



## DLLP Project Research Findings

For details of the project student sample cohorts, data collection procedures and linguistic analyses, see the **DLLP Research Design & Approach** pamphlet at DLLP.org.

### Progressions of Oral Language and Discourse

For these analyses, we focused on the oral mathematics explanations of a subset of the corpus, across two time points (4-6 mos. interval) and between kindergarten and 3rd grade.

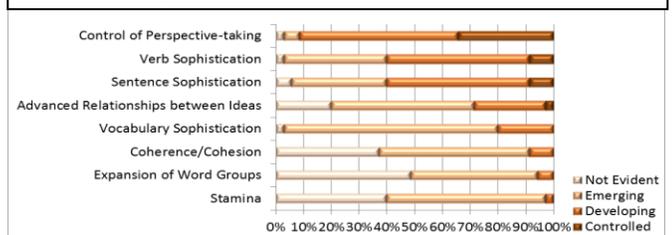
#### Research Questions:

1. What orders of emergence are observed for features of explanations of English learners (EL) compared with English only or proficient peers (EO/P)? And how do these progressions differ at the two grades and across two time points?
2. What relationship, if any, do progressions have with teachers' concurrent ratings of student oral language abilities more generally?



- ➔ Language groups differed in order of emergence, and EO/P kindergartners' usage of complex sentences (found in the *developing* phase of Sentence Sophistication) was more advanced than EL peers at T1. However, both language groups progressed on Relationships between Complex Ideas and Vocabulary Sophistication (beyond *because* and *so* to include connectives such as *since*; increased range of core vocabularies with words such as *equals* and *plus*).
- ➔ ELs and EO/Ps differed more in 3rd grade than in kindergarten at T1, with EO/Ps' explanations placed higher than those of ELs for Vocabulary Sophistication, Stamina, and Expansion of Word Groups (repertoire of adverbs, adjectives, nominalizations, etc.). However, both groups showed little progress during 3rd grade, especially on Coherence/Cohesion and Stamina—discourse-level features perhaps challenging at early grades due to underlying cognitive and linguistic aspects: Coherence/Cohesion involves ordering explanations logically or temporally and using linguistic devices to tie referents; Stamina requires students to explain their mental models of the mathematics task.
- ➔ Kindergarten EO/P students' use of Expanding Word Groups was positively correlated with teacher Speaking ratings. Third-grade EO/P students' Control of Perspective-Taking (maintaining pronominal references to contribute to listener comprehension) was positively correlated with teacher Listening ratings. So few correlations suggests teachers may have a more generalized impression of student language abilities, one that is more favorable toward students' abilities and one not necessarily commensurate with levels of specificity in the progressions; progressions force attention to language at different levels of organization: word, sentence, and discourse.

Example Progressions: Kinder EL Order of Emergence at T1



### Interaction of Mathematics Content and the Progression of Oral Explanations

This study examined strategies students use to solve mathematical problems and how they might impact students' competence in explaining mathematical reasoning in Kindergarten, 3<sup>rd</sup> and 5<sup>th</sup> grades.

#### Research Question:

1. How might the mathematical strategies that students adopt during tasks impact the language of their explanations?

- ➔ Explanations of less complex strategies (addition) contained fewer words, shorter sentences, less frequent general academic vocabulary and temporal discourse connectors, and fewer characteristics

of well-developed explanations.

- ➔ Explanations produced by EO/P students were linguistically more sophisticated but not more cogent than those of EL students. There were differences in connections between strategies and explanations by grade but few by EL group status.

## Comparing Progressions of Oral and Written Language in Academic and Non-Academic Explanations

This study examined differences between oral and written language in the academic (mathematics procedure) and non-academic (personal routine: teeth cleaning) explanations of 3<sup>rd</sup> and 5<sup>th</sup> graders.

### Research Questions:

1. How do the language and discourse features of explanations differ by modality (oral vs. written)?
2. Are differences moderated by explanation task (academic vs. non-academic), grade level, or EL status?

- ➔ Students had greater control of Sentence Sophistication and Coherence/Cohesion in their oral explanations than in their written explanations.
- ➔ There was more of an effect of modality on Vocabulary Sophistication for non-academic explanations than for academic explanations; students were placed higher on the progression for oral explanations.

## Student Self-Assessment of Oral Mathematics Explanations with the DLLP

In this study, a subset of 58 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 6<sup>th</sup> grade students used a “progression board” to complete a self-assessment of two language features in their explanations: Discourse Stamina or Vocabulary Sophistication.

### Research Questions:

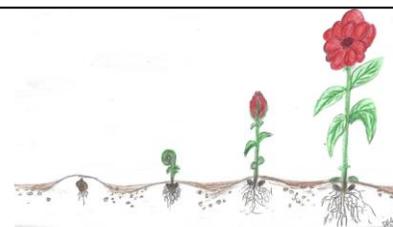
1. How do students' self-assessments of their own oral explanations compare with researchers' placement of their explanations on language learning progressions?
2. Does student-researcher concordance on the language learning progressions differ by key characteristics such as students' grade level, gender, or target language feature?
3. What reflections do students have on the novel self-assessment approach?

- ➔ Fifty percent of students self-assessed in accordance with researchers' placement of their explanations.

- ➔ Consistent with prior research, there was greater accordance between 6<sup>th</sup> graders' and researchers' placements of explanations, than for 4<sup>th</sup> and 2<sup>nd</sup> graders. However, even the youngest students could complete the self-assessment activity with scaffolding of the DLLP. Girls were more aligned with researchers' placements. Additionally, agreement was highest for Stamina.

- ➔ Over 90% of students found the activity to be a useful learning experience.

### DLLP Self-Assessment “Progression Board”



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<sup>2</sup>The English Language Proficiency Assessment Consortium: Assessment Services Supporting English Learners Through Technology Systems (ASSETS), funded by the U.S Department of Education Enhanced Assessment Grant to the Wisconsin Department of Public Instruction and WIDA.

**Sources:** Bailey, A. L. (2017). Progressions of a new language: Characterizing explanation development for assessment with young language learners. *Annual Review of Applied Linguistics*, 37; Bailey, A. L., Blackstock-Bernstein, A., & Heritage, M. H. (2015). At the intersection of mathematics and language: examining mathematical explanations of English proficient and English language learner students. *Journal of Mathematical Behavior*, 40, 6–28; Blackstock-Bernstein, A., Woodbridge, A., Pitsoulakis, D. & Bailey, A.L. (April, 2017). Cross-Sectional Comparisons of Elementary Students' Oral and Written Explanations about Academic and Non-Academic Tasks. Poster presented at the annual meeting of the American Educational Research Association, San Antonio, TX; Bailey, A. L., Blackstock-Bernstein, A., Ryan, E., & Pitsoulakis, D. (2016). Data mining with natural language processing and corpus linguistics: unlocking access to schoolchildren's language in diverse contexts to improve instructional and assessment practices. In S. El Atia, O. Zaiane, & D. Ipperciel (Eds.), *Data mining and learning analytics in educational research* (pp. 255–275). Malden, MA: Wiley-Blackwell; Bailey, A. L., & Heritage, M. (2014). The role of language learning progressions in improved instruction and assessment of English language learners. *TESOL Quarterly*, 48(3), 480–506.

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