

## DISSERTATION ABSTRACT

# The Acquisition of Tonic and Pre-Tonic Vowels in Brazilian Portuguese

Graziela Pigatto Bohn

University of São Paulo, 2015, BR  
grazielabohn@gmail.com

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This study presents the acquisition of the tonic and pre-tonic vowels in Brazilian Portuguese (BP) by three children aged from 1;0 to 3;5, assuming the Contrastive Hierarchy Theory (CHT) (Dresher 2003, 2009). We address three issues regarding acquisition within the CHT: variability, phonological processes and restructuring. Results indicate that children may take different paths in acquiring segmental phonology and restructure their built structure if it does not account for the phonological processes found in the language they are exposed to.

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**Keywords:** phonological acquisition; Brazilian Portuguese; Contrastive Hierarchy Theory; variability

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This dissertation investigates the acquisition of the vowel system in the tonic and pre-tonic positions in Brazilian Portuguese, henceforth BP, using longitudinal data from three children exposed to the Paulista variety and recorded weekly from 1;0 to 3;5 (year; month). The BP vowel system consists of seven stressed vowels in the tonic position (/u, o, ɔ, a, ε, e, i/) which neutralize to five in the pre-tonic position (/u, o, a, e, i). This investigation builds on Rangel's (2002) analysis of BP vowel acquisition, differing from her study in two main aspects: (i) Rangel does not consider the difference between stressed and unstressed vowels and (ii) her account overlooks the variability among learners shown in her data. As the pre-tonic position in BP is a subsystem of the tonic system and is affected by different phonological processes, in this dissertation the acquisition of the tonic and the pre-tonic vowels is analyzed separately. Our analysis also tests the hypothesis that the pre-tonic vowels /e/ and /o/ are acquired at a later stage because of the instability caused by an optional vowel harmony process affecting these vowels in the pre-tonic position (Miranda 2013). Because learners are sensitive to how the inventory being acquired functions phonologically in their language, we seek to contribute to a longstanding debate in BP: whether pre-tonic /e/ alone is a target of vowel harmony while pre-tonic /o/ undergoes raising due to phonetic factors (Callou et al. 2002; Yacovenco 1993).

To deal with how segmental acquisition can vary from one learner to another and how phonological processes determine the acquisition of segments, the theoretical framework assumed in this study is the Contrastive Hierarchy Theory – CHT – (Dresher 2003, 2009), which proposes that the phonemes of a language are lexically represented by a feature hierarchy dependent on the language and its phonological processes. As the feature hierarchy is not innate, it must be constructed by the learner. The study addresses three main issues about vowel acquisition in BP and the CHT: variability, phonological processes and restructuring of hierarchies. The study was carried out following the methodology proposed by Ingram (1981, 1989) according to which only types are taken

into consideration, and each vowel was categorized into *marginal*, *in use* or *frequent* in each month sample for each child (see Fee 1991, for values). For example, at age 2;0 child A. has a sample of 247 types. For this specific sample, following Fee's values, a vowel is considered *frequent* if it occurs in 9 or more types, *in use* if it occurs in 5 to 8 types, and *marginal* if it occurs in 1 to 4 types. Samples were divided by month, and categorization values change according to the size of each sample. A vowel was considered to be acquired once it became *frequent* in a specific month sample and all the subsequent samples. A child's vowel system was only considered complete once all the segments became *frequent*. Substitutions which occurred in deviant productions were also taken into account because they help to determine the organization of the feature hierarchy at different stages.

The dissertation also discusses a contrastive hierarchy for BP vowels that begins with vowel height ([low] > [back] > [high] > [ATR]), as proposed by Lee (2008), in order to establish a target representation to be acquired. An analysis of the Paulista BP shows that Lee's (2008) proposal cannot account for the external sandhi process that occurs in this variety. While external sandhi affects only final unstressed /a/ in the Southern variety of BP (Bisol 1996) – *menin[a]#[e]sperta* → *menin[e]sperta* – in the Paulista variety, studies have shown that the labials /o/ and /u/, often realized as [u], are also affected (Nogueira 2007; Santos 2007) – *menin[u]#esperto* → *menin[e]sperto*. According to Lee's proposal, /a/ and /u/ are not under the same branch, since [low], being the first specification, isolates /a/ from all the other vowels. Therefore, these vowels cannot pattern similarly in a given phonological process. For this reason, we have put forward a contrastive hierarchy proposal for the variety under study which begins with place of articulation: [back] > [low] > [high] > [ATR], thus contrasting [back] vowels (u, o, ɔ, a) to [non-back] vowels (i, e, ε).

The acquisition findings show that the children take different paths in acquiring the vowel system in BP. While two of them follow a path showing a hierarchy that begins with a place of articulation feature, [back] (child Am.'s first contrast is /a/ vs. /e/ and child L.'s first contrast is /a/ vs. /i/), the third child follows a path that begins with a height feature, [low], by first contrasting /a/ with /o/ (for results see **Table 1** below). We propose that if a learner's initial contrastive hierarchy subsequently prevents the learner's grammar from handling any of the language's phonological processes, the learner restructures the hierarchy as long as there is no insertion of new features. This proposal is supported by the identification in our data of a moment when there is restructuring in the hierarchies by observing vowel substitutions. For example, in child L.'s hierarchy the back vowel terminal nodes are /o/ and /u/, allowing alternations such as ([*'fugu*] for [*'fogu*] and [*'utu*] for [*'otru*]). However, in order to account for the BP neutralization process affecting /o/ and /ɔ/ in unstressed final position, /o/ and /ɔ/ should be sisters in the terminal node (Câmara Jr 1977; Wetzels 1992). Interestingly, we have found, at a later period, productions in which only /o/ and /ɔ/ alternate in stressed position ([*'fole*] for [*'fole*] and [*'kɔpɔ*] for [*'kɔpɔ*]), suggesting there has been restructuring in the hierarchy.

The acquisition of the pre-tonic position tested the hypothesis that the segments that undergo optional phonological processes are acquired later (Miranda 2013) and, for this reason, both pre-tonic /e/ and /o/ should take longer to be acquired in relation to their tonic counterparts and other pre-tonic vowels. The results showed, however, that only the pre-tonic vowel /e/ was acquired later (see **Table 1** below), which provides more evidence for studies that argue that only this vowel is the target of the optional vowel harmony process in BP (Callou et al. 2002; Yacovenco 1993).

We hope to have shown with this study that a model which does not assume a fixed set of ordered features can better account for the variability found in the acquisition of segmental phonology. Also, the late acquisition of the pre-tonic /e/ provides positive

**Table 1:** The acquisition of tonic and pre-tonic vowels (Bohn 2015).

	Child A.		Child Am.		Child L.	
	Tonic	Pre-tonic	Tonic	Pre-tonic	Tonic	Pre-tonic
1;1						
1;2						
1;3						
1;4					/a/	
1;5						
1;6	/a, o/	/a/			/i/	/a/
1;7		/o/				
1;8	/i, e, u/	/i/			/e, o/	
1;9						
1;10	/ɔ/		/a/		/ɔ, ε/	
1;11	/ε/		/e/	/a/	/u/	/o, i/
2;0		/e/				/u/
2;1		/u/				
2;2						
2;3			/o/			
2;4			/i/			
2;5						
2;6						
2;7						/e/
2;8				/o/		
2;9						
2;10						
2;11				/i/		
3;0			/ɔ, u/			
3;1			/ε/			
3;2				/e/		

evidence that children are sensitive to phonological processes and use them as cues to acquire the abstract phonological grammar of their language (cf. Fikkert 2005).

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### Competing Interests

The author has no competing interests to declare.

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