

Individual imbalances in prosody production and comprehension

Tomas O. Lentz^{1,2*}

Aoju Chen²

¹ Institut für Phonetik und Sprachverarbeitung, Ludwig-Maximilians-Universität München

² Utrecht Institute of Linguistics OTS, Universiteit Utrecht

* tom@phonetik.uni-muenchen.de

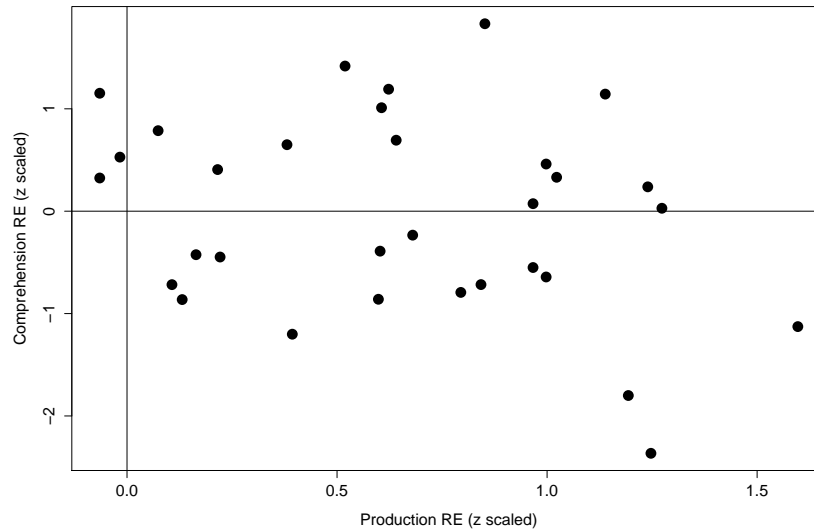
In studies assessing language processing by children, performance of the children is often compared to an adult level. Such a comparison requires the implicit assumption that adult comprehension and production are balanced, i.e. that adults perform similarly well in both, and that adults perform at ceiling. The present paper tests this assumption for the prosodic marking of focus. Informal exploration of adult data (used in Chen (2010)) suggested that there might be groups of participants performing above average in only one of the two skills, in contrast to the idea of balanced comprehension and production.

As part of a larger project on acquisition, we needed solid data on adults' focus marking capacities and possible individual differences. We therefore tested a new group of adults on the marking of narrow focus in Dutch. We defined a constituent as having narrow focus if it contains information that is new to the hearer (Vallduví & Engdahl, 1996) (cf. (Vallduví, 1993)). In Dutch, narrow focus is marked prosodically (see e.g., Swerts, Krahmer, & Avesani, 2002; Hanssen, Peters, & Gussenhoven, 2008).

The present paper investigates individual differences in depth, by looking at the production and comprehension scores of 32 adults. The scores were analysed in linear mixed models and the random effects per participant were extracted. These values reflect the individual's deviance from the group (Quené & Bergh, 2008; Baayen, Davidson, & Bates, 2008). The correlation between random effects for production and perception were subsequently analysed, generally following the approach of (Mirman, Yee, Blumstein, & Magnuson, 2011) (see also the online explanation, www.danmirman.org/gca). We had analysed the data for the first 16 adults to see whether any pattern of grouping was showing up at all (note that the stopping point was always 30 or slightly over, to avoid capitalising on chance). As the preliminary data (reported in Lentz & Chen, 2015) showed a surprising negative correlation, we were strengthened in our suspicion that there might be different types of participants and we gathered additional data about the last 16 participants. Of these data, we hypothesised that the Perspective Taking score of the Interpersonal Reactivity Index (IRI) questionnaire (Davis, 1980) could explain part of the imbalance found, e.g. because participants particularly good at taking the perspective of their partner might expect or produce better focus marking, or because such participants might be more baffled by an unexpected intonation that clashes with their assumptions about the interlocutor's perspective.

For the full group of 32 participants, we found that the negative correlation that was significant in the preliminary analysis was now only a trend (Pearson's correlation $t(30) = -1.51, p = 0.07085$. (one-tailed)), but there was still obviously no straight correlation (see Figure 1). For each data point we calculated the distance to the perfect regression line (in which the z-score on production equals the z-score on comprehension). Negative distances indicated a low comprehension/high production (positive distances v.v.); these scores can thus potentially express two types of imbalance. The Perspective Taking score was a very significant positive predictor of this score ($F(1) = 8.87, p = 0.0064^{**}$); surprisingly, people that were strong on perspective taking had an imbalance in the direction lower production score / higher comprehension score.

Figure 1: Comprehension and Production scores per participant. The solid lines indicate the grand means.



References

- Baayen, R. H., Davidson, D. J., & Bates, D. M. (2008). Mixed effects modelling with crossed random effects for subjects and items. *Journal of Memory and Language*, *59*(4), 390–412.
- Chen, A. (2010). Is there really an asymmetry in the acquisition of the focus-to-accentuation mapping? *Lingua*, *120*, 1926–1939.
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *Catalog of Selected Documents in Psychology*, *10*, 85.
- Hanssen, J., Peters, J., & Gussenhoven, C. (2008). Prosodic effects of focus in dutch declaratives. In P. A. Barbosa, S. Madureira, & C. Reis (Eds.), *Proceedings of fourth international conference on speech prosody in campinas, brazil* (pp. 609–612). Campinas: Editora RG/CNPq.
- Lentz, T. O., & Chen, A. (2015). Unbalanced adult production and perception in prosody. In T. Scottish Consortium for ICPHS 2015 (Ed.), *Proceedings of the 18th International Congress of Phonetic Sciences*. Glasgow. (Paper number 972 retrieved from <https://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2015/Papers/ICPHS0972.pdf>)
- Mirman, D., Yee, E., Blumstein, S. E., & Magnuson, J. S. (2011). Theories of spoken word recognition deficits in aphasia: Evidence from eye-tracking and computational modeling. *Brain & Language*, *117*, 53–68.
- Quené, H., & Bergh, H. van den. (2008). Examples of mixed-effects modeling with crossed random effects and with binomial data. *Journal of Memory and Language*, *59*(4), 413–425.
- Swerts, M., Krahmer, E., & Avesani, C. (2002). Prosodic marking of information status in Dutch and Italian: a comparative analysis. *Journal of Phonetics*, *30*, 629–654.
- Vallduví, E. (1993). *Information packaging: A survey*. Edinburgh: Edinburgh Centre for Cognitive Science.
- Vallduví, E., & Engdahl, E. (1996). The linguistic realization of information packaging. *Linguistics*, *34*(3), 459–519.