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2aSC25. What palatalized consonants can tell us about theories of loanword adaptation 
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Phonology- and perception-based theories of loanword adaptation clash over two different assumptions: what language background the adapter has and what cognitive component handles adaptation. Phonology-based theories argue that borrowers know both the source and borrowing language and that the phonology determines output forms; perception-based accounts argue that the borrower doesn't know the source language and that the phonetic decoder guides adaptation. Since there is no reason to believe that either population of borrowers cannot adapt words, a production experiment was carried out to test both populations/approaches. Four monolingual English and three bilingual English-Russian speakers were played currently unborrowed Russian words containing palatalized consonants and asked to repeat them aloud in an American English accent. Since palatalized velar and coronal stops are often articulated with some degree of affrication and monolinguals are unaware of this, it was predicted that they would sometimes adapt said consonants as affricates. However, since bilinguals are familiar with the co-articulatory affrication, they were not predicted to adapt palatalized stops as affricates. The results corroborated the hypothesis in that bilinguals never affricated while monolinguals affricated a tenth of palatalized stops-- demonstrating that both theories make the correct predictions for their respective populations.

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INTRODUCTION

In this paper I investigate what effect language background has on loanword adaptation. This study was motivated by claims that adaptation is purely perception-based or purely production-based (C. Paradis & Thibeault, 2004; Carole Paradis & Lacharité, 1997; Carole Paradis & LaCharite, 2009; Carole Paradis, 2006, 2006; Peperkamp, Vendelin, & Nakamura, 2008; Peperkamp, 2004; Vendelin & Peperkamp, 2006). By providing Russian words containing palatalized consonants to monolingual English speakers and bilingual English-Russian speakers, I show that monolinguals are susceptible to coarticulatory effects while bilinguals are not. These results best make sense using a model that permits monolinguals to only adapt words perceptually, but gives bilinguals the option of adapting them via perception or production.

The following section begins with a brief overview of what loanword adaptation is and two popular approaches for it; it ends with a discussion on what palatalized consonants can tell us about the conflicting perspectives taken by the two popular approaches. Section 3 and 4 lay out the design and results of the experiment designed to see how monolinguals and bilinguals adapt palatalized consonants. Section 5 summarizes and explores the implications of the results. Section 6 concludes the paper.

BACKGROUND

Loanword adoption is the process of importing a lexical item from one language into another. The language from which the word is taken is called the source language, while the language that receives the word is referred to as the borrowing language. Loanwords themselves can be divided into two types, sound-based or meaning-based.

In sound-based adaptation, the borrower imports the surface form of a source word as faithfully as they can given the restrictions of the borrowing language. For instance, the English word ‘bike’-[baɪk] was borrowed into Japanese as 「バイク」-[baɪku]. Since the archiphoneme [N] and the first half of a geminate are the only licit coda segments in Japanese, [u] is epenthesized after the singleton coda [k] in order to make the form comply with Japanese phonotactics.

In meaning-based adaptations, the borrower entirely disregards the source surface form and instead preserves the literal meaning of a source word using lexemes from the borrowing language. For example, the English word ‘skyscraper’ was borrowed into German as ‘Wolkenkratzer’, where ‘Wolken’ means ‘cloud’ and ‘kratzer’ means ‘scratcher’. In this paper, I will only focus on sound-based forms since they enable phonologists to explore the uniformity of synchronic grammars (Ito & Mester, 2009) and the boundaries of the phonetics-phonology interface (Zuraw, 2007).

Theories of Loanword Adaptation

There are two popular approaches to explaining loanword adaptations like [bai.ku]. One is production-based and the other is perception-based. Proponents of the production-based approach (C. Paradis & Thibeault, 2004; Carole Paradis & Lacharité, 1997; Carole Paradis & LaCharite, 2009; Carole Paradis, 2006) argue that adaptation takes place when a speaker familiar with both the source and borrowing languages (henceforth an experienced speaker), retrieves the phonological representation for a source lexeme and uses it as the input to the borrowing phonology. Any differences between the source and borrowed form are thus the results of the phonology and the phonology alone. See FIGURE 1.a for a schematic of the production model. To ground this perspective with an example, let us return to the Japanese borrowing for ‘bike’. According to production model, a Japanese-English bilingual must have accessed the English word for ‘bike’, retrieved its phonological representation [baik], and fed it to their Japanese phonology. Here, EVAL selected [bai.ku] as the winner and not the fully faithful candidate [baik] since the former best satisfies the constraint hierarchy for Japanese.

a.

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1 In the literature, alternative terms for ‘source’ and ‘borrowing’ language found are ‘donor’ and ‘recipient’ language or ‘L2’ and ‘L1’.
Advocates of the perception-based approach to loanword adaptation argue that adaptation takes place when a speaker who does not know the source language (henceforth a naive speaker), hears the acoustic form of a source word and then parses that continuous acoustic representation into a discrete abstract representation. Any differences between the source and borrowed forms are thus the result of the phonetic decoder. See FIGURE 1.b for a schematic of the perception model. To make this concrete, let us again return to the Japanese borrowing for ‘bike’. According to the perception model, a monolingual Japanese speaker must have heard the acoustic form of the word ‘bike’ and then parsed it as [bai.kɯ]. Evidence for ‘perceptual epenthesis’ comes from a now famous study conducted by Dupoux et al. (1999), in which Japanese and French speakers were asked to identify whether or not they heard the vowel [u] in nonce words such as [ebuzo]. Even when the vowel in said forms was completely spliced out, Japanese speakers reported hearing [u] about 60-75% of the time while French speakers reported hearing it approximately 10-20% of the time. Since Japanese prohibits [bz] sequences and French does not, these results are taken as evidence for the influence of phonotactic knowledge in perception.

The ‘Conflict’

The production account rests on the idea that unfaithfulness in loans is the result of the phonology forcing illicit structures to conform to the borrowing language’s restrictions, while the perception model is based on the notion that adaptations reflect phonetically minimal transformations that occur during speech perception. The classic conflict between the perception and production accounts are exemplified by the data sets below, which I will now discuss in turn.

Using a corpus of English loans in Mandarin Chinese (MC), Paradis and Trembley (2009) argue that a perception account cannot explain the robust adaptation patterns for stop consonants illustrated in (1).

(1) Stop Adaptation in MC

a. ‘pizza’: pʰitsɔ > pʰisa
b. ‘bandage’: bæn.dɪdʒ > pæŋ.ti
c. ‘hippies’: hɪ.pɪz > si.pʰɪs

Since aspirated and plain stops contrast in MC, speakers should be adept at distinguishing the presence or lack of aspiration in word. A perceptual account would therefore predict that aspirated stops would be nativized as aspirated stops and unaspirated stops as unaspirated stops. Looking at 1.a and 1.b we see that this prediction is borne out, since the initial aspirated voiceless stop in ‘pizza’ is adapted as an aspirated stop and the initial unaspirated voiced stop in ‘bandage’ is adapted as an unaspirated stop. The problem for the perception model occurs in 1.c, where the medial unaspirated voiceless stop is adapted as aspirated. Since there is no perceptual evidence that can explain why an unaspirated stop would be borrowed as an aspirated one in this situation, the perception model fails to account for the data.

Conversely, using a variety of phenomena from various languages, Peperkamp (2004) argues that the
production account cannot predict instances of ‘unnecessary adaptation’. An example of one such adaptation is presented in (2).

(2) Coda Nasal Adaptation in Japanese

<table>
<thead>
<tr>
<th>Word</th>
<th>(Japanese)</th>
<th>(English)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ‘book’</td>
<td>hoN</td>
<td>sk[iin] &gt; su.ku.riiN</td>
</tr>
<tr>
<td>b. ‘screen’</td>
<td>(English)</td>
<td>(French)</td>
</tr>
<tr>
<td>c. ‘piscine’</td>
<td>pisin &gt; pi.sin:u</td>
<td></td>
</tr>
</tbody>
</table>

As stated earlier, in Japanese, the only permissible coda segments are [N] and the first half of a geminate. The fact that [N] is a licit coda is demonstrated by the native word in 2.a and the English loan in 2.b. However, as 2.c shows, the coda nasal in French borrowings undergoes germination and has the vowel [u] epenthesized after it. These operations, which are unattested responses to coda nasals in both native words and loans from other languages, challenge the idea of a stable synchronic phonology and thus the production account.

Both Experienced and Naïve Borrowings Exist?

Although the production account claims that experienced speakers are the sole source of loans and the perception account makes the same claim about naïve speakers, it is reasonable to ask, especially when one considers the evidence for and against each side, if both populations can yield loans. Should it be the case that they can, both theories would be lacking since the perception approach would not be able to explain experienced borrowings and the production approach would not be able to explain naïve borrowings.

In a personal communication with Junko Ito and Armin Mester, it was brought to my attention that the English word ‘water’ was borrowed into Japanese twice, with two very different outcomes. The first time it was borrowed it emerged as [wara] and the second time as [wa:ta:]—explaining the different outcomes is easy once one knows a bit about when they were borrowed. [wara] was borrowed during the 1800s when Japan was practicing a strict policy of isolationism known as sakoku, which if violated was punishable by death. However, so that trade did not suffer, sanctioned ports were established. In these ports a pidgin developed wherein the word for ‘water’ was pronounced [wara]. Considering that (i) Japanese speakers were likely to be dependent on the acoustic representation given the situation, (ii) English speakers flap alveolar stops after non-nasal sonorants, and (iii) the Japanese ‘r’ is flap like, this borrowing is perfectly explained by the perception account.

[wataː] has appeared as part of a variety of loans (e.g. 「ウォーターベッド」 - ‘waterbed’, 「ウォーターゲート」 - ‘Watergate’, etc.) since sakoku was abolished in 1853, after which bilingualism increased significantly due to both the industrialization of Japan during the Meiji Restoration and the American military occupation after World War II. Given that (i) Japanese speakers were likely to be bilingual, (ii) ‘water’ underlying has a /t/, and (iii) Japanese has no process of /t/ flapping, the production account perfectly accounts for the set of modern borrowings containing [wataː].

The data points above would appear to demonstrate that both experienced and naïve speakers can adapt words and that they do so in a manner consistent with the production and perception models respectively---this suggests that both models are necessary. However, since there is no way of truly knowing what the language background of the adapters were and speculative storytelling should never be used to motivate a theoretical reconciliation, I carried out an experiment to see how English monolinguals and English-Russian bilinguals would adapt Russian words containing palatalized consonants.

Palatalized consonants were selected because they have robust coarticulatory effects that are only expected to surface in the adaptations of those dependent on the acoustic form---that is, the adaptations of monolingual English speakers. To elaborate, when palatalized consonants are produced, the tongue body is raised towards the hard palate (Kochetov, 2002). This creates a great degree of constriction at the hard palate when palatalized coronal or velar stops are released which leads to frication (Padgett, 2008). Thus, when presented with palatalized coronal or velar stops, we would expect monolingual English speakers to adapt them as affricates (e.g. v > f’). The borrowings of English-Russian bilinguals are not expected to display any of these patterns since they known what the underlying place and manner of these consonants are.
**EXPERIMENT**

**Tokens**

There were a total of 64 unique tokens in the experiment. 32 were fillers containing either non-native English segments (i.e. [x, j, ʃ] or [θ]) or illicit English clusters (i.e. [stv, sv, zv, gv, zm, gr, kr, tr, xl] or [kn]). Fillers with non-native segments and clusters were selected over those with native segments and clusters because the non-native elements were expected to be better distractors given that the task involved adapting foreign words. Since many participants reported that they thought the task was meant to explore how [r] and [x] were borrowed, this intuition proved correct. The 32 non-filler items were comprised of 17 experimental tokens and 13 control tokens. Since natural stimuli were used, it was not always possible to find a control item for every experimental item. Of the 17 experimental tokens only 8 contained palatalized stops---the remaining 9 contained palatalized consonants with other manners of articulation and were included as part of a larger study exploring how palatalized consonants were adapted. The results for such tokens are not discussed here because of space limitations.

<table>
<thead>
<tr>
<th>exp</th>
<th>ctrl</th>
</tr>
</thead>
<tbody>
<tr>
<td>редис</td>
<td>dɪ</td>
</tr>
<tr>
<td>индюк</td>
<td>d'ʊ</td>
</tr>
<tr>
<td>дятел</td>
<td>d'a</td>
</tr>
<tr>
<td>паутина</td>
<td>t'i</td>
</tr>
<tr>
<td>тюбик</td>
<td>t'u</td>
</tr>
<tr>
<td>толстяк</td>
<td>t'a</td>
</tr>
</tbody>
</table>

Since it was hypothesized that coarticulatory frication occurring in palatalized dental and alveolar stops would be adapted as affricates, Russian words containing palatalized [d, t, g, k] were used. For each consonant there were generally three experimental items such that a palatalized consonant would either be followed by [i, u,] or [a]. Different vocalic contexts were used because palatalized consonants are expected to be adapted as affricates more often when the vowel is high than low since they are in closer proximity to the palate and will accordingly extend the time the tongue spends near it---extending the coarticulatory affrication. The 9 tokens containing palatalized stops can be found below. Gaps in the paradigm exists because natural stimuli were used and words containing certain consonant+vowel combinations could not be found.

64 words discussed above were compiled into a list for recording; dummy items were added at the beginning and end of it to avoid a list intonation on tokens of interest. Although coarticulatory affrication would most likely be found to a greater degree in words that were embedded in a carrier sentence, I decided on eliciting the words using a list in order to be more faithful to the idea of the adaptation process. That is, if monolinguals were trying to adapt a foreign word that someone has told them (without hyper-articulating it), then they would most likely not be provided with a form containing a great degree of affrication but an average degree. Furthermore, since that form would have been likely said in isolation, the intonation of a list elicted token but not carrier-sentence elicited token would be more faithful to the borrowing conditions.

Two native Russian speakers were asked to provided three casual repetitions of the list. Only two of the repetitions were used; the third acted as a backup in case there were an technical issues or to s a backup in case there were an technical issues with one of the tokens in the initial two repetitions. If speakers misarticulated an item while reciting the list they were instructed to repeat the item and continue on. One speaker was recorded in a quite room on a 2010 MacBook Air and the second was recorded in a sound attenuated booth at the Stanford Linguistics Lab.

The tokens were extracted into individual WAV files using Pratt and then RMS normalized using a script. No further modifications were made to the tokens in order to ensure they sounded as naturalistic as possible.

**Methods**

The experiment was conducted at the UCSC Speech Perception and Production laboratory in a sound attenuated booth using an AKG-C520 head-mounted condenser microphone run through an M Audio AudioBuddy Dual Mic Preamp with Phantom Power into a PC. The participants were told they would hear foreign words and be asked to repeat them aloud in an American English accent or “Americanize” them. The words were presented in four blocks and were each separated by a break, the duration of which was controlled by the participant. Each block contained the tokens from one speaker’s repetition. The blocks and tokens within each block were randomized by E-Prime. A practice session using the dummy item preceded the main portion of the experiment. Each token was
preceded by 250 ms of silence. After each token played, the subject had exactly 3 seconds to Americanize the word before the next token began to play. Subjects were given 3 seconds in order to have enough time to repeat the word with feeling too rushed but not to much time as to overthink how they would adapt the word. Each subject’s adaptation was saved as a WAV file by ePrime.

**Participants**

7 subjects participated in experiment, 4 of whom were monolingual speakers of American English (i.e. naïve speakers) and 3 of whom were bilinguals fluent in American English and Russian (i.e. experienced speakers). According to the language background questionnaire they filled out, the monolinguals were all native speakers of English. All of them reported studying Spanish in high school but none claimed fluency. They were compensated with course credit for their time. The 3 bilingual speakers all identified as native English and native Russian speakers, having spoken both languages since birth. The one exception learned English at 24 and reported being ‘fluent’ in understanding and ‘fairly good’ at speaking. They were compensated $10 for their time.

**Coding**

The naïve speaker borrowings were transcribed into IPA by undergraduate linguistics students well versed in transcription work. The students were not told any details about the experiment until after they completed their transcriptions. Due to limits on access to undergraduate transcribers, the Russian adaptations were coded by the principle investigator. Using the transcriptions, each borrowing was coded as either being ‘affricated’ or ‘not-affricated’ depending on whether or not the word originally contained a palatalized stop that was adapted as an affricate.

**RESULTS**

There were 60 instances of affrication in total, all of which came from monolingual English speakers adapting palatalized stops. Bilinguals never affricated. Since there were 4 monolinguals who heard 8 words with palatalized stops 4 times each, there 128 opportunities for a palatalized stop to be adapted as an affricate. This means that 46.9% of tokens that were predicted to affricated did.

There were three factors thought to influence the whether or not a palatalized stop would be affricated in borrowings. The first was language background since monolinguals but not bilinguals were expected to affricate given their lack of knowledge about the coarticulatory frication. The second factor thought to affect affrication rates was manner of articulation since affrication is only expected to occur with palatalized stops. As was stated in Section 3, palatalization causes the tongue body to be fronted and raised toward the hard palate. If the consonant being palatalized is a stop, the fronted and raised tongue body creates a narrow constriction near the hard palate after the stop is released. This results in frication after the stop, which gives the naive listener the impression of an affricate. The third and final factor thought to effect affrication rates in stops was vowel height. Since low vowels require the tongue body to be away from the hard palate, the degree of constriction after the stop’s release would be lessened and thus less frication is expected to occur.

**TABLE 1** Results of the generalized linear model testing if language background, manner of articulation, and vowel height affect affrication rates.

<table>
<thead>
<tr>
<th>fixed effects</th>
<th>estimate</th>
<th>std. error</th>
<th>z value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>affricated</td>
<td>-9.67</td>
<td>1.36</td>
<td>-7.13</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>language background</td>
<td>5.07</td>
<td>1.03</td>
<td>4.88</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>manner of articulation</td>
<td>5.25</td>
<td>0.76</td>
<td>6.95</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>vowel height</td>
<td>0.40</td>
<td>0.56</td>
<td>0.72</td>
<td>&gt;.05</td>
</tr>
</tbody>
</table>

In order to see if the three factors above actually predict affrication, a generalized linear model was created using the glm function in R (R Development Core Team, 2008). The three factors were treated as fixed effects. Looking at the results of the model in **TABLE 1**, we see that language background and manner of articulation were highly significant while vowel height was not. Not only are the results significant but their estimates trend in the right direction. That is, affrication rates increase if the adapter is monolingual or if the segment being adapted is a stop.

Although the model above is consistent with the hypothesis that monolinguals are susceptible to the coarticulatory frication in palatalized consonants, the fixed effects used only reflect general conditions expected to
induce coarticulatory frication. It is entirely possible, however unlikely, that some non-phonetic property of stops and high vowels is causing monolinguals to borrow palatalized stops as affricates. To ensure that the link between the fixed effects above and affrication is truly phonetic in nature, a post-hoc analysis was carried out on the stimuli used in the experiment.

In order to assess how much frication was present in each of the stimuli with palatalized stops, three measures were collected using Praat (Boersma & Weenink, 2012) following Ni Chiosain & Padgett (2012). First, the duration of aperiodic energy from the beginning to the stop’s release to beginning of the first periodic cycle of the vowel was gathered. Second, relative intensity measures were gathered with the minimum pitch set at 300 Hz. Finally, relative center of gravity measures were taken after passing each stimulus through a high pass filter to attenuate frequencies in the 0-1000 Hz range.

<table>
<thead>
<tr>
<th>fixed effects</th>
<th>estimate</th>
<th>std. error</th>
<th>z value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>affricated</td>
<td>0.15</td>
<td>1.71</td>
<td>0.09</td>
<td>&gt;.05</td>
</tr>
<tr>
<td>duration</td>
<td>-0.02</td>
<td>0.01</td>
<td>-2.48</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>relative intensity</td>
<td>-0.03</td>
<td>0.03</td>
<td>-1.17</td>
<td>&gt;.05</td>
</tr>
<tr>
<td>relative c.o.g.</td>
<td>0.0004</td>
<td>0.0001</td>
<td>3.02</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

**TABLE 2** Results of the post-hoc linear model exploring how duration, relative intensity, and relative center of gravity influence rates of affrication in monolinguals.

TABLE 2 contains the results of the linear model using affricated as the dependent variable and duration, relative intensity, and relative center of gravity as predictor variables. Of the three fixed effects, only duration and relative center of gravity were significant. Unexpectedly, as affrication rates increase, the duration and intensity of coarticulatory frication decrease. On the other hand, affrication rates increased as the center of gravity increased in stops--- this trend follows from our hypothesis. It should be noted that the estimates for the fixed effects, regardless of significance, are incredibly small.

**Monolingual Affrication Patterns by Word**

**FIGURE 1** Monolingual affrication patterns by word with duration (purple), relative intensity(yellow), and relative center of gravity (blue) measures overlaid.

**FIGURE 1** shows the number of times a stimulus with a palatalized stop was adapted as affricated by the four monolinguals (duration, intensity, and COG measures are laid over the counts). While duration and relative center of gravity measures do appear to correlate with affrication rates in [tji], [tju], and [dji] tokens, they do not explain the rates of affrication in [dja] and [dju] tokens or the complete lack of affrication in [ta], [kji], and [gji] tokens. Intensity (the yellow dotted line) does appear to be a good predictor for affrication rates in [dju], [dji], and perhaps [dja] tokens, but little else. It is possible that subjects affrication rates for [dja], [dji], and [dju] tokens (i.e. tokens containing a palatalized [d]) were guided by intensity values while rates for [tji] and [tju] tokens (i.e. most of the tokens containing palatalized[t]) were guided by duration or center of gravity measures. However, there is no obvious phonetic reason for why tokens containing palatalized [d] would be affricated because of intensity values.
while those containing palatalized [t] would be affricated because of duration or center of gravity measures. Simply put, differences in voicing are not predicted change which measures affect affrication rates. Another problem with this analysis is that it doesn’t explain why there is no observed affrication in [tja], [kji], and [gji] tokens.

There is one plausible reason for why there is no observed affrication in [kji] and [gji] tokens and two possible explanations for the lack of [tja] tokens. Affrication may not have occurred in [kji] and [gji] tokens because the place cues in velars are too robust to be misperceived as palatal-alveolar. As for the [tya] tokens, they are the only stimuli in which the palatalized stop is part of a complex onset. Specifically, the palatalized [t] is preceded by an [s]. As we know from English, the burst of voiceless stops are highly attenuated when the stop is preceded by an [s]. It is therefore possible that the coarticulatory frication was attenuated by the preceding [s]. The one glaring problem with this explanation is that we have intensity measures for [tya] and they are not the lowest out of all the tokens. Several of the [dya] and [tyu] tokens actually have the lowest intensity and yet they have fairly robust affrication rates. Alternatively, one might argue that trying to rapidly adapt a sequence composed of a fricative, stop, and unfamiliar coarticulatory frication is too demanding on the parser of monolinguals and that, in response, it simply disregards the element requiring the most resources: the unfamiliar coarticulatory frication.

Before moving on, it is worth noting how little the individual subjects differed in terms of their rates of affrication. Looking at rates for individual tokens by subject in FIGURE 2, we see that all subjects affricated approximately 61% of palatalized stops (min: 54%, max: 67%).
The results of the experiment support the hypothesis that language background influences how loanwords are adapted. Since naïve speakers do not have access to underlying representations and must rely on the auditory ones when borrowing words, the monolinguals were predicted to be susceptible to coarticulatory effects. Indeed, monolinguals had a noteworthy tendency of adapting palatalized alveolar stops as affricates. Conversely, since experienced speakers have access to the underlying representations of words in their language and are aware of the coarticulatory effects that accompany their production, they were predicted to not be susceptible to such effects when borrowing words. As hypothesized, bilinguals did not adapt palatalized stops as affricated.

Although the phonetic correlates of the categorical predictors appeared to account for the various adaptation patterns in graphs, statistically the correlates did not always reach significance and some even trended in the wrong direction. These issues would most likely be resolved by a larger sample. The only truly unexpected outcome concerning the correlates was that no single one was able to predict affrication rates.

FIGURE 2 Monolingual affrication patterns by subject then word with duration (purple), relative intensity(yellow), and relative center of gravity (blue) measures overlaid.

DISCUSSION

The results of the experiment support the hypothesis that language background influences how loanwords are adapted. Since naïve speakers do not have access to underlying representations and must rely on the auditory ones when borrowing words, the monolinguals were predicted to be susceptible to coarticulatory effects. Indeed, monolinguals had a noteworthy tendency of adapting palatalized alveolar stops as affricates. Conversely, since experienced speakers have access to the underlying representations of words in their language and are aware of the coarticulatory effects that accompany their production, they were predicted to not be susceptible to such effects when borrowing words. As hypothesized, bilinguals did not adapt palatalized stops as affricated.

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Implications for Both Models

In the following section, the implications of the results for theories of loanword adaptation are explored. In FIGURE 4, the large boxes in the schematizations represent cognitive components and the smaller boxes the inputs/outputs of those components. As can be seen, the only components the two models share that could potentially conflict and complicate a merger is the phonology; there is nothing about the lexicon in the production approach which would conflict with the parsing mechanism in the perception account. Although certain loanword specific constraints rankings are posited for several phenomena, the models do not make conflicting claims about the core aspects of the phonology such as GEN, CON, or EVAL. Given that the models share an identical phonological component and no other components conflict, I propose merging the models at the phonology. The remaining components are left intact and create two paths or channels to the phonology. The path leading from the Lexicon to the Phonology has the same function as the production model and thus will be referred to as the production channel. The path leading from the Parser to the Phonology has the same function as the perception model and will be referred to as the perception channel. A schematization of the ‘channel model’ is presented in FIGURE 4.

Although adaptation can occur along two fundamentally different channels, notice that the final output of either is simply labeled ‘loanword’. Technically, the box should read ‘production loanword or perception loanword’ but it was left underspecified to highlight the fact that we have no way of knowing what channel a loan was adapted along simply by looking at it, and that, in order to know what type of loan it is, we have to know exactly how it was adapted.

CONCLUSION

Motivated by persistent claims in the literature that loanword adaptation is accounted for solely by perception or solely by production, I presented English speaking monolinguals and English-Russian bilinguals words from Russian containing palatalized consonants to see how they adapted the words. The results showed that adaptation patterns of each population were affected by their language backgrounds. Monolingual borrowings were heavily influenced by co-articulatory frication, which was expected given that the acoustic form was the only input available to them. Bilingual borrowings were insensitive to co-articulatory effects, this was not surprising considering they have access to the underlying forms for the words and could accordingly disregard the frication as co-articulation. Based on the results, I argued for a model of loanword adaptation in which the borrower potentially has two channels at their disposal. If they are monolingual they must use the perception channel to adapt words, but if they are bilingual they have access to either the perception or production channels--- access to these channels is determined by language background.
REFERENCES