Analyzing Linguistic Complexity and Accuracy in Academic Language Development of German across Elementary and Secondary School

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About

- We combine empirically broad modeling of complexity with high-quality error annotations to track early German writing acquisition
- Results:
  - Overall, writing becomes more accurate and complex
  - In elementary school, accuracy discriminates grade-levels best
  - In secondary school, complexity discriminates grade-levels best
  - These findings well generalize across writing topics

- The complexity code is becoming part of CTAP (Chen & Meurers, 2016):
  - http://purl.org/ctap
- Our script to extract accuracy measures from KCT can be found at
  - https://github.com/zweiss/KCTErrorExtractor

Zooming in on Students’ Writing Development

- Information gain ranking on elementary and secondary school data to inspect the most informative feature of each feature set
- Two-tailed t-tests to test if grade-level differences are significant

Data

- Karlruhe Children’s Text corpus (Lavallée, Berkling & Stüker, 2015)
- 1,701 German texts of students in elementary and secondary school
- We study 1,633 texts containing ≥ 10 words by students aged 7 to 15

Assessment of Writing Performance

- (Second) language performance is analyzed along the dimensions of complexity, accuracy, and fluency (CAF triad)
- CAF is used for L1/L2 proficiency and readability assessment
  - Weiss & Meurers, 2018; Yoon & Polio, 2016; Bulté & Housen, 2014
- Complexity refers to the elaborateness and variability of language while accuracy is defined as a native speaker-like error rate
- 308 complexity features of theoretical linguistic domains and psycho-linguistic language processing and use measures (Weiss, 2017)
- 41 accuracy features based on KCT annotations and inferred from comparing the target hypothesis with students’ original writings

Studies 1 and 2: Grade-Level Predictions

- We classify grade-levels across (study 1) and within schools (study 2)
- No invariable features (most common value ≥ 90%) → 262 features
- SMO classifier with linear kernel using 10 iterations of fold-CV
- Meta information includes writing topic and school track

Study 3: Cross-Topic Testing

- We test the cross-topic performance of the classifiers from study 2
- We perform cross-topic training and testing of classifiers using all features (+ meta), all complexity features, and all error rate features

Current Limitations and Future Work

- Our current studies are restricted by using quasi-longitudinal data that approximates development through grade-level bins
- Our follow-up study will investigate this development in a genuinely longitudinal corpus spanning several weeks (Berkling, 2018)

References