

## Weighing in on End Weight

The Principle of End Weight maintains that constituents will occur in order of increasing weight (Behagel 1909; Quirk et al. 1985), but the precise definition of “weight” has been heavily debated. Previous proposals have defined weight as syntactic complexity (syntactic nodes or words), processing (dependencies), phonological complexity (lexical stresses), or phonological length (syllables). This paper presents a systematic investigation of the predictive value of these measures on constituent ordering in two constructions in spoken English. We show that weight measured as the number of words or lexical stresses most reliably predicts construction choice.

As approximations of weight in studies of syntactic complexity, counts of orthographical words or syntactic nodes have been widely shown to be reliable predictors of constituent ordering (Wasow 2002; Szmrecsányi 2004; Bresnan and Ford 2010; a.o.). Less well-studied are notions of phonological weight, sometimes operationalized as the number of syllables (Benor and Levy 2006; McDonald et al. 1993). Alternatively, Anttila et al. (2010) proposed that weight be measured by the number of lexical stresses (following Selkirk 1984; Zec and Inkelas 1990), arguing that primary stress count supersedes word count as a more accurate predictor of construction choice in the English dative alternation. They, however, failed to control for the influences of other non-phonological predictors of dative construction choice (see esp. Bresnan et al. 2007). Nor did they account for the high degree of correlation between the two weight measures—the number of stresses increases as word count increases—which potentially masks the effects of both predictors.

We examine the effects of phonological weight by distinguishing the independent influences of the various weight measures using multivariate regression analysis of genitive and dative construction choice in a corpus of spoken American English while crucially controlling for other known predictors of genitive and dative construction choice (Shih et al. 2009; a.o.). Four measures of weight were studied: the number of syntactic nodes, words, lexical stresses, and syllables in the possessor and possessum NPs of the genitive and in the recipient and theme arguments of the dative. A model that includes all of the different weight measures demonstrates that their independent effects are robustly indistinguishable due to their severe collinearity, even after the application of de-correlation methods. Tested independently, word count and lexical stress count are marginally better predictors than the number of syllables or syntactic nodes. An analysis of the data where the number of words and the number of lexical stresses do not coincide moreover finds that one is not a significantly better predictor than the other.

Finally, we note that in theories of processing complexity (e.g., Dependency Length Theory; Gibson 1998, 2000; Hawkins 1994), dependency measures, which count lexical categories introducing new discourse concepts, are near equivalents to phonological measures of weight and thus can predict the same empirical facts (e.g., Comrie 2003). Given our findings, we argue that word count, as commonly used in many studies of construction choice, is a fitting and sufficient proxy for any number of theoretical approaches to end weight, including phonological ones.

Words: 500

- Anttila, Arto, Matthew Adams, and Michael Speriosu. 2010. "The role of prosody in the English dative alternation." *Language and Cognitive Processes*.
- Behagel, O. 1909. "Beziehungen zwischen Umfang und Reihenfolge von Satzgliedern." *Indogermanische Forschungen*. 25: 110-42.
- Benor, Sarah Bunin and Roger Levy. 2006. "The Chicken or the Egg? A Probabilistic Analysis of English Binomials." *Language*. 82(2): 233-278.
- Bresnan, Joan, Anna Cueni, Tatiana Nikitina, and R. Harald Baayen. 2007. "Predicting the Dative Alternation." In Bouma, G., I. Kraemer, and J. Zwarts (ed). *Cognitive Foundations of Interpretation*. Royal Netherlands Academy of Science. 69-94.
- Bresnan, Joan and Marilyn Ford. 2010. "Predicting syntax: Processing dative constructions in American and Australian varieties of English." *Language*. 86(1): 168-213.
- Comrie, Bernard. 2003. "On explaining language universals." In Tomasello, M. (ed). *The New Psychology of Language: Cognitive and Functional Approaches to Language Structure*. Mahwah, NJ: Erlbaum. 195-210.
- Gibson, Edward. 1998. "Linguistic Complexity: locality of syntactic dependencies." *Cognition*. 68: 1-76.
- Gibson, Edward. 2000. "The dependency locality theory: A distance-based theory of linguistic complexity." In Miyashita, Y., A. Marantz, and W. O'Neil (ed). *Image, Language, Brain*. Cambridge, MA: MIT Press. 95-126.
- Hawkins, John A. 1994. *A Performance Theory of Order and Constituency*. Cambridge: Cambridge University Press.
- McDonald, Janet L., Kathryn Bock, and Michael H. Kelly. 1993. "Word and World Order: Semantic, Phonological, and Metrical Determinants of Serial Position." *Cognitive Psychology*. 25: 188-230.
- Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech, and Jan Svartvik. 1985. *A Comprehensive Grammar of the English Language*. London and New York: Longman.
- Selkirk, Elisabeth O. 1984. *Phonology and Syntax: the Relation between Sound and Structure*. Cambridge, MA: MIT Press.
- Shih, Stephanie, Jason Grafmiller, Richard Futrell, and Joan Bresnan. 2009. "Rhythm's role in genitive and dative construction choice in spoken English." Paper presented at the 31<sup>st</sup> annual meeting of the Linguistics Association of Germany (DGfS). University of Osnabrück, Germany. March 4, 2009.
- Szmrecsányi, Benedikt. 2004. "On Operationalizing Syntactic Complexity." *Journées internationales d'Analyse statistique des Données Textuelles*. 7: 1031-38.
- Wasow, Tom. 2002. *Postverbal Behavior*. Stanford, CA: CSLI Publications.
- Zec, Draga and Sharon Inkelas. 1990. "Prosodically Constrained Syntax." In Inkelas, S. and D. Zec (ed). *The Phonology-Syntax Connection*. Stanford, CA: Center for the Study of Language and Information.