

COMMENTARIES

Look both ways before crossing the street: Perspectives on the intersection of bimodality and bilingualism

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(Received: May 01, 2015; final revision received: May 12, 2015; accepted: June 08, 2015; first published online 9 July 2015)

In 1939, NYU Professor of German, Murat Roberts warned readers about the potentially harmful effects of societal bilingualism: “When two languages come to be spoken by the same society for the same purposes, both of these languages are certain to deteriorate. The sense of conflict disturbs in both of them the basis of articulation, deranges the procedure of grammar, and imperils the integrity of thought. The representation of the mind is divided into incongruous halves; and the average speaker, being no linguistic expert, finds it difficult to keep the two media apart. Confusion follows. The contours of language grow dim as the two systems collide and intermingle” (23). Roberts’ warnings about the threat of bilingualism are a thin cloak over the assumption that monolingualism is the norm. But even without dire predictions, conceptions of language representation and use derived from the study of bilinguals have been slow to enter the mainstream. The relation between language representation and control (Abutalebi & Green, 2007) and the dynamic nature of grammatical knowledge across the lifespan (Linck, Kroll & Sunderman, 2009) should change the way we conceptualize all language processing, whether monolingual, bilingual or multilingual.

Emmorey, Giezen & Gollan (Emmorey, Giezen & Gollan) contribute to growing evidence that bilinguals are spared derangement, and in some respects even BENEFIT from their knowledge of multiple languages. Further, these authors remind us once again to check our assumptions. The recent upsurge of research on bilingualism is situated primarily on just one corner of the intersection of bilingualism and bimodality – most studies of bilinguals to date explore the interaction of two spoken languages. Emmorey and colleagues highlight the potential that research ‘on the other side of the street’ has to reveal about the cognitive architecture of this crossroads.

One of several unanticipated results to emerge from the study of bimodal bilinguals is that activating two languages is not always costly in terms of cognitive

resources. Emmorey, Petrich & Gollan (2012), for example, found that bimodal bilinguals named pictures with ASL-English code-blends just as quickly as in ASL alone, and further, that code-blending was helpful to participants trying to retrieve low frequency ASL signs. These and related findings are a reminder that competition and inhibition in bilingual language processing is a more general property of how the mind manages diverse representations and not a property unique to bilingualism per se.

What is less clear is the degree to which the visual nature of signed languages is shaping the pattern of effects found for hearing bimodal bilinguals. Cognitive Linguistic (Croft & Cruse, 2004) and Grounded Cognition (Barsalou, 2008) theories reject the notion of amodal symbolic representations. While we don’t dispute that the BIMODALITY of bimodal bilinguals impacts their language processing, some phenomena might be explained better in terms of the MODALITY, and specifically the VISUALITY, of signed languages. Signed languages provide the ideal articulatory landscape for anchoring embodied cognitive construals (Dudis, 2004; Janzen, 2006; P. Wilcox, 2000, 2004; S. Wilcox, 2004). The fact that dual lexical retrieval is cost-free could reflect a processing advantage for linguistic forms that are richly embedded in their cognitive construals as much as a lack of inhibition between signed and spoken forms. As another example, consider the translation direction asymmetry effect. Hearing unimodal interpreters prefer to interpret from their L2 into their L1 (Seleskovich, 1978) – a pattern that can be partially explained by the Revised Hierarchical Model (RHM) prediction that L2-L1 translation typically engages direct lexical links, while L1-L2 translation relies on conceptual mediation (Kroll & Stewart, 1994). Why then is it common for bimodal bilingual interpreters to report a preference to interpret into their L2 (Nicodemus & Emmorey, 2013)? Nicodemus & Emmorey outline several sensible performance factors that may contribute to the reversed direction asymmetry in bimodal bilinguals,

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and most recently suggest a disconnect between novice interpreters' perception and actual performance during L1-L2 interpretation (Nicodemus & Emmorey, in press). Could it be that this preference is also motivated by the interrelatedness of form and meaning in signed languages? Translating from L2 Spanish *arbol* to L1 English *tree* may be easy to complete through direct lexical links, but foregoing conceptual mediation when viewing the ASL sign for TREE may be nearly impossible. A surprising result from Baus, Carreiras & Emmorey (2013) would be consistent with this interpretation. They found that highly proficient bimodal bilinguals were slower to translate iconic than non-iconic ASL signs into English. Bimodality alone cannot account for this effect.

Kitty-corner to the hearing signing bilinguals that are the focus of the Emmorey et al. (Emmorey et al.) review are deaf signing bilinguals, who provide another reason to be cautious with our assumptions about bimodality. Deaf bilinguals who use two signed languages are clearly not 'bimodal' bilinguals. Even deaf signing bilinguals who are proficient in a spoken language may not feel comfortable under the 'bimodal' mantle. Multi-modal representations in deaf signing bilinguals engage vision, movement, spatial schemas and affect, but are less likely to rely on auditory experiences. So the unique patterns of code-blending and dual lexical retrieval observed for 'bimodal bilinguals' hold little relevance for this corner of bilingual experience. Deaf bilinguals exhibit some widely documented bilingual behaviors, such as cross-language activation during lexical access of printed words (Kubus, Villwock, Morford & Rathmann, published online January 27, 2014; Morford, Wilkinson, Villwock, Piñar & Kroll, 2011; Ormel, Hermans, Knoors & Verhoeven, 2012) and signs (Hosemann, Altvater-Mackensen, Herrmann & Mani, 2013) as well as sensitivity to implicit L2 language patterns (Anible, Twitchell, Waters, Dussias, Piñar & Morford, published online April 1, 2015). However, without understanding how deaf bilinguals use and manage multiple languages, we cannot hope to distinguish effects of general cognitive processing (phonological forms grounded in the same sensory-motor systems compete for activation and engage inhibition and control processes) from effects of bimodality (phonological forms grounded in different sensory-motor systems become integrated into multi-modal representations).

In one of the only studies to date investigating bilingual processing in deaf unimodal bilinguals, Adam (2013) asked deaf Irish Sign Language (ISL)–British Sign Language (BSL) bilinguals to name pictures in ISL and BSL in order to investigate language switching costs. Signers were slower to name pictures on switch than on stay trials, but switch costs were not asymmetric – with greater switch costs when switching into the dominant language – as has been reported for hearing unimodal bilinguals (Costa & Santesteban, 2004). These results

are particularly interesting given Emmorey, Petrich and Gollan's (2014) finding that hearing bimodal bilinguals incur no processing cost for releasing a language from inhibition. While inhibiting the dominant language may be particularly burdensome in hearing unimodal bilinguals, it is possible that high levels of lexical/conceptual overlap between signed languages are at least partially responsible for the lack of L1-L2/L2-L1 asymmetry in switch trials for signed language unimodal bilinguals. Unrelated signed languages use similar forms to express related concepts at a rate higher than chance (Padden, Hwang, Lepic & Seegers, 2015), and Adam (2013) reports that a "pseudo-cognate" subset in his data had shorter response latencies in both signed languages, indicating facilitation of picture naming times for shared conceptual construals.

Are effects of bimodality really effects of 'bimodality' or are they effects of richly detailed embodied representations? There is substantial evidence that simulation mechanisms are activated by linguistic input (Barsalou, 2008). A phrase such as "The ranger saw the eagle in the sky," evokes an image of extended wings causing participants to name a picture of an eagle with wings extended faster than with wings folded (Zwaan & Madden, 2005). Equivalent effects are evoked in hearing and deaf signers with a single lexical item (Grote & Linz, 2003; Thompson, Vinson & Vigliocco, 2009). But differing results across tasks contribute to ongoing debate about the effects of modality/visuality on signed language processing (Anible, Occhino-Kehoe & Kammann, 2013; Baus et al., 2013; Bosworth & Emmorey, 2010; Emmorey, 2014; Occhino-Kehoe, Anible, Wilkinson & Morford, 2015; Thompson, Emmorey & Gollan, 2005; Thompson, Vinson & Vigliocco, 2010). Regardless of where the discussion eventually leads and what theoretical framework it engenders, we would be wise to step back for a moment and take a look around to see what we may have missed just across the street, or maybe even kitty-corner.

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