

The bilingual advantage: Conflict monitoring, cognitive control, and garden-path recovery

Susan Teubner-Rhodes, Alan Mishler, Ryan Corbett, & Jared Novick (University of Maryland, College Park), Llorenç Barrachina & Mònica Sanz-Torrent (Universitat de Barcelona), & John Trueswell (University of Pennsylvania)

steubner@umd.edu

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Mounting research findings demonstrate that balanced bilinguals enjoy certain cognitive advantages relative to monolinguals. On tasks requiring cognitive control (CC)—the ability to regulate mental activity and resolve among competing representations—bilinguals frequently outperform monolinguals selectively on trials inducing conflict [1]. Other evidence reflects broader patterns: bilinguals are better at conflict *monitoring* during goal-directed tasks, performing faster generally under high, but not low, conflict-monitoring conditions [2]. Considering psycholinguistic research emphasizing that domain-general CC enables recovery from temporary misanalysis [3], we investigate whether bilinguals' putative CC advantage improves their garden-path recovery abilities. We also test if brief practice on an N-back memory task with high (but not low) conflict-monitoring demands affects subjects' syntactic ambiguity resolution abilities.

Balanced Spanish-Catalan bilinguals (N=59) and Spanish monolinguals (N=51) performed three tasks in this order: a (Spanish) self-paced, moving-window reading task involving sentences that were temporarily ambiguous between a preferred subject-first or dispreferred object-first cleft interpretation; a 20-minute high- or low-interference version (randomly assigned) of an N-back task; and a posttest form of the reading task. In the reading task, comprehension probes tested lingering effects of misinterpretation in object-first sentences [4; see example]. During N-back, subjects viewed single words sequentially and indicated whether an item appeared 3 trials previously. Only the high-interference version contained "lures"—words that appeared 2, 4, or 5 items before, forcing subjects to override a familiarity bias to correctly indicate that the item was not a 3-back target.

On N-back, bilinguals were significantly more accurate than monolinguals in the high-interference ($p < .01$), but not the low-interference version ($p > .37$). However, language-group did not interact with trial type in either version, suggesting the benefit is not limited to stimuli requiring conflict resolution (lures), but instead reflects a general conflict-monitoring advantage in high conflict-monitoring conditions, consistent with [2]. In the reading task, subjects spent longer in disambiguating regions of, and were less accurate on, object-first versus subject-first items (p 's $< .01$)—the expected garden-path effect; but there was no interaction with group. Bilinguals had higher accuracy than monolinguals generally across all item types (object-first, subject-first, and filler probes; $p < .05$); thus, bilinguals' comprehension advantage was not specific to garden-path recovery.

Interestingly, regardless of language group, subjects' accuracy improvement throughout the N-back task on lure trials, but not other trial types, predicted their improvement from pre- to posttest selectively on object-first comprehension probes ($r = .28$, $p < .05$), which necessitated syntactic reanalysis. Some individuals therefore adaptively increased CC recruitment during brief interference-resolution practice, and transferred this benefit to sentence re-interpretation, further supporting the theory that domain-general CC underlies syntactic-ambiguity resolution.

Together these results suggest that balanced bilingualism bestows a general cognitive benefit in high, but not low, conflict-monitoring situations—namely, when there is repeated switching between conflict (lures) and non-conflict (target, non-target) trials—non-specific to conflict trials independently. Similarly, bilinguals enjoy a general comprehension advantage during a sentence-parsing task involving conflict-monitoring. We discuss findings in terms of bilinguals' advantage in conflict-monitoring, which enables them to detect situations requiring frequent conflict-resolution and flexibly increase domain-general CC, which also supports syntactic ambiguity resolution processes.

Example

Object-first/ Subject-first Cleft Sentence (probe in parentheses): Este es el cajero que cuestionaba [el/ al] gerente sobre el inventario. (El cajero cuestionaba al gerente/ El gerente cuestionaba al cajero.)

English: This is the cashier who [the manager questioned/ questioned the manager] about the inventory. (The cashier questioned the manager/ The manager questioned the cashier.)

References

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