

7-2016

Disentangling Research on Study Abroad and Pronunciation: Methodological and Programmatic Considerations

Charles Nagle

Iowa State University, cnagle@iastate.edu

Alfonso Morales-Front

Georgetown University

Colleen Moorman

Georgetown University

Cristina Sanz

Georgetown University

Follow this and additional works at: http://lib.dr.iastate.edu/language_pubs



Part of the [Bilingual, Multilingual, and Multicultural Education Commons](#), [Higher Education Commons](#), and the [Language and Literacy Education Commons](#)

The complete bibliographic information for this item can be found at http://lib.dr.iastate.edu/language_pubs/125. For information on how to cite this item, please visit <http://lib.dr.iastate.edu/howtocite.html>.

Handbook of Research on Study Abroad Programs and Outbound Mobility

Donna M. Velliaris

Eynesbury Institute of Business & Technology, Australia

Deb Coleman-George

International College of Hotel Management, Australia

A volume in the Advances in Higher Education
and Professional Development (AHEPD) Book
Series

Information Science
REFERENCE

An Imprint of IGI Global

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: <http://www.igi-global.com>

Copyright © 2016 by IGI Global. All rights reserved. No part of this publication may be reproduced, stored or distributed in any form or by any means, electronic or mechanical, including photocopying, without written permission from the publisher. Product or company names used in this set are for identification purposes only. Inclusion of the names of the products or companies does not indicate a claim of ownership by IGI Global of the trademark or registered trademark.

Library of Congress Cataloging-in-Publication Data

Names: Velliariis, Donna M., 1971- editor. | Coleman-George, Deb, 1960- editor.

Title: Handbook of research on study abroad programs and outbound mobility /

Donna M. Velliariis and Deb Coleman-George editors.

Description: Hershey, PA : Information Science Reference, 2016. | Includes bibliographical references and index.

Identifiers: LCCN 2016003167 | ISBN 9781522501695 (hardcover) | ISBN 9781522501701 (ebook)

Subjects: LCSH: Foreign study--Social aspects. | Student mobility. | Education and globalization.

Classification: LCC LB2375 .H364 2016 | DDC 370.116/2--dc23 LC record available at <https://lcn.loc.gov/2016003167>

This book is published in the IGI Global book series Advances in Higher Education and Professional Development (AHEPD) (ISSN: 2327-6983; eISSN: 2327-6991)

British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

For electronic access to this publication, please contact: eresources@igi-global.com.

Chapter 27

Disentangling Research on Study Abroad and Pronunciation: Methodological and Programmatic Considerations

Charles L. Nagle

Iowa State University, USA

Colleen Moorman

Georgetown University, USA

Alfonso Morales-Front

Georgetown University, USA

Cristina Sanz

Georgetown University, USA

ABSTRACT

Despite intuitive and theoretically motivated claims that Study Abroad (SA) is an optimal environment for language development, including pronunciation gains, research on its effectiveness has produced contradictory results. Furthermore, there is little known about short-term study abroad programs, where matriculation numbers are increasing faster than ever before. This chapter analyzes pre- and post-SA oral production data from 18 advanced learners of Spanish, focusing on stop consonants (/p, t, k, b, d, g/). Development was defined in terms of voice onset time for /p, t, k/ and a 5-point lenition measure for /b, d, g/. Learners produced significantly shorter VOT values after the SA program, though there was not a similar improvement in lenition score. Therefore, the intensive, six-week SA experience yielded substantial gains in L2 pronunciation for these advanced learners of Spanish. Results are discussed in light of advances in both research methodology and study abroad program design.

INTRODUCTION

According to the 2013 Open Doors Report from the Institute for International Education, the number of students from the United States (US) enrolled in credit-granting Study Abroad (SA) programs has more than tripled over the past two decades. This impressive growth reflects the fact that students, parents, and language practitioners have come to regard SA as the keystone to a successful language learning

DOI: 10.4018/978-1-5225-0169-5.ch027

experience. This sentiment is echoed by institutions like the Modern Language Association (MLA), which included SA as a continuing priority in its call for translingual and transcultural competence in foreign language education (2007).

SA as an engine of linguistic and cultural development has intuitive appeal. While abroad, students immerse themselves in the language and culture and learn by doing, until one day they discover themselves thinking and dreaming in the target language. This line of thinking is not simply impressionistic, however. Indeed, classical theories of Second Language Acquisition (SLA) such as: Krashen's (1985) Input Hypothesis; Long's (1996) Interaction Hypothesis; and Swain's (1995) Output Hypothesis, lend support to the notion that SA is an optimal learning environment, one that is rich in meaningful input and opportunities for interaction and negotiation in the Second Language (L2). Moreover, some models of L2 pronunciation development such as the Speech Learning Model (Flege, 1995) have postulated that speakers' phonetic categories evolve over time to reflect the input they have received. Thus, the richer the input, the faster the categorization process.

To test these assumptions, empirical research on SA has grown and diversified in recent years, examining not just grammatical characteristics such as length of stay, but also attitudinal and language use variables that purportedly regulate the quantity and quality of input. Much of the research on pronunciation reviewed here has focused on US students in Spanish-speaking countries. Despite numerous studies on this specific population, results have remained inconclusive, perhaps due to the methodological diversity of research in this area, which has included learners of varying levels of proficiency in programs that differ in lengths of stay, operationalized development in terms of both continuous and categorical measures, and analyzed variables related to core and regional (i.e., dialect-specific) pronunciation features. Moreover, this work has routinely compared learners studying abroad to a group of learners at home. However, unlike laboratory studies where random distribution is easy, at-home (AH) vs. SA comparisons end up pairing populations that are often poles apart, not only in terms of individual differences such as motivation and personality, but also academically and financially. Given the complex interactions between learner differences and the environment, as well as potential differences in learners' pretest proficiency levels, the validity of previous reports comparing SA and AH learners seems questionable.

In this research domain, two key variables are pre-departure proficiency level and length of stay. DeKeyser (2007, 2010, 2014) suggested that learners may need to possess a certain level of language skill in order to maximize benefits from a SA experience. To that point, research has shown that lower proficiency learners appear to achieve greater gains in oral skills than their higher proficiency peers (e.g., Llanes & Muñoz, 2009; Valls-Ferrer & Mora, 2014). Still, more research in this area is warranted, particularly research on more advanced learners participating in short-term programs, which are growing in popularity. Sixty percent of US students studying abroad during 2012-2013 participated in short-term SA programs, such as summer programs, January term programs, or programs that were eight weeks or less, as compared to one semester, 6-month, or year-long SA programs (Institute of International Education, 2014). Thus, given the growing popularity of SA programs and their financial cost, we have both an epistemological and ethical imperative to understand the outcomes of stays abroad at a range of skill levels, particularly for short-term programs.

The purpose of the present study, therefore, was to explore what effect a short, but intense SA program had on pronunciation development among advanced L2 learners. Specifically, this study examined changes in the pronunciation of stop consonants /p, t, k, b, d, g/ among 18 female students who had completed 3+ years of college Spanish at a private US university and who participated in a six-week SA program in Barcelona. This research aimed to fill two gaps regarding current knowledge on the efficacy

of intensive L2 exposure as it relates to length of program and proficiency level. Despite their increasing popularity, relatively little is known about the effects of short-term SA programs, as they are currently under-researched within the SA field at large. Moreover, no study thus far has investigated the potential benefits to language development of a stay abroad, whether long or short, for a homogeneous group of advanced learners. Importantly, the design of the present study addressed some of the limitations of previous research. First, this study focused on the learning of phonetic detail: VOT for voiceless stops (/p, t, k/) and lenition for medial voiced stops (/b, d, g/). Given that these measures are scalar, they were arguably more amenable to subtle shifts in learners' production over time. Indeed, previous work on stays abroad and pronunciation development focused on more categorical measures that capture learner development only at the crossover point; for example, when speakers stop producing aspirated /p, t, k/ (phonetically [p^h, t^h, k^h]), typical of English, and begin to produce unaspirated variants ([p, t, k]), typical of Spanish. We also provide an extensive description of the SA environment since program structure varies and has been cited as one of the determining factors in learner development (Dewey, Bown, Baker, Martinsen, Gold, & Eggett, 2013).

BACKGROUND

Phonological Development in Study Abroad Contexts

SA is intuitively appealing for pronunciation gains given that L2 input is not only abundant, but also contextualized within meaningful interactions with native speakers. This section dissects this claim, focusing on SA research that has examined the acquisition of core phonological features, summarized in Table 2. Studies marked with an asterisk reported positive results for SA, irrespective of the performance of an AH group. Likewise, this list includes only the results relevant to the present study and is not exhaustive, but represents the most often-cited research in the domain.

Simões (1996) was one of the first researchers to address pronunciation in SA. In an investigation of English-speaking learners of Spanish participating in a five-week program in Costa Rica, he reported that two of the five participants registered gains related to vowel quality (e.g., less reduction to schwa). Díaz-Campos (2004, 2006) obtained similar results. Participants were either enrolled in a Spanish course at the home institution or a ten-week program in Alicante, Spain. Both groups improved their production of voiceless stop consonants, though neither group improved their production of medial fricatives (i.e., [β, ð, ɣ]), and the AH group actually outperformed the SA group in terms of their production of laterals. In his 2006 study, Díaz-Campos reported an interaction between the SA context and style. Although both groups performed better on the conversational OPI task at posttest, the SA group favored an even more target-like production on the task, perhaps reflecting the fact that they had gained more experience with more extemporaneous forms of expression.

In a study on the production of L2 Spanish vowels, Stevens (2011) found that SA participants produced statistically shorter vowels after a course abroad compared to the AH group. Thus, the tentative conclusion emerging from such research is that SA helps learners to improve their pronunciation at the segmental level. However, research on L2 English has produced contradictory findings. In an investigation of Catalan-Spanish bilinguals' production of VOT and vowel quality and duration in English, Avello and Lara (2014) failed to find a statistically significant improvement in participants' pronunciation after SA. Mora (2008) obtained similar results in his study of Catalan-Spanish bilinguals' VOT production. In

both cases, the authors suggest that participants did not achieve more target-like pronunciation because they already possessed a relatively target-like pronunciation at pretest, recalling the importance of pre-departure proficiency level or, in the case of phonology, accent.

To this line of research, we must add studies on foreign accent (FA), a more holistic measure of pronunciation gains abroad. These studies have also produced mixed results. Avello, Mora, and Pérez-Vidal (2012), Martinsen et al. (2010), and Martinsen and Alvord (2012) failed to find an improvement in FA as a result of SA, but Muñoz and Llanes (2014) did. However, Martinsen, Alvord, and Tanner (2014) reported that participants who had spent an extended time abroad, participating in a two-year missionary project, had the most target-like accent on a 100-point FA scale. Research has demonstrated a positive relationship between pronunciation development abroad and attitudinal variables (Martinsen & Alvord, 2012). The importance of such variables to pronunciation may explain why Martinsen and colleagues (2014) only obtained positive results in the case of the long-term SA group. Arguably, those learners achieved a high level of integration into the target language community, which may have had a direct impact on their pronunciation. On the other hand, participants enrolled in shorter-term, service-oriented SA experiences did not appear to improve their pronunciation to a similar extent (Martinsen et al., 2010), which may indicate that such programs may not produce the level of integration and collaboration that educators expect.

Taken together, these studies suggest that learners interact with the SA environment in complex and idiosyncratic ways, which may preclude some studies from obtaining convincing group-level results. For example, Martinsen et al. (2014) reported that the participant with the most target-like accent, who obtained a rating of 90 out of 100 points, had not spent extensive time abroad. Rather, she had developed and executed a plan to improve her pronunciation. This learners' attention to pronunciation prior to the SA period may have primed and catalyzed her development during her semester-long SA experience. These findings echo Lord (2010), who reported that learners that had completed a pronunciation course prior to studying abroad achieved greater gains in their production of the voiced fricatives than learners that simply studied abroad with no previous instruction in phonetics. In summary then, certain factors, including previous instruction and a positive attitude, appear to optimize SA. Nevertheless, more research is clearly warranted on different types of SA experiences given limited research on pronunciation and SA up to this point and the diverse findings that this line of inquiry has produced. Given this fact, the current study addresses the following research question, broadly stated: How does a short, but intense, study abroad program affect advanced L2 learners' pronunciation of Spanish stop consonants /p, t, k, b, d, g/?

The Phonological Target

This paper centers on the Spanish voiced and voiceless stops /p, t, k, b, d, g/. We chose to investigate stop consonants for two reasons: (1) the acoustic parameters associated with stop consonants (such as VOT) are well-understood, quantifiable, and scalar, and therefore, even small shifts in production are detectable; (2) learners tend to focus on other segments, such as the trill /r/ or salient dialectal features (for instance, the distinction between /s/ and /θ/ in Spain) rather than on the stops. The following section outlines the acoustic properties of stop consonants in Spanish and English, the languages relevant to the purposes of this study.

Briefly stated, in many languages, the difference between voiced and voiceless stops has to do with when the vocal folds start to vibrate (i.e., when voicing occurs) relative to when the stop is released (e.g., for /p/, when the lips separate). Researchers have found that by measuring VOT, one can account

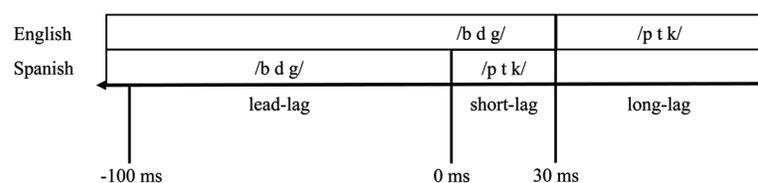
Disentangling Research on Study Abroad and Pronunciation

for stop consonant systems across a range of languages (Lisker & Abramson, 1964). VOT values can be negative if voicing begins before the stop is released or positive if voicing begins after the release of the stop. Positive VOT is easy to detect without any special acoustic software because the emission of a slight puff of air from the mouth is actually what delays the onset of voicing. For example, the release of air for the stop consonant /p/ can be felt by holding one's hand in front of one's mouth while saying 'Peter Pan' in English. Negative VOT, known as prevoicing since voicing begins before stop release, is harder to detect. Nevertheless, one can feel the buzzing vibration of the vocal folds while articulating a /b/ as in Spanish *beso* by holding one's hand to one's throat. Negative VOT values correspond to the lead-lag category, while positive VOT values correspond to the short- or long-lag categories, depending on whether voicing begins shortly or substantially after stop release (Keating, 1984).

As Figure 1 displays, stop consonants receive different articulations in English and Spanish (i.e., they are produced with different VOT values). Compare the burst of air in 'Peter Pan' in English to the absence of a comparable burst in *para Pedro*, 'for Peter' in Spanish. In English, voiceless stops are realized as long-lag stops, with typical VOT values in the 50-80 ms range (e.g., Lisker & Abramson, 1964), whereas voiceless stops in Spanish are realized as short-lag stops, with corresponding VOT values of 10-30 ms. By the same token, compare the /b/ in 'bay' to the /b/ in *beso* and one should note that, in English, /b/ is also produced with a short burst of air, whereas in Spanish, voicing begins before the stop is released. That is, voiced stops are typically realized as short-lag stops in English (0-10 ms VOT), but as lead-lag stops in Spanish (-100-0 ms VOT). Consequently, English /b/ is similar to Spanish /p/ in that both are produced as short-lag stops (i.e., with a small burst of air that delays the onset of voicing), though attested VOT values for each may differ slightly. Therefore, English speakers must learn to produce Spanish stops with shorter VOT values in order to attain a more target-like accent, and research has demonstrated that learners produce more target-like VOT values, particularly for voiceless stops, as they become more proficient L2 users (e.g., Kissling, 2013; Nagle, 2014; Reeder, 1998; Zampini, 1998).

In addition to VOT differences, there is another fact about Spanish that poses a challenge for English-speaking learners: When voiced stops occur in medial positions in Spanish (e.g., in word-internal position, as in *abogado*, 'lawyer' or across word boundaries, as in *la base*, 'the base'), they weaken to approximants [β, ð, γ]. In traditional terms, this process has been known as spirantization. In fact, approximant realizations of these sounds are more common than stop realizations, which only occur after a nasal consonant (e.g., /m, n/), a pause, or /l/ in the case of /d/. Weakening or lenition is most pervasive when the stop occurs between two vowels, as in *abogado* [a.βo.ɣa.ðo]. This process by and large applies only to /b, d, g/; /p, t, k/ usually occur as stops even between vowels as in *acopiar* [a.ko.piar], 'to collect', although scholars have noted spontaneous voicing of voiceless stops in intervocalic position (e.g., Hualde, Simonet, & Nadeu, 2011) and voicing of post-nuclear and/or intervocalic voiceless stops in certain dialects (Guitart, 2004). In contrast to the gains speakers attain in VOT production, lenition appears to be more difficult to acquire. In general, learners produce approximants in the required con-

Figure 1. The phonology and phonetics of stop consonants in Spanish and English



texts only rarely, even at advanced levels of L2 proficiency (e.g., Face & Menke, 2009; Kissling, 2013; Nagle, 2014; Shively, 2008; Zampini, 1994), though they do appear to be sensitive to subtle phonetic variation in the input (Shea & Curtin, 2011).

In summary, English speakers of Spanish face two challenges. On the one hand, they must shift their perception and production of stop consonants towards shorter VOT values (i.e., towards the lead-lag category for /b, d, g/ and the short-lag category for /p, t, k/) to match the phonetic characteristics of Spanish, and, on the other hand, they must acquire the pattern of lenition (weakening) that affects Spanish /b, d, g/ in the majority of phonetic environments. Both of these tasks have real consequences for speech processing since confusing VOT categories can produce shifts in meaning (e.g., *beso* v. *peso*, 'I kiss' vs. 'I weigh') and failure to produce approximants in appropriate contexts can lead to a marked foreign accent (*Quiero bistec y pescado* ['k^hje.ro.bis.'te.ki.p^hes.'ka.do], instead of [kje.ro.βis.'te.ki.pes.'ka.ðo], 'I want steak and fish'), if not also contribute to breakdowns in communication.

Theoretical Framework

Exemplar theoretic approaches to L2 pronunciation development (e.g., Johnson, 2007; Pierrehumbert, 2001) posited that words are stored in robust phonetic detail and accumulate over time to form exemplar clouds that guide speakers' perception and production. This approach intersects neatly with the tenets of the Speech Learning Model (Flege, 1995), which also holds that phonetic categories continue to evolve in accord with the forms the speaker experiences. This explains why, for example, many studies have reported that L2 speakers (mostly highly proficient bilinguals) produce L2 sounds that fall between L1 and L2 phonetic norms (e.g., Flege, 1991). For the purposes of this paper, we adopt the stance that complex phonological patterns and subtle phonetic variation emerge as a result of the combined effect of countless tokens. Thus, SA programs theoretically provide an optimal environment since learners have unprecedented opportunities to interact in the target language, thereby developing a robust phonetic space based on extensive, authentic input. It is precisely in this setting, therefore, that we would expect to see learners develop more nativelike pronunciation, given appropriate research methodologies that are able to track incremental shifts in production.

Key Variables in Pronunciation Research in Study Abroad Contexts

As is evident from the earlier review of empirical research on phonological development in SA contexts, it is important to characterize this strand in terms of the following key methodological and programmatic features: length of stay; type of housing; language use; pre-departure proficiency level; and outcome measure. Considering these variables should shed light on the diverse results that this area has produced.

Length of stay is arguably a determinative factor in language gains abroad insofar as it theoretically relates to the quantity of L2 exposure learners have and, perhaps, even to the quality of that exposure in those cases in which longer programs allow participants to make more inroads into the target language community. With respect to phonology, research suggests that learners completing even a short-term program improve their pronunciation, although it is not clear that they consistently outpace an AH control group (e.g., Díaz-Campos, 2004). Simply put, there is not enough research to make any conclusive statements on length of stay as it relates to phonological development abroad. Length of stay is analogous in many respects to length of residence in the naturalistic acquisition literature (i.e., literature on learners who have immigrated to a country in which the target language is spoken).

Disentangling Research on Study Abroad and Pronunciation

To that effect, Piske, MacKay, and Flege (2001) noted that this type of variable ‘only provides a rough index of overall L2 experience’ (p. 197). For example, Martinsen et al. (2014) found that students who had participated in a two-year missionary program in a Spanish-speaking country possessed a much more target-like accent than their peers who had participated in a traditional semester program. However, these results may stem from the fact that the learners involved in missionary work likely experienced some degree of acculturation to the language community, or that their involvement with the community was deeper and consequently, their interactions greater and more complex. If, as Lybeck (2002) argued, social network formation and acculturation govern the deployment of nativelike features, then perhaps Martinsen and colleagues’ participants improved their pronunciation not as a result of a longer period abroad, but because of the degree of cultural integration they achieved.

On the other hand, the authors also point to a participant in the traditional group who achieved the highest pronunciation score, noting that she had developed a structured approach to improving her pronunciation, which may have helped her to achieve significant gains while studying abroad. Thus, there appears to be a complex interplay of variables in SA, both socio-psychological and programmatic, that dictate learning outcomes. From a meta-analytic perspective, most studies on phonological development in SA contexts have focused on shorter-term and semester programs, although research also includes longer sojourns of 12 weeks or more. As Table 1 summarizes, roughly 45% of all studies conducted examine shorter-term programs, mirroring the IIE data demonstrating the growing popularity of this option. Thus, it appears that investigations of short-term programs are popular in L2 pronunciation research although they remain comparatively scarce in the broader SA field.

SA research tends to include a characterization of the SA environment as optimal for language learning in that it provides authentic, varied, and extensive input to learners. Three variables relate directly to such a claim: type of housing, type of coursework, and L2 use. Both type of housing and type of coursework index potential for language contact, though indirectly, as is the case with length of stay, whereas L2 use measure refers to whether or not the study included an instrument designed to collect language use data (see Table 1 for a summary). Many studies (38% of the current sample) do not report on type of housing, despite the fact that this factor may shape the quantity and quality of input that learners receive. If quantity and quality of input is critical to L2 pronunciation development, as scholars have suggested (e.g., Moyer, 2011), then researchers should give a richer description of SA living arrangements.

One can easily contemplate different living arrangements that combine L1 and L2 speakers and varying levels of L1 and L2 use. For example, SA participants could be living with one another and interacting predominantly in the L1, living with native speakers of the target language and interacting predominantly in the L2, or even living with native speakers, but interacting primarily in the L1. To that point, Muñoz and Llanes (2014) provided a detailed description of participants’ living arrangements, taking into account those possibilities, and future research should do the same. One may adduce similar arguments for type of coursework, though most studies more reliably report on this aspect of study abroad programming.

Crucially, researchers have increasingly recognized the importance of collecting data on participants’ L2 use abroad, drawing upon language use questionnaires (Díaz-Campos, 2004, 2006; Muñoz & Llanes, 2014; Stevens, 2011) and language logs (Martinsen, Baker, Dewey, Bown, & Johnson, 2010). However, the use of such measures remains relatively low; only 44% of the reviewed studies included such a measure, despite the prevalence of arguments linking linguistic gains in SA to quantity of input and opportunities for interaction with native speakers. Muñoz and Llanes’ (2014) study on Catalan-Spanish bilingual adults and children attests to the diversity of experiences learners have while abroad. Take, for example, the adult SA group, who reported speaking English on average 24.36 hours per week,

Table 1. Summary of methodological and programmatic characteristics of study abroad pronunciation research

Study	Length of Stay		Proficiency			Housing			L2 Use Measure			Outcome Measure		
	< 12 wks.	>	Beg.	Inter.	Adv.	Homestay	Residence	NR	Yes	No	Core	Regional	FA	
Avello & Lara (2014)		x			x		x			x	x			
Avello et al. (2012)		x			x		x			x			x	
Díaz-Campos (2004)	x			x	x			x	x		x			
Díaz-Campos (2006)	x			x	x			x	x		x			
George (2014)		x	x	x	x	x	x		x			x		
Howard et al. (2006)		x			x			x		x		x		
Knouse (2013)	x		x	x	x	x	x					x		
Lord (2010)	x			x		x				x	x			
Martinsen & Alvord (2012)	x					x				x			x	
Martinsen et al. (2010)		x		x	x	x			x				x	
Martinsen et al. (2014)		x	x	x	x			x		x			x	
Mora (2008)		x			x					x	x			
Muñoz & Llanes (2014)		x			x	x	x		x				x	
Ringer-Hilfinger (2012)		x		x				x	x			x		
Simões (1996)	x			x	x			x		x	x			
Stevens (2011)	x		x	x		x			x		x			
Count (n = 16)	7	4	4	10	11	7	6	6	7	9	7	4	5	
%	44	38	25	63	69	44	38	38	44	56	44	25	31	

NR: no report; FA: foreign accent.

Disentangling Research on Study Abroad and Pronunciation

an impressive figure to be sure. However, speakers also reported a wide range of contact hours, from 4 to 35 hours per week, and noted that they tended to interact more frequently with non-native speakers than native speakers (see Table 2, p. 440). If such variables are in fact crucial to learning, then the imperative is clear: from a methodological viewpoint, we must work to include measures that provide accurate snapshots of language use, and from a programmatic perspective, we must configure programs to promote meaningful contact between native speakers and program participants.

The variable of pre-departure proficiency level is a thorny methodological issue. On the one hand, studies have operationalized it using a range of measures, including level of coursework completed (e.g., Lord, 2010; Martinsen & Alvord, 2012) and proficiency scales such as the Common European Framework (e.g., Avello et al., 2012; Avello & Lara, 2014; Mora, 2008) or ACTFL guidelines (e.g., Díaz-Campos, 2004, 2006; Simões, 1996; Stevens, 2011). From a practical perspective, operationalizing proficiency as level of coursework is intuitively appealing, given that acceptance into many SA programs is predicated on having completed a certain amount of coursework in the target language.

From a methodological standpoint, however, such a criterion is ambiguous, as experience has taught us that even within a single level of coursework participants tend to possess varying levels of proficiency. Moreover, these measures fail to take into account participants' phonological proficiency. In other words, they do not assess students' ability to pronounce the target language and, to our knowledge, SLA has yet to develop such an instrument. The fact that the field has no means of systematically assessing accent as part of L2 proficiency problematizes this line of research as far as pronunciation is concerned, although scholars have noted that learners who possess a relatively target-like pronunciation at pretest tend to realize minimal gains abroad (e.g., Avello & Lara, 2014; Mora, 2008). Turning to the body of research reviewed in this chapter (Table 1), most studies have focused on learners at intermediate and advanced proficiency levels, and many have incorporated learners of varying proficiencies. The current study intervenes in this debate by examining a relatively homogeneous group of advanced learners.

Lastly, one must bear in mind the nature of the outcome measures that researchers have employed, considering such aspects as broad vs. narrow measures (e.g., DeKeyser, 2007), which inevitably vary in their ability to register development at different structural levels. Indeed, the development and deployment of a regional pronunciation feature is arguably quite different from the acquisition of core properties of the target language. One may hypothesize that regional features are more closely tied to issues of identity and group membership than core features, such as VOT. Likewise, FA, being a more holistic outcome measure, may exhibit development only after longer-term programs as opposed to acoustic measures like VOT, which may be more capable of registering more subtle shifts in learners' pronunciation after shorter-term SA experiences (e.g., Mora, 2008).

From this brief overview of the characteristics of a sample of research on SA and pronunciation gains, one notes considerable methodological and programmatic diversity. Given such diversity, and the growing presence of SA programs in the college curriculum, more research in this area is needed to refine our understanding of different types of SA experiences and the variable impact they have on phonological development.

Table 2. Summary of studies examining pronunciation development abroad

Study	L2	Participants	Length (weeks)	Dependent Variables	Results
Avello et al. (2012)	English	23 CS bilinguals	12	Error count 7-point FA scale	<ul style="list-style-type: none"> Fewer errors at post Slight improvement in FA but not statistically significant
Avello & Lara (2014)	English	25 CS bilinguals	12/24	Vowel duration/quality VOT	Little improvement overall, irrespective of length of stay
Díaz-Campos (2004)*	Spanish	46 L1 English: SA (26) AH (20)	10	± Target-like segments	<ul style="list-style-type: none"> Both groups favor target-like production of /p, t, k/ at posttest No clear indication of larger gains for SA group
Díaz-Campos (2006)*	Spanish	46 L1 English: SA (26) AH (20)	10	± Target-like segments	<ul style="list-style-type: none"> Both groups perform better on conversational task SA > AH on conversational task
Lord (2010)*	Spanish	8 L1 English: ± Instruction	8	% Accuracy of [β, δ, γ]	<ul style="list-style-type: none"> Statistically significant improvement for both groups (3.3% to 5.8% and 8.6% to 28.7% respectively); Greater gains for instruction + SA group (20.1% vs. 2.5% for no prior instruction + SA)
Martinsen et al. (2010)	Spanish	26 L1 English: SA (9) Service SA (9)	12	5-point FA scale	No statistically significant improvements in FA score for any of the groups over time
Martinsen & Alvord (2012)	Spanish	38 L1 English	6	5-point FA scale	<ul style="list-style-type: none"> No statistically significant improvement in FA score Attitudes Toward Others most important predictor of pronunciation gains
Martinsen et al. (2014)*	Spanish	36 L1 English: SA (26) AH (10)	2 years	FA slider (1-100)	SA (72.5) > AH (42.7)
Mora (2008)	English	25 CS bilinguals	12	AX score VOT	<ul style="list-style-type: none"> No statistically significant development during SA period SA may have had some effect on VOT given maintenance of VOT despite increase in speech rate
Muñoz (2014)*	English	27 CS bilinguals: SA (15) AH (12)	12	7-point FA scale	<ul style="list-style-type: none"> SA > AH by FA gain score Hours Spent Speaking, Hours in Class, & Hours Speaking with NS significantly correlated with FA gains
Simões (1996)*	Spanish	5 L1 English	5	Vowel quality	Statistically significant improvements for 2 of the 5 participants
Stevens (2011)*	Spanish	22 L1 English: SA (11) AH (11)	4	Vowel duration	SA > AH: SA learners produce statistically significantly shorter vowels

CS: Catalan-Spanish; FA: Foreign Accent

METHODOLOGY

Participants

Twenty-four students participated in this study, but only the 18 who completed all experimental tasks were included in the final sample. These 18 participants were all female college-age students ($M_{age} = 20$) from a private university on the East Coast of the US. All participants had an average of 6.4 ($SD = 2.31$) years of classroom Spanish, had completed through the third year of university Spanish language classes, and had a GPA of 3.1/4.0 or higher. None of the participants had studied abroad prior to their time in Barcelona and none were fluent in any language aside from English, their L1. Additionally, recordings from one bilingual Spanish-English graduate assistant, born and raised in Spain, were used as a baseline for comparison.

Program Characteristics

The full program consisted of five weeks of immersive coursework and fieldwork, plus an additional half a week in the Ebro Delta, southwest of Barcelona, before the beginning of classes. Prior to beginning the program, all of the students signed a language pledge affirming their commitment to communicate only in Spanish during the entire duration of the program; as such, they understood that violations would be penalized with grade reductions or even suspension from the program. This was a highly intensive program requiring the equivalent of nine credit units of faculty contact and homework.

During the program, students were enrolled in three content courses, which were taught in Spanish, on topics covering visual arts, history, and politics (12 hours/week with an average of 10 hours of homework per week) and faculty were also present throughout the day. Outside the classroom, there was required contact for 16-20 more hours per week, including faculty-led fieldwork (14 hours/week) and twice-a-week meetings with native Spanish-speaking language exchange partners (2-6 hours/week) to ensure students always interacted in Spanish. This provided ample opportunities for exposure to input that was varied and rich in information. Except for conversation exchanges, all other classroom and fieldwork time involved listening to lectures and note-taking, which was necessary to complete evening assignments.

Fieldwork consisted of visits to key sites in the region, with all activities directed by native instructors who were doctoral students in the host institution's Humanities program. These guide-instructors lectured and fielded questions as students attempted to complete preassigned comprehension questions and tasks (e.g., complete a map of the Roman city of Tarraco, list architectural characteristics of different sections of the Monastery of Santes Creus; take notes to write a short report listing key words). Lectures were complemented by audiovisual presentations offered by museums and other sites with information to which students had to attend to complete their tasks, and, like their printed equivalent, were created by native speakers for native speakers of Spanish. Students were allowed to relax on the way to the sites, but once there and between sites, the program director, her assistants, and local graduate student used the time on the bus to test students' comprehension and retention of knowledge gained, and allowed time to share impressions. The content of the fieldwork served as a complement to the topics covered in students' coursework, such as the visual arts and history.

Students lived in a residence with individuals studying abroad through other universities. One of the program assistants also lived in the residence with the students and interacted with them on a regular

basis. In the evenings and on the weekends, students had free time, which they occasionally spent with their language exchange partners or with one another, attending cultural events, exploring the surrounding area, or traveling around Spain.

Instruments and Procedure

In conducting the present research, we adopted a program-centered approach to the selection of materials by taking into account the specific input to which learners would be exposed. Rather than generating an *a priori* word list for the speaking task, former participants compiled a list of words that they recalled as being frequent and particular to the SA setting in Barcelona. Former assistants also compiled a list and reviewed participants' lists to confirm whether they also recalled the items as being frequent. Within an exemplar-based approach, more frequent items are the locus of change. Therefore, we hypothesized that gains would be most evident on words frequently used in the Barcelona program context, particularly given the short duration of the program (six weeks). These words pertained to two broad groups: words that often came up in conversation (e.g., *vino* or *viaje*, 'wine' and 'trip' respectively); or words occurring in the courses in which students were enrolled (e.g., *muralla*, 'fortified wall').

Participants rated the frequency of the words at pretest and posttest using a 7-point, Likert-type scale (1 = *I do not remember hearing this word at all*; 7 = *I have heard this word on a daily or near daily basis; it is one of the most frequent words I can recall*). The words were presented in random order on both versions of this frequency task. Half of the group received version A at pretest and version B at posttest, and the other half in the reverse order. At both points, participants rated the words as fairly frequent, indicating slightly greater familiarity with the target items after the SA period (pretest $M = 5.32$; posttest $M = 5.68$). Although the target items included a range of problematic segments for English-speaking learners (e.g., /r, ɾ, b, d, g, p, t, k/ and the vowels), the discussion is limited to the stop consonants and their approximant allophones in this paper.

In selecting words for acoustic analysis, every effort was made to control various phonetic factors. In addition to the frequency of the words, the target words were also grouped based on voicing (whether the target segments were voiced or voiceless), stress (whether the target segments were located in a stressed or unstressed syllable), and word position (word-medial or word-initial segments). Additionally, utterance position was controlled by situating the target words within a carrier phrase. A total of 18 words were included in the analysis and can be found in Table 3, with the target segment for each word bolded.

Table 3. Target words included in the analysis, grouped by voicing, position in the word, and stress

Voiced Word-Medial Stressed	Voiced Word-Medial Unstressed	Voiced Word-Initial Intervocalic	Voiceless Word-Medial Stressed	Voiceless Word-Medial Unstressed	Voiceless Word-Initial Intervocalic
Gau d í	móvil (cell phone)	vamos (let's go)	pa t ata (potato)	auto b ús (bus)	cat a lán (Catalan)
res i dencia (residence)	mod e rnismo (modernism)	Gau d í	merc a do (market)	cat a lán (Catalan)	pa r ada (bus stop)
neg o cios (businesses)	sig l o (century)	Bar c elona	rep a so (review)		ta r ea (homework)
reb a jas (sales)	dig o (I say)	di f icil (difficult)			

Disentangling Research on Study Abroad and Pronunciation

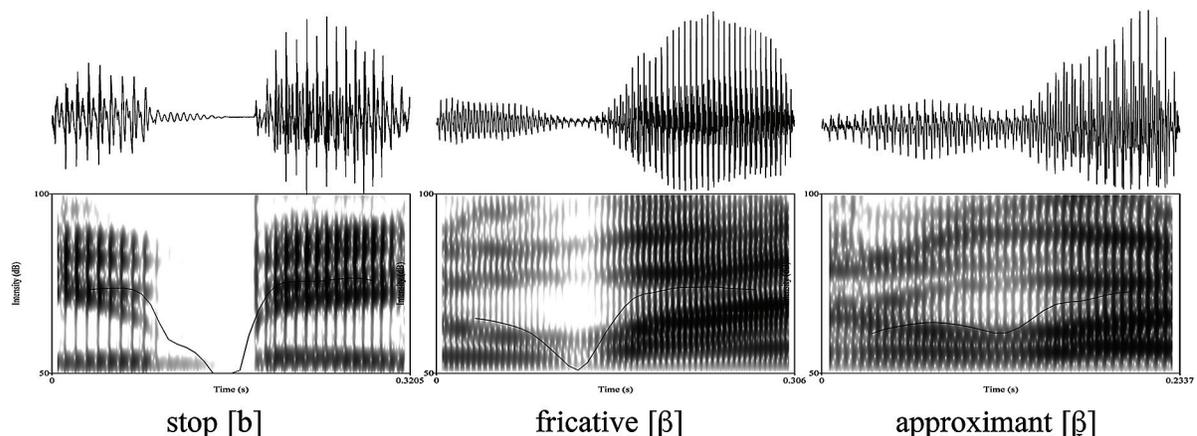
Participants completed a reading task in which they read aloud the target item embedded in the carrier phrase *Digo _____ porque sí* ('I say _____ just because') to provide a uniform prosodic context and ideally to elicit more natural speech than a simple word list. Participants received a list of the target words in the aforementioned context and were instructed to read through the list silently before recording. They were instructed to speak in a loud, clear voice and were recorded in a quiet space in the residence hall by a trained research assistant. Participants also completed a questionnaire designed to collect basic biographical data, as well as data on their language learning history and program experience. Prior to participating in the program, learners completed the background questionnaire and consent form. Within a week of their arrival, they completed the pretest and, during the last week of the program, they took the posttest and filled out the debriefing questionnaire.

A total of 760 sound files were coded independently by two expert phoneticians for the following three dependent variables: VOT (ms) of the voiceless stops, duration² (ms) of both the voiced and voiceless stops, and lenition of the voiced stops. For lenition, we developed a five-point scale to capture the varying degrees of lenition observed in participants (1 = Occlusive; 2 = Quasi-occlusive; 3 = Fricative; 4 = Quasi-approximant (Native Norm); 5 = Approximant) (Figure 2). Forty tokens were eliminated due to recording quality, resulting in a final set of 720 tokens. The two coders completed the coding using wide-band spectrograms and waveforms of the audio files in Praat to analyze the tokens visually, and supplemented analysis with auditory cues. Both during and after the coding process, subsamples of the data set were compared for inter-coder agreement. Twenty-five per cent of the tokens were double-coded by both coders for interrater reliability and these tokens were found to have greater than 90% simple agreement between the coders.

Results

The goal of the present study was to examine whether or not English speakers learning Spanish improved their production of Spanish stop consonants after a six-week SA program in Barcelona. Improvement was operationalized in terms of three auditory-acoustic measurements: VOT, duration, and lenition. VOT applies to voiceless stops /p, t, k/ as in *parada* (word-initial /p/) or *patata* (word-medial /t/), regardless of position. Duration principally applies to medial voiced stops³ (e.g., medial /b/ in *rebajas*). Lenition

Figure 2. Waveforms and spectrograms illustrating levels of lenition of /b, d, g/ in Spanish



applies only to voiced stops in medial positions (word or utterance) (e.g., medial /b/ in *rebajas* or initial /d/ in *difícil*; recall that word-initial /b, d, g/ were also intervocalic since they occurred in the carrier phrase *Digo _____ porque sí*). Means and standard deviations for the three dependent measures for the pre- and posttest are listed in Table 4, as well as those for the bilingual speaker baseline.

Paired samples *t*-tests were conducted for each of the three dependent variables to determine whether or not there were significant changes from pre- to posttest. There was a significant reduction in VOT for voiceless stop consonants, $t(17) = 2.58, p = .02$, with a medium effect size, Cohen's $d = .63$ (Figure 3). For the lenition and duration comparisons, despite a lack of statistical significance $t(17) = -1.36, p = .19$, Cohen's $d = 0.40$, and $t(17) = 1.58, p = .13$, Cohen's $d = -0.32$ respectively, participants did show improvements. Therefore, subsequent analyses explored whether learners significantly differed from the bilingual speaker at pre- and posttest for both of these measures using one-way *t*-tests with the bilingual speaker's production as the comparison value. At both points, learners significantly differed from the bilingual speaker for lenition, $t(17) = -4.30, p < .001$ and $t(17) = -3.52, p < .003$, respectively. However, for duration, learners were significantly different from the bilingual speaker at pretest, $t(17) = 2.45, p = .03$, but not at posttest, $t(17) = 1.92, p = .07$ (Figure 4).

Table 4. Descriptive statistics for voice onset time, duration, and lenition

	VOT (ms)	Duration (ms)		Lenition (1-5)
		/b d g/	/p t k/	
Pretest	29.59 (9.96)	72.68 (17.06)	101.74 (19.30)	2.59 (.65)
Posttest	24.21 (7.34)	68.30 (12.11)	94.67 (11.37)	2.77 (.58)
Bilingual	13.50 (12.11)	62.83 (40.75)	106.75 (32.28)	3.25 (.93)

Figure 3. VOT of voiceless stop consonants at pre- and posttest. Line = bilingual mean (13 ms)

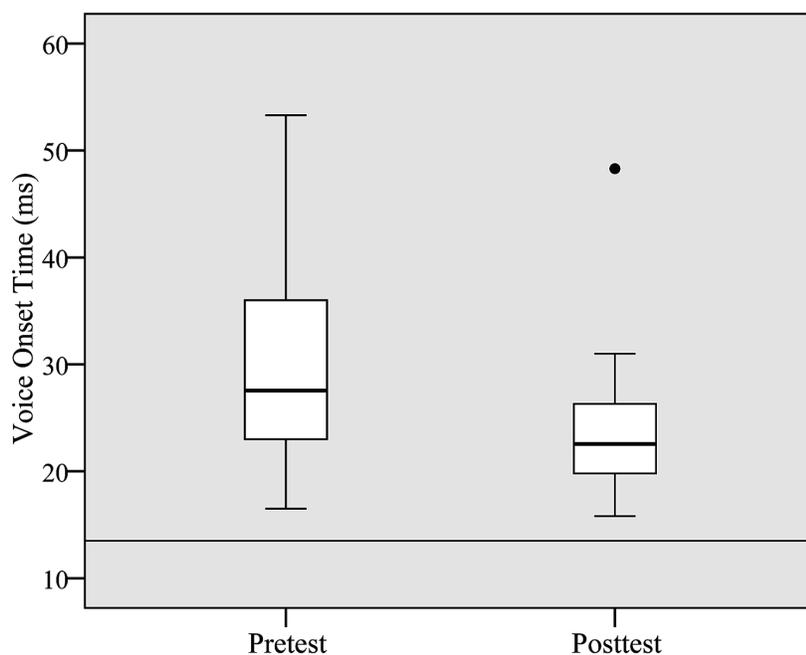
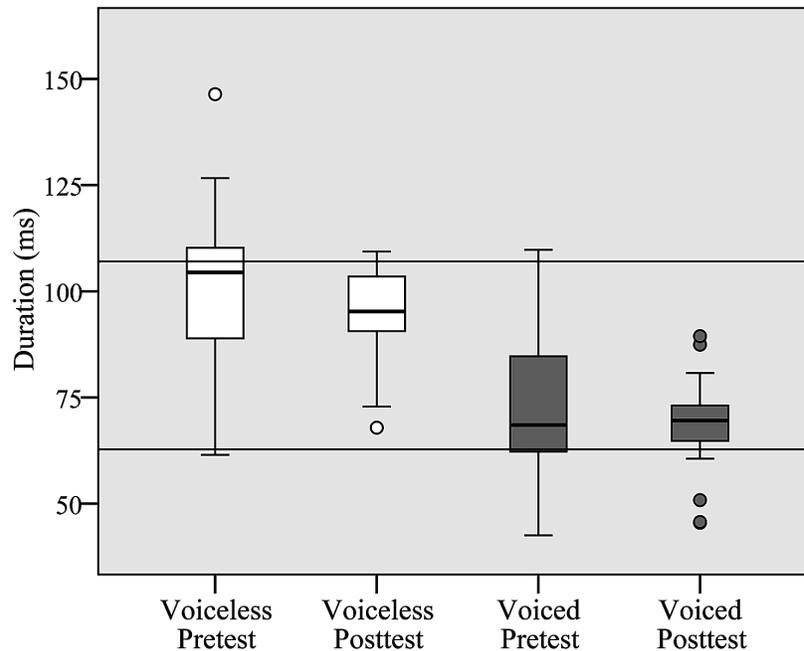


Figure 4. Stop consonant durations at pre- and posttest. Lines = bilingual mean for voiceless (107 ms) and voiced (63 ms) stops



Given that previous research has identified stress and position as key factors governing the degree of /b, d, g/ lenition in Spanish (e.g., Colantoni & Marinescu, 2010), these factors were also examined using two 2 x 2 repeated measures ANOVAs: Time (2) x Position (2) and Time (2) x Stress (2). Descriptive statistics organized by environment are presented in Table 5 below. A statistically significant main effect was found for position, $F(17) = 52.31, p < .001$, but the interaction effect did not reach significance, $F(17) = .24, p = .63$, indicating that learners treated word-initial and word-medial voiced stops differently at both test times. On the other hand, there was no statistically significant main effect for stress, $F(17) = 1.26, p = .28$.

Discussion

This study sought to elucidate the extent of L2 phonetic development during an academic stay abroad, given that some previous studies reported gains as a result of a SA experience (e.g., Díaz-Campos 2004, 2006; Simões, 1996), whereas others did not (e.g., Avello & Lara 2014; Mora, 2008). In contrast to

Table 5. Descriptive statistics for lenition by stress and position in the word

	Stress	Unstressed	Word-Initial	Word-Medial
Pretest	2.73 (.80)	2.45 (.66)	2.02 (.64)	2.88 (.75)
Posttest	2.77 (.80)	2.78 (.59)	2.13 (.63)	3.09 (.68)
Bilingual	3.75 (.89)	3.29 (.95)	2.67 (1.0)	3.63 (.92)

previous research, the current study gauged the development of a homogeneous group of advanced L2 students, rather than a mixed group of beginning or intermediate-level students, and investigated gains after a short (six-week) intensive summer program, rather than after a semester or year-long program. Programmatic idiosyncrasies aside, SA provides learners with extensive opportunities for interaction with native speakers. Within an exemplar-based approach, perception and production are related to how robust a given category is for a speaker, which is a product of how many tokens the speaker has experienced and stored.

Based on these affinities between immersion contexts and exemplar-based accounts of phonetics and phonology, we hypothesized that learners' production of Spanish stop consonants would slowly shift towards a more native-like paradigm given the intensity of the exposure facilitated by specific programmatic traits: twice-a-week language exchange partners that encouraged learners to interact with a Spanish peer group and extensive fieldwork conducted in Spanish, to name just two. Results confirmed this hypothesis, though only reduction in VOT proved statistically significant. Nevertheless, as is evident in Figures 3 and 4, not only did learners improve on all three acoustic measures (VOT, degree of lenition and duration), but the range that they produced also decreased, indicating that they became more precise over time. This narrowing of the range suggests that they did not simply hit the articulatory target occasionally by coincidence. Rather, they began to master and automatize the articulatory gestures and coordination that led to a more target-like production of stop consonants in Spanish, in line with previous claims that 'participants in a SA setting have more opportunities for oral and pronunciation practice in the L2, which may have attuned and automatized learners' articulation routines' (DeKeyser, 2007 as cited in Muñoz & Llanes, 2014, p. 441).

Previous research has shown that learners made gains in pronunciation accuracy regardless of context of learning (Díaz-Campos, 2004) or that they made little gains as a result of time abroad (Avello & Lara, 2014; Mora, 2008). The present study demonstrates that even advanced learners—whose pronunciation is relatively target-like—improve segmental accuracy as a result of a SA experience. Participants in the present study produced a VOT value that was not totally target-like, but not totally English-like either at pretest ($M = 30$ ms). Thus, in contrast to Avello and Lara (2014) and Mora (2008) who claimed that participants' relatively target-like accent at pretest may have prevented them from obtaining results for the VOT data, our data suggest the opposite. Even with a relatively target-like accent at onset, advanced learners still stand to benefit from SA. These divergent findings may also relate to pre-departure pronunciation accuracy; perhaps the learners in the present study simply had more room to improve than Avello and Lara's (2014) and Mora's (2008) L2 English speakers.

Despite improvements in VOT production, there were no statistically significant gains in terms of participants' production of word-medial voiced stops, which weaken to approximants in most contexts. These findings coincide with Lord (2010) who reported minimal gains in terms of this feature for her group of students that studied abroad without previous instruction (from 3.3% to 5.8% accuracy, pre- to posttest, a net gain of only 2.5%). However, the group that had received pronunciation instruction prior to SA made greater strides towards a more accurate realization of $[\beta, \delta, \gamma]$ (from 8.6% to 27.8% accuracy, a net gain of 19.2%), even though they still fell short of target-like production.

Lord (2010) suggested that this feature, and others like it, may develop only during longer stays abroad, '[p]erhaps a short-term summer program is insufficient for making certain phonological changes in some learners' systems, but longer-term stays, such as a semester or a full academic year, might evidence greater gains in pronunciation skills' (p. 499). Previous research on learners in instructed contexts has

Disentangling Research on Study Abroad and Pronunciation

also demonstrated that this phonological process remains a challenge even at more advanced levels of study (e.g., Face & Menke, 2009).

In general, our study aligns with previous research linking SA to a more target-like accent (e.g., Martinsen et al., 2014; Muñoz & Llanes, 2014), and with research on other pronunciation features. For example, Henriksen, Geeslin, and Willis (2010) found that some learners achieved more target-like intonation patterns in L2 Spanish after a seven-week program in Spain. More broadly, the present research also complements research on oral fluency development in SA contexts, which has produced evidence of significant positive changes (Segalowitz & Freed, 2004; O'Brien, Segalowitz, Freed & Collentine, 2007).

In general, we agree with Lord (2010) and Grey, Cox, Serafini, and Sanz (2015) that the improvements found in the present research may stem from the immersive, yet partly instructed nature of the SA program. Program participants consistently engaged in highly intensive, content-rich fieldwork and classroom lectures, providing them with substantial input and opportunities for interaction in the target language. This combination of an immersive and intensive content-based instructed environment then contributed to the rapid accumulation of high-frequency words specific to the program, from which complex phonological patterns began to emerge. Thus, specific program characteristics optimized the learning environment by facilitating exposure to unprecedented amounts of meaningful input to which students needed to attend. The scenario helped participants to develop a robust phonetic space based on extensive, authentic input, which was more natural and complex than pedagogical input or teacher talk. Indeed, the 2007 MLA report called for educators to recognize the symbiotic relationship between instruction and immersion, stating '[c]lassroom study and study abroad should be promoted as interdependent necessities: The classroom is an ideal place for structured learning that first sets the stage and later reinforces and builds on learning absorbed in study abroad'.

LIMITATIONS AND RECOMMENDATIONS

Despite these encouraging results, researchers should bear in mind a few important limitations to the present study. First, given that style (e.g., Díaz-Campos, 2006) and orthography exert an influence on learners' productions, particularly on the production of voiced approximants (Face & Menke, 2009; Zampini, 1994), future research should include more extemporaneous tasks that better reflect the range of communicative and cognitive pressures that learners face in normal conversation. Likewise, future research must take into account that sounds exist within an interrelated network and should be studied in unison whenever possible. For this reason, we attempted to study Spanish stop consonants across contexts and future pronunciation research should do the same.

An AH group was *not* included, because the SA program in which students participated was unique; matching it to an AH group would have been an arbitrary comparison at best, and a misleading one at worst. Indeed, instead of comparing an AH group to a SA group, a more fruitful approach would be to compare target development across different programs (Grey et al., 2015). Given that instruction in conjunction with SA appears to produce the most striking results, future research in this area is warranted. Lastly, the present study did not include an instrument designed to collect data on participants' language use and social networks, though extensive details were given regarding the SA environment and the types of activities in which participants engaged. Nevertheless, future research should include such measures. Broadly, then, future study abroad research should include the following features:

- Measures of language use;
- A detailed description of the program participants and environment, including pre-departure proficiency level, type of housing, and the activities and coursework in which students engaged;
- A range of speaking tasks;
- Outcome measures that register development at multiple levels, such as acoustic features and foreign accent ratings; and
- Mixed methodologies capable of reflecting a more identity-based and culturally-informed approach to pronunciation and accent abroad.

CONCLUSION

The present study helps to confirm the unique status of SA in phonological SLA, and, indeed, in SLA in general. After a six-week SA program in Barcelona, as learners gained more experience with the language, they produced voiceless stops with significantly less VOT and in general, produced forms that increasingly aligned with bilingual norms, both in terms of lenition and duration. By the end of the program, learners were producing voiced medial stops with duration comparable to that of the bilingual speaker. Furthermore, learners became more precise over time. That is, they began to produce more target-like stops more consistently, which suggests that they were indeed mastering the articulatory routines needed to produce target-like L2 segments. Certain programmatic aspects likely contributed to learners' success: fieldwork and scheduled Spanish language exchanges with native speakers that pushed participants to communicate in Spanish, content courses in Spanish with native instructors that combined lectures with Socratic seminars, a considerable amount of homework, and a language policy that students signed contributed to a highly intensive immersion experience. Future research should endeavor to explore how programmatic aspects influence learning outcomes, as well as investigate the tenets of exemplar theory in phonological SLA.

ACKNOWLEDGMENT

Initial results from this study were presented at the 2012 *Second Language Research Forum* Conference and the 2013 *Residence Abroad, Social Networks, and Second Language Learning* Conference. This research is part of the BarSA Project, funded by two Georgetown International Initiatives grants and a *Language Learning* grant to Cristina Sanz (GU IRB Exemption # 2010-065). We would like to thank Sarah Grey, Ellen Johnson Serafini and Jessie Cox for data collection and input and Germán Zárate-Sández and Jorge Seijas for their insightful comments on previous versions of this chapter. Any remaining errors are exclusively the responsibility of the authors.

REFERENCES

Avello, P., Mora, J. C., & Pérez-Vidal, C. (2012). Perception of FA by non-native listeners in a study abroad context. *Research in Language*, 10(1), 63–78. doi:10.2478/v10015-011-0050-9

Disentangling Research on Study Abroad and Pronunciation

- Avello, P., & Lara, A. R. (2014). Phonological development in L2 speech production during study abroad programmes differing in length of stay. In C. Pérez-Vidal (Ed.), *Language acquisition in study abroad and formal instruction contexts* (pp. 137–166). Philadelphia, PA: John Benjamins. doi:10.1075/aals.13.08ch6
- Colantoni, L., & Marinescu, I. (2010). The scope of stop weakening in Argentine Spanish. In M. Ortega-Llebaria (Ed.), *Selected Proceedings of the 4th Conference on Laboratory Approaches to Spanish Phonology* (pp. 100-114). Somerville, MA: Cascadilla Proceedings Project.
- DeKeyser, R. M. (2007). Study abroad as foreign language practice. In R. DeKeyser (Ed.), *Practice in a second language. Perspectives from applied linguistics and cognitive psychology* (pp. 208–226). New York, NY: Cambridge University Press. doi:10.1017/CBO9780511667275.012
- DeKeyser, R. M. (2010). Monitoring processes in Spanish as a second language during a study abroad program. *Foreign Language Annals*, 43(1), 80–92. doi:10.1111/j.1944-9720.2010.01061.x
- DeKeyser, R. M. (2014). Methodological considerations about research on language development during study abroad. In C. Pérez-Vidal (Ed.), *Language acquisition in study abroad and formal instruction contexts* (pp. 313–326). Philadelphia, PA: John Benjamins.
- Dewey, D. P., Bown, J., Baker, W., Martinsen, R. A., Gold, C., & Eggett, D. (2013). Language use in six study abroad programs: An exploratory analysis of possible predictors. *Language Learning*, 64(1), 36–71. doi:10.1111/lang.12031
- Díaz-Campos, M. (2004). Context of learning in the acquisition of Spanish second language phonology. *SSLA*, 26, 249–273.
- Díaz-Campos, M. (2006). The effect of style in second language phonology: An analysis of segmental acquisition in study abroad and regular-classroom students. In C. A. Klee & T. L. Face (Eds.), *Selected Proceedings of the 7th Conference on the Acquisition of Spanish and Portuguese as First and Second Languages* (pp. 26-39). Somerville, MA: Cascadilla Proceedings Project.
- Face, T. L., & Menke, M. R. (2009). Acquisition of the Spanish voiced spirants by second language learners. In J. Collentine et al. (Eds.), *Selected Proceedings of the 11th Hispanic Linguistics Symposium* (pp. 39-52). Somerville, MA: Cascadilla Proceedings Project.
- Flege, J. E. (1995). Second-language speech learning: Theory, findings, and problems. In W. Strange (Ed.), *Speech perception and linguistic experience: Issues in cross-language research* (pp. 229–273). Baltimore, MD: York Press.
- George, A. (2014). Study abroad in central Spain: The development of regional phonological features. *Foreign Language Annals*, 47(1), 97–114. doi:10.1111/flan.12065
- Grey, S., Cox, J. G., Serafini, E. J., & Sanz, C. (2015). The role of individual differences in the study abroad context: Cognitive capacity and language development during short-term intensive language exposure. *Modern Language Journal*, 99(1), 137–157. doi:10.1111/modl.12190
- Guitart, J. M. (2004). *Sonido y sentido*. Washington, DC: Georgetown University Press.

- Henriksen, N. C., Geeslin, K. L., & Willis, E. W. (2010). The development of L2 Spanish intonation during a study abroad immersion program in León, Spain: Global contours and final boundary movements. *Studies in Hispanic and Lusophone Linguistics*, 3(1), 113–162. doi:10.1515/shll-2010-1067
- Howard, M., Lemée, I., & Regan, V. (2006). The L2 acquisition of a phonological variable: The case of /l/ deletion in French. *French Language Studies*, 16(01), 1–24. doi:10.1017/S0959269506002298
- Institute of International Education. (2014). 'Duration of US Study Abroad 2001/02-2012/13' *Open Doors report on international educational exchange*. Retrieved from <http://www.iie.org/opendoors>
- Johnson, K. (2007). Decisions and mechanisms in exemplar-based phonology. In M. J. Sole, P. Beddor, & M. Ohala (Eds.), *Experimental approaches to phonology* (pp. 25–40). Oxford, UK: Oxford University Press.
- Keating, P. (1984). Phonetic and phonological representation of stop consonant voicing. *Language*, 60(2), 286–319. doi:10.2307/413642
- Kissling, E. M. (2013). Teaching pronunciation: Is explicit phonetics instruction beneficial for FL learners? *Modern Language Journal*, 97(3), 720–744. doi:10.1111/j.1540-4781.2013.12029.x
- Knouse, S. M. (2013). The acquisition of dialectal phonemes in a study abroad context: The case of the Castilian theta. *Foreign Language Annals*, 45(4), 512–542. doi:10.1111/j.1944-9720.2013.12003.x
- Krashen, S. D. (1985). *The input hypothesis: Issues and implications* (Vol. 1). London: Longman.
- Llanes, A., & Muñoz, C. (2009). A short stay abroad: Does it make a difference? *System*, 37, 353–365.
- Lisker, L., & Abramson, A. (1964). A cross-language study of voicing in initial stops: Acoustical measurements. *Word*, 20(3), 384–422. doi:10.1080/00437956.1964.11659830
- Llanes, À., & Muñoz, C. (2009). A short stay abroad: Does it make a difference. *System*, 37(3), 353–365. doi:10.1016/j.system.2009.03.001
- Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bahtia (Eds.), *Handbook of Second Language Acquisition* (pp. 412–468). New York, NY: Academic Press. doi:10.1016/B978-012589042-7/50015-3
- Lord, G. (2010). The combined effects of immersion and instruction on second language pronunciation. *Foreign Language Annals*, 43(3), 488–503. doi:10.1111/j.1944-9720.2010.01094.x
- Lybeck, K. (2002). Cultural identification and second language pronunciation of Americans in Norway. *Modern Language Journal*, 86(2), 174–191. doi:10.1111/1540-4781.00143
- Martinsen, R. A., Baker, W., Dewey, D. P., Bown, J., & Johnson, C. (2010). Exploring diverse settings for language acquisition and use: Comparing study abroad, service learning abroad, and foreign language housing. *Applied Language Learning*, 20(1-2), 45–69.
- Martinsen, R. A., & Alvord, S. M. (2012). On the relationship between L2 pronunciation and culture. *Spanish in Context*, 9(3), 443–465. doi:10.1075/sic.9.3.04mar

Disentangling Research on Study Abroad and Pronunciation

- Martinsen, R. A., Alvord, S. M., & Tanner, J. (2014). Perceived foreign accent: Extended stays abroad, level of instruction, and motivation. *Foreign Language Annals*, 47(1), 66–78. doi:10.1111/flan.12076
- MLA Ad Hoc Committee on Foreign Languages. (2007). *Foreign languages and higher education: New structures for a changed world*. Modern Language Association of America. Retrieved from http://www.mla.org/pdf/forlang_news_pdf
- Mora, J. C. (2008). Learning context effects on the acquisition of a second language phonology. In C. Pérez-Vidal, M. Juan-Garau, & A. Bel (Eds.), *A portrait of the young in the new multilingual Spain* (pp. 241–263). Tonawanda, NY: Multilingual Matters.
- Moyer, A. (2013). *Foreign accent: The phenomenon of non-native speech*. New York, NY: Cambridge University Press. doi:10.1017/CBO9780511794407
- Muñoz, C., & Llanes, À. (2014). Study abroad and changes in degree of foreign accent in children and adults. *Modern Language Journal*, 98(1), 432–449. doi:10.1111/j.1540-4781.2014.12059.x
- Muñoz, C., & Singleton, D. (2007). Foreign accent in advanced learners. *EUROSLA Yearbook*, 7, 171–190. doi:10.1075/eurosla.7.10mun
- Nagle, C. (2014). *A longitudinal study on the role of lexical stress and motivation in the perception and production of L2 Spanish stop consonants*. (Doctoral dissertation). Georgetown University, Washington, DC.
- O'Brien, I., Segalowitz, N., Freed, B., & Collentine, J. (2007). Phonological memory predicts second language oral fluency gains in adults. *SSLA*, 29, 557–582.
- Pierrehumbert, J. (2001). Exemplar dynamics: Word frequency, lenition, and contrast. In J. Bybee & P. Hopper (Eds.), *Frequency effects and the emergence of lexical structure* (pp. 137–157). Philadelphia: John Benjamins. doi:10.1075/tsl.45.08pie
- Piske, T., MacKay, I. R. A., & Flege, J. E. (2001). Factors affecting degree of foreign accent in an L2: A review. *Journal of Phonetics*, 29(2), 191–215. doi:10.1006/jpho.2001.0134
- Reeder, J. T. (1998). English speakers' acquisition of voiceless stops and trills in L2 Spanish. *Texas Papers in Foreign Language Education*, 3(3), 101–118.
- Ringer-Hilfinger, K. (2012). Learner acquisition of dialect variation in a study abroad context: The case of the Spanish. *Foreign Language Annals*, 45(3), 430–446. doi:10.1111/j.1944-9720.2012.01201.x
- Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics*, 11(2), 129–158. doi:10.1093/applin/11.2.129
- Segalowitz, N., & Freed, B. (2004). Context, contact, and cognition in oral fluency acquisition. *SSLA*, 26, 173–199.
- Shea, C. E., & Curtin, S. (2011). Experience, representations and the production of second language allophones. *Second Language Research*, 27(2), 229–250. doi:10.1177/0267658310375753
- Shively, R. L. (2008). L2 acquisition of [β], [ð], and [ɣ] in Spanish: Impact of experience, linguistic environment and learner variables. *Southwest Journal of Linguistics*, 27(2), 79–114.

Simões, A. R. M. (1996). Phonetics in second language acquisition: An acoustic study of fluency in adult learners of Spanish. *Hispania*, 79(1), 87–95. doi:10.2307/345617

Stevens, J. J. (2011). Vowel duration in second language Spanish vowels: Study abroad versus at-home learners. *Arizona Working Papers in SLA & Teaching*, 18, 77–104.

Swain, M. (1995). Three functions of output in second language learning. In H. G. Widdowson, G. Cook, & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics: Studies in honour of H. G. Widdowson* (pp. 125–144). Oxford, UK: Oxford University Press.

Valls-Ferrer, M., & Mora, J. C. (2014). L2 fluency development in formal instruction and study abroad: The role of initial fluency level and language contact. In C. Pérez-Vidal (Ed.), *Language acquisition in study abroad and formal instruction contexts* (pp. 111–136). Amsterdam: John Benjamins. doi:10.1075/aals.13.07ch5

Zampini, M. L. (1994). The role of native language transfer and task formality in the acquisition of Spanish spirantization. *Hispania*, 77(3), 470–481. doi:10.2307/344974

Zampini, M. L. (1998). The relationship between the production and perception of L2 Spanish stops. *Texas Papers in Foreign Language Education*, 3(3), 85–100.

KEY TERMS AND DEFINITIONS

Context of Learning: The physical site where learning is taking place as well as the approach. For example, learners may study at-home or abroad, in naturalistic or instructed settings.

Exemplar Theory: In phonology, a probabilistic approach to learning which posits that speakers' perception and production of speech is the product of the particular characteristics of the speech to which they have been exposed.

Input: The speech to which learners are exposed.

Lenition: Phonetic or phonological weakening that occurs in all languages, affecting different segments. In Spanish, the process by which medial voiced stops (i.e., /b, d, g/) weaken to approximants (i.e., [β, ð, γ]).

Speech Learning Model: A major model of L2 pronunciation developed by James Emil Flege (e.g., 1995) that posits three types of sounds: *new*, *similar*, and *same*. *Similar* sounds are theoretically the most challenging for L2 speakers since they are similar, but not identical to, a nearby L1 category. Equivalence classification is the process by which L2 speakers perceive an L2 sound as an instance of an L1 category, blocking the formation of a new phonetic category. This leads to non-target-like realization of the L2 sound.

Voice Onset Time: The period of time that elapses between the onset of vocal fold vibration and the release of the stop consonant. VOT may be negative or positive, depending on whether or not voicing begins before or after the stop is released.

ENDNOTES

1. The voiced category in English may also be instantiated by lead-lag stops (e.g., [b]), though the majority of speakers produce short-lag stops.
2. Duration may be a relevant cue to stop consonant identity in Spanish (Zampini, 1998). This partly follows from the relationship between degree of constriction, voicing and duration. Voicing becomes harder to maintain the longer the duration of the consonant, therefore, at least from an articulatory-aerodynamic perspective, stop consonants of shorter duration should be favored when voicing is also present.
3. The duration of medial voiceless stops was also measured in this study, although it should remain largely the same across time. However, we might expect less dispersion over time as learners produce more stable phonetic targets with increasing experience. This was in fact the case (see Figure 4).