Psycholinguistic evidence for the composite group

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Abstract

It is widely accepted that speech is phonologically structured in terms of phonological constituents composing a Prosodic Hierarchy (PH). There is less consensus, however, regarding the constituents themselves. We focus here on the controversy surrounding a prosodic constituent between the Phonological Word and the Phonological Phrase, the Clitic Group in (Nespor and Vogel 1986/2007). While in some analyses it has been excluded, elsewhere it has been replaced by a revised Composite Group(κ) (Vogel 2009). Here we present psycholinguistic data from language acquisition and adult speech production that support the existence of κ across languages.

Key Words: language acquisition, speech encoding, phonological word, composite group

Introduction

The Composite Group (κ), which has replaced the Clitic Group, is the most controversial constituent in the PH, and in fact, it is often excluded. The κ consists of a Phonological Word (ω) and certain affixes and/or function words, and possibly additional ω s in the case of compounds. It thus provides a constituent between the Phonological Word (ω) and Phonological Phrase (φ) which may serve as the domain of phonological phenomena across languages. The data presented below provide independent support for the κ based on two types of psycholinguistic studies, language acquisition and language processing. We first discuss the acquisition of prosody in English and Greek, and then speech processing studies in Dutch, Italian, Romanian, and Nepali.

Acquisition of Prosody and the Composite Group

It has been argued that the acquisition of prosodic phenomena proceeds according to the PH, from lower to higher constituents (Athanasopoulou 2016, Demuth & Fee 1995, Vogel & Raimy 2002). Thus, the acquisition of phenomena that involve constituents in the range of the κ can provide evidence with regard to the presence of this constituent in the PH between the ω and φ . That is, if the κ exists, we should observe a developmental order of $\omega \rightarrow \kappa \rightarrow \varphi$ phenomena.

It has been demonstrated that English word stress is acquired quite early, around age 2 (Kehoe et al. 1995), while compound and phrasal stress (e.g., *greenhouse* vs. *green house*) are not fully acquired until the age of 11 years or later (Athanasopoulou 2016, Shilling 2010, Vogel & Raimy 2002). Interestingly, the production of phrasal stress is mastered after compound stress. Thus, we can place the acquisition of compound stress between that of the ω and φ , providing support for an intermediate κ constituent. The acquisition order is thus as predicted: $\omega \rightarrow \kappa \rightarrow \varphi$.

The acquisition of Greek compound (ω), clitic (κ), and phrasal stress (φ) further supports the presence of κ in the PH. Stress in compounds (e.g., *kokinomális* ‘redhead’) is acquired first, at the age of 6 (Athanasopoulou 2016) and possibly earlier (Tzakosta & Manola 2012) while phrasal stress (e.g., *kókinamaliá* ‘red hair’) is acquired last (Athanasopoulou 2016). Clitic stress (e.g., *kípelo tis* ‘her cup’; compare with *kípelo* ‘cup’) appears as early as 2 years (Tzakosta 2004), but it is not fully acquired until later, crucially, after compound stress and prior to phrasal stress (Athanasopoulou 2016). This three-step acquisition sequence provides further support for the κ constituent and matches the one we saw in English: $\omega \rightarrow \kappa \rightarrow \varphi$.

Table 1 summarizes the findings regarding the order of acquisition of the different prosodic patterns in English and Greek. The results support the claim that prosodic development follows the PH and crucially, they show that the presence of the κ between the ω and φ is necessary to account for the order of acquisition of these prosodic phenomena.

Table 1. Prosodic patterns tested and predictions

PH	English	Greek	Order of acquisition
φ	phrasal stress	phrasal stress	third
κ	compound stress	clitic stress	second
ω	word stress	compound stress	first

The Composite Group as Speech Encoding Unit

It has been proposed that planning for speech production is based on the Phonological Word, as opposed to a lexical word or other morpho-syntactic constituent (Levelt 1989). This predicts that the encoding time for speech strings with more ω s will be longer than those with fewer ω s. To test this prediction, the encoding time for a range of constructions, measured as the reaction time (RT) of the participants to a stimulus, is compared to the encoding time for a baseline stimulus.

Wheeldon and Lahiri (1997, 2002) examined the RT of Dutch speakers producing utterances consisting of a generic structure (e.g., *Ik zoek* ‘I seek’) followed by nothing (baseline) and structures with either one or two ω s: (i) one ω structures included full pronouns (e.g., *het* ‘it’), lexical words (e.g., *water* ‘water’), and clitic + noun structures (e.g., *het water* ‘the water’) and (ii) two ω s structures included compounds (e.g., *oog lid* ‘eyelid’) and phrases (e.g., *ver water* ‘fresh water’). Based on the proposal above, the prediction was that the structures with one ω would show shorter RTs than the baseline, while the structures with two ω s would show longer RTs. Contrary to the prediction, however, only phrases had longer RTs, while the compounds had similar RTs to the structures with one ω (i). Analogous RT patterns have also been found for Italian, Romanian, and Nepali where compounds and clitic structures had similar encoding times to single words rather than to phrases (Vogel and Wheeldon 2010, Vogel and Spinu 2009, Koirala 2012). Table 2 summarizes the results for all the languages (NT = not tested).

Table 2. RTs to different structures in comparison to the baseline.

Structures	# ω s	# κ s	RT (vs. baseline)			
			Dutch	Italian	Romanian	Nepali
Words (full pronouns)	1	1	shorter	shorter	shorter	shorter
Clitic structures	1	1	shorter	NT	shorter	NT
Compounds	2	1	shorter	shorter	shorter	shorter
Phrases	2	2	longer	longer	longer	longer

Overall, we see the same pattern: compounds behave like single words while clitics do not significantly increase the encoding time. One account for this pattern is to reassess the structure of compounds as a single (recursive) ω despite their internal composition with two ω s (Wheeldon and Lahiri 1997, 2002). This would not only alter the definition of prosodic constituents, but it would also obscure structural and other phonological distinctions, resulting in serious drawbacks (Vogel 2009). On the other hand, if the κ is included in the PH, the results can be simply accounted for avoiding these drawbacks: it is the number of κ s, not ω s, that determines the encoding time. As we can see in Table 2, this account yields the correct predictions for all the structures, since the κ could have one ω (e.g., clitic structures) or two ω s (e.g., compounds). Overall, we see that having a constituent between ω and φ explains better the encoding time patterns across languages.

Conclusions

In the present paper, we synthesized the findings from several studies in language acquisition and speech processing to assess the psychological reality of the controversial κ constituent in PH. The results from both groups of studies demonstrate that the observed behaviors are best accounted for if an intermediate constituent is included in the PH between ω and φ . Thus, while there is theoretical controversy regarding the κ , psycholinguistic findings from language acquisition and speech encoding in several languages provide independent support for this constituent in the PH.

References

- Athanasopoulou, A. 2016. Prosodic development in Greek and English. University of Delaware: Doctoral dissertation.
- Demuth, K., Fee, J. 1995. Minimal Words in early phonological development. Brown University & Dalhousie University.
- Kehoe, M., Stoel-Gammon, C., Buder, E. 1995. Acoustic correlates of stress in young children's speech. *Journal of Speech and Hearing Research* 38,2, 338-350.
- Koirala, C. 2012. The composite group as the units of speech production in Nepali. Talk presented at the 33rd Annual Conf. of the Ling. Society of Nepal.
- Levelt, W. 1989. *Speaking: from intention to articulation*. Cambridge, MA: MIT Press.
- Nespor, M., Vogel, I. (1986/2007). *Prosodic phonology*. Dordrecht: Foris.
- Shilling, H. 2010. Compound and phrasal stress acquisition: When a greenhouse becomes different to a green house. University of Birmingham: MA dissertation.
- Tzakosta, M. 2004. The acquisition of the clitic group in Greek. *Proc. of the 24th Annual Meeting of Greek Linguistics*, 693-704. Thessaloniki, Greece.
- Tzakosta, M., Manola, D. 2012. Perception and production of compounds by preschool children. In Malafantis et al. (eds.), *Proc. 7th Intern. Conf. Greek Pedagogical Soc. – Greek Pedagogy and Educ. Research*, vol. 2, 1119-30. Athens: Diadrasi.
- Vigário, M. 2011. Prosodic structure between the prosodic word and the phonological phrase: recursive nodes or an independent domain? *The Linguistic Review* 27, 4, 485-530.
- Vogel, I. 2009. The Status of the Clitic Group. In Grijzenhout, J., Kabak, B. (eds.), *Phonological Domains*, 15-46. Berlin: Mouton de Gruyter.
- Vogel, I. and Raimy, E. 2002. The Acquisition of Compound vs. Phrasal Stress in English. *Journal of Child Language* 29, 2, 225-50.
- Vogel, I. and Spinu, L. 2009. The domain of palatalization in Romanian. In Masullo, P., O'Rourke, E., Huang, C. (eds.), *Selected Papers from LSRL 37*, 307-20. Philadelphia: John Benjamins.
- Vogel, I., Wheeldon, L. 2010. Units of speech production in Italian. In Colina, S., Olarrea, A., Carvalho, A. (eds.), *Romance Linguistics 2009*, 95-110. Philadelphia: John Benjamins.
- Wheeldon, L., Lahiri, A. 1997. Prosodic Units in Speech Production. *Journal of Memory and Language* 37, 356-81.
- Wheeldon, L., Lahiri, A. 2002. The minimal unit of phonological encoding: prosodic or lexical word. *Cognition* 85, B31-B4