

Language Processing is Both Incremental and Segmental --  
and the Balance May Shift with Aging

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A considerable body of contemporary research now supports the idea that language is processed incrementally as the text or speech unfolds. Often neglected is the role played by segmental processing in which further computations are conducted at the ends of syntactic constituents (e.g., concepts are integrated; ambiguity is resolved; and meaning is consolidated for syntactic units as whole). A significant indicator of segmental processing is an increase in reading time on clause-final and sentence-final words, a phenomenon called "wrap-up." The size of the wrap-up effect has been shown to increase with the conceptual load of the prior text and with ambiguity, supporting the view that wrap-up reflects the engagement of meaning resolution processes in comprehension. Wrap-up effects have been found to decrease with demands of orthographic processing, with concomitant disruption of recall performance. Also, wrap-up at clause and sentence boundaries reduces the parafoveal preview benefit relative to sentence-internal positions, especially for older adults, and older (but not younger) adults show an increase in wrap-up under dual-task demands, suggesting that wrap-up engages age-sensitive attentional processes. Conditionalized on recall performance, wrap-up effects are reduced when knowledge can be used to aid interpretation, especially among older readers. Individual differences in sentence wrap-up effects are (a) reliable over time, as well across different texts read in close temporal proximity, (b) predictive of subsequent recall, and (c) predicted by verbal ability, by literacy skill, and controlling for verbal ability, by print exposure. Wrap-up effects are even observed among cognitively impaired older adults, but the relationship between wrap-up and recall is reduced. Collectively, these findings suggest that the computations needed for comprehension are not always fully completed during incremental processing, and that segmental processing is a(n automatized) procedural skill that affords the opportunity for attentionally demanding integration and meaning-consolidation processes. With lifelong literacy engagement, the procedural skill of segmentation may remain intact, but meaning consolidation processes, which are demanding of attentional resources, may be conducted less consistently with age unless supported by knowledge.