Divergences between complexity and performance in language sample analysis

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Background

Language sample analysis (LSA) measures have been shown to be more representative of the language skills of bilingual children when compared to standardized normed assessments (Cleave, Girolametto, Chen, & Johnson, 2008; Peets & Bialystok, 2015). Certain measures, such as mazing, have also been suggested to be particularly promising for distinguishing between a language difference and a language disorder (Lofranco, Peña, & Bedore, 2006). However, not all language sample measures may be equally as representative of the abilities of bilingual children. Inflectional morphology measures have been shown to underestimate the abilities of these children when compared to measures of syntax (Paradis, Rusk, Sorenson Duncan, & Govindarajan, 2017). Another suggestion is that differing psycholinguistic processes may be inappropriately grouped together in the measurement of mazing (Thordardottir & Ellis Weismer, 2002). Given the myriad of LSA measures, more work is needed to understand which are the most useful in distinguishing between a language difference and a disorder. This poster presents unexpected findings suggesting the need for more LSA measurement studies.

Methods

- Known-group cross-sectional validation design
- Study goal: to evaluate evidence of LSA measure construct validity

Participants
- 4 groups
    - M7   7-8-year old English speakers
    - M11   11-12-year old English speakers
    - B7   7-8-year old English-French speakers
    - B11   11-12-year old English-French speakers
- All English monolingual children spoke English at home and school
- All bilingual children attended school in French and spoke English and French at home
- No significant main effects of age or language group on PPVT-4 standard score (p > .1) (see Table 2 for descriptive statistics)

Procedure & Materials
- Order of tasks counterbalanced
- PPVT-4/EVIP
- Conversation
- Narrative tasks
    - TNL – scene picture retell task
    - Story stem task
- Expository task
    - Favourite game-or-sport task
- PPVT-4/EVIP
- Bilingual children were tested twice, once in each language, order of language was counterbalanced
- Equivalent versions of tasks were used for each language, versions were counterbalanced
- Only the narrative tasks and expository task are explored in this study and only English data are included
- Language samples were coded with SALT guidelines
- Calculated:
    - MLUm
    - Clausal density (CD)
    - Mazes per utterance (number of mazes)
    - Errors per utterance (all error types)
- Three-way mixed ANOVAs
    - Within   - Discourse type
    - Between   - Age group
    -      - Language group

Predictions

Measures of syntactic complexity (MLU and CD) were compared with a cross-sectional design with measures of performance (mazing and errors per utterance). We hypothesized that, as complexity increased, performance difficulties would as well. As such, all measures would demonstrate the same pattern of results. Specifically, we hypothesized:
1. Higher scores in 11-12-year-olds compared to 7-8-year-olds.
2. Higher scores in expository discourse compared to narrative discourse.
3. Higher scores in samples by bilingual children compared to those by monolingual children.

Results

Table 1:   Main and interaction effects of 2x2x2 ANOVA for each dependent variable

Effect	MLU$_m$	CD	Mazes/utterance	Errors/utterance
Age (11-12>7-8)	p=.000, η_p^2=.249	p=.013, η_p^2=.136	∅	p=.035, η_p^2=.099
Discourse (exp>nar)	p=.002, η_p^2=.197	p=.003, η_p^2=.193	p=.000, η_p^2=.423	∅
Language group (bi>mono)	∅	∅	p=.008, η_p^2=.152	p=.001, η_p^2=.216
Interaction (age by language group)	∅	∅	∅	p=.030, η_p^2=.105

Key for table 1: ∅ - Results not significant (p>.05)

Table 2:   Participant Characteristics

Group	n	Age[1]	PPVT-4 Standard Score	EVIP Standard Score	EVIP Age-Equivalent Score	Speak English[2]	Understand English[2]
M7	12	91.08 (4.64)	108.00 (11.05)		25.83 (1.75)		
M11	11	140.64 (8.61)	104.91 (9.26)		30.30 (5.60)		
B7	12	94.00 (5.49)	113.75 (19.82)	108.75 (15.43)	102.17 (19.82)	3.77 (0.93)	4.15 (0.56)
B11	13	138.23 (6.91)	112.38 (15.95)	105.08 (13.68)	164.00 (67.91)	3.92 (1.24)	4.00 (1.04)

Key for Table 2
1 - Chronological age in months
2 - Proficiency in English relative to French on a 7-point scale
  1 = only English, 4 = English and French equivalent, 7 = only French

Discussion

Results did not conform to predictions. Rather, performance difficulty measures diverged from each other and from complexity measures. These suggest that, as measured in this study, mazing may be reflecting at least two different underlying constructs (a complexity-driven mazing and a "true bilingual mazing"). Errors are difficult to interpret, given the combination of semantic, syntactic, and morphological errors in one measure. However, the result of higher numbers of errors per utterance only in the younger bilingual group provides tentative support for the idea that morphosyntactic error rates are still resolving in bilingual children at this age (Paradis et al. 2017). Nevertheless, this is not the only possible interpretation. More work is needed to determine the specific constructs being measured by LSA metrics.

Recommendations for future work

1. Additional validation work for LSA measures
2. Measures of performance (mazing, errors) require particular attention in future studies
3. More powerful, multivariate methods recommended for LSA measures

References

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