Measurement of Language Dominance in Bilingualism

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Background

Introduction

- Bilinguals typically use one language more often, or are "stronger" in one language = *dominant* in that language.
- *Dominance* is a continuous and relative construct: bilinguals are not just Language A (LA) – dominant, they are dominant in LA to varying degrees, vis à vis Language B (LB).
- "Balanced bilinguals" are dominant in neither language.
- Balance does not imply high proficiency.

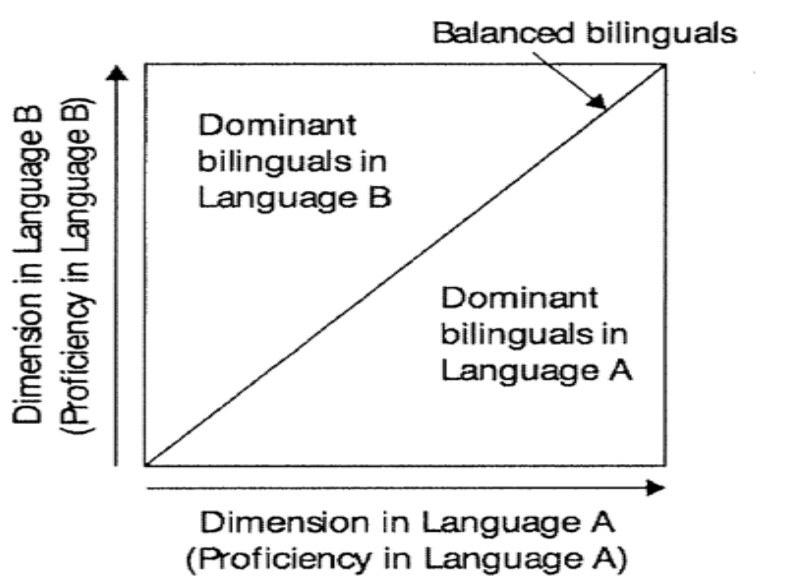

FIG 1: Dominance is continuous & relative (see X & Y axes); balanced bilinguals are dominant in neither LA nor LB (diagonal line); balanced bilingualism doesn't imply high proficiency (track from bottom left up the diagonal). [1]

- Dominance is assessed by specialized instruments and is used as a predictor variable in regression.
- In all the above respects, dominance in bilingualism is comparable to dominance in handedness. [2]

Assessment of dominance

- Dominance is assessed w/r/t:

→ *Dimensions:* naming speed, reading speed, proficiency, fluency, MLU, etc.
→ *Domains:* use at work, with children, with partner, for counting, math, etc.

- *Dominance indices* are numerical assessments along one or more dimensions / domains.
- *Global dominance indices* represent composite scores across multiple dimensions or domains.
- Indices are derived by subtraction (score LA – score LB); or by division as ratios (score LB / score LA); or by hybrid method (subtraction & division).

https://sites.la.utexas.edu/bilingual/

Dominance indices using different methods, compared

Examples of hypothetical raw scores for LA and LB converted to dominance indices by different methods: subtraction, ratio, and hybrid [2]

Raw Score LA	Raw Score LB	Subtraction-Derived Index (LA – LB)	Simple Ratio-Derived Index (LB ÷ LA)	(LB ÷ LA) * 100	(LA – LB) ÷ (LA + LB) *100
20	10	10	.5	50	33
30	20	10	.67	67	20
40	30	10	.75	75	14
50	40	10	.80	80	11
60	50	10	.83	83	9
70	60	10	.86	86	8
80	70	10	.88	88	7
90	80	10	.89	89	6
100	90	10	.90	90	5

TABLE 1: This comparison of dominance indices shows an increase in absolute value of simple ratio-based indices as raw scores for LA and LB increase and as subtraction-based indices remain constant. Indices computed by the hybrid method (rightmost column) decrease.

Raw Score LA	Raw Score LB	Subtraction-Derived Index (LA – LB)	Simple Ratio-Derived Index (LB ÷ LA)	(LB ÷ LA) * 100	(LA – LB) ÷ (LA + LB) *100
20	15	5	.75	75	14
32	24	8	.75	75	14
40	30	10	.75	75	14
48	36	12	.75	75	14
60	45	15	.75	75	14
72	54	18	.75	75	14
80	60	20	.75	75	14
96	72	24	.75	75	14

TABLE 2: With a different set of increasing raw scores for LA and LB, this comparison of dominance indices shows that simple ratio-based and hybrid-based indices remain constant, while subtraction-based indices increase.

Raw Score LA	Raw Score LB	Subtraction-Derived Index (LA – LB)	Simple Ratio-Derived Index (LB ÷ LA)	(LB ÷ LA) * 100	(LA – LB) ÷ (LA + LB) *100
20	10	10	.50	50	33
30	10	20	.33	33	50
40	10	30	.25	25	60
50	10	40	.20	20	67
60	10	50	.17	17	71
70	10	60	.14	14	75
80	10	70	.13	13	78
90	10	80	.11	11	80
100	10	90	.10	10	82

TABLE 3: With another set of raw scores for LA (increasing) and LB (constant), this comparison shows that as subtraction-based indices increase, simple ratio-derived indices decrease and hybrid-based indices increase.

- TAKE-AWAY: When choosing a suitable method for computing dominance indices, one should compare the arithmetic outputs of various methods, and avoid any method that results in an uninformative distribution of indices over varying raw scores, e.g. subtraction in TABLE 1; ratio and hybrid in TABLE 2.
- NOTE: In cases where two or more indices do vary over varying raw scores (e.g. TABLE 3), those indices will inter-correlate.
- NOTE: In the 2 rightmost columns of each of the 3 examples, ratio and hybrid arithmetic outputs are converted to whole numbers by multiplying by 100.

Bilingual Language Profile — DESCRIPTION OF THE INSTRUMENT

Bilingual Language Profile (BLP) [3] is an **easy-to-use, open-source, no-cost assessment instrument** that yields global indices of language dominance. Supported by the Center for Open Educational Resources and Language Learning **(COERLL)** at the University of Texas at Austin.

Bilinguals **self-assess** for each of their languages, on 19 questions in four modules: **Language History, Language Use, Language Proficiency,** and **Language Attitudes**.

BLP includes ***Dimension-based*** items (= skills) and ***Domain-based*** items (= use). Also, items for age of LA - LB learning, years of residence, language identity, etc. **Items are equally weighted. Scoring:** (Score LA) – (Score LB) = BLP dominance index (range +218 to -218); 0 = perfect balance.

BLP can be administered by pencil-and-paper, or online Google form. For the latter, BLP dominance indices are **calculated automatically**; raw scores & scores by module are also tabulated automatically.

BLP is available in **15 language pairings**, e.g. English-Spanish / Español-Inglés. Respondents choose the language of their BLP questions.

13 different languages are represented, e.g. Arabic, Japanese, Russian, Italian, French, Basque, Catalan, Samoan. **Future administrators** are invited to translate BLP items into still other languages.

SAMPLE BLP MODULE
Language Attitudes

V. Language attitudes
In this section, we would like you to respond to statements about language attitudes by giving marks from 0-6.

0=disagree … *6=agree*

16. a. I feel like myself when I speak **English**. ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6
 b. I feel like myself when I speak **Spanish**. ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6

17. a. I identify with an **English-speaking** culture. ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6
 b. I identify with a **Spanish-speaking** culture. ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6

18. a. It is important to me to use (or eventually use) **English** like a native speaker. ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6
 b. It is important to me to use (or eventually use) **Spanish** like a native speaker. ☐ 0☐ 1☐ 2☐ 3☐ 4☐ 5☐ 6

19. a. I want others to think I am a native speaker of **English**. ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6
 b. I want others to think I am a native speaker of **Spanish**. ☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6

BLP SCORES PREDICT ACCENT & LEARNING

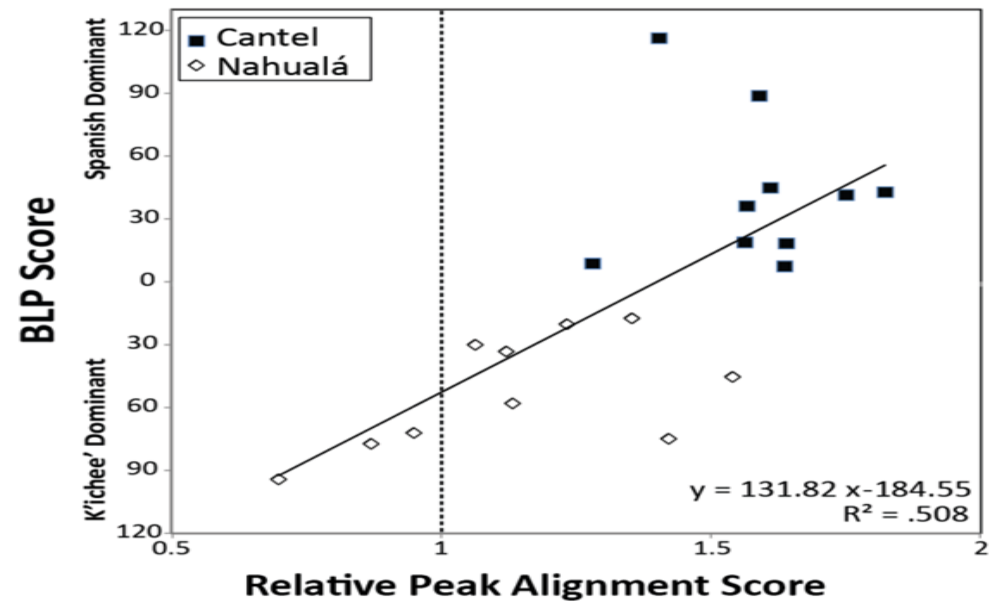

FIG 2: BLP dominance indices for Spanish–K'ichee' bilinguals in Guatemala predict subtle features of Spanish stressed syllables; place of residence (Cantel vs. Nahualá) underspecifies degree of relative peak F_0 alignment. [4]

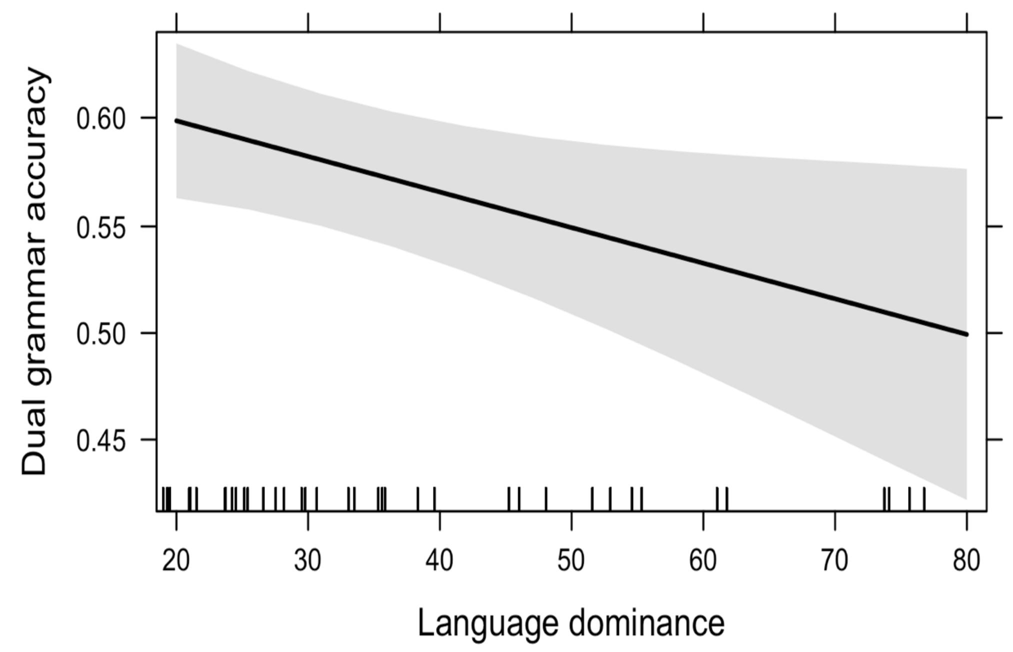

FIG 3: BLP dominance indices for adult bilinguals predict statistical learning (frequencies of, and transitional probabilities between, grammatical elements) in an artificial grammar paradigm. Participants who are closer to balanced bilingualism on the BLP learn best. [5]

Additional information

①

- BLP has been used for participant screening & sorting in studies of bilingual aphasia, cross-language morphosyntactic priming, etc.
- BLP components are predictive of reading comprehension in Gen.1.5 students, knowledge of clitics among early Spanish-Catalan bilinguals, etc.

②

- BLP global raw scores for LA and LB can be converted to ratio- and hybrid-based dominance indices.
- BLP by-item raw scores and modular scores used in regression along with / instead of global indices.
- Proposed formula for <u>any</u> dominance index. Adapted from [6].

$$\left(\frac{[(\text{Score LA} - \text{Score LB}) / \text{larger of the two scores})] + 1}{2} \right)$$

Multiplying the result by 100 yields dominance indices ranging between 0 and 100, with 50 = perfect balance.

Future work

- Exploring dominance as a predictor of academic achievement in schools.
- Using BLP to reveal longitudinal dynamics of dominance relationships across the lifespan.

References:

[1] Goto Butler, Y., and Hakuta, K. (2004). "Bilingualism and second language acquisition," in *Handbook of Bilingualism*, eds T. Bhatia and W. Ritchie (New York: Blackwell Publishers), 114–144.

[2] Birdsong, D. (2016). "Dominance in bilingualism: foundations of measurement, with insights from the study of handedness," in *Language Dominance in Bilinguals: Issues of Measurement and Operationalization*, eds C. Silva-Corvalán and J. Treffers-Daller (Cambridge: Cambridge University Press), 85–105.

[3] Birdsong, D., Gertken, L. M., and Amengual, M. (2012). *Bilingual Language Profile: An Easy-to-Use Instrument to Assess Bilingualism.* Austin, TX: COERLL, University of Texas at Austin. Available at: https://sites.la.utexas.edu/bilingual/

[4] Baird, B. O. (2015). "Pre-nuclear peak alignment in the Spanish of Spanish-K'ichee' (Mayan) bilinguals," in *Proceedings of the 6th Conference on Laboratory Approaches to Romance Phonology*, eds E. W. Willis, P. Martín Burtagueño, and E. Herrera Zendejas (Somerville, MA: Cascadilla Proceedings Project), 163–174.

[5] Onnis, L., Chun, W. E., and Lou-Magnuson, M. (2018). Improved statistical learning abilities in adult bilinguals. *Bilingualism* 21, 427–433.

[6] Langdon, H.W., Wiig, E.H., and Nielsen, N.P. (2005) Dual-dimension naming speed and language-dominance ratings by bilingual Hispanic adults. *Bilingual Research Journal,* 29, 319-336.