

# A proposal for research on the acquisition of prosodic focus marking in diverse languages: A response to Kidd and Garcia (2022)

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## Abstract

Kidd and Garcia demonstrate a dire lack of diversity in language acquisition research. We present a concrete proposal to improve language and area coverage in the field. Our approach outlines key questions in an understudied area, that is, prosody, methods for collecting and analyzing data, resources for training and tools, and a means to foster research collaboration and publication of crosslinguistic findings. The proposal, if implemented on a publicly accessible website, will facilitate crosslinguistic research on prosody acquisition.

## Keywords

Prosody, acquisition, crosslinguistic, diversity, experimental

## Introduction

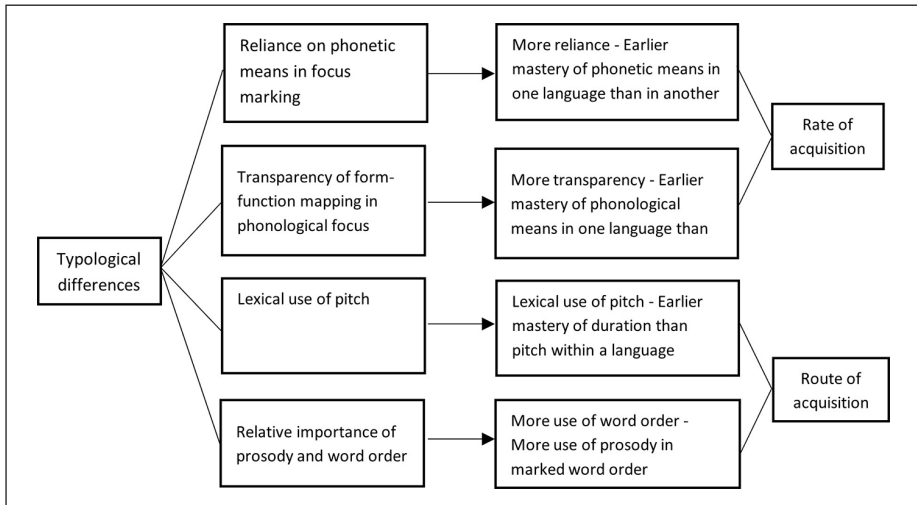
Kidd and Garcia (2022) perform a valuable service to the field of language acquisition by highlighting the limitations in its empirical foundations. We take their paper as a call to action and present a research toolkit to facilitate the investigation of prosody acquisition in diverse languages.

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**Figure 1.** A crosslinguistic model of the acquisition of prosodic focus marking (Chen, 2018).

## The acquisition of prosody as an interface phenomenon

An understudied aspect of language development in any language is prosody, that is, melody and rhythm of speech and signs. In speech, prosody is primarily reflected in variation in pitch (related to vocal-fold vibration frequency), duration, and intensity. It is instrumental to the structure of speech and vital to communication (Cole, 2015).

Children's prosodic abilities are critical to early language development in non-prosodic domains. For example, infants' sensitivity to prosodic cues at prosodic boundaries serves as a gateway to speech segmentation, word learning, and syntactic structures in the first year of life (Gervain et al., 2020). Because prosody is typically used in tandem with lexical and morphosyntactic means, prosody acquisition entails developing competence at the interface between prosody and other linguistic domains. Thus, although newborns exhibit remarkable prosodic sensitivity (Gervain, 2018), acquiring adult-like prosodic competence can take up to a decade (Chen et al., 2020). Prosody acquisition research can extend our understanding of the learning mechanisms required to coordinate information from multiple linguistic domains, an issue that lies at the very heart of language development.

Here, we focus on the acquisition of the prosody-information structure interface. In many languages, adult speakers vary prosody so that focus, that is, information provided about a topic, typically new or contrastive, is distinguished from less important information in an utterance. Crucially, languages differ in how prosody is used to mark focus (Kügler & Calhoun, 2020). This raises the question of how crosslinguistic differences in prosodic systems influence the acquisition of prosodic focus marking. Based on methodologically comparable studies on children's prosodic focus marking in Mandarin, Korean, Swedish, Finnish, English, German, and Dutch, Chen (2018) proposes that acquisition of prosodic focus marking is influenced by (at least) four types

of typological differences (Figure 1): reliance on phonetic means (i.e. phonetic implementation of a phonological category), transparency of form-function mapping between phonological cues and focus, whether the prosodic parameters involved are also used for lexical purposes, and the importance of prosodic means relative to non-prosodic means for focus marking. The first two types of typological differences affect the *rate* of acquisition; the latter two affect the *route* of acquisition.

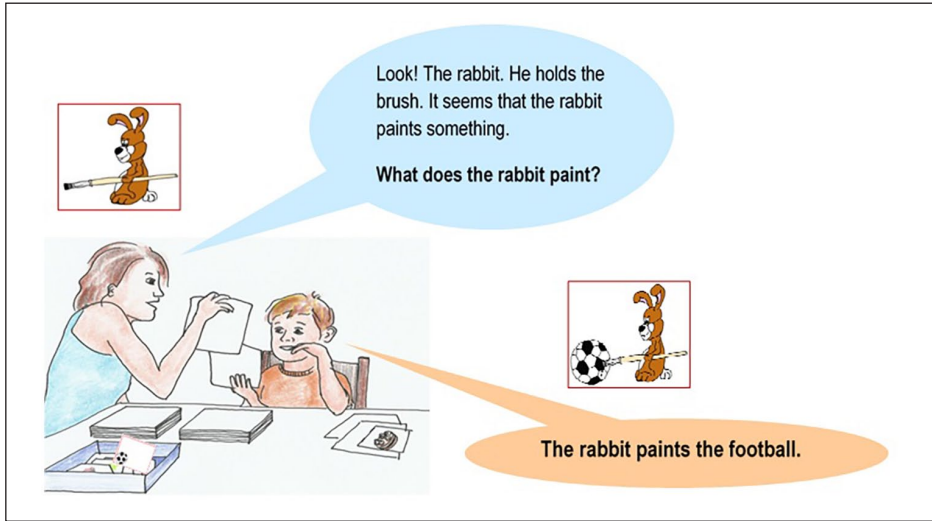
While the theory provides a first account of focus marking acquisition, a larger crosslinguistic sample is needed to test its predictions. For example, if lexical use of pitch triggers later acquisition of pitch-related cues to focus, will children acquiring a tone language with more lexical tones than Mandarin (e.g. Vietnamese with six lexical tones) learn to use pitch-related cues at an even later age? Does the position of a focus marking prosodic boundary matter to acquisition under the same transparency of phonological form-focus mapping? Acquisition data from a language that inserts a prosodic boundary at the left of the focused constituent (e.g. Chichewa) versus at the right (e.g. Seoul Korean) can shed light on this issue. More importantly, in many languages (e.g. Hungarian), syntax (e.g. word order) is an essential means to encode focus and is often accompanied by prosodic marking (Kügler & Calhoun, 2020). Do children first learn to use word order to realize focus and only subsequently realize the focused elements with prosodic prominence? Relatedly, some languages hardly use prosody in focus marking, for example, varieties of Indonesian and some African tone languages (e.g. Hausa, Northern Sotho) (Kügler & Calhoun, 2020). Data from children acquiring these languages can reveal the (ir)relevance of prosody in their acquisition of focus marking. Additional crosslinguistic acquisition research will thus extend the theory in a typologically meaningful way.

## Methods

We propose an experimental approach using an adaptable and easy-to-use task, the picture-matching game. This task employs question–answer dialogues to elicit various sentence types in different focus conditions (e.g. narrow focus on subject, object, verb, or an adverbial with or without contrast, broad focus on the whole sentence) (Chen, 2018). Additional experimental factors can be flexibly incorporated, such as lexical tones, lexical accents, or number of syllables.

The game uses three sets of pictures (Figure 2). The experimenter’s pictures lack some, or all, of the information about an event. The participant’s pictures depict complete events. The third set of pictures in a separate box depict only the information missing in the experimenter’s pictures. The participant is asked to provide the missing information in the experimenter’s pictures which allows the experimenter to match their own pictures with the right ones in the box.

For instance, the experimenter describes a picture (e.g. ‘It seems that the rabbit paints something’). She then asks a question (e.g. ‘What does the rabbit paint?’). The participant looks at his own picture and provides a response using a full sentence (e.g. ‘The rabbit paints the football’). The experimenter locates the football picture in the box. The participants’ responses constitute the data to be analyzed. To ensure the use of the intended words, a picture-naming task where participants name each entity present in the



**Figure 2.** A sample trial eliciting narrow focus on the object noun.

game can be carried out prior to the game. This task also renders the use of a definite article in reference in the game appropriate.

Sessions are recorded using a digital recorder at a sample rate and bit depth of 44.1 kHz/16-bit, and can be further processed using Praat (Boersma, 2001). In order to position prosodic focus marking analysis within the target language's prosodic system, researchers can employ phonologically-oriented notations proposed within the autosegmental-metrical framework (AM) (Jun, 2005, 2014; Gussenhoven & Chen, 2020). If this is not feasible, researchers can conduct acoustic analyses on the use of F0-, duration-, and intensity-related cues (Lee et al., 2015) and model shapes of F0 contours (Turco et al., 2011). These approaches cannot test hypotheses concerning the learning of phonological marking of focus in some languages, but they are suitable for studying the general use of prosodic parameters in focus marking.

## Resources and collaboration

The stimuli and corresponding pictures that have been used in past studies are available via the Open Science Framework (<https://doi.org/10.17605/OSF.IO/JHR29>). Examples of applying AM-based notations to children's productions are reviewed in Chen et al. (2020). Tools for AM-based automatic transcription of intonation are available for English (Rosenberg, 2010), Spanish and Catalan (Elvira-García et al., 2016), and Dutch (Hu et al., 2020), and may be applied to child speech. Acoustic analyses on the use of prosodic parameters and modeling of F0 contours can be conducted semi-automatically, for example, via ProsodyPro (Xu, 2013) and AASP (Hu et al., 2020), respectively. These resources and research initiatives can be coordinated by establishing collaborative projects (cf. the ManyBabies project, Frank et al., 2017)

to help beginning researchers conduct research in understudied languages and disseminate their findings.

## Conclusion

Our commentary responded to the call to diversify the field of language acquisition in Kidd and Garcia (2022) by presenting a toolkit for crosslinguistic research on the development of prosody. The toolkit, made available on a publicly accessible website, will facilitate research on the acquisition of under-resourced languages from around the world.

## Author contribution(s)

**Aoju Chen:** Conceptualization; Writing – original draft; Writing – review & editing.

**Bhuvana Narasimhan:** Conceptualization; Writing – original draft; Writing – review & editing.

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