Perception of Narrow Focus Prosody in Buenos Aires Spanish

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1. Introduction

This paper presents a pilot study which investigates the perception of narrow focus in Buenos Aires Spanish, a variety of Spanish whose intonation notably diverges from the Castilian and Latin American standards of Spanish. Previous research on Spanish intonation has provided detailed descriptions of the pitch contours and prosodic correlates contrasting broad and narrow focused utterances. The majority of these studies are dedicated to the production of focus (e.g. Sosa 1991; Toledo 1989); and many are specific to the Castilian variety of Spanish (e.g. Face 2000, 2001, 2002a, 2002b, 2006; Garrido et al. 1993).

Previous work on focus intonation for many, but not all (e.g. Dominican Spanish, Willis 2003) varieties of Spanish, describes the alignment pattern of broad focus declarative pre-nuclear accents as a rising movement generally reaching its peak late in the tonic syllable or, more frequently in the post-tonic syllable (Face 2001; Garrido et al. 1993; Hualde 2002; Prieto et al. 1995; Sosa 1991). Conversely, early alignment of the peak in the tonic syllable is the unmarked alignment pattern for narrow focus pre-nuclear accents. It is this generalization of peak alignment, contrasting broad from narrow focus, which is cause for the present study, since Buenos Aires Spanish (henceforth BAS) is shown to lack distinctive patterns of peak alignment for narrow and broad focus (Colantoni and Gurlekian 2002).

The question that remains to be answered is what other correlates of focus become relevant for the perception of and distinction between narrow and broad focused utterances in BAS? In the ensuing paragraphs of this section, I describe the previous work on narrow and broad focus in Spanish and BAS; then I introduce the present study beginning in Section 2 with a detailed description of the methodology for data collection. Section 3 presents an analysis of the results from the perception test and in Section 4 I discuss the implications of the present study within the realm of Spanish focus research. I conclude the paper in Section 5 by framing the present work within a plan for future research of BAS intonation.

1.1. Narrow and Broad Focus Intonation in Spanish

Intonation guides the listener's attention and interpretation in spoken discourse, and for Spanish, can determine the sentence type and the relevancy of individual constituents within the utterance. Narrow focus marks some of the information in an utterance salient, highlighting one or more constituents relative to the rest of the phrase. Broad focus refers to the absence of emphasis on any single constituent. Focus may be realized phonetically through intonation, as well as with other prosodic devices, resulting in one of the ways that prosody is pragmatically meaningful.

Face (2000, 2001, 2002a, 2002b), in his extensive work on Castilian Spanish describes the characteristics contrasting broad and narrow focus. He identifies increased peak height (F0) and early peak alignment as important correlates for narrow focus (Face 2001); and while narrow focus (of declaratives) results in lengthening of the stressed syllable, his findings reveal no difference in the intensity (Face 2000), contrary to Toledo's findings for BAS (1989). In both declarative and interrogative utterances, the F0 peak may be higher in narrow focus than broad focus, and there may be an F0 rise beginning near the onset of the stressed syllable and continuing into a post-tonic syllable (Face 2006). Furthermore, narrow focus is frequently followed by a prosodic boundary and may result in a contour with an H- or a L- tone following the word in contrastive focus (Face 2002a, 2002b). Face also shows that not only the focused word (or constituent) is intonationally marked, but also the non-focal parts of the utterance (Face 2002a, 2006). Broad focus is 'marked' in that the entire utterance lacks the characteristics of narrow focus.

1.2. Buenos Aires Spanish

The Spanish of the Rio de la Plata region, comprising Buenos Aires and most of Uruguay, and referred to in this paper simply as BAS, has received surprisingly little attention to its intonation (Colantoni & Gurlekian 2004; Labastía 2006; Toledo 1989, 2000a, 2000b; Kaisse 2001; Rodriguez 2008; Gabriel et al. 2010). This is despite the recognition BAS receives, on the part of the casual observer and researcher, of its highly distinctive intonation. The few extant studies show that BAS proves to differ from other varieties of Spanish in the alignment of pre-nuclear pitch accents (Sosa 1999; Toledo 2000; Colantoni & Gurlekian 2002). Colantoni and Gurlekian show that for broad focus declarative sentences: "the peak is consistently aligned within the stressed syllable in pre-nuclear pitch accents [and] a low tone is aligned within the stressed syllable in nuclear accents" (2004:107).

Also unique to BAS intonation is the pronounced falling contour of statements, noted by other scholars of Argentine Spanish (Malmberg 1950; Fontanella de Weinberg 1966, 1980; and Colantoni & Gurlekian 2004). Kaisse (2001) describes this "long fall" as a high tone on the most prominent syllable of a phrase combined with a fall to a low tone within that same syllable, or an H* + L pitch accent. One of the unique characteristics of this contour is that the fall occurs on the salient syllable, even if it is followed by unstressed syllables. Often times, the salient syllable is greatly exaggerated in duration, up to five times the length of the surrounding syllables. Furthermore, this contour may occur when adding a relevant or focused piece of information. Kaisse's findings contradict those of Sosa (1991) for narrow focus, as he found neither a compressed fall nor increased duration on the accented syllable.

Labastía (2006) provides a qualitative analysis of focus from spontaneous speech in which F0, duration, and intensity were measured for a speaker of BAS. He found that Argentine Spanish "prefers to keep focal accent on the final constituent, [as well as] segment speech into small intonation units to give prominence on individual words rather than grouping them in longer units" (Labastía 2006: 1684). Additionally, constituents can be defocalised with or without a contrastive interpretation for Argentine Spanish; and final-nucleus placement can have a contrastive or non-contrastive interpretation. Toledo (1989) also has studied the intonation contours for BAS, with attention to the prosodic correlates of focus: F0, duration and intensity.

He reports no significant differences in the marking of focus with pitch peaks between speakers; instead, the most systematic prosodic marker is the increase of intensity for the word in focus position. And while there were no significant differences in duration of the accented word, there was a tendency for slower enunciation in the syllables occuring after the focus. Toledo concludes that marking focus is left to the freedom of the speaker, and in a later study (Toledo 2000a) his results show a lack of systematic correlation between the duration of the accented syllable and the time of pitch realization. Finally, Rodriguez (2008) found that duration increased on the stressed vowel in narrow focus utterances of two BAS speakers.

While these studies of BAS present wide ranging descriptions of how narrow and broad focus are produced in BAS, they are at the same time contradictory and show little consensus as to the correlates relevant to the production of focus. Most notable, however, is the complete lack of attention previous studies have given to the perception and interpretation of focus for BAS, and for Spanish in general.

This gives cause for the research question investigated in the present study: what phonetic correlates are important for speakers of BAS in the perception of narrow versus broad focus interpretation for declarative utterances?

2. Methodology

Data collection for the present study occurred in two parts: first, recording and synthesizing the experimental tracks, and second, engaging participants in a perception task. The methodology for each phase will in turn be described.

2.1. Recording and synthesizing the experimental tracks
2.1.1. Subjects

Target narrow focus and broad focus utterances were performed by a native male speaker of Buenos Aires Spanish in his late 30s. He is an acquaintance of the researcher, and at the time of the recording had been living in the United States for 8 years, but reported using Spanish as part of his daily life at home and at work and was continuously in contact with other Argentines.

2.1.2. Procedure

Recordings were made using a Marantz digital recorder in a sound-controlled space. The investigator presented the subject with the target utterance 'Manolo viene mañana' (Manolo is coming tomorrow) written on a note card and proceeded to orally elicit narrow and broad focus readings of the phrase using specifically formulated questions, such as "Cuándo viene Manolo?" (When is Manolo coming?). More narrow focus and broad focus readings of the target phrase were recorded with the subject by practicing a written script out loud with him, with similar prompt questions and target utterances. Additional phrases of similar type were elicited to make the task less repetitive for the subject and to create distractor tokens for use in the perception task. The entire recording lasted 9 minutes and was done entirely in Spanish.

The entirety of the recording includes both broad focus readings of "Manolo viene mañana" as well as narrow focus readings for each of the three words in the utterance. Of the multiple repetitions of the utterance, the investigator chose one model broad focus reading and one model narrow focus reading, the latter with the narrow focus on 'Manolo'. These were chosen based on the overall quality of voice, intensity, and pronunciation of the phrase, and also on the intonation shape of the target phrase[1] (see Figures 1 and 2). Compared to the broad focus model, the narrow focus model showed a markedly higher peak over the stressed syllable /no/ (by 49 hertz) and increased duration of the vowel (a 62% increase from broad to narrow focus). However, as is typical in BAS the peak was aligned within the accented syllable /no/ in both the narrow focus and the broad focus reading.

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[1]The two model tracks chosen for the experiment happen to have been produced with a relatively higher peak for the narrow focus utterance than the broad focus utterance. Increased pitch height, as a marker of narrow focus, has resulted in conflicting conclusions for production studies of BAS (Toledo 1989) and other varieties of Spanish. Face (2002a, personal communication) argues that for Castilian, higher peaks are one strategy used alternately with others (such as an early peak) and so result in non-significantly higher peaks when all cases are considered together.

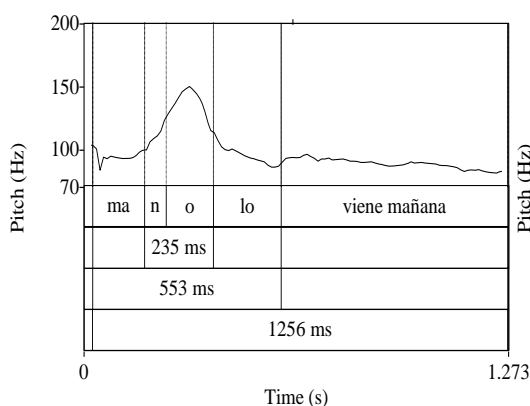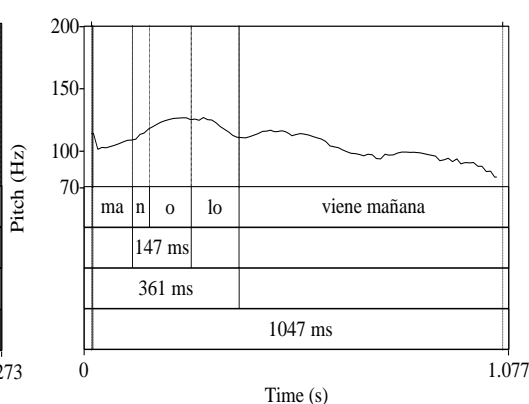Figure 1. Narrow focus on 'Manolo' in 'Manolo viene mañana'

Figure 2. Broad focus interpretation of Manolo viene mañana

The model broad focus track and model narrow focus track were used as a baseline from which manipulations were made using Praat 5.1.33 (Boersma & Weenik 2009) to create the experimental tokens. The post-focal deaccenting (following 'Manolo') the speaker naturally produced for the narrow focus utterance was left untouched in this experiment, the effect of which will be discussed in later sections. Manipulations targeting pitch height (H) and duration of the stressed vowel /no/ (D) were performed only on the stressed syllable of the word *Manolo,* /no/, while the manipulation inserting a post-focal word pause (P) was placed at the end of the word *Manolo*. The three features were manipulated to form binary categories, each associated with narrow and broad focus.

The treatments associated with narrow focus (H1 and D1) are based on the narrow focus model utterance, conversely the H2 and D2 treatments are based on the broad focus model utterance. The values used for the peak height manipulation reflect the percent increase from the lowest point of the preceding valley to the top of the peak, which is calculated as the highest (peak) hz /lowest (valley) hz *100. Since the model narrow focus utterance resulted in an increase from 91hz in the pre-nuclear valley to 149hz at the peak, this percent change, 164% was applied to the pitch peak of the model broad focus track to create the H1 treatment with a broad focus base. When applied to the broad focus base, the H1 treatment results in a peak of 150hz. Similarly, the H2 treatment represents the 124% percent increase from valley to peak in the broad focus base recording; which, when applied to the narrow focus base results in a peak of 100 hz. The D1 and D2 treatments also reflect the percent difference of duration between the syllable /no/ and the whole word /manolo/, taken from the narrow focus and broad focus base recordings. These values, once applied in the track manipulations are long duration of /no/ (D1=240 ms) or short duration of /no/ (D2=150 ms).

The pause treatments are not based on the actual recordings, but were added using Praat for experimental purposes. These treatments are post-focal pause (P1=220 ms) or no pause (P2). Only one of the three binary features was manipulated at a time to create all possible combinations (n=8). The model broad focus and narrow focus base files are included within these combinations, and since the manipulations are applied to each of these base files (8X2), the total number of experimental tokens is 16.

In light of previous studies contrasting narrow and broad focus, it is necessary to explain the use of only one experimental utterance, 'Manolo viene mañana' with the focal element in initial position. The approach used here is purposely limited to phrase-initial intonationally marked narrow focus, since previous work suggests that peak alignment is relatively more important for phrase-initial narrow focus (Face 2001; Prieto 1998; Prieto et al. 1995, 1996). Furthermore, the present study aims to best exemplify intonational (as opposed to syntactic) narrow focus marking. At least for Castilian Spanish, when the word in focus is placed phrase-finally it does not use a narrow focus intonation pattern (Face 2002a & D'Imperio 2005).

2.2. Narrow focus Perception task
2.2.1. Subjects

The subjects who participated in the perception task are Buenos Aires natives and lifetime residents. These include 7 males and 1 female, all having received or in the process of completing college degrees and involved in the professional world. Their ages ranged from 19-38. Their participation did not exceed 30 minutes total and was completely voluntary.

2.2.2. Pre-test perception task

Before the experimental tracks were played for the forced multiple choice task, subjects were introduced to the type of phrase and intonation they would hear by means of a pre-test. Under control of the investigator, subjects listened to 2 broad focus and 3 narrow focus recordings with narrow focus on each of the content words in "Mariana miraba la luna" ('Mariana looked at the moon'). The recordings used for the pre-test were produced naturally (not synthesized) by a different speaker from the one they heard in the actual perception experiment. Additionally, the pre-test utilized the same written question and answer format as the experimental test, so that the task would be made clear before actual data were collected. Subjects received written and oral instruction of how to perform the task. The use of a pre-test allowed the investigator not only to train the subjects on the specific task required for the experiment, but also to confirm that each subject would be able to perform the experimental task by monitoring their success on the pre-test.

2.2.3. Perception task

Participants completed a forced multiple choice task for the perception of focus[2] in the phrase "Manolo viene mañana". The 16 experimental tokens were presented in random order with 4 distractor tokens, each of the 20 recordings was repeated 3 times for a total of 60 tokens. Following each of the 60 recorded tokens, participants responded to the question "Which word seems to be the most important in the phrase?" on a paper answer sheet. In example (1), the 5 possible answers include each of the three words in the phrase (a-c), "all words are equally important" (d), and "unknown" (e). This process was simple, since tokens could either be the experimental phrase "Manolo viene mañana" or one of four distractor phrases, for which the participant's response was not relevant.

(1): Sample item on answer sheet
.
n∘_____ ¿Cuál palabra parece la más importante en la frase?
a. Manolo
b. viene
c. mañana
d. todas son iguales de importancia
e. no se sabe

The perception task was performed with Windows Media Player and headphones, while the responses were in printed (paper) form, requiring subjects to write the track number of the sound file being played in the space provided, and then circle their response. Each token occurred as an individual sound file, with 3 seconds of silence (added in Praat) before the token during which subjects were allowed the time to enter the track number of the sound file, and then another 3 seconds of silence after the token in which subjects could choose their response. Obligatory breaks of 2 minutes were controlled by the researcher after every 20 tracks, so that subjects would not become tired or overwhelmed with such a repetitive and concentrated task.

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[2]Subjects were trained to attend to what the researcher described as 'emphasis' ("énfasis") or 'importance' ("importancia") on certain words in the phrase, the terms narrow focus and broad focus were not used in the pre-test training.

3. Results

The results are based on the % response of the selection of 'Manolo' as the word in narrow focus for the multiple choice perception test, since 'Manolo' is the word which received the experimental treatments. The alternate response to 'Manolo' was almost exclusively (d) 'all the words are equally important' (i.e. broad focus) for all subjects and experimental tokens. A result of 100% means 'Manolo' is perceived as the word in focus by all subjects all of the time. Figure 3 illustrates a trend for the narrow focus base tokens to elicit a more frequent perception of narrow focus on 'Manolo' than the broad focus base tokens, despite receiving the same manipulations of H, D, and P on the focal word. The broad focus base results in a decreasing percent response as the treatments trend toward broad focus type realizations (i.e. H2, D2, and P2). The narrow focus base, however, never drops below 64% for narrow focus perception even when treatments have rendered the target syllable to have broad focus qualities. Both the narrow focus and broad focus bases show a response to the treatments favoring narrow focus perception. For example, H1D1P1 results in 100% and 90% narrow focus perception for the two bases, respectively, while those treatments dis-favoring narrow focus perception, H2D2P2 result in much lower percent responses, 64% for narrow focus base and 0% for broad focus base (Fig.3). This is presumably due to the effect of the treatments being all aimed towards broad focus interpretations, and then for the effect of the base; when the base intonation was also broad focus, the interpretation was never for narrow focus. Another very disparate response is found for the H1D2P2 treatment, which resulted in 95% narrow focus perception for the narrow focus base and 17% narrow focus perception for the broad focus base. These results point to the importance of the cues in the rest of the utterance, the deaccenting following 'Manolo' in the narrow focus base utterance and the accenting in the broad focus base utterance.

All experimental correlates of focus are found to be significant at the 95% confidence level when tested with percent response in a two-way ANOVA: Pitch Height (H), ($p<.01$), Vowel duration (D) ($p<.01$), and post-accentual pause (P) ($p=0.013$). Interactions between H, D, and P, however are not significant. Additionally, the factor of Base Intonation (*base*) is also significant ($p<.01$) in the perception of narrow focus. The main effect of base intonation is made evident in Figure 4, which illustrates the variation of response among subjects as well. Those tokens with a narrow focus original base result in an increased perception of narrow focus on the experimental word 'Manolo' (Figures 3 and 4).

Figure 3. The % response for narrow focus perception of 'Manolo' for 16 experimental tracks.
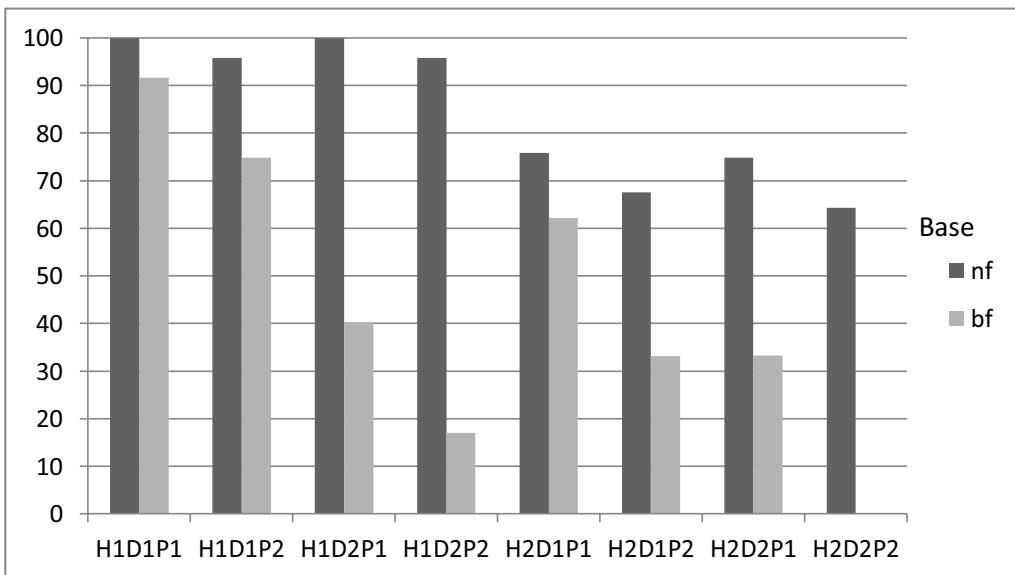
The Pearson correlation shows the correlation of the independent variables to the perception of narrow focus, and is expressed as the % variation explained by each of the four independent variables (two-tailed). The variables are ordered by degree of significance: Base utterance intonation has the highest correlation, at .503, then Pitch Height (.320); Duration (.274), and lastly, Pause (.203).

Figure 4. Perception of narrow focus based on intonation of original utterances used for manipulation.
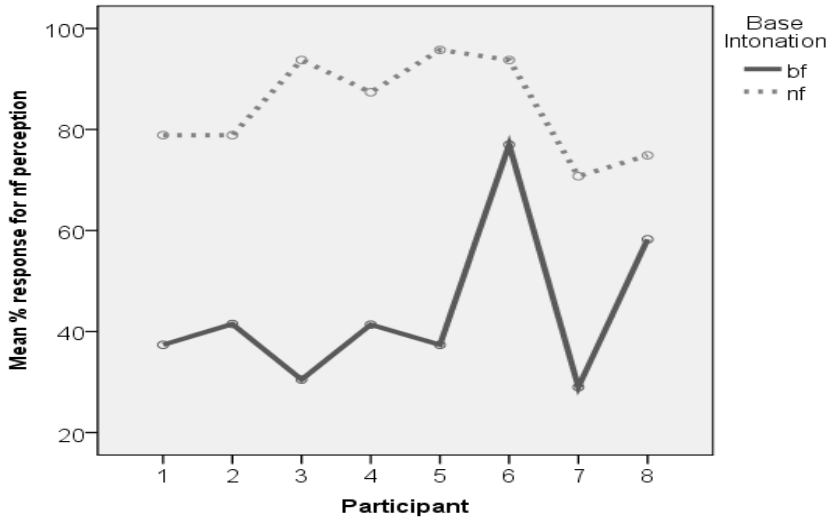
4. Discussion

Pitch alignment patterns are often the basis for phonological representation, both in Spanish and across many languages, and Prieto et.al (2005) argue that they are valid for crosslinguistic comparison of Romance varieties. Pitch alignment patterns, however, cannot account for the distinction of narrow from broad focus in BAS (Colantoni and Gurlekian 2004). The data presented here support that narrow and broad focus distinction is achieved by the other prosodic cues used to mark focus, and in the intonation of the non-focal constituents of the intonational phrase.

The perception of narrow focus on the word 'Manolo' is significantly affected by each of the experimental factors associated with focus: an increased height on the stressed syllable /no/ of 'Manolo', an increased duration of the vowel of the same syllable, a 220 ms pause after the word 'Manolo', and the accenting or deaccenting of what follows 'Manolo' in the original utterance. These correlates explain the variation found in the responses to the perception test to varying degrees, with base intonation being the most highly correlated, followed by pitch height, vowel duration, and lastly, post-accentual pause.

The present study also contributes to the evidence that the perception of narrow focus is influenced by factors affecting the non-focal constituents, in this case, the intonation of the remainder of the utterance following 'Manolo'. The narrow focus base track is deaccented after 'Manolo' while the broad focus base track shows downstepped pitch peaks (illustrated in Figures 2 and 3). As this non-focal part of the recordings remained in its original, un-manipulated state for the experimental perception test, the deaccentuation following the focused constituent is believed to have positively influenced narrow focus perception, an effect found in studies of both production and perception of Castillian Spanish narrow focus (respectively, Face 2002a and 2011). For BAS, Toledo also found the non-focal portion of the utterance to be a consistent cue in distinguishing narrow from broad focus, with a slower enunciation of the syllables following the focus, as reported from his production experiment (1989).

The effect of the base intonation is evident when we see that the treatments pattern to very different degrees for the two bases, the narrow focus base showing a consistently higher percent of narrow focus perception despite the broad focus treatments. The effectiveness of the treatments for

narrow focus perception is illustrated by the lowest percent responses from H2D2P2, and the highest from H1D1P1 regardless of their intonational bases. The particular case of H1D2P2, with very disparate results for the two bases, suggests that the combination of an increased pitch height on the word in focus followed by deaccentuation elicits a narrow focus response nearing 100%, which is higher even than H1D1P1 with a broad focus base. For the 'opposite' treatment to the former, H2D1P1, narrow focus interpretation is nearly on par for the two bases. However, the perception still remains above 60% showing the effects for long duration and a pause despite having a lower peak and/or a broad focus intonational base.

These results illustrate the individual and combined effects of individual prosodic strategies lending to a narrow focus perception, particularly that of the narrow focus intonational base and a higher peak over the focused word. The results for an increased pitch and narrow focus intonation base (H1D2P2) show how the prosodic strategies for focus might reinforce each other's effect on the interpretation of focus when employed additively, as evidenced by much of the previous work (cf. Face 2011; Hualde 2002).

5. Conclusion

The present study explores the effect of some prosodic correlates of focus on the perception of narrow focus of BAS speakers. While vowel duration of the stressed syllable of the word in focus as well as adding a pause after the word is shown to contribute to a narrow focus perception of the experimental tokens in a forced choice listening task, the most influential factors, however, are the deaccenting of material after a word in narrow focus, as opposed to the pitch accents present in broad focus, and an increased pitch peak of the focused word. These findings suggest that the perception of narrow focus is determined by the non-focal parts of the utterance more so than by the focally marked constituents (cf. Face 2011).

Future experiments will expand to include phrase-medial and phrase-final narrow focus utterances. In doing so, special attention will be paid to the *pre-focal* elements for medial and final narrow focus utterances, and the *post-focal* elements for initial and medial narrow focus utterances; the latter described by Face (2006, 2011) as the most relevant non-focal elements for overall intonation of the utterance. Furthermore, future experiments will examine the effect of intensity on the perception of narrow focus in BAS. While Face (2000) states that intensity was not affected by narrow focus (for Castilian Spanish), other linguists have shown (Toledo 1989) or suggested (Colantoni 2010, personal communication) intensity to be an important correlate of narrow focus intonation, at least for BAS. Intensity may prove to be another prosodic strategy functioning differently for BAS than for other Spanish varieties in the perception of focus, and might further exemplify the uniqueness of Argentine prosody.

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Selected Proceedings of the
5th Conference on Laboratory
Approaches to Romance Phonology

edited by Scott M. Alvord

Cascadilla Proceedings Project   Somerville, MA   2011

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This paper can be cited as:

Lang-Rigal, Jennifer. 2011. Perception of Narrow Focus Prosody in Buenos Aires Spanish. In *Selected Proceedings of the 5th Conference on Laboratory Approaches to Romance Phonology*, ed. Scott M. Alvord, 118-126. Somerville, MA: Cascadilla Proceedings Project. www.lingref.com, document #2640.