Bridging the gap between prosody and pragmatics: Preschoolers' prosodic profiles and Theory of Mind abilities

Mariia Pronina[1], Iris Hübscher[2], Ingrid Vilà-Giménez[1,3] and Pilar Prieto[4,1]

[1] Dept. of Translation and Language Sciences, Universitat Pompeu Fabra, Barcelona, Catalonia, [2] URPP Language and Space, University of Zurich, [3] Dept. of Subject-Specific Education, Universitat de Girona, Girona, Catalonia, [4] Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Catalonia

mariia.pronina@upf.edu, iriscarmela.huebscher@uzh.ch, ingrid.vila@udg.edu, pilar.prieto@upf.edu

INTRODUCTION: Even though it is well-known that prosodic features are central in the conveyance of pragmatic meaning across languages, most developmental research has separately assessed the development of prosodic and pragmatic abilities (see e.g., Hübscher, 2018, as an exception). Moreover, research has focused on the infant stages of prosodic development addressing early infant communication abilities, for example, speech vocalization expressing emotional status, intentionality or speech act information (for a complete review, see Esteve-Gibert & Prieto, 2018). However, much less is known about the acquisition of prosodic patterns for the expression of pragmatic meanings (what we will call from now on "pragmatic prosody") later in development. Some authors like Armstrong and Hübscher (2018) have suggested that internal (epistemic and affective) prosodic skills might be tied to ToM development. This study sets out to better explore the developmental path followed by pragmatic prosody in typically developing preschool children while taking into account children's conceptual development, e.g., Theory of Mind abilities, the ability to understand mental states of others (Premack & Woodruff, 1978), which occurs during the preschool period.

METHOD: A total of 42 3- to- 4-year-old typically developing Catalan-speaking children participated in the study. Children's pragmatic prosody skills were assessed by means of the Audiovisual Pragmatic Test (APT; Pronina, Hübscher, Vilà-Giménez, & Prieto, 2019). This test assesses prosody in relation to social contexts by using a comprehensive pragmatic coverage, as well as a picture-supported set of the Discourse Completion Task in which the participant is asked to imagine an everyday social context and then to respond to it as naturally as possible. All items intended to elicit a pragmatically appropriate phrase/set of phrases which correspond to a certain speech act. We distinguish between 4 types of speech acts, specifically, *assertions*; *requests*; *basic expressives* such as greeting, calling or thanking; and *complex expressives* that evolve around complex social situations like expressing empathy, compassion, condole or congratulations. Requests and assertions can be either *unbiased* or *biased*. Unbiased (i.e., unmarked) requests and assertions have no additional pragmatic meanings (e.g., an example of *unbiased request* is a command; an example of *unbiased assertion* is an unmarked declarative statement). Biased (i.e., marked) requests and assertions convey additional pragmatic biases such as different types of epistemic meanings (e.g., a *biased request* expressing incredulity or a *biased assertion* expressing obviousness or uncertainty), marked informational structure (e.g., a *biased assertion* conveying contrastive focus), or negation. The children were tested individually; the prosodic component of the answer was evaluated perceptually in terms of the appropriateness of the prosody and was given a score from 0 to 2. The children were additionally tested on their Theory of Mind abilities. The two classical false belief tasks, the unexpected content task (Gopnik & Astington, 1988) and the unexpected

location task (the Catalan version, Armstrong et al. 2018) were used. The child was awarded 1 point for each correct answer to the control and the false belief question; the total scores ranged from 0 to 4.

RESULTS: Results are reported in terms of the percentages of appropriate prosodic answers that were pragmatically correct in a given context, that is, we focus on the number of appropriate prosodic patterns produced by children for a specific speech act type. Results showed that at the age of 3 children can produce a variety of speech acts in speech. The speech acts with higher rates of prosodic accuracy were *unbiased assertions* (36%), *basic expressives* (34%), and *unbiased requests* (32%). By contrast, *biased assertions*, *complex expressives*, *biased requests*, and obtained less appropriate answers. As for the expression of focus (*biased assertion*), the rate of correct responses was 19%. As for the expression of epistemic meanings, at this age kids start to express some of them. For example, they were able to express a confirmatory-seeking request through prosodic cues (17%), but they tend to struggle with other epistemic meanings such as obviousness (5%) or uncertainty (0%). Finally, the most difficult speech act to express through prosody for children were *complex expressives* (17%). We hypothesized that the ability to produce complex expressives (e.g., empathy, concerns, or congratulations towards others) could be related to the ability to understand others' minds (ToM). To test this, we ran a correlational analysis. The analysis revealed moderate correlations between the number of correctly expressed complex expressive items through prosody, and the ToM score ($r(40) = 0.39$, $p = .011$). However, there were no significant correlations between ToM and the number of appropriate prosodic contours obtained for biased assertions and requests containing epistemic meanings.

DISCUSSION: Our findings allow us to sketch out the prosodic profiles of preschoolers, contributing to the integration of prosody and pragmatics and their joint consideration by investigating pragmatic prosody in preschool children. Results showed that while 3- to 4-year-old children successfully produce *basic expressives, unbiased requests and assertions*, and they have more trouble with *biased speech acts* conveying focus and epistemic meanings, as well as with *complex expressives*. Preschoolers show difficulties in complex social situations presented in complex expressive scenarios, e.g., a praising comment, a positive exclamation or an expression of concern, which typically include the signaling of a positive stance conveying appreciation of the other person or the emotional support. A possible explanation of why children cope less well with expressing these pragmatic meanings through prosody could be that these items focus on other-centered feelings and share the same component of the understanding of what another person is feeling. Therefore, our hypothesis that *complex expressives* assume some ToM skills was confirmed by the results of the correlational analysis.

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