Journal of Experimental Psychology:
Learning, Memory, and Cognition
2018, Vol. 44, No. 1, 143–156

0278-7393/18/$12.00 http://dx.doi.org/10.1037/xlm0000462

RESEARCH REPORT

A Switch is Not a Switch: Syntactically-Driven Bilingual Language Control

Tamar H. Gollan
University of California, San Diego

Matthew Goldrick
Northwestern University

The current study investigated the possibility that language switches could be relatively automatically triggered by context. *Single-word switches*, in which bilinguals switched languages on a single word in midsentence and then immediately switched back, were contrasted with more complete *whole-language switches,* in which bilinguals completed a full phrase (or more) in the switched to language before switching back. Speech production was elicited by asking Spanish–English bilinguals to read aloud mixed-language paragraphs that manipulated switch type (single word, whole language), part of speech (switches on function or content words), and default language (dominant language English or nondominant Spanish). Switching difficulty was measured by production of translation-equivalent language intrusion errors (e.g., mistakenly saying *pero* instead of *but*). Controlling for word length (more errors on short vs. long words), intrusions were produced most often with function word targets in the single-word switch condition, and whole-language switches reduced production of intrusion errors for function but not content word targets. Speakers were also more likely to produce intrusions when intending to produce words in the dominant language—a reversed dominance effect. Finally, switches out of the default language elicited many errors, but switches back into the default language rarely elicited errors. The context-sensitivity of switching difficulty, particularly for function words, implies that some language switches are triggered automatically by control processes involving selection of a default language at a syntactic level. At a later processing stage, an independent form-level monitoring process prevents production of some planned intrusion errors before they are produced overtly.

Keywords: speech error, intrusion, read aloud, bilingualism, inhibition

How do bilinguals switch languages at will but also avoid switching by mistake? A growing body of work argues that bilinguals rely on the same processes that support nonlinguistic switches in manual responses (e.g., shifting between drinking coffee and lifting a muffin up to your mouth; Declerck, Grainger, Koch, & Philipp, 2017; Prior & Gollan, 2013; but see Calabria, Branzi, Marne, Hernández, & Costa, 2015; Calabria, Hernández, Branzi, & Costa, 2011; Klecha, 2013). Starting with a seminal paper by Meuter and Allport (1999), a large number of studies laid the foundation for this *shared switch assumption*; language switch responses in controlled laboratory settings bore striking resemblance to results in nonlinguistic switching paradigms. Across domains, cued switches were slower than nonswitched responses. These *switch costs* were modulated by similar variables, including response dominance, preparation time, and when switches were voluntary, instead of externally, cued (for review, see Declerck & Philipp, 2015a; but see Gollan, Kleinman, & Wierenga, 2014). If the shared switch assumption is correct, this could afford a valuable opportunity to further our understanding of how switches are planned and executed in a variety of domains, shedding light on how to maximize switching efficiency quite broadly (for more general review, see Bialystok, 2017).

A different possibility is that only some language switches share control processes with nonlinguistic switches while other switches are driven more automatically by language specific control processes (Gollan, Sandoval, & Salmon, 2011; Grainger, Midgley, & Holcomb, 2010; Green, 1998; Prior & Gollan, 2013; Weissberger, Wierenga, Bondi, & Gollan, 2012). On this view, what seems on

This article was published Online First August 7, 2017.

Tamar H. Gollan, Department of Psychiatry, University of California, San Diego; Matthew Goldrick, Department of Linguistics, Northwestern University.

We thank Vic Ferreira, Alena Stasenko, Chuchu Li, and Julie Fadlon for comments, Rosa Montoya and Mayra Murillo for paragraph composition and error coding, and Dan Kleinman for assistance with programming and counterbalancing procedures. The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article. This research was supported by grants from the National Institute on Deafness and Other Communication Disorders (011492), the National Institute of Child Health and Human Development (050287, 051030, 079426) and the National Science Foundation (BCS1344269, BCS1457159). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NIH or NSF.

Correspondence concerning this article should be addressed to Tamar H. Gollan, Department of Psychiatry, University of California, San Diego, 9500 Gilman Drive, 0948, La Jolla, CA 92093-0948. E-mail: tgollan@ucsd.edu

the surface to be the same—that is, a language switch—in some cases reflects an intentionally controlled behavior but in others relatively automatic, domain specific, processes (Gollan & Goldrick, 2016; Kleinman & Gollan, 2016). If specialized switching mechanisms might exist, it is hard to imagine a domain better suited for developing such automaticity than language (a highly practiced expert skill).

Language selection mechanisms are typically investigated in out of context speech, focusing very narrowly on a single part of speech, that is, nouns. However, language switches in conversation between bilinguals often involve multiword strings that likely use syntax of the switched-to language to a greater extent than single-word switches (e.g., Deuchar, 2005; Fricke & Kootstra, 2016; Muysken, 2000; Poplack, 1980; Treffers-Daller, 1999; for reviews see contributions to Bullock & Toribio, 2009), and could elicit more automatic switches than out of context speech.

Though small in number, existing studies of language switching in sentence contexts reveal some systematic contextual facilitation effects. Switches elicited at points in sentence structure that match habitual patterns of language switching are less costly than points that infrequently involve naturally occurring switches (Gollan & Goldrick, 2016). But why do bilinguals prefer to switch in some sentence locations more than in others? Two recent studies revealed that language switches are more likely to occur when syntactic structure is shared between languages (i.e., matching in word order; Kootstra, Van Hell, & Dijkstra, 2010, see also Poplack, 1980; Deuchar, 2005), and in the same position in a sentence as a recently perceived switch if the exact word was repeated, or if switches were adjacent to words with formally similar translation equivalents (e.g., the Dutch word for *book* is *boek*; Kootstra, Van Hell, & Dijkstra, 2012). Another study revealed cost-free language switches when bilinguals repeatedly produced sentences with shared word order across languages (Declerck & Philipp, 2015b). Finally, in both comprehension and production, ease of switching also appears to be influenced by syntactic constraints (e.g., the Spanish auxiliary *estar* co-occurs with English participles often whereas *haber* rarely does; Guzzardo Tamargo, Valdés Kroff, & Dussias, 2016). These studies suggest greater integration of languages—perhaps even a blurred distinction between languages, effectively making a switch less of a switch—when shared or overlapping structures at various levels of processing are coactive.

Here we examined how surrounding linguistic context might support bilingual language control, by randomly assigning bilinguals to read aloud paragraphs with either *single-word switches*, in which a single-word switched and then subsequent words immediately switched back, or *whole-language switches*, in which speakers produced several words in the switched-to language before switching back—boosting the degree to which properties of the switched-to language was engaged (see Table 1). Reading aloud engages the speech production system in a manner that enables examination of processes involved in planning of connected speech with precise control over what speakers say in terms of semantic, lexical, and syntactic content (Gollan & Goldrick, 2016; Gollan, Schotter, Gomez, Murillo, & Rayner, 2014; Kolers, 1966). If contextual support facilitates language control, paragraphs with whole-language switches should be easier to produce than single-word switches. Alternatively, if all switches rely on the same mechanisms used to control single-word production, there should be no difference across the conditions.

To examine whether syntactic processes contribute to contextual support, we contrasted the influence of these manipulations on function versus content words. Function words like *the* and *el* have rich syntactic properties but relatively few semantic properties; in contrast, content words like *dog* and *perro* have rich semantics (Bell, Brenier, Gregory, Girand, & Jurafsky, 2009) but relatively impoverished syntax (see Altmann, Pierrehumbert, & Motter, 2009, for detailed discussion). This distinction has led theories of word production (Bock & Levelt, 1994; Garrett, 1975, 1982) and code-switching (Myers-Scotton & Jake, 2009) to propose that the selection and retrieval of function words is more highly dependent on grammatical encoding processes than selection of content words. If syntactic processes contribute to contextual support for language control, the effect of context should be much stronger for function versus content words.

We indexed the difficulty of language control in these conditions by the rate of *intrusion errors*, in which bilinguals substitute a target word with its translation equivalent word. While these are rare in spontaneous speech (occurring on <1% of words; Poulisse, 1999; Poulisse & Bongaerts, 1994), a similar form of speech error can be induced in larger numbers with experimental control over speech content by asking bilinguals to read aloud mixed-language paragraphs. While reading, bilinguals sometimes spontaneously translate written words in their speech by mistake (e.g., saying *y*, the translation equivalent of *and*, instead of reading ". . . with a blanket *and* se salió"; Gollan & Goldrick, 2016; Gollan, Schotter, et al., 2014; Kolers, 1966). Failing to switch when cued to switch is clearly different from switching unintentionally; however, trans-

Table 1
Example Sentences From Each Mixed-Language Condition

Default language	Switch type	Part of speech	Example sentence
English	Single word	Function	Throughout the Land of the Pig River, *el* name Mrs. Peace was well known by everyone. It wasn't . . .
		Content	Throughout the Land of the Pig River, the *nombre* Mrs. Peace was well known by everyone. It wasn't . . .
	Whole language	Function	Throughout the Land of the Pig River, *el nombre doña Paz era bien conocido por todos*. It wasn't . . .
		Content	Throughout the Land of the Pig River, the *nombre doña Paz era bien conocido por todos*. It wasn't . . .
Spanish	Single word	Function	Por toda la Tierra del Río Puerco, *the* nombre doña Paz era bien conocido por todos. No era . . .
		Content	Por toda la Tierra del Río Puerco, el *name* doña Paz era bien conocido por todos. No era . . .
	Whole language	Function	Por toda la Tierra del Río Puerco, *the name Mrs. Peace was well known by everyone*. No era . . .
		Content	Por toda la Tierra del Río Puerco, el *name Mrs. Peace was well known by everyone*. No era . . .

Note. See Appendix for an example of a full paragraph in each condition.

lation errors in the read aloud task resemble spontaneous intrusions in several key ways—likely revealing overlapping cognitive mechanisms (Gollan, Schotter, et al., 2014; Gollan & Goldrick, 2016). Critically, in both cases function words significantly outnumber content words as error targets (Gollan, Schotter, et al., 2014; Kolers, 1966; Poulisse, 1999; Poulisse & Bongaerts, 1994).

Additionally, we investigated the contribution of other, more general processes of language control. Both paragraph types were written primarily in one or the other language, henceforth the *default language*, allowing for another test of how supporting context affects language control. If control mechanisms are sensitive to the default status of one linguistic system, then switches back into the default language should be much easier than switches out. If specification of a default is weakened when the proportion of words produced in the default language is lower, then the distinction between switches out and switches back would be smaller in the whole-language versus single-word condition implying that bilinguals can operate without selecting a default language, in a kind of "bilingual mode," making switches in either direction relatively easy (Soares & Grosjean, 1984). (Note that here, we adopt a general assumption that one language can be specified as default, while remaining agnostic about more specific constraints as to which types of words might be more or less affected by default specification (as in the matrix language framework; Myers-Scotton & Jake, 2009, which we consider in more detail in the Discussion section).

Finally, we investigated the relationship between default language selection and inhibition, a key mechanism of many language control theories (e.g., Abutalebi & Green, 2007; Green, 1998; Philipp, Gade, & Koch, 2007; Philipp & Koch, 2009; for reviews, see Kroll, Bobb, Misra, & Guo, 2008; Bobb & Wodniecka, 2013; Declerck & Philipp, 2015a). In previous work (Gollan & Goldrick, 2016; Gollan et al., 2014), bilinguals more often replaced dominant language targets with translation equivalents from the nondominant language—a *reversed language dominance* effect. To enable production of mixed language utterances bilinguals might partially inhibit the dominant language causing the nondominant language to muscle in and replace the dominant language more often than the reverse. Here, we asked whether this form of control is generally utilized during language switching, or if it is recruited only for very difficult switching tasks, for example, for switches not supported by surrounding context, or for switches on function but not content words.

Table 2
Participant Characteristics for All English-Dominant Bilinguals

Characteristic	Single-word switches (n = 44) *M*	*SD*	Whole-language switches (n = 42) *M*	*SD*
Age	20.3	2.5	20.3	2.7
Years of education	14.4	1.8	14.4	1.7
Age of English acquisition	3.9	2.5	3.4	2.6
English spoken proficiency self-rated[a]	6.6	.6	6.6	.6
Spanish spoken proficiency self-rated[a]	6.0	.9	6.1	.9
English MINT score[b]	60.9	3.8	60.8	3.1
Spanish MINT score[b]	47.0	9.9	45.3	7.7
Current percent English use	80.9	15.6	77.3	22.9
Percent English use during childhood	56.7	17.9	52.4	31.3
Current switching frequency[c]	3.5	1.4	3.5	1.3
Switching frequency during childhood[c]	3.6	1.7	3.5	1.5

Note. MINT = Multilingual Naming Test. Language dominance was determined using MINT scores. Bilinguals who were assigned to read single-word versus whole-language switches did not differ significantly from each other on any of the characteristics listed in the table. All ts < 1, all ps ≥ .38.
[a] Self-rated proficiency level was averaged across ratings for speaking, comprehension of spoken speech, reading, and writing on a scale from 1 (*little to no knowledge*) to 7 (*like a native speaker*). [b] Maximum possible score is 68. [c] Self-rated estimate of how often bilinguals switch languages when speaking with other bilinguals who know the same languages; the 6-point rating scale included the following anchors: 1 (*never*), 2 (*very infrequently*), 3 (*occasionally*), 4 (*two to three times per conversation*), 5 (*several times per conversation*), and 6 (*constantly*).

Method

Participants

A total of 96 Spanish–English bilinguals participated in the study with random assignment to read paragraphs with either *single-word* or *whole-language* switches. Bilinguals were given course credit for their participation through undergraduate classes in the psychology department at the University of California, San Diego (UCSD). Sample size was based on previous studies using this paradigm (Gollan & Goldrick, 2016; Gollan, Schotter, et al., 2014). Table 2 shows self-reported participant characteristics and ability to name pictures in each language on the Multilingual Naming Test (MINT, see below; Gollan, Weissberger, Runnqvist, Montoya, & Cera, 2012), which provided an objective measure of English and Spanish proficiency. The MINT (Gollan et al., 2012) consists of 68 black-and-white line drawings, administered in order of progressing difficulty (e.g., Item 1 is *hand*, and Item 68 is *axle*). This test was designed to assess picture-naming ability in four languages (English, Spanish, Mandarin, Hebrew), and also both dominant and nondominant language proficiency. Two participants with missing MINT scores (they needed to leave prior to completing the protocol) were excluded from analysis (and replaced with different bilinguals who were able to complete the entire testing protocol). The majority of Spanish–English bilinguals at UCSD (including the bilinguals tested in this study) have Spanish as their first language but are dominant in English due to extended immersion and schooling primarily in English; thus, to ensure our analyses were conducted over a relatively homogenous group, consistently dominant in English, we excluded from analysis 10 bilinguals who scored higher on the MINT in Spanish than in English (n = 4 from single-word, and n = 6 from whole-language paragraphs; see below).

Materials and Procedure

Bilinguals read an equal number of paragraphs with switches on function or switches on content words, with position of the switches on function and content words in the same location across paragraph types (though previous studies reported robust part-of-speech effects on intrusion errors, function and content word switches in those studies were not controlled for location of the switch and thus might have been caused by an uncontrolled factor related to subtle differences in context; Gollan & Goldrick, 2016;

Gollan, Schotter, et al., 2014). Stimuli were presented using PsyScope X software (Build 57; Cohen, MacWhinney, Flatt, & Provost, 1993; *http://psy.ck.sissa.it*) on an iMac 7 computer with a 20-in. color monitor. On each trial an entire paragraph appeared on the screen and bilinguals were instructed to read the paragraph aloud as accurately as possible at a comfortable pace. Each bilingual read 18 paragraphs, three in each of six conditions: (a) English-only; (b); Spanish-only (c) English default, content switches; (d) English default, function switches, (e) Spanish default, content switches; (f) Spanish default, function switches. On average, paragraphs had 122.3 (SD = 14.8) words (range 93–152 words). Bilinguals were randomly assigned (every other subject who signed-up) to either read single-word or whole-language switch paragraphs. Single-word switch paragraphs were written mostly in one language; paragraphs with English as the default language averaged 95.1% (SD = 0.6%) in English, and in paragraphs with Spanish as the default language averaged 5.0% (SD = 0.7%) in English (and the rest in Spanish). Whole-language switch paragraphs were more balanced in the number of words written in each language; in these paragraphs with English as the default language averaged 59.6% (SD = 5.1%) of words in English, and in paragraphs with Spanish as the default language averaged 41.3% (SD = 4.9%) words in English (and the rest in Spanish). An example of each paragraph type is presented in the Appendix.

A native Spanish–English bilingual selected and adapted the paragraphs from published English-Spanish translations of short stories to manipulate switch type. A second native Spanish–English bilingual read through the paragraphs and confirmed the intended manipulations (any disagreements were discussed and settled and paragraphs modified accordingly). Paragraphs were constructed by first modifying language and content as needed so that English and Spanish versions had similar word order, and replacing words that are uncommon in Mexico (the country of origin for the majority of Spanish speakers at UCSD). Switches on words with more than two syllables, cognates, proper names, and words that are sometimes classified as function and sometimes as content words were avoided as much as possible, as were switches on words that had previously already been switched within the same paragraph. Each paragraph had six switches out of default language, with all switches in the paragraph on either function or content words, and six switches back into the default language that occurred immediately after the switch out in single-word paragraphs, and at least four words later, and after a comma or period, in whole-language paragraphs. In the whole-language condition, there were six paragraphs that were intended to have switches only on content words but had one switch on a function word by mistake, and two paragraphs that were intended to have switches only on function words but had one switch on a content word by mistake. In the single-word condition, there were two paragraphs intended to have switches only on content words, and two intended to have switches only on function words, each with one switch on the wrong part of speech by mistake. In the analyses reported below these targets were analyzed based on their actual part of speech (not the type of paragraph in which they appeared).

Paragraphs were presented in one of six different fixed-order lists, each bilingual was presented with just one of these lists, with either single-word or whole-language switch versions of the paragraphs. Within each list, participants saw three consecutive blocks of six paragraphs (18 total), with one paragraph per condition in each block (thus each participant saw one paragraph in each of the six conditions before reading a second paragraph in any of the six conditions, and similarly, they saw two paragraphs in each condition before reading the third paragraph in any of the six conditions). In each of the six lists, each paragraph was presented just once. Across lists each paragraph appeared once in each of the six conditions, with varying position in the list; that is, each paragraph appeared relatively early in the trial sequence in two lists (i.e., in Trials 1–6), somewhere in the middle in two lists (i.e., Trials 7–12), and toward the end in two lists (i.e., in Trials 13–18). Finally, within each of the three consecutive six-paragraph blocks in each list, each paragraph appeared once in each of the six possible positions (again between subjects in different lists; once each as the first, second, third, fourth, fifth, and sixth trials within a block). (Note: [a] Lists were divided into three blocks of six paragraphs only for counterbalancing purposes; there was no testing break between blocks. [b] After reading nine out of 18 paragraphs, half of the participants were instructed that they would need to summarize the paragraph content when they finished reading. A follow-up regression showed that this manipulation did not interact with any of the other experimental factors; we therefore do not discuss it further.)

Each trial began with a fixation cross that appeared at the location on the screen where the first word appeared and remained on the screen until the participant pressed the space bar, after which the fixation was replaced by the paragraph, which remained on the screen until the participant pressed the space bar again. A blank screen was then presented for 1,500 ms and was then replaced by the fixation point for the following trial. Before beginning, bilinguals completed four practice paragraphs similar in length to the experimental materials in a random order: one English-only, one Spanish-only, one with English as the default language, and one with Spanish as the default language. Mixed-language practice paragraphs had six switches in them, three on function and three on content word targets.

Results

If supporting context reduces production of intrusion errors, particularly for function words, then intrusion rates and, critically, part-of-speech effects on intrusions would be reduced in the whole-language versus single-word conditions. Alternatively, if function words outnumber content word targets to the same extent in both conditions, this would imply universal difficulty for bilinguals with switching on function words regardless of context, a result that would be consistent with some explanations of part-of-speech effects (e.g., that function words elicit more errors because they tend to be higher frequency than content words (Poulisse & Bongaerts, 1994).

Following the methods of Gollan, Schotter, et al. (2014) and Gollan and Goldrick (2016), a native Spanish–English bilingual research assistant transcribed the errors which were classified as intrusions (n = 341; e.g., saying *la* instead of *the*). Also as in previous studies using the read-aloud task, bilinguals produced a number of other error types that were not analyzed in detail (i.e., accent errors), or not analyzed (i.e., partial intrusions, omissions, insertions, and within-language errors), given the focused interest on language control failures (i.e., intrusion errors). These included partial intrusions (n = 84; starting to produce an intrusion but self-correcting before producing the error)—which resemble intrusions errors in some ways, but tend not to occur on function words (Gollan, Schotter, et al., 2014; Gollan & Goldrick, 2016; Poulisse & Bongaerts, 1994). Accent errors (e.g., $n = 307$), saying the correct word with the accent of the nontarget language, also constitute a form of language control failure, but were coded via subjective judgments (see also Kolers, 1966) and are more difficult to detect on shorter function words. Bilinguals also produced other error types that are difficult to interpret given indeterminacy with respect to error content (i.e., omissions, $n = 554$ and insertions, $n = 326$). Finally, bilinguals produced a substantial number of within-language errors ($n = 7{,}606$; e.g., saying *such* instead of *much*). However, these errors are markedly different from intrusion errors. Within-language errors tended to occur on content as opposed to function words (within-language errors on content words $M = 5.7\%$; function words: 3.0%)—the opposite pattern from intrusion errors; see below and Gollan, Schotter, et al., 2014; Gollan & Goldrick, 2016). Within-language errors also occurred equally frequently at switch and nonswitch locations (controlled switch $M = 3.9\%$ error; no switch $M = 4.1\%$), whereas intrusion errors are concentrated at switch sites (see below and Gollan & Goldrick, 2016). Given this divergence in patterns, and also that within-language errors are not as relevant for constraining models of bilingual language control (see Gollan & Goldrick, 2016) we focused our analyses on errors of language control: intrusions.

In single-language paragraphs only five bilinguals produced at most one language intrusion error, and the majority of bilinguals (81/86) produced no intrusion errors. Thus, we focused our analyses on mixed-language paragraphs. The vast majority (78/86) of bilinguals produced at least one intrusion and up to as many as 16 ($M = 4$; $SD = 3$). A small number of intrusion errors ($n = 14$) were cases in which bilinguals said the correct target and then quickly self-corrected to an intrusion error (e.g., the target was *la* and the participant said "*la* . . . the . . .") and another small number ($n = 15$) were classified as more than one type of error (e.g., accent and within, or intrusion and accent). These cases were classified as intrusion errors, with only one error coded if two errors were produced. For example, if the intended target was *his* and the speaker said *su* and then self-corrected to *his* but produced the English word with a Spanish accent, these would be counted as a single intrusion error.

Intrusion Errors

Figure 1 shows the proportion of intrusion errors on target words that switched out of the paragraph's default language by language of the target word, default language, and part of speech. Note that error bars show boot-strapped confidence intervals. In a bootstrap procedure, the distribution of a statistic is estimated by repeatedly resampling from the observations with replacement (here, with 1,000 replicates). This does not require assuming the statistic is normally distributed. Given that most of our dependent measures are (nonnormally distributed) proportions, we elected to use this method throughout. The substantial number of intrusions at switches out of paragraph order allowed for statistical comparison of performance across conditions. A logistic mixed effects regression (Jaeger, 2008) examined the rate of intrusions at these points, including switching type (whole-language vs. single-word),

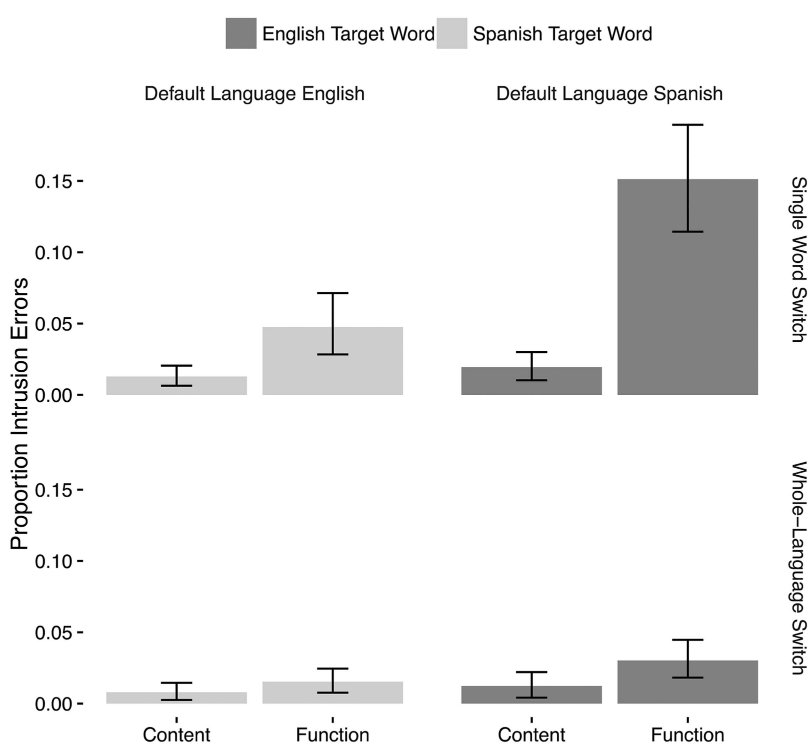

Figure 1. By-participant mean proportion of intrusion errors by condition at switch-out points (errors bars show bootstrapped 95% confidence intervals).

part of speech of the target word (content vs. function), and language of production (Spanish vs. English), and all interactions and a random intercept for subjects (more complex random effect structures would not converge for all comparisons, so we used this model structure throughout). Significance of fixed effects was assessed via model comparisons (Barr, Levy, Scheepers, & Tily, 2013).

In addition, because function words tend to be shorter than content words, we repeated our analysis of intrusion rates including centered length in letters as a predictor (and allowing it to interact with all factors). This analysis revealed a robust length effect shown in Figure 2; with more intrusions occurring on shorter versus longer targets ($\beta = -0.37$, $SE\ \beta = 0.09$, 95% confidence interval [CI] [−0.52, −0.21]), $\chi^2(1) = 26.21$, $p < .0001$. Length effects also interacted with part of speech ($\beta = -0.46$, $SE\ \beta = 0.16$, 95% CI [−0.77, −0.15]), $\chi^2(1) = 8.2$, $p < .005$; length effects were significant for function ($\beta = -0.60$, $SE\ \beta = 0.11$, 95% CI [−0.81, −0.39]), $\chi^2(1) = 49.62$, $p < .0001$, but not content words ($\beta = -0.14$, $SE\ \beta = 0.12$, 95% CI [−0.37, 0.09]), $\chi^2(1) = 1.49$, $p < .30$. However, as shown in Figure 2, there were very few short content words (minimum length = three letters; function words have a minimum length of one letter). Because we did not manipulate length, and to facilitate interpretation, the full results of this model are reported below only where it produced different results from the first analysis (i.e., the model without length).

Bilinguals produced more intrusion errors when reading aloud paragraphs with single-word than with whole-language switches, a highly robust effect of switch type ($\beta = 0.96$, $SE\ \beta = 0.22$, 95% CI [0.52, 1.40]), $\chi^2(1) = 17.94$, $p < .0001$, and replicating previous work, when producing switches on function versus content words ($\beta = 1.30$, $SE\ \beta = 0.19$, 95% CI [0.92, 1.68]), $\chi^2(1) = 48.49$, $p < .0001$. However, condition effects were not uniform across types of switch targets; there was a significant interaction between switch type and part of speech ($\beta = 1.02$, $SE\ \beta = 0.39$, 95% CI [0.26, 1.79]), $\chi^2(1) = 6.42$, $p < .02$. Follow-up regressions within each part of speech showed whole-language switches elicited significantly fewer intrusion errors than single-word switches for function word targets ($\beta = 1.48$, $SE\ \beta = 0.24$, 95% CI [1.01, 1.95]), $\chi^2(1) = 36.44$, $p < .0001$. In contrast, whole-language and single-word paragraphs were equally likely to induce intrusion errors with content word targets ($\beta = 0.46$, $SE\ \beta = 0.34$, 95% CI [−0.20, 1.11]), $\chi^2(1) = 1.91$, $p < .17$. Thus, the greater vulnerability of single-word than whole-language switches to intrusion errors was driven entirely by function word targets. Additional follow-up regressions within each switch type showed significant part-of-speech effects in both whole-language and single-word paragraphs, such that content words elicited significantly fewer intrusions than function words; however, this effect was much stronger for single-word ($\beta = 1.82$, $SE\ \beta = 0.23$, 95% CI [1.37, 2.26]), $\chi^2(1) = 83.41$, $p < .0001$, as opposed to whole-language switches ($\beta = 0.79$, $SE\ \beta = 0.32$, 95% CI [0.16, 1.41]), $\chi^2(1) = 6.49$, $p < .02$. This effect did not survive when controlling for length; that is, after controlling for length, whole-language switches failed to show a significant part-of-speech effect ($\beta = -0.43$, $SE\ \beta = 0.52$, 95% CI [−1.45, 0.59]), $\chi^2(1) = 0.91$, $p < .35$, indeed the main effect of part of speech was also no longer significant in the analysis that included length as a factor ($\beta = 0.20$, $SE\ \beta = 0.31$, 95% CI [−0.41, 0.82]), $\chi^2(1) = 0.39$, $p < .55$, though critically (and of greatest interest) the interaction between part of speech and switch type remained significant in this

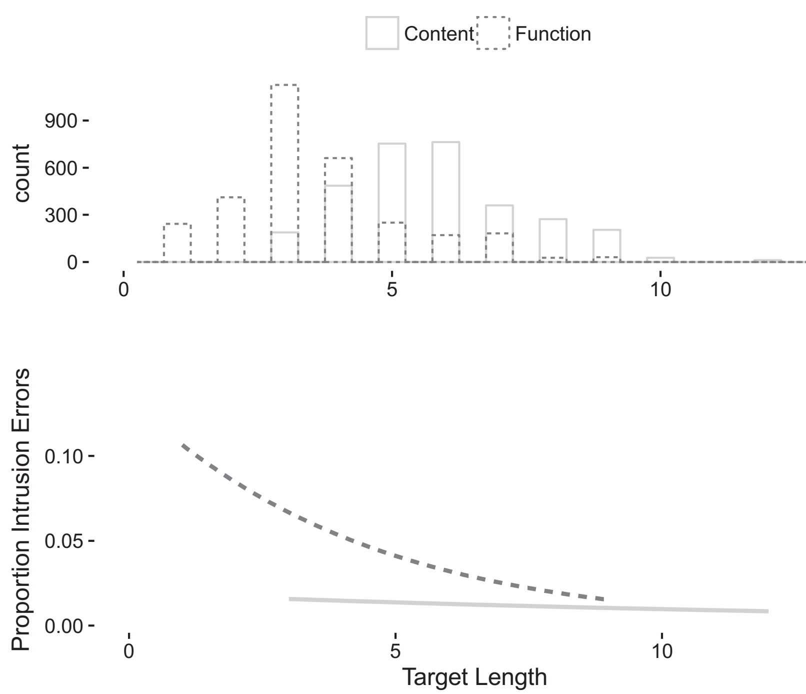

Figure 2. At each letter length, proportion of target words at switch-out points that were function versus content words (top) with by-part-of-speech correlations of length with intrusion rate (bottom).

model ($\beta = 1.27$, $SE\ \beta = 0.63$, 95% CI [0.04, 2.50]), $\chi^2(1) = 4.3$, $p < .04$.

Also at switch-out points, bilinguals exhibited significantly reversed language dominance, producing more intrusions on English than on Spanish target words ($\beta = 0.70$, $SE\ \beta = 0.19$, 95% CI [0.32, 1.08]), $\chi^2(1) = 12.99$, $p < .0005$. Thus, even though English was the dominant language (see Table 2), bilinguals produced Spanish words by mistake, replacing their translation equivalent English target words, more often than the reverse. Reversed dominance effects did not interact with condition, that is, neither switch type ($\beta = 0.32$, $SE\ \beta = 0.39$, 95% CI −0.44, 1.08]), $\chi^2(1) = 0.66$, $p < .42$, nor part of speech ($\beta = 0.58$, $SE\ \beta = 0.39$, 95% CI [−0.18, 1.35]), $\chi^2(1) = 2.14$, $p < .15$, and the three-way interaction between language, condition, and part of speech was also not significant ($\beta = 0.55$, $SE\ \beta = 0.79$, 95% CI [−0.98, 2.08]), $\chi^2(1) = 0.49$, $p < .49$. However, given the very low rate of errors in the whole-language conditions, the failure to find these interactions should be treated with caution. In particular, follow-up regressions revealed significantly reversed dominance effects in single-word ($\beta = 0.86$, $SE\ \beta = 0.23$, 95% CI [.42, 1.30]), $\chi^2(1) = 14.53$, $p < .0002$, and marginal effects in whole-language switches ($\beta = 0.54$, $SE\ \beta = 0.32$, 95% CI [−0.09, 1.16]), $\chi^2(1) = 2.89$, $p < .09$. Follow-up regressions also revealed significantly reversed dominance effects on function word switches ($\beta = 0.99$, $SE\ \beta = 0.21$, 95% CI [0.58, 1.39]), Z[1] = 4.8, $p < .0001$, but not on content word switches ($\beta = 0.42$, $SE\ \beta = 0.36$, 95% CI [−0.24, 1.07]), $\chi^2(1) = 1.57$, $p < .21$. However, the very low rate of errors overall in the whole-language condition makes it impossible to draw firm conclusions, and thus it remains unclear if the magnitude of reversed dominance effects does or does not vary across switch types. Indeed, after controlling for length, target language and part of speech interacted ($\beta = 1.75$, $SE\ \beta = 0.63$, 95% CI [0.52, 2.98]), $\chi^2(1) = 8.20$, $p < .005$, such that reverse dominance effects were significant for function ($\beta = 172$, $SE\ \beta = 0.33$, 95% CI [1.09, 2.36]), $\chi^2(1) = 42.88$, $p < .0001$, but not content words ($\beta = 0.49$, $SE\ \beta = 0.37$, 95% CI [−0.23, 1.21]), $\chi^2(1) = 1.89$, $p < .17$. The possible implications of these differing patterns are discussed below.

Interestingly, intrusion errors were concentrated at switch sites (replicating Gollan & Goldrick, 2016); however, not all switch sites were equally intrusion prone. While bilinguals produced a substantial number of intrusion errors at controlled switches out of the default language into the other language, they produced *extremely few* errors at switches back into the default language. Given that logistic regression models have difficulty fitting data with very low (or zero) counts (Agresti, 2007), we assessed these patterns using a nonparametric bootstrap procedure. We collapsed across part of speech as this was not controlled for switches back. As shown in Table 3, across all conditions the rate of intrusions errors at switches out of default was greater than the rate of intrusions at switches back in to default. The 95% CI for these differences was greater than zero, suggesting that intrusion errors occur at a reliably greater rate at switches out of default versus switches back in to default.

Figure 3 provides a visualization of how the advantage for switches back versus switches out is distributed across individual participants for both single-word and whole-language switches (collapsing across default language). Many bilinguals show vanishingly small error rates when switching back to default, whereas switching out is consistently difficult (across both single-word and whole-language switches) for many bilinguals. The consistent advantage for switching back over switching out reveals that either language can be specified as the default language (dominant/English or nondominant/Spanish), and suggests that bilinguals must always specify a default language which will facilitate switches in this direction—or over and above—other forces of local contextual support on language control (single-word, whole-language).

Though we did not analyze accent errors in detail (because coding of accent errors is highly subjective and may be particularly challenging on relatively short function word targets) we note that these confirmed some of the patterns reported for intrusion errors. In particular, like intrusion errors, accent errors were much more likely to occur when switching out of the default language (M = 2.34%; bootstrapped 95% CI [1.74%, 3.09%]) as compared to switching back to the default (M = 0.57%; 95% CI [0.36%, 0.80%]). Also parallel to intrusion errors, when switching out, accent errors were essentially limited to single-word switch sites (M = 4.07%; 95% CI [3.16%, 5.20%]), with almost no errors found at whole-language switch sites (M = 0.53%; 95% CI [0.26%, 0.86%]). However, in contrast to intrusions, in the single-word switch condition, accent errors did not vary with part of speech and language; a mixed-effects logistic regression including part of speech, language of production, and their interaction (with maximal correlated random effects structure by participants) showed no effects, χ^2s(1; 1) < 1, ps > .30 (but see Gollan, Schotter, et al., 2014, who observed significantly reversed dominance effects on accent errors).

Reading Times

The analyses of intrusion errors suggested that surrounding same-language context facilitated language control, particularly for function word targets. Additional analyses were conducted to confirm that the greater production of intrusions in single-word paragraphs was not driven by particularly fast production in those conditions. Because paragraphs varied in the proportion of words in each language (see Materials section) we adjusted reading times to control for language effects (Spanish words tend to be longer than English words, and bilinguals produce words in the nondominant language more slowly than in the dominant language; see Sadat, Martin, Alario, & Costa, 2012, for a review). For each participant, we used the ratio of their mean reading times for Spanish (M = 50.71, bootstrapped 95% CI [48.55, 52.71]) vs. English (M = 36.92, 95% CI [35.97, 37.87]) paragraphs without switches to calculate a scaling factor: how much longer it takes that participant to read the nondominant language with longer words. For each paragraph, we then estimated the proportion of the paragraph reading time devoted to English based on the relative proportion of English vs. Spanish words in the paragraph. This portion of the reading time was then increased by the scaling factor. Raw reading times are reported in Table 4, and normalized values are reported in Table 5.

We analyzed the normalized reading times using a regression with structure parallel to the error analysis reported above, performing a linear mixed effects regression on paragraph reading times (log transformed to correct for skew). Reading rates did not differ for para-

[1] The subset model testing this effect failed to converge; we therefore report a Wald Z statistic to test significance.

Table 3
By-Participant Mean Proportion of Intrusion Errors by Condition

Default language	Switch type	Intrusion rate: Switch out of default	Intrusion rate: Switch back to default	Difference (switch out – switch back)[a]
English	Single word	8.55%	.57%	7.98% [6.07%, 9.90%]
	Whole language	2.12%	.07%	2.05% [1.32%, 2.84%]
Spanish	Single word	3.03%	1.35%	1.68% [.49%, 3.01%]
	Whole language	1.19%	0%	1.19% [.66%, 1.79%]

[a] Bootstrapped 95% confidence interval for differences shown in brackets.

graphs with single-word vs. whole-language switches (β = 0.012, *SE* β = 0.042, 95% CI [−0.070, 0.095]), $\chi^2(1) = 0.08$, $p < .78$, and also did not differ across paragraphs with switches on function versus content words (β = .009, *SE* β = 0.009, 95% CI [−0.008, 0.025]), $\chi^2(1) = 1.05$, $p < .31$. As reported above for intrusion errors, condition effects were not uniform across types of switch target; that is, there was a significant interaction between part of speech and condition (β = 0.042, *SE* β = 0.017, 95% CI [0.009, 0.076]), $\chi^2(1) = 6.1$, $p < .01$. Follow-up regressions revealed just one significant effect; within each switch type, and as found in analysis of error rates, part-of-speech effects were significant for single-word switches, such that paragraphs with switches on function words were read more slowly than paragraphs with switches on content words (β = 0.030, *SE* β = 0.012, 95% CI [0.006, 0.054]), $\chi^2(1) = 6.02$, $p < .02$. However, for whole-language switch paragraphs, there was no significant difference across paragraphs with switches on function versus content words (β = −0.013, *SE* β = 0.011, 95% CI [−0.036, 0.011]), $\chi^2(1) = 1.11$, $p < .30$. Note there was no main effect of condition (i.e., switch type) for paragraphs with function (β = 0.033, *SE* β = 0.043, 95% CI [−0.050, 0.117]), $\chi^2(1) = 0.61$, $p < .44$, or content word switches (β = −0.009, *SE* β = 0.042, 95% CI [−0.092, 0.074]), $\chi^2(1) = 0.05$, $p < .83$.

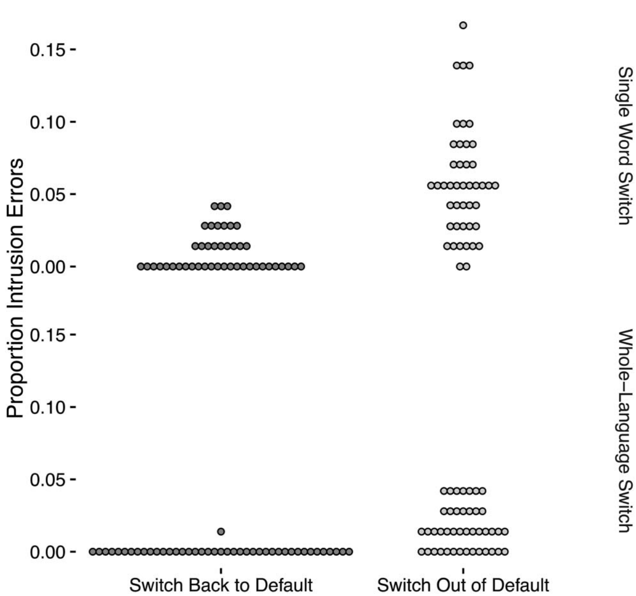

Figure 3. Proportion of intrusion errors for each participant, switching out of and back into the default language, for each switch type.

As we normalized for overall language differences, we expected reading rates would not show a significant main effect of language; the regressions confirmed this (β = −0.004, *SE* β = 0.009, 95% CI [−0.021, 0.012]), $\chi^2(1) = 0.25$, $p < .62$. There was no interaction of language and part of speech (β = 0.018, *SE* β = 0.018, 95% CI [−0.017, 0.053]), $\chi^2(1) = 1.12$, $p < .29$, nor language and switch type (β = 0.022, *SE* β = 0.017, 95% CI [−0.011, 0.056]), $\chi^2(1) = 1.7$, $p < .20$, and the three-way interaction between language, condition, and part of speech, was also not significant (β = 0.014, *SE* β = 0.034, 95% CI [−0.053, 0.081]), $\chi^2(1) = 0.16$, $p < .69$.

Summing up, our analyses of paragraph reading times demonstrated that higher error rates in the read aloud paradigm were not driven by faster reading times; if anything, paragraphs with higher error rates also exhibited significantly slower reading times. Reading times also provided further support for our suggestion that part-of-speech effects are more robust when they must be produced without contextual support (part-of-speech effects in reading times were significant only in the single-word switch condition).

Discussion

The assumption that language switches rely on the same processes used to support nonlinguistic switches forms a key component of prominent theoretical approaches to language control (Abutalebi & Green, 2007; Green, 1998; for review see Kroll & Bialystok, 2013). The results of this study suggest some limitations on this approach. While production of isolated nouns in rapid succession without linguistic context likely shares at least some control processes with similar implementations of nonlinguistic task switches (but see Branzi, Calabria, Boscarino, & Costa, 2016; Gollan, Kleinman, et al., 2014), the robust effect of paragraph type on function but not content word retrieval in the present study suggests that syntactically driven mechanisms of language control facilitate certain types of language switches in connected speech. Similar conclusions are supported by evidence that bilinguals can switch, without paying costs in time, on every other word in production of full sentences but only if they share word order between languages (Declerck & Philipp, 2015b), and with fewer intrusions if switch points conform to naturally occurring grammatical constraints on switch locations in connected speech (Gollan & Goldrick, 2016).

How might an extended string of words in the switched-to language, that is, the language *not* selected as the default language, temporarily facilitate a switch? When reading aloud, the eyes are often ahead of the mouth (Buswell, 1922; Inhoff, Solomon, Radach, & Seymour, 2011). Such processes might trigger a temporary shift in the default language *at a syntactic level*, thereby affecting retrieval of

Table 4
By-Participant Mean Reading Times (s) by Condition

Switch type	Grammatical category of word at controlled switch	Word order of paragraph[a]	
		English	Spanish
Single word	Content	40.26 [38.61, 41.74]	52.90 [49.58, 55.98]
	Function	40.92 [39.25, 42.72]	55.25 [51.09, 58.45]
Whole language	Content	44.52 [42.77, 46.45]	46.19 [44.38, 47.99]
	Function	43.56 [42.11, 45.18]	45.97 [44.10, 48.06]
Paragraphs without switches		36.92 [35.97, 37.87]	50.71 [48.55, 52.79]

[a] Bootstrapped 95% confidence interval for differences shown in brackets.

function more than content words. Importantly, similar "look ahead" processes are involved when speakers plan upcoming words in spontaneous speech (Levelt, 1989; for a review see Konopka, 2012). The robust effects of switch type (i.e., single-word vs. whole-language) suggest that this manipulation successfully mimics, and therefore supports, the proposed contrast between insertion and alternation in naturalistic code-switching (Muysken, 2000; but see Green & Wei, 2014, who argued that similar mechanisms underlie insertions and alternations).

Furthermore, the difference between single-word and whole-language conditions was driven entirely by function word targets (even after controlling for target word length), thus, it appears these switch types should be distinguished at the level of syntactic planning—something that would not be predicted by models of bilingual control that operate without reference to the forces of grammatical encoding in planning utterances. For example, Olson (2016) proposed that the extent to which bilinguals rely on inhibitory control varies with the proportion of words in each language. On this view, greater control of the dominant language is applied when bilinguals switch only on a small a minority of trials into the nondominant language (e.g., 5%; in which, contra to the patterns reported above, only switches back into the default and dominant language were costly and no costs were found in the nondominant language). Also on this view, inhibitory control is applied more equally to both languages when switch rates are higher and equal numbers of nouns in each language are produced (50%; here, equal switch costs were found in both languages; Olson, 2016). Such a model could not explain why, in the present study, different patterns were observed for different parts of speech (i.e., switch type affected function but not content words), why switches back to default consistently elicited fewer errors than switches out of default, nor how default language could be specified independently of the proportion of words in each language—a necessary and important feature of bilingual language control in dense code-switching contexts (even with frequent switches, a default language must be specified; but see Green & Abutalebi, 2013).

Perhaps the most notable effect of context on planning of switches in the present study was that switches back into the default language rarely elicited errors (see Figure 3 and Table 3). Switches-back were effectively error-free for both single-word and whole-language switches (i.e., regardless of the proportion of words produced in each language), in both languages (dominant and nondominant), and even though switches back necessarily occurred as frequently as switches out of the default language. The contrast between switches out of default, which were difficult, and switches back into the default language, which appeared to be nearly effortless—is striking, and supports our suggestion that some switches are driven by relatively automatic processing mechanisms likely arising at the level of grammatical encoding. Notably, both the dominant and nondominant languages could be selected as the default language (Myers-Scotton & Jake, 2009), but whole-language paragraphs did not elicit a kind of "bilingual mode" or relaxed selection of a default language such that switches in either direction would be equally costly or cost-free.

The present study also replicated previously reported reversed language dominance effects, often attributed to inhibition (Declerck, Thoma, Koch, & Philipp, 2015; Gollan & Ferreira, 2009; Gollan & Goldrick, 2016; Gollan et al., 2014), such that English, the dominant language in this case, was more vulnerable to substitutions of Spanish translation equivalents than the reverse. The absence of robust reversed dominance effects in the whole-language condition could imply that inhibition is recruited only when switches are minimally supported by context (though note the interaction between part of speech and dominance was not significant). This would be consistent with the proposals that bilinguals recruit inhibition relatively less (Green & Abutalebi, 2013), or in different ways (Olson, 2016) when operating in dense-switching contexts, though as noted above we equated switching rate across switch types. Thus, our results imply

Table 5
By-Participant Mean Normalized Reading Times (s) by Condition

Switch type	Default language of paragraph	Grammatical category of word at controlled switch[a]	
		Content	Function
Single word	English	54.58 [50.96, 58.28]	55.59 [51.69, 59.63]
	Spanish	53.93 [50.55, 57.22]	56.33 [52.86, 59.73]
Whole language	English	55.00 [51.79, 58.31]	53.79 [50.97, 57.04]
	Spanish	53.62 [50.84, 56.69]	53.34 [50.60, 56.26]

[a] Bootstrapped 95% confidence interval for differences shown in brackets.

that the proportion of elements from each language, not switching rate, might be critical (in Olson, 2016, switch rate and proportion of words in each language were confounded). However, given the very low number of intrusions in the whole-language condition, these conclusions remains uncertain. The joint appearance of reversed dominance effects (reflecting dominant language inhibition) and, in contrast, robust differences between switches-out and switches-back for *both* languages (see Table 3), implies that inhibition of the dominant language and default language selection function independently.

A key area for future work is more detailed investigation of the interrelationship of inhibitory control and domain-specific syntactic encoding mechanisms. In particular, effects that appear to implicate inhibitory control processes (i.e., reversed dominance effects) could also impact control at the syntactic level. Consistent with this, after controlling for length (but not without this control), we observed a significant interaction between language dominance and part-of speech effects (with reversed dominance effects for function but not content words).

In addition, other noninhibitory control mechanisms might be considered, including activation of the nondominant language (Branzi, Martin, Abutalebi, & Costa, 2014; for related possibilities see Costa & Santesteban, 2004). In our view, (contra Branzi et al., 2014) it is unlikely that bilinguals could rely exclusively on activation to achieve control and selection at the lexical level; it's unclear how such a proposal could account for the full range of data. In bare picture naming in single-language contexts (i.e., without language mixing), language dominance effects are highly robust, and frequency sensitive, suggesting that lexical representations in the nondominant language are less active than dominant language representations (Francis, Augustini, & Sáenz, 2003; Gollan, Montoya, Cera, & Sandoval, 2008; Gollan et al., 2011; Hanulovà, Davidson, & Indefrey, 2011; Ivanova & Costa, 2008; Runnqvist, Strijkers, Sadat, & Costa, 2011). If bilinguals were capable of simply activating the nondominant language (to the point that dominance effects reverse completely in mixed contexts), then it is not clear why dominance effects would be so robust in single-language contexts. To explain reversed dominance when overt competition *is* present (i.e., in mixed-language contexts), a pure activation-based account would therefore have to assume that there is some source for extra activation for representations in the nondominant language that is only available under these specific circumstances. It's unclear what would motivate such a mechanism. In contrast, an inhibition-based account explains the different performance under conditions of competition (and mixing) as arising from a distinct processing mechanism, and one that is specific to situations of conflict. While activation-based explanations do not provide a ready account of effects at the level of lexical selection, such mechanisms might contribute (alone or in concert with inhibition) to control at the syntactic level. Given that many syntactic structures would be highly frequent in both languages, there might be syntactic representations in the nondominant language that are quite active—and could initiate activation-based default language selection. The potential contributions of activation-versus inhibition-based control mechanisms is clearly a key area for future empirical and theoretical contributions.

In considering the nature of domain-specific control mechanisms, it is important to note that part-of-speech effects remained significant even in whole-language paragraphs (though not after controlling for length). The possibly lingering vulnerability of function words to intrusions in whole-language paragraphs even after equating for number of opportunities to err on function versus content words, and equating as much as possible the surrounding context, broadly supports hypotheses incorporating specialized selection mechanisms for function versus content words in speech production (Garrett, 1975, 1982) and more specifically theories that assume bilingual language control mechanisms operate differently over different word classes (e.g., the Matrix Language Framework; see Myers-Scotton & Jake, 2009, for a review). Part-of-speech effects might be eliminated entirely if paragraphs restricted switches more specifically to those function words hypothesized to be controlled by syntactic processing (Myers-Scotton & Jake, 2009), or could suggest that temporary switches triggered by look-ahead processes are graded (not absolute) and vary in the extent to which they can elicit automatic retrieval of functional elements. However, the main effect of part of speech was not significant in the present study after controlling for length, thus additional work is needed to investigate the presence (or absence) of part-of-speech effects in whole-language switches—specifically, designs that have greater power for observing intrusions on relatively short content words.

The results of the present study could resolve the apparent paradox contrasting intentional versus unintentional language switches: intentional switches rarely involve single function words, whereas unintentional switches most often involve function word targets (Muysken, 2000; Poulisse, 1999). The robust length effects we observed on intrusion errors (see Figure 2), implies that part-of-speech effects arise in part because of a form-based monitoring process (Ivanova, Ferreira, & Gollan, 2017), that operates most effectively when processing switches (Declerck, Lemhofer, & Grainger, 2016), and that more easily intercepts longer than shorter words before an utterance begins. The possibility of a form-based monitor was also suggested by the finding in previous work of significant cognate effects on intrusion errors (i.e., intrusions were produced at a higher rate for translation equivalents that are similar in form such as *instant* and its Spanish equivalent *instante*; Gollan, Schotter, et al., 2014).

Finally, even after controlling for length, the more robust effect of context on function versus content words supports the view that these are controlled by distinct mechanisms at a processing level that specifically is *not* sensitive to form, such as grammatical encoding. Intentional single-word language switches might be insertions (Deuchar, 2005; Muysken, 2000), whereas unintended intrusion errors might reflect the consequences of automatic function word retrieval triggered by temporary switches at the whole-language level. On this view, naturally occurring intrusions arise with function more often than content word targets because they reflect a momentary shift in default language selection that bypasses a language checking monitor only when triggered automatically (i.e., for function words), and is self-corrected before overt production of content words. If so, intrusion errors in spontaneous speech may be rather unlike speech errors within a single language—arising at a much higher processing level than lexical substitution errors. In this way, the results of the current study illustrate the importance of examining language switches in connected speech to deliver more complete theories of bilingual speech production while also potentially illuminating unresolved mysteries in the literature. More generally, the contrasting effects of switch type on part of speech suggest that control over language switching is not simply a frequency-driven process (see Poulisse & Bongaerts, 1994), and instead suggests that switches on function words are fundamentally different types of switches, controlled by more automatic processing mechanisms, greatly influenced by local context, and also not likely reflecting mechanisms that could operate outside the linguistic domain.

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Appendix

Example of Paragraph Variations Across Conditions

An example paragraph and its variants presented between subjects across different conditions. The abbreviation *CS* stands for part-of-speech controlled switches out of the default language, and *UCS* stands for uncontrolled switches back into the default language. The abbreviations were not shown to participants and are presented here to illustrate the nature of the experimental manipulations.

English Only: Throughout the Land of the Pig River, the name Mrs. Peace was very well known by everyone. It wasn't so much because of the gossip that traveled from village to village, but due to the stories that circulated declaring her adventures and mischief. There was something magnetic and charming about her personality that attracted attention. In fact, there was always someone that had something funny to say about Mrs. Peace. The curious thing is that very few people spoke negatively about her, in spite of her eccentric behavior. The truth is that almost everyone admired her; even the youngest ones.

English Single-Word Switch, Function: Throughout the Land of the Pig River, el (CS) name (UCS) Mrs. Peace was very well known by everyone. It wasn't so much because of the gossip que (CS) traveled (UCS) from village to village, but due to the stories that circulated declaring her adventures and mischief. There was something magnetic y (CS) charming (UCS) about her personality that attracted attention. In fact, there was always someone that had algo (CS) funny (UCS) to say about Mrs. Peace. The curious thing is that very poca (CS) people (UCS) spoke negatively about her, in spite of her eccentric behavior. La (CS) truth (UCS) is that almost everyone admired her; even the youngest ones.

English Single-Word Switch, Content: Throughout the Land of the Pig River, the nombre (CS) Mrs. (UCS) Peace was very well known by everyone. It wasn't so much because of the chisme (CS) that (UCS) traveled from village to village, but due to the stories that circulated declaring her adventures and mischief. There was something magnetic and encantador (CS) about (UCS) her personality that attracted attention. In fact, there was always someone that had something chistoso (CS) to (UCS) say about Mrs. Peace. The curious thing is that very few gente (CS) spoke (UCS) negatively about her, in spite of her eccentric behavior. The verdad (CS) is (UCS) that almost everyone admired her; even the youngest ones.

English Whole-Language Switch, Function: Throughout the Land of the Pig River, el (CS) nombre doña Paz era muy bien conocido por todos. It (UCS) wasn't so much because of the gossip que (CS) corría de pueblito a pueblito, but (UCS) due to the stories that circulated declaring her adventures and mischief. There was something magnetic y (CS) encantador de su personalidad que llamaba la atención. In (UCS) fact, there was always someone that had algo (CS) chistoso que contar de doña Paz. The (UCS) curious thing is that very poca (CS) gente hablaba mal de ella, in (UCS) spite of her eccentric behavior. La (CS) verdad es que casi todos la admiraban; even (UCS) the youngest ones.

English Whole-Language Switch, Content: Throughout the Land of the Pig River, the nombre (CS) doña Paz era muy bien conocido por todos. It (UCS) wasn't so much because of the chisme (CS) que corría de pueblito a pueblito, but (UCS) due to the stories that circulated declaring her adventures and mischief. There was something magnetic and encantador (CS) de su personalidad que llamaba la atención. In (UCS) fact, there was always someone that had something chistoso (CS) que contar de doña Paz. The (UCS) curious thing is that very few gente (CS) hablaba mal de ella, in (UCS) spite of her eccentric behavior. The verdad (CS) es que casi todos la admiraban; even (UCS) the youngest ones.

Spanish Only: Por toda la Tierra del Río Puerco, el nombre doña Paz era muy bien conocido por todos. No era tanto por el chisme que corría de pueblito a pueblito, sino las historias que circulaban declarando sus aventuras y travesuras. Había algo magnético y encantador de su personalidad que llamaba la atención. De hecho, siempre había alguien que tenía algo chistoso que contar de doña Paz. Lo curioso es que muy poca gente hablaba mal de ella, a pesar de su comportamiento excéntrico. La verdad es que casi todos la admiraban; hasta los más jóvenes.

Spanish Single-Word Switch, Function: Por toda la Tierra del Río Puerco, the (CS) nombre (UCS) doña Paz era muy bien conocido por todos. No era tanto por el chisme that (CS) corría (UCS) de pueblito a pueblito, sino las historias que circulaban declarando sus aventuras y travesuras. Había algo magnético and (CS) encantador (UCS) de su personalidad que llamaba la atención. De hecho, siempre había alguien que tenía something (CS) chistoso (UCS) que contar de doña Paz. Lo curioso es que muy few (CS) gente (UCS) hablaba mal de ella, a pesar de su comportamiento excéntrico. The (CS) verdad (UCS) es que casi todos la admiraban; hasta los más jóvenes.

Spanish Single-Word Switch, Content: Por toda la Tierra del Río Puerco, el name (CS) doña (UCS) Paz era muy bien conocido por todos. No era tanto por el gossip (CS) que (UCS) corría de pueblito a pueblito, sino las historias que circulaban declarando sus aventuras y travesuras. Había algo magnético y charming (CS) de (UCS) su personalidad que llamaba la atención. De hecho, siempre había alguien que tenía algo funny (CS) que (UCS) contar de doña Paz. Lo curioso es que muy poca people (CS) hablaba (UCS) mal de ella, a pesar de su comportamiento excéntrico. La truth (CS) es (UCS) que casi todos la admiraban; hasta los más jóvenes.

(*Appendix continues*)

Spanish Whole-Language Switch, Function: Por toda la Tierra del Río Puerco, the (CS) name Mrs. Peace was very well known by everyone. No (UCS) era tanto por el chisme that (CS) traveled from village to village, sino (UCS) las historias que circulaban declarando sus aventuras y travesuras. Había algo magnético and (CS) charming about her personality that attracted attention. De (UCS) hecho, siempre había alguien que tenía something (CS) funny to say about Mrs. Peace. Lo (UCS) curioso es que muy few (CS) people spoke negatively about her, a (UCS) pesar de su comportamiento excéntrico. The (CS) truth is that almost everyone admired her; hasta (UCS) los más jóvenes.

Spanish Whole-Language Switch, Content: Por toda la Tierra del Río Puerco, el name (CS) Mrs. Peace was very well known by everyone. No (UCS) era tanto por el gossip (CS) that traveled from village to village, sino (UCS) las historias que circulaban declarando sus aventuras y travesuras. Había algo magnético y charming (CS) about her personality that attracted attention. De (UCS) hecho, siempre había alguien que tenía algo funny (CS) to say about Mrs. Peace. Lo (UCS) curioso es que muy poca people (CS) spoke negatively about her, a (UCS) pesar de su comportamiento excéntrico. La truth (CS) is that almost everyone admired her; hasta (UCS) los más jóvenes.

Received May 7, 2017
Revision received June 14, 2017
Accepted June 21, 2017 ■