The role of endogenous control mechanisms in bilingual language switching
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A critical component of functional bilingualism is the ability to fluently switch between languages. For example, fluent Spanish-English bilinguals can produce different forms for the same lexical item (e.g. for the numeral 2, bilinguals can produce “dos” in Spanish “pero” but “two” in English; Meuter & Allport, 1999) and distinct realizations of similar phonetic categories (e.g. pre-voiced/short-lag vs. short-lag/long-lag voicing distinctions; Antoniou, Best, Tyler, & Kroos, 2010). How do bilingual speakers control which representations are utilized for the production of speech? In recent work, Verhoef, Roelofs, and Chwilla (2009a,b) developed a novel experimental paradigm that allows a separation of the effects of exogenous control, involuntarily driven by external stimuli, from endogenous control, voluntarily motivated by internal goals and expectations. To examine the generalizability and replicability of their results, we examined their experimental manipulation in the context of a well-established language switching paradigm involving digit naming (Meuter & Allport, 1999).

Language switching is typically examined experimentally by presenting bilinguals with stimuli (e.g., pictures, digits) whose names have distinct phonological forms in the two languages (e.g., “two” vs. “dos”). Participants are given a cue instructing them which language to produce the stimulus (e.g. if the numeral is red, use English; blue, use Spanish). Verhoef et al. (2009a, b) observed that such experiments typically conflate exogenous and endogenous control. Language cues appear simultaneous with or are embedded in the stimuli (e.g., the color of a numeral). In such paradigms, results may reflect both participants’ involuntary reactions to the language cue (i.e., exogenous control) and internal planning (i.e., endogenous control). To differentiate between these mechanisms, Verhoef et al. kept language cues constant but varied the amount of preparation time available to participants. By holding exogenous cues constant, but allowing for more time for endogenous control mechanisms to influence processing, this paradigm allows us to separate these two aspects of control.

Verhoef et al. (2009a) report results from a language switching paradigm using pictures. These show that preparation time more strongly influences the processing of L2 vs. L1 representations in unbalanced bilinguals. We examined whether similar results would be obtained using digit naming (Meuter & Allport, 1999).

Participants, Materials and Procedure. Sixteen unbalanced bilinguals (L1 varied, L2 English) named digits in either their L1 or L2. They first completed 8 mixed language blocks of 144 trials each. Each trial began with a 250ms language cue (blue or yellow squares, with assignment of color to L1 vs. L2 counterbalanced), followed by a 500ms or 1250ms preparation interval. The digit was then presented for 250ms digit stimulus and participants responded. Inter-trial intervals were randomly set to 1000ms or 1250ms. Participants then named digits in pure language blocks (English, followed by L1) consisting of 144 trials with no language cue.

Analysis (in progress). Preliminary results suggest we replicate standard findings from Meuter and Allport’s (1999) paradigm. We find a local switch cost, such that reaction times (RTs) are slower when the preceding trial has a different language. Furthermore, replicating other studies with low proficiency speakers, this cost is larger for the L1 than the L2. Ongoing analyses examine whether, as reported by Verhoef et al. (2009a), these switching effects are modulated by preparation time. Such interactions will help reveal the contributions of endogenous mechanisms to bilingual language control.
REFERENCES


