

A NEW TOOL TO ASSESS PRAGMATIC PROSODY IN CHILDREN: EVIDENCE FROM 3- TO 4-YEAR-OLDS

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ABSTRACT

Prosodic and pragmatic abilities develop in parallel over the preschool years and beyond. While tests that measure prosodic skills in children do exist at present, there exists no test that assesses children's expressive prosodic skills within a variety of pragmatically relevant discourse contexts. We present a new Audiovisual Pragmatic Test that is intended to fill that gap. The test consists of picture-supported prompts revolving around social scenarios which are based on pragmatic assessment tests designed for children. The administration of the test to 100 3- to 4-year-old Catalan-speaking children obtained a total of 1294 appropriate responses (from a total of 3500 prompts). The results indicate that at this age children start to successfully produce pragmatically appropriate statement, question, imperative and vocative prosody, but tend to have difficulty with epistemically biased sentences. All in all, this test is found to be suitable for eliciting pragmatic prosody in preschool children.

Keywords: Prosody, pragmatics, prosodic assessment, prosodic development.

1. INTRODUCTION

Research in the last few decades has shown that the prosodic features of language are crucial in signaling sociopragmatic meanings in communication, such as speech act marking, focus, or epistemic stance marking ([2], [6], [10]). In the developmental literature it has been shown that the acquisition by children of increasingly complex prosodic skills goes hand-in-hand with their sociopragmatic development (see [17], for a review). However, relatively little is known about the developmental path followed by prosodic features in later stages of development ([9], [11], [4], [1]).

If one reviews the set of currently available prosodic assessment tools and protocols in children, namely *Prosody Profile* (PROP) [5], *Prosody Voice Screening Profile* (PVSP) [20], *Diagnostic Analysis of Nonverbal Accuracy 2* (DANVA 2) [14], *Profiling Elements of Prosody in Speech-Communication* (PEPS-C) [15], *Perception of Prosody Assessment Tool* (PPAT), [12], and *Minnesota Tests of Affective*

Processing (MNTAP) [13], it quickly becomes apparent that they are not optimal to comprehensively assess pragmatic prosodic skills in young typically developing children (see Table 1 for a comparison of features).

First, all six tests primarily focus on children with atypical language development. While the PROP and the PVSP were designed exclusively for clinical use and the PPAT and the MNTAP were used for research purposes in diverse clinical populations, the DANVA 2 and the PEPS-C (which were initially developed for both clinical and research purposes) have been used to assess clinical groups as well as typically developing children.

Second, most of the prosodic tests focus only on receptive abilities. While the PROP and the PVSP do evaluate expressive prosody in terms of its acoustic dimensions such as pitch, tempo, stress, loudness, laryngeal quality and resonance, neither of these tests covers the pragmatic functions of prosody in a comprehensive way. Perhaps the PEPS-C is the only one of these instruments that takes into account the pragmatic function of prosody. Yet it only assesses a few communicative aspects of prosody, namely, the ability to place contrastive stress and express affective stances (only two, liking and disliking), as well as the production of neutral questions and statements.

Importantly, most of the tests were designed for children aged 5 or older, and only two of them are appropriate for children aged 3 or 4 (the PVSP and DANVA 2). Finally, the administration of most of these tests is fairly time consuming (the DANVA 2, PEPS-C and PPAT take around one hour, and the MNTAP takes more than two hours) making it difficult to apply them to young children in one session.

To summarize, while prosodic assessment tests for children do exist, (a) they are primarily designed for clinical use or for research in diverse clinical populations; (b) they focus principally either on receptive prosodic skills, or on very basic expressive prosodic skills and do not fully integrate the pragmatic functions of prosody; (c) they are not designed to assess preschool-aged children; and (d) they are time-consuming.

Table 1: Comparative table showing the main features of the existing prosodic assessment tools for children

Test	Purpose		Target child population		Prosodic skills assessed		Target age range	Administration time
	Clinical use	Research use	Typical	Atypical	Expressive	Receptive		
PROP	+	-	-	+	+	-	-	-
PVSP	+	-	-	+	+	-	3-81	-
DANVA 2	+	+	+	+	-	+	3-99	1 hour
PEPS-C	+	+	+	+	+	+	5-14	1 hour
PPAT	-	+	-	+	-	+	7-12	1 hour
MNTAP	-	+	-	+	-	+	6-11	2-3 hours

All in all, no standard prosodic test to date is optimized to assess in a comprehensive way young children's expressive prosodic abilities in relation to pragmatic contextual situations. There is thus a need for a standard elicitation test which allows researchers to understand the acquisition of pragmatic prosody during the preschool years and beyond. While some research has been done on the early development of intonation (for a review see [7]), our understanding of how intonation is acquired in the preschool years and beyond is still patchy. Moreover, studies on the acquisition of prosody by young children typically use speech corpus databases (see [18] for an example), which require lengthy analyses. Thus, given this state of affairs, the proposal will offer a practical and efficient instrument that can elicit reliable data.

The present study has two main goals, namely (a) to present a new Audiovisual Pragmatic Test (henceforth APT) designed for use with typically developing children starting from the age of three; and (b) to assess the first findings from a first administration of this test to 100 3- to 4-year-old Catalan-speaking children.

The APT tool presented here has two main novelties which are strongly grounded on previous research. First, its pragmatic coverage is comprehensive yet appropriate for children starting from the age of 3 because it takes into account previous pragmatic tests designed for children of that age group (see section 2.2.). Second, it uses a carefully controlled picture-supported set of Discourse Completion Task (DCT) items which allows the user to assess prosody in relation to pragmatic social contexts. Some of the selected contexts have been based on published work on the prosody and pragmatics of Catalan adults [19]. Thus, this paper will assess whether the DCT elicitation methodology, which has been successfully used for assessing adult intonational grammar, can be also applicable to obtain expressive developmental data for 3- and 4-year-old children. This is of special

importance given the lack of knowledge on the acquisition of prosody in preschoolers and the fact that the majority of the prosodic tests are not designed to assess preschool-aged children.

2. METHODOLOGY

2.1. Participants

Because this first version of the new APT tool is in Catalan, it was administered to 100 3- to 4-year-old native Catalan-speaking children (45 male and 57 female; mean age = 46.92 months, $SD = 3.28$ months; age range 41 to 53 months). All participants were preschoolers at two Catalan public schools, located in the middle-income district of Sant Martí within the metropolitan area of Barcelona, where the population is largely Catalan-Spanish bilingual. Prior to the experiment, the children's parents signed a participation consent form and completed an occupational status questionnaire (mean ISEI score = 61.32, $SD = 12.7$ [8], confirming middle class SES scores) as well as a language questionnaire regarding the daily exposure of their child to Catalan (mean overall exposure time = 57.9%, $SD = 22.2$). All children were typically developing children and had no history of speech, language, or hearing difficulties.

2.2. Materials

The APT was designed to test pragmatic and prosodic abilities from early childhood up to adolescence. The general design and elicitation procedure of the APT is on the one hand based on a variety of currently used pragmatic tests for children, e.g., the *Test of Pragmatic Language* (TOPL-2) [16]; the *Clinical Evaluation of Language Fundamentals-5* (CELF-5) instrument [21]; and the *Comprehensive Assessment of Spoken Language-2* (CASL-2) tool [3]. On the other hand, some selected contexts have been extracted from adult DCT questionnaires on Catalan prosody [19]. The elicitation procedure was based on the DCT method, in which the participant is

asked to imagine an everyday social context and then to respond to it as naturally as possible.

A total of 47 items were designed for the APT tool that represented some context that might plausibly occur in everyday life. All 47 items were accompanied by illustrations which were specifically designed for the APT (see Fig. 1 for an example).

Figure 1: Item number 22 of the APT showing text and illustration intended to elicit an expression of concern for a friend.



“Acabes de veure que el teu amic s’ha entrebancat i ha caigut. Què li diries?”

‘Your friend just tripped and fell down. What would you say?’

For the purposes of the study, given that the test-takers would be 3- to 4-year-old children, only the first 35 items of the test were applied. We deemed the last 12 items not to be adequate for this age range, since they represent complex social contexts that preschool children likely do not encounter, for example, to politely refuse to give personal information. The target 35 items were classified into five areas according to the pragmatic functions they intended to elicit, namely basic interaction skills (6 items), speech-act marking (6 items), affective stance marking (13 items), focus marking (3 items) and marking of epistemic bias (7 items) such as uncertainty or obviousness. The items were presented in a fixed order based on increasing pragmatic difficulty.

2.3. Set-up of the APT and procedure

The children were tested individually in a quiet room at their respective preschools by the examiner (the first author and three trained research assistants) and all the sessions were videotaped which allows for future prosodic analyses and inter-rater reliability scores. The child faced the computer screen where the images for each item were presented. At the beginning of the test, two familiarization trials were carried out. For all items, the examiner described the social situation in a lively child-directed fashion while the child was looking at the illustration displayed on the computer screen. The examiner then asked the child to respond appropriately as if he or she was a character in the situation. If the child showed any difficulties understanding a situation or did not behave as expected, the examiner tried to contextualize the situation by changing the characters in the prompt by names who are likely to be important to the child (such as a friend, parent or teacher). This technique was applied as needed during the

administration of the tool. We note that in this test it is especially important that young children feel comfortable in the presence of an unknown tester, that is why the experimenter should engage children in warm-up conversation, encourage them to participate and try to contextualize items if children show difficulties.

Each child participant was exposed to all 35 of the test items. The total duration of the full procedure was between 15 and 20 minutes.

2.4. Scoring

The scoring of each response was carried out online by the examiner. Two complementary scores were given, namely, pragmatic appropriateness and prosodic appropriateness (e.g., enactment of the response).

The pragmatic appropriateness of responses was given a score from 0 to 2. While a score of 0 was recorded when the child’s verbal response was either pragmatically inappropriate (for example, saying “It wasn’t me” in response to the prompt shown in Fig. 1), or completely absent. A score of 1 was recorded if the child gave pragmatically appropriate but not elaborate responses that typically consisted of a single word or a simple construction (e.g., saying “Are you okay?” in response to the prompt shown in Fig. 1). Finally, if the answer was pragmatically appropriate and the child produced elaborated speech that typically included a more complex set of constructions (e.g., saying “Are you alright? Do you want me to go to the doctor with you?” in response to the prompt shown in Fig. 1), a score of 2 was recorded. The scores were then added for a total ranging between 0 and 70 for pragmatic appropriateness (35 items \times 2 points per item).

Prosodic appropriateness was given a score from 0 to 1 depending on whether the child adequately enacted his or her response or not. A prosodic score of 0 was given if (a) the response was pragmatically incorrect, thus we could not analyze the prosody of the speech; or (b) if the child did not enact the scenario, that is, if he or she did not take the perspective of the situation’s character and used indirect speech (e.g., to the question “What should you say?” the child answered “That he shouldn’t cry”). A prosodic score of 1 was given if the response was pragmatically appropriate and the child enacted the situation and answered with the prosody that would be appropriate if the situation was really happening at that moment and used directed speech in first-person (e.g., to the question “What should you say?” the child answered “Don’t cry!”).

3. RESULTS

From the total amount of 3500 potential responses (35 items \times 100 children), 49,9% (1748 target sentences) of pragmatically appropriate responses and 36,9% of prosodically appropriate responses (1294 target sentences) were obtained. A large majority of the children engaged in the activity to one degree or another, with only 1% of the group failing to enact any item. These results indicate that the APT allows for the gathering of a considerable amount of prosodic patterns produced by preschool children starting at three.

It is thus clear that three-year-old children start to successfully enact situations and produce semi-spontaneous speech to contextual prompts, which confirms the sensitivity and suitability of the measure for the youngest children in terms of the elicitation technique applied.

In order to assess the prosodic profile of children at this age, we analyzed obtained responses according to the pragmatic areas (basic interaction skills, speech-act marking, affective stance marking, focus marking and marking of epistemic bias). The results show that 66% of them produced appropriate responses to scenarios that focused on basic interaction skills (e.g., greetings, farewells, expressions of gratitude). As for basic speech acts (statements, questions, imperatives, vocatives), 43% of this subgroup successfully produced the target prosodic outcome in these contexts. Thirty-seven percent produced sentences to express different affective and emotional states such as discontent, guilt or sympathy (e.g. scolding request, regret, congratulatory sentence), and 29% managed to correctly express emphasis or focus. Finally, more complex sentence types encoding epistemic biases like uncertainty and obviousness in statements or confirmation in questions were the most difficult area for expressive prosody at this age. Only 17% of the children were able to successfully enact prosody with these items. This suggests that, in general, these 3- to 4-year-old children had trouble responding the situations conveying pragmatic meanings related to beliefs and epistemic status.

4. CONCLUSIONS AND DISCUSSION

The first goal of this paper was to present the Audiovisual Pragmatic Test (APT). In contrast to the existing prosodic tests, this new tool has been developed to assess prosody in relation to pragmatic social actions in typically developing children starting from the age of three. As such, the novelty of this tool lies in two main features, namely, (1) it provides comprehensive coverage of socially

appropriate pragmatic situations, which allows for the assessment of pragmatic prosody; and (2) it uses a carefully controlled DCT elicitation method which is enhanced by the use of illustrations.

The second goal of the paper was to provide the first results from the administration of the APT tool to 100 3- to 4-year-old Catalan-speaking children. Our results suggest that the APT test was usable with 3- to 4-year old children, allowing the test administrator to obtain 49,9% pragmatically appropriate responses and 36,9% prosodically appropriate responses. With regard to the prosodic skills of 3- to 4-year-olds, our initial results revealed that, as expected, children at this age cope best with items involving basic interaction skills, followed by basic speech act prosody, as well as prosody that marks affective stance, information and contrastive focus, and least well with biased-sentences.

These results are in line with previous reports based on spontaneous speech data analyzing children's intonational grammar and suggesting that by the age of two, infants are able to produce pragmatically appropriate prosody for basic speech acts ([17], [18]). Importantly, one of the strengths of using this method as compared to collecting natural speech data is that it allows for a collection of a large amount of pragmatically-based prosodic data in a relatively short period of time.

Though these results may be regarded as an initial indication of the pragmatic prosodic skills available to 3- to 4-year-olds, a more in-depth analysis of the development of pragmatic prosody in preschool-aged children is clearly still needed.

Though this preliminary version of the instrument was written in Catalan, it can easily be adapted to other languages. This suggests that the APT has the potential to be of great utility in future research across languages on the parallel development of pragmatic and prosodic skills, particularly in young children.

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6. REFERENCES

- [1] Armstrong, M. E., Hübscher, I. 2018. Early development of intonation: Perception and production. In: Prieto, P., Esteve-Gibert, N. (eds), *The development of prosody in first language acquisition*. Amsterdam: John Benjamins, 271–293.
- [2] Brown, L., Prieto, P. Gesture and Prosody as Sister Systems in Multimodal Communication. Submitted.
- [3] Carrow-Woolfolk, E. 2017. *Comprehensive assessment of spoken language, Second Edition (CASL-2)*. Torrance, CA: Western Psychological Services.
- [4] Chen, A. 2018. Get the focus right across languages: Acquisition of prosodic focus-marking in production. In: Prieto, P., Esteve-Gibert, N. (eds), *The development of prosody in first language acquisition*. Amsterdam: John Benjamins, 295–316.
- [5] Crystal, D. 1982. *Profiling linguistic disability*. London, UK: Edward Arnold.
- [6] Esteve-Gibert, N., Guellai, B. 2018. Prosody in the auditory and visual domains: a developmental perspective. *Frontiers in Psychology*, 9(338), 1–10.
- [7] Frota, S., Butler, J. 2018. Early development of intonation: Perception and production. In: Prieto, P., Esteve-Gibert, N. (eds), *The development of prosody in first language acquisition*. Amsterdam: John Benjamins, 145–164.
- [8] Ganzeboom, H. B. G., De Graaf, P. M., Treiman, D. J. 1992. A Standard International Socio-Economic Index of Occupational Status. *Social Science Research* 21, 1–56.
- [9] Hübscher, I. 2018. *Preschoolers' pragmatic development: How prosody and gesture lend a helping hand* (PhD thesis). Universitat Pompeu Fabra.
- [10] Hübscher, I., Prieto, P. Gestural and prosodic development act as sister systems and jointly pave the way for children's sociopragmatic development. Submitted.
- [11] Ito, K. 2018. Gradual development of focus prosody and affect prosody comprehension. In: Prieto, P., Esteve-Gibert, N. (eds), *The development of prosody in first language acquisition*. Amsterdam: John Benjamins, 247–270.
- [12] Klieve, S. A. 1998. *Perception of prosodic features by children with cochlear implants. Is it sufficient for understanding meaning differences in language* (Unpublished master's thesis). University of Melbourne, Australia.
- [13] Lai, Z., Hughes, S., Shapiro, E. 1991. *Manual for the Minnesota Tests of Affective Processing (MNTAP)*. Minneapolis, MN: University of Minnesota.
- [14] Nowicki, S., Duke, M. P. 1994. Individual differences in the nonverbal communication of affect: The Diagnostic Analysis of Nonverbal Accuracy Scale. *Journal of Nonverbal Behavior* 18, 9–35.
- [15] Peppé, S., McCann, J. 2003. Assessing intonation and prosody in children with atypical language development: The PEPS-C test and the revised version. *Clinical Linguistics & Phonetics* 17, 345–354.
- [16] Phelps-Terasaki, D., Phelps-Gunn, T. 2007. *The Test of Pragmatic Language (2nd ed.)*. Austin, TX: Pro-Ed.
- [17] Prieto, P., Esteve-Gibert, N. (eds). 2018. *The development of prosody in first language acquisition*. Amsterdam: John Benjamins.
- [18] Prieto, P., Estrella, A., Thorson, J., Vanrell, M. M. 2012. Is prosodic development correlated with grammatical development? Evidence from emerging intonation in Catalan and Spanish. *Journal of Child Language* 39(2), 221–257.
- [19] Prieto, P., Rigau, G. 2011. Prosody and pragmatics. In: Payrató, Ll., Cots, J. M. (eds), *The Pragmatics of Catalan*, The Hague: Mouton de Gruyter, 17–48.
- [20] Shriberg, L. D., Kwiatkowski, J., Rasmussen, C. 1990. *The Prosody-Voice Screening Profile*. Tucson, AZ: Communication Skill Builders.
- [21] Wiig, E. H., Semel, E., Secord, W. A. 2013. *Clinical Evaluation of Language Fundamentals—Fifth Edition (CELF-5)*. Bloomington, MN: NCS Pearson