

Control stimuli in experimental code-switching research

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Introduction

- Various methodological concerns specific to research on:
 - Bilinguals (De Houwer, 1998; Grosjean, 1998; among others)
 - Code-switching (CS) (Gullberg, Indefrey & Muysken, 2009; González-Vilbazo et al., 2013; MacSwan & McAlister, 2010; among others)
- Current study investigates the use of control stimuli in experimental studies involving intrasentential CS
- Structural constraints on intrasentential CS consistently shown to be a rule-governed phenomenon
 - Despite general findings, specific intuitions regarding CS can be quite heterogeneous among a group of bilinguals
 - Unclear to what extent heterogeneity is an artifact of the methods employed (as opposed to actual differences in linguistic competence)
- Under investigation:
 - (i) How control stimuli can be used as a baseline of acceptability
 - (ii) Whether there is variation between different types of control stimuli
 - (iii) How control stimuli can be used effectively to better understand bilingual CS intuition heterogeneity

Methods

Participants

- Native (i.e., 2L1) US Spanish-English bilinguals ($N = 20$)
 - Acquisition of Spanish: 0 - 6 years ($M = 0.9$ years)
 - Acquisition of English: 0 - 6 years ($M = 2.6$ years)
 - Self-reported code-switchers
 - Spanish proficiency: Intermediate/Advanced ($M = 31.8$ out of 50) (Montrul & Slabakova, 2003)
 - English proficiency: Advanced ($M = 36.7$ out of 40) (O'Neill, Cornelius & Washburn, 1981)
 - Age: 19 - 55 years ($M = 23.5$)

Experimental Procedure

- Acceptability judgment task with 7-point Likert scale
 - 7 = 'completely acceptable'; 1 = 'completely unacceptable'
 - Completed online (via Qualtrics)
 - Background questionnaire, task training and practice

Experimental Stimuli

- Varied written code-switched sentences ($N = 30$)
 - Target control stimuli ($n = 18$): complex-sentence switches (1), subject-predicate switches (2), direct-object switches (3)
 - Comparison stimuli ($n = 12$): pronoun switches (4), auxiliary switches (5)

(1) We'll hear a sound <i>si alguien toca el timbre.</i> 'We'll hear a sound if someone rings the doorbell.'	Complex sentence
(2) My brother <i>está pescando.</i> 'My brother is fishing.'	Subject-predicate
(3) He has <i>una mala reputación.</i> 'He has a bad reputation.'	Direct object
(4) * They <i>compraron unas manzanas.</i> 'They bought some apples.'	Pronoun
(5) * The students have <i>prestado atención a la profesora hoy.</i> 'The students have paid attention to the professor today.'	Auxiliary

Results

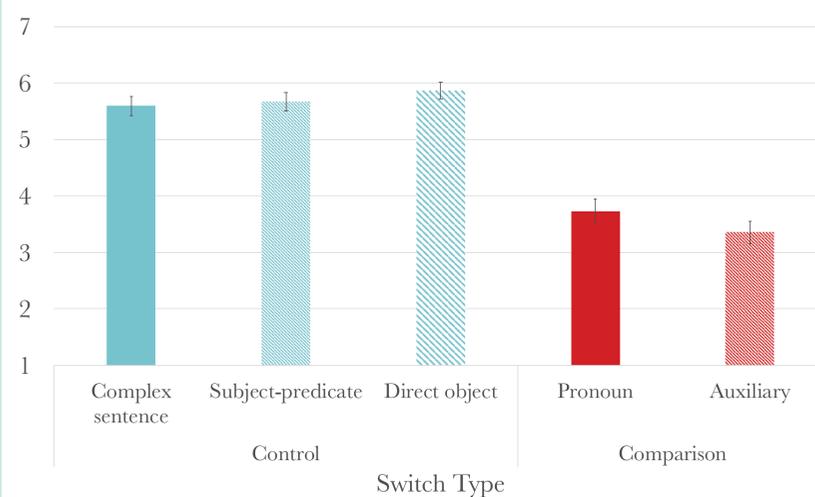
General Results

Table 1. Mean rating of stimuli by switch type

Switch type	<i>M</i>	<i>SD</i>	<i>n</i>
Control stimuli	5.72	1.76	360
Complex sentence	5.60	1.86	120
Subject-predicate	5.68	1.77	120
Direct object	5.88	1.65	120
Comparison stimuli	3.55	2.30	240
Pronoun	3.73	2.40	120
Auxiliary	3.36	2.18	120

- Participants as a whole exhibited expected grammatical distinctions based on switch type (see Fig. 1)
 - Control stimuli rated considerably higher than the comparison stimuli
 - Uniformity within the two general groups of stimuli
- High degree of individual variability (see Fig. 2)

Figure 1. Mean rating of stimuli by switch type



- Significant difference between the switch types ($F(4,595) = 43.622, p < .001$)
 - Both types of comparison stimuli rated significantly lower than all three types of control stimuli ($p < .001$)
 - No significant difference between comparison stimuli types ($p = .590$)
 - Nor between control stimuli types ($p > .05$)

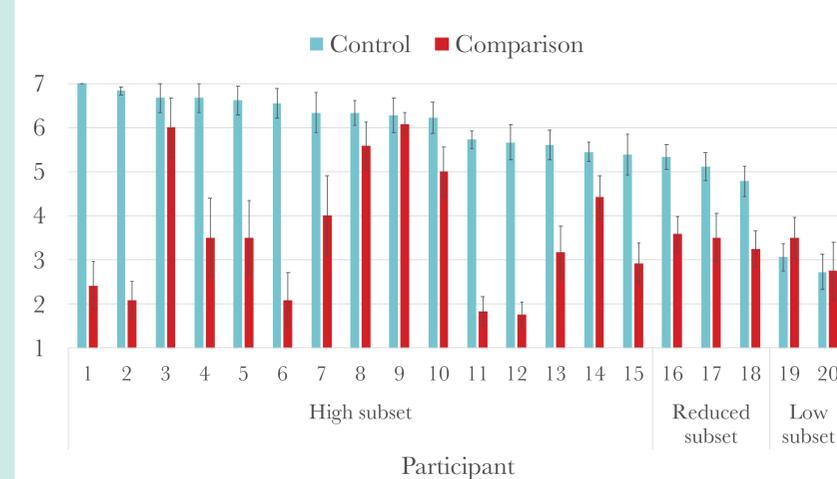
Heterogeneity Results

- Significant difference between control stimuli ratings based on participant ($F(19,340) = 12.285, p < .001$)
 - Three homogeneous participant subsets ($p < .05$): (i) high control ratings, (ii) reduced control ratings, (iii) low control ratings

Table 2. Mean rating of control stimuli by participant subset

Participant subset	<i>M</i>	<i>SD</i>	<i>n</i>
High control ratings	6.22	1.44	15
Reduced control ratings	5.07	1.34	3
Low control ratings	2.89	1.49	2

Figure 2. Mean rating of stimuli by participant



Conclusions

- Control stimuli able to establish baseline rating: 5.72 (out of 7-point scale)
 - Regardless of structure analyzed, at least a 1-point reduction of the scale
- No variability among types of control stimuli
 - Complex-sentence switches, direct-object switches and subject-predicate switches provided parallel ratings
- Heterogeneity due to both methods and differences in linguistic competence
 - Control stimuli can be used as an independent measure to isolate or remove participant subsets from the dataset
 - Broader impact in that, minimally, such control stimuli should be included in experimental CS studies
- Highlights need to continue investigating methodological issues in CS
 - Continued need to better understand heterogeneous results

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