Promoting Syntax: Engaging and empowering teachers with linguistically-driven text

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Background. Results of the National Assessment of Educational Progress (nationsreportcard.gov) have been unchanged for the last 32 years: roughly only 1/3 of 4th, 8th, and 12th grade students in the US read at what is termed a "proficient" level. Great strides have been made within the educational community in the past 40 years due to evidence-based methods for teaching decoding (word reading). It is now widely understood that instruction must be phonics-based. The wide-spread success of decoding instruction, including identification and remediation of individuals with dyslexia, has been made possible by intensive efforts to ensure that teachers are trained to understand the linguistic structure of words. Unfortunately, there have been no similar efforts to ensure that teachers are knowledgeable about syntactic structure, and teachers report being nervous and unprepared to teach it (e.g., Brimo & Melamed, 2017). Further, most elementary curricula are silent about syntax, and instead teach "reading comprehension" via instruction in story grammars, inferencing, and vocabulary. At the same time, the clinical community is recognizing that the prevalence of developmental language disorder (DLD), is both nearly equal to that of dyslexia, and often co-morbid with it. For these children, interventions that include syntactic training have been promising (e.g. Balthazar et.al., 2020; Montgomery et al., 2024). There has never been a more crucial time for sentence-level researchers to partner with clinical and educational providers to improve educational outcomes.

Technology to be Demonstrated. To meet this call, we built a reading tool that capitalizes on open-source NLP resources to provide real-time support for syntactic processing during reading, as well as a complementary tool for syntactic instruction. Referred to as Cascade Reading, this free tool uses a patented algorithm to provide linguistically-driven text formatting (LDTF) for any text (Fig. 1). The format uses line breaks and indentations to separate phrasal elements and hierarchically organize them into a visual map of syntactic relationships. Research shows that this format improves comprehension for elementary and college-aged readers, as well as English language learners (Authors, under review; Authors, 2024), and currently operates in English, Spanish, French, Italian, and German.

Demonstration Proposal. We aim to showcase how an innovation driven by psycholinguistics can be implemented in schools and communities to produce real learning outcomes. Objectives are: 1) Demo Cascade Reading via several laptops on which visitors can read (or convert) text presented in LDTF for five languages, and interact with the Explorer tool that automatically marks syntactic relationships (Fig 2), allows collapsing of optional (modifying) elements, colorizes embedded clauses, and identifies parts of speech. 2) Share information from school partnerships geared toward exploring best practices for implementation and obtaining instructor feedback from those using Cascade Reading in their classrooms. 3) Demo elementary-level lesson-plans centered around the LDTF and the Explorer tool. 4) Obtain feedback from the HSP community regarding theories of explicit vs. implicit instruction of syntax for education and clinical remediation.

Requested Resources. Access to internet and electricity for three computers/tablets, a table and possibly chairs to allow visitors to interact with the tool, and posterboard behind the table for information sharing. We can provide computers/tablets and power strips as needed.

Figure 1. Principles behind LDTF with an example sentence.

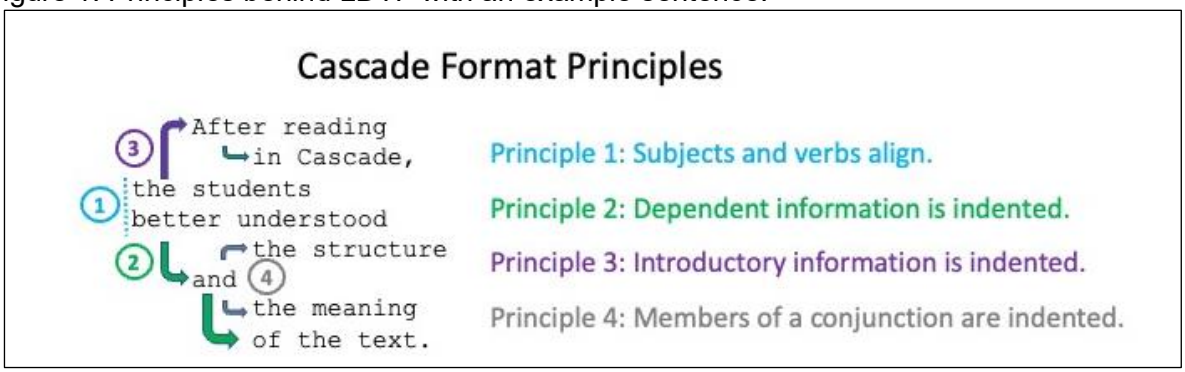
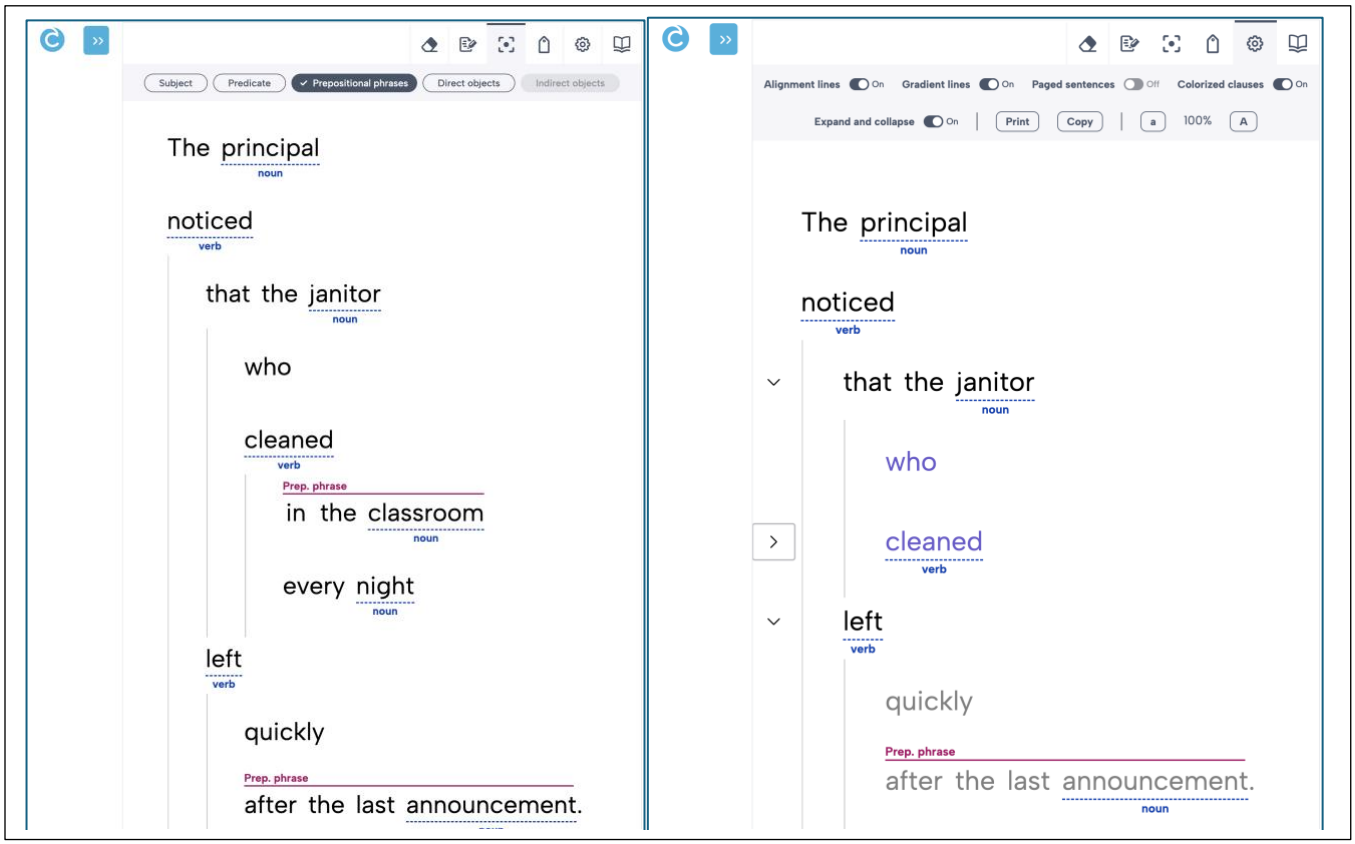


Figure 2. Example of the interactive explorer tool for the demonstration computer stations. Users may highlight syntactic elements like parts of speech or specific types of phrases like 'subject' or 'direct object,' separate clauses and optional elements via color coding, and more.



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