.

Results and discussion

This section presents and discusses the results for the production of English verbs ending in *-ed* by two native speakers of BP, two of Spanish, two of German and two of English who produced 72 verbs each, or a total of 576 verbs. Among the verbs, 429 (74.47%) were target-like produced whereas 147 (25.52%) had some type of non-target pronunciation, including 35 verbs (6.07%) produced with an epenthetic vowel when it was not required, 60 (10.41%) produced in the stem form, and 52 (9.02%) produced with other type of non-target pronunciation, such as final consonant cluster devoicing in *-ed* pronunciation, thus producing [t] rather than [d], changing the context preceding the *-ed*, producing the target verb in the third person singular and replacing it with another word while reading the verbs inserted in short sentences. Table 3 displays the results for the production of verbs ending in *-ed* by the eight participants.

Table 3 - Overall results for the production of verbs ending in *-ed* according to participants' L1 (in percentages)

Category	BP	Spanish	German	Total NNs	English	TOTAL
Target	88.88	60.41	73.61	74.30	75.00	74.47
Epenthesized	2.77	21.52	0.00	8.10	0.00	6.07
Stem	4.16	2.77	13.19	6.71	21.52	10.41
Other	4.16	15.27	13.19	10.87	3.47	9.02
Non-Target	11.11	39.58	26.38	25.69	25.00	25.52

N for each group of non-native speakers of English (NNSs) and native speakers of English = 144; N for all NNSs = 432; Total for all speakers 576

Source: the authors.

Overall, results displayed in Table 3 indicate a similar high level of target-like production of verbs ending in *-ed* by native (75%) and non-native (74.30%) speakers of English, varying from 88.88% for BP speakers to 60.41% for Spanish speakers, which corroborates the findings of studies with BP and Spanish advanced learners of English (e.g., ALVES, 2007; DAVILA, 2018; DELATORRE, 2004; DELATORRE 2010a; PEREIRA, 1994). These results may be related to the fact that most speakers were highly proficient and used English on a daily basis (either by working as English teachers (BP1, BP2, and S1) or other types of job (S2, G1, and G2)). This intense contact with English helped the L2 speakers to master the pronunciation of the *-ed* endings or at least to monitor their pronunciation.

As previously mentioned, the target-like production rates of verbs ending in *-ed* by Spanish speakers were the lowest ones, which, however, may have been influenced by proficiency level difference between the two Spanish L1 participants, since S2⁹ had higher rates of non-target productions compared with S1's¹⁰, corroborating Davila's (2018) findings regarding proficiency influence for Spanish L1 speakers learning English and Alves' (2007), Delatorre's (2004, 2010a), Delatorre and Baptista's (2014), Gomes' (2009, 2010, 2011, 2014) and Pereira's (1994) for Brazilian learners of English. On the other hand, as Table 4 shows, results for BP, German and English L1 speakers were more similar between the two participants from the same L1 than between the two Spanish L1 speakers, suggesting that they possibly had a similar proficiency level in the target language. Table 4 displays the results for verb production by each participant.

Table 4 - Production of verbs by each participant (in percentages)

Category	BR1	BR2	S1	S2	G1	G2	E1	E2	Total
Target	86.11	91.66	94.44	26.38	79.16	68.05	76.38	73.61	74.47
Epenthesis	1.38	4.16	2.77	40.27	0.00	0.00	0.00	0.00	6.07
Stem	6.94	1.38	1.38	4.16	12.50	13.88	16.66	26.38	10.41
Other	5.55	2.77	1.38	29.16	8.33	18.05	6.94	0.00	9.02
Non-targets	13.88	8.33	5.55	73.61	20.83	31.94	23.61	26.38	25.52

Other. = other pronunciations; Non-targets = total of non-target productions; N for each participant = 72; N for all participants = 576

Source: the authors.

⁹ As he came from Spain (See Table 1) and, as pointed out by Laborda *et al.* (2018) "In relation to foreign languages, Spain is among the European countries with the lowest competence in English" (p. 177), he could be less proficient in the target language and might have had some difficulty with the pronunciation of English verbs.

¹⁰ See their individual results in Table 4.

Analyzing the data according to non-target productions (Table 4), the rate for all six English non-native speakers (25.69%), Gs (26.38%) and Es (25%) were very similar, but higher than the rate for BPs (11.11) and lower than the rate for Ss (39.58%). Among the non-target productions, it was observed a tendency for producing stem form verbs (10.41%), other types of pronunciations (9.02%) for the target verbs, and vowel epenthesis (6.07%) as syllable simplification strategies used to pronounce verbs ending in *-ed*. But, as Table 4 shows, this pattern was not followed by speakers from the four L1 backgrounds, since participants whose L1 was a Romance language, such as BP and Spanish, tended to use vowel epenthesis, stem form and other productions, as strategies to deal with the pronunciation of English verbs ending in *-ed*, whereas native speakers of German, which is not a Romance Language, tended to use stem productions more frequently than BP or Spanish L1 speakers, or other pronunciations. These overall results on non-target productions of verbs ending in *-ed* show that the difficulty to pronounce the *-ed* endings may persist in high proficiency levels for learners of different L1 backgrounds, especially for native speakers of romance languages, as pointed out by Caballero and Rosado (2018), and also for German L1 speakers, as observed by Roothoof (2012) based on Rohde's (2002) study. It is important to highlight that nearly all non-target productions by the native speakers of English consisted of stem form verbs, showing that this is a recurrent strategy used by native speakers of English to produce complex verb codas.

As can be seen in Table 4, vowel epenthesis production (6.07%) was used by BP and Spanish L1 speakers to produce verbs such as 'parked', 'watched', 'stopped', 'jumped', 'looked', 'missed', 'loved', 'changed', 'screamed', 'planned', 'learned', 'called' and 'played', corroborating results with English learners in Alves (2004, 2007), Davila (2018), Delatorre (2004, 2005, 2006a, 2006b, 2008, 2010a, 2010b), Delatorre and Baptista (2014), Delatorre and Koerich (2008), Fernandes (2009), Gomes (2008, 2009, 2010, 2011), Mariano (2009), Pereira (1994) and Roothoof (2012). As occurred in Davila (2018), BP and Spanish participants used [ɪ] and [ə] as epenthetic vowels in the production of verbs ending in *-ed* in the present study, corroborating Davila's findings.

In regard to stem forms, Table 4 demonstrates that speakers from the four L1s (e.g., BP, Spanish, German, English) that participated in this study produced 10.41% of the verbs in the stem form, including

verbs such as ‘stop’, ‘type’, ‘clap’, ‘help’, ‘ask’, ‘park’, ‘force’ ‘miss’, ‘fix’, ‘whish’, ‘love’, ‘save’, ‘provide’, ‘cause’, ‘close’, ‘judge’, ‘change’, ‘plan’, ‘earn’, ‘play’, ‘need’, ‘include’ ‘post’. These results corroborate the findings of Alves (2004), Davila (2018), Delatorre (2005, 2006b), Delatorre and Baptista (2014), Fernandes (2009), Roothoof (2012) and Rohde¹¹ (2002) for Brazilians, Spanish and German L1 speakers, as well as the observation made by Prator and Robinett (1985) for non-native speakers of English production of regular verbs in the simple past tense. Stem verb form production may be related to some misreading, doubt in verb pronunciation while reading, hypercorrection¹² after explicit instruction in the case of the [ɪd] allomorph in ‘needed’, produced as [nɪd] in Alves (2004), corrective feedback after associating the simple past auxiliary and the simple past tense verb as found by Roothoof (2012) or frequency of occurrence for the verb ‘completed’ produced as [kəmplit] in Delatorre and Baptista (2014).

Stem form production for native speakers of English could be attributed to different reasons. For example, it may be related to blending or linking of similar surrounding sounds (HAGEN; GROGAN, 1992), as final /s/ in ‘miss’ with initial /s/ in ‘some’ in sentences such as ‘She missed some classes’, which was recorded by the participants. In other words, native speakers of English also tend to use some syllable simplification strategies in the production of verbs ending in *-ed*, despite the fact that the literature says that English verbs ending in *-ed* tend to be produced as [t], [d] or [ɪd] due to assimilation processes (CELCE-MURCIA; BRINTON; GOODWIN, 1996; CELCE-MURCIA *et al.*, 2010; HAGEN; GROGAN, 1992; HANCOCK, 2003; LANE, 1993; MARSLEN-WILSON; TYLER, 1998; PRATOR; ROBINETT, 1985). In addition, Hagen and Grogan (1992), Ladefoged and Johnson (2010) and Lodge (2009) also pointed out that oral stops, such as /p, t, k, b, d, g/, are nonreleased in final position but not completely deleted as it was the case in the present study. The acoustic analysis of verbs that were expected to be pronounced with [t] (e.g. ‘worked’) were produced with complete final coda deletion by the native speakers of English. Moreover, Flege, Munro and Skelton (1992) also stated that native speakers of English who participated in their study tended to produce the final /t/ and /d/

¹¹ The author investigated the aspect hypothesis on the acquisition of simple past tense, both regular and irregular verbs in English, by four German L1 children from 4 to 9 years old learning English in a naturalistic setting.

¹² Eckman, Iverson and Song (2013), based on Major (2001), considers that hypercorrection occurs in the late process of learning.

contrasts in monomorphemic words (e.g., ‘float’, ‘flood’). Thus, it is not possible to relate the production of monomorphemic words with /t/ and /d/ in coda position with production of verbs ending in *-ed* by native speakers as they do not seem to follow the same process.

Moreover, as demonstrated in Table 4, Spanish and German, more frequently than BP and English L1 speakers, produced 9.02% of the verbs ending in *-ed* by resorting to other types of pronunciation, namely, word replacement, final consonant cluster devoicing and preceding *-ed* context change. In this regard, BPs’ non-target productions included changes in the preceding *-ed* context in verbs, such as ‘rented’ and ‘filled’, produced as [ɹɛnd] and [fɪɹd], and word replacement in verbs such as ‘painted’, ‘invited’, ‘guided’ and ‘stayed’, produced as [peɪnd], [ɪnvɑɪdɪə], [kaɪəd] and [steɪəd], respectively. Except for the verb ‘filled’, in which the final /l/ was produced as [ʊ]/, a common process for Brazilian learners of English (BARATIERI, 2006), other cases may reflect some misreading or influence of their pronunciation in other verbs, such as ‘waited’ produced as [wəɪəd], by both native speakers of English and one native speaker of German in this study which is explained by the /t/ being realized as a flap [ɾ] between two vowels (BAPTISTA, 2001; CARR, 2008; LADEFOGED; JOHNSON, 2010; LODGE, 2009).

As previously mentioned and demonstrated in Table 4, Spanish L1 speakers frequently used other types of pronunciation to produce verbs ending in *-ed*. Thus, changes in the context preceding the *-ed*, as in ‘judged’ produced as [dʒʊgəd] possibly due to orthographic influence, as suggested by Alves (2007), Delatorre (2005, 2006a, 2010a, 2010b) and Pereira (1994), and ‘started’ produced as [stɑːtʃɪ], were found in their production of verbs ending in *-ed*. In addition, misreading of verbs, changing the pronunciation of some consonantal or vocalic sounds, the addition of syllables, consequently producing other words as well as word replacements, also occurred. For instance, verbs such as ‘laughed’ produced as [lɔftʰ] possibly because S1’s knowledge of English pronunciation of words as ‘taught’ and ‘washed’ produced as [ʊɔsət] and ‘shared’ as [sɔəd] probably because of S2’s lack of proficiency in English¹³. Regarding the production of the verbs ‘rented’, ‘plugged’, and ‘asked’, produced with the addition of a syllable, as [ɹɛntɪdɪt], [plʌʒedɪd] and [ɹɛntɪdɪt], respectively; ‘fixed’ produced in the third person singular

¹³ See his individual results in Table 4 and Footnote 12 in which Laborda et al. (2018) comment on European Spanish speakers’ proficiency in English.

as [fiksəs], ‘skipped’ replaced by a word that sounded like [spɪkɪt] and ‘proved’ by the verb ‘provided’ by S2; the omission of the /l/ in the onset of the verb ‘clapped’ producing a word similar to the verb ‘kept’, which also occurred with E1, are examples of other pronunciations used by Spanish L1 speakers when pronouncing the verbs ending in *-ed*.

According to the results displayed in Table 4, native speakers of German also had other non-target pronunciations, including final consonant cluster devoicing and consonant replacement as syllable simplification strategies to deal with the production of verbs ending in *-ed*. For instance, G1 and G2 devoiced the /g/ context preceding the *-ed*, producing the verb ‘plugged’ as [plɒk] whereas G1 devoiced the /v/ producing the verb ‘saved’ as [seɪf], both in the stem form. Moreover, G1 and G2 speakers devoiced the entire cluster in which the *-ed* occurred, as in ‘lived’ produced as [lɪft], and G2 produced the verbs ‘proved’ and ‘loved’ as [prɒft] and [lɒft], respectively. Thus, these non-target pronunciations were possibly caused by L1 interference since the grapheme <v> tends to be pronounced as [f] in German, as Antonsen (2007) pointed out, and by devoicing of final-English-voiced consonants, as found by Yavas (1994), who attributed it to L1 influence, since, as pointed out by Antonsen (2007), some varieties of German have a preference for final voiceless obstruents.

Change in the context preceding the *-ed* also occurred in the pronunciation of the verb ‘changed’ produced as [ʃeɪnɜd] by G2 and as [tʃeɪnɜ] by E1. Moreover, G2 had non-target pronunciations of the verbs ‘laughed’ and ‘wished’ produced as [lɒd] and [vɪʃ], respectively, which may have been caused by the difficulty with L2 spelling and sound correspondences, as possibly also occurred in Delatorre (2005, 2006a, 2010a, 2010b) in the case of ‘laughed’, or to L1 influence in the pronunciation of ‘wished’ since the grapheme <w> tends to be pronounced as [v] in German (Antonsen, 2007), rather than as [w] as it is in English (Giegerich, 1992). Moreover, as occurred with Rohde (2002), results the present study seemed to be influenced by participants’ L1 German.

As results displayed in Tables 4 demonstrate, English native speakers produced few instances of other pronunciation in the production of verbs ending in *-ed*, including the replacement of the verb ‘caused’ by the word ‘cost’ and the change in the preceding *-ed* context /dʒ/ by [ʒ] in ‘changed’, both by E1, possibly due to misreading, or changes that may be emerging in the English language replacing /dʒ/ by [ʒ].

Conclusion

This study investigated the production of verbs ending in *-ed* by two L1 speakers of BP, Spanish, German, and English, which seemed to be influenced by participants' proficiency level and contact with the English language either by teaching it (BP1, BP2, S1) or using it at work (G1, G2), consequently producing high rates of target verb production. On the other hand, S2, who seemed to have less contact with English as a whole and with listening, speaking and pronunciation, according to Tables 1 and 2¹⁴ and be less proficient than the other five non-native speakers, produced higher rates of non-target *-ed* ending verbs. In addition, speakers' L1 and markedness seemed to have affected the production of verbs by non-native speakers since there was a tendency to produce the less marked syllables either with vowel epenthesis (BP and Spanish L1 speakers) or by omitting the *-ed* pronunciation, producing verbs in the stem form due to misreading or hyper-correction (BP, Spanish and German L1 speakers) or due to blending and linking of similar sounds (English L2 speakers).

Orthography of the verbs associated or not with the speakers' L1 also seemed to have affected non-native speakers' results since participants tended to pronounce verbs according to their spelling (S2 and G2) or speakers' L1 pronunciation of grapho-phonetic conversions, thus changing the preceding *-ed* context in some cases (G1 and G2) or the entire cluster by devoicing (G2). Moreover, misreading or doubts in the pronunciation of verbs ending in *-ed* possibly affected the results since some verbs were replaced by other similar words or pseudo-words (BP1, S1 and S2), or the addition of an entire syllable after the *-ed* (S2). The use of blending or linking of similar sounds also seemed to have affected the results for native speakers of English, given that both factors seemed to have triggered the omission of the *-ed* pronunciation in about 25% of the tokens produced by English native speakers.

Results of the present study have important pedagogical implication for the teaching of pronunciation regarding verbs ending in *-ed* since they indicate that teachers and pronunciation manuals should take into account the target-like voicing assimilation processes as well as possible syllable simplification strategies in *-ed* ending production. In addition, the English native speakers' results also indicate the need for addressing the role of suprasegmental factors found in fluent speech, such as linking or blending in the pronunciation of *-ed* endings.

¹⁴ See these two tables and participants' background information in the Method section.

Having access to this information could aid non-native speakers of English to better understand the production of simple past tense *-ed* verbs, as well as help them produce complex cluster combinations in a target-like fashion without adopting strategies that are typical of their L1 phonetic-phonological system and that may hinder the intelligibility and comprehensibility of their speech in different contexts of use.

Further studies on this issue should include more speakers from the L1 backgrounds investigated here, as well as speakers from other L1s, such as European Portuguese, French or Chinese learning English in both naturalistic and non-naturalistic settings, and more native speakers of English from different areas. Data collection could also vary, including reading of sentences and spontaneous speech. Moreover, factors related to participants' individual differences could be included in the analysis to observe the effects that experience with the language and language proficiency exert on the acquisition of a new phonological system.

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APPENDIX A – List of sentences

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|--|--------------------------------------|
| 01: She bought a new car. | 30: Children screamed a lot. |
| 02: They voted in the elections. | 31: He missed some classes. |
| 03: Students trained for the test. | 32: They waited for the train. |
| 04: Mary washed her dress. | 33: Jack proved his innocence. |
| 05: They came by bus. | 34: The family attended a concert. |
| 06: The stadium cheered him. | 35: She asked my name. |
| 07: Tom guided visitors. | 36: Lisa drew a bird. |
| 08: Bob stopped smoking. | 37: Students danced all night. |
| 09: She played piano. | 38: Susan tried her best. |
| 10: He drove for 18 hours. | 39: Kids saw a black dog. |
| 11: They watched a movie. | 40: They rented a car. |
| 12: Helen painted her bedroom. | 41: They crossed a famous street. |
| 13: The audience laughed out loud. | 42: John printed his paper. |
| 14: He needed a job. | 43: Boys shared a house. |
| 15: She made a cake. | 44: They woke up late on Sunday. |
| 16: The pilot saved all passengers. | 45: They adopted a child. |
| 17: I visited my family. | 46: George brushed his teeth. |
| 18: They took a trip. | 47: Anna taught English for years. |
| 19: She looked for a new job. | 48: Ann and Bob planned a trip. |
| 20: They judged a robber. | 49: They drank a lot. |
| 21: They skipped some exercises. | 50: His speech sounded fine to us. |
| 22: Models avoided eating. | 51: The man clapped his hands |
| 23: He wrote a letter. | 52: Students joined a group. |
| 24: The driver caused an accident. | 53: They fought at school. |
| 25: The family had breakfast together. | 54: They worked hard. |
| 26: Suzy kissed her father. | 55: The teacher added a new student. |
| 27: The teacher spelled his name. | 56: He failed in the Math test. |
| 28: He recorded a video. | 57: This reminded me of his songs. |
| 29: Kids slept for 10 hours. | 58: Journalists gave us bad news. |
| | 59: The chief jumped a wall. |

60: He changed his mind.
61: Paul sang for three hours.
62: Police counted one million people.
63: James called his parents.
64: Helen dressed well.
65: She wished she had a car.
66: His family left Brazil
67: Martha loved Peter
68: She started reading the book.
69: Students filled in a questionnaire.
70: Adolescents spent hours on internet.
71: Peter parked his car here.
72: They invited a hundred people.
73: Anna cut some vegetables.
74: The couple earned some money.
75: The government provided less money.
76: The secretary typed some letters.
77: The invitation included all teachers.
78: The car cost fifty thousand dollars.
79 Stella talked for one hour.
80: Taxi drivers learned some English.
81: Kids ate a lot of chocolate.
82: Jeff fixed Mary's car.
83: Stevie concluded his book.
84: Bill closed a window.
85: Parents forced him to lie.
86: They stayed in the line.
87: Bruce posted on Facebook.
88: Birds flew in the sky.

89 Jim helped many people.
90: Kate brought cake to the party.
91: They lived in London.
92: Teachers graded students.
93: The priest blessed her children.
94: Jane hurt her finger.
95: They rested on the weekend.
96: David plugged in his computer.