Spanish progressive aspect in stochastic OT

Andrew Koontz-Garboden

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Spanish Progressive Aspect Variation in Stochastic OT*

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1 The facts

Spanish has two verb forms that have an overlap in their meaning when used in contexts calling for a progressive reading: a synthetic form and an analytic form (Comrie, 1976, Butt and Benjamin, 1994, Westfall, 1995).

(1) a. Mira, sale ahora el sol. (synthetic form)
look comes-out now the sun
b. Mira, está saliendo ahora el sol. (analytic form)
look, is coming-out now the sun
'Look, the sun is coming out now.'

This overlap in meaning is not complete, however. While the analytic form is largely restricted to progressive contexts (cf. Torres Cacoullos, 2000), the synthetic form can also occur in habitual contexts.

(2) a. Como es joven, Miguel juega futbol los lunes.
as is man Miguel plays soccer the Mondays
b. ?? Como es joven, Miguel está jugando futbol los lunes.
as is man Miguel is playing soccer the Mondays
'As he's young, Miguel plays soccer on Mondays.'

The analytic form, then, strongly favors a progressive meaning, while the synthetic form is consistent with either progressive or habitual meaning. Stated another way, the analytic form exhibits a one-to-one relationship between form and meaning while the synthetic form exhibits a one-to-many relationship. These considerations, as well as others discussed in Koontz-Garboden (2002), suggest a representation of the content of these two forms as in (3), with the analytic form being fully-specified for attributes giving rise

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to progressivity and blocking habituality, and the synthetic form being underspecified for these attributes, thereby making it consistent with both progressive and habitual meaning.[1]

(3) a. analytic

$$\begin{bmatrix} \text{VIEWPNT} & \text{IMP} \\ \text{PROG} & + \\ \text{HAB} & - \end{bmatrix}$$

b. synthetic

$$\begin{bmatrix} \text{VIEWPNT} & \text{IMP} \end{bmatrix}$$

According to the criteria of typologists who work on aspect (Comrie, 1976, Dahl, 1985, Bybee, Perkins, and Pagliuca, 1994), the Spanish analytic form can be characterized as a Progressive, and the Spanish synthetic form as an Imperfective.[2] The relationship between these two Spanish forms can be contrasted with the situation in English, which lacks an Imperfective, having instead a Progressive and a Habitual, where the latter occurs only in contexts with habitual meaning (4a).

(4) a. John eats apples. (synthetic; habitual meaning)
b. John is eating apples. (analytic; progressive meaning)

In contrast to Spanish, English can then be described as having one-to-one mappings between form and meaning; habitual meaning maps to the Habitual form, while progressive meaning maps to the Progressive form. These facts suggest a representation of the English analytic and synthetic forms as in (5).

(5) a. analytic

$$\begin{bmatrix} \text{VIEWPNT} & \text{IMP} \\ \text{PROG} & + \\ \text{HAB} & - \end{bmatrix}$$

b. synthetic

$$\begin{bmatrix} \text{VIEWPNT} & \text{IMP} \\ \text{PROG} & - \\ \text{HAB} & + \end{bmatrix}$$

[1]This formal mode of representation is based on work by Glasbey (2001), who bases her proposal on work by Smith (1991). The motivation for using two features—PROG and HAB is typological. There are more crosslinguistic co-occurrence possibilities than a single feature can capture.

[2]Following a convention in the typological literature, I use a capital letter to refer to the form (e.g. Progressive) and a lowercase letter to refer to the meaning (e.g. progressive).

2 Klein's (1980) hypothesis

Klein (1980) picked up on the subtle difference between Spanish and English discussed above, and hypothesized that it might lead to different patterns of use in the Spanish of Spanish/English bilinguals when compared to monolingual Spanish speakers of a similar social background. In her view, this would be due to an effort on the part of bilinguals to (unconsciously) minimize the differences between their Spanish and English. Spanish speakers have *two* ways of expressing progressivity, with a Progressive or an Imperfective. In contact with English, which lacks an Imperfective, bilinguals would choose the Progressive form more often, since use of it brings their Spanish closer to their English system. The crucial idea was that bilingual Spanish speakers could move to the English-type one-to-one mappings without changing the meaning of the forms; they would simply cease using the synthetic (Imperfective) form in progressive contexts, i.e. in contexts where the English synthetic form is not used.[3]

In order to test her hypothesis, Klein (1980) carried out two types of data collection with 10 Spanish/English bilinguals and 8 Spanish monolinguals from Puerto Rico, all of whom were between 16-20 years old and living in New York City at the time of the study. The first type was free conversation, with the topics of conversation focusing on 'new developments,' as such topics were expected to elicit a good number of utterances with progressive meaning. The second part of the study was more psycholinguistically oriented. Here, Klein showed her consultants a series of pictures (eight in total), and asked them to describe what was occurring in them.

In the course of her study, Klein also observed that Spanish synthetic forms are potentially ambiguous between a progressive and a habitual reading, so she thought it possible that speakers might disfavor it where its use might lead to ambiguity, i.e. in environments with less contextual support. In light of this, in addition to coding her data for morphosyntactic form (synthetic/analytic), meaning of the utterance (progressive/habitual, in the case of synthetics), and bilingual versus monolingual speaker, Klein also coded for whether the utterance was surrounded by informative context or not. Her results are given in (6).

[3]This type of situation, of which Klein's study is a paradigmatic example, is now known as a more general phenomenon: INDIRECT TRANSFER (Silva-Corvalán, 1994, 4), CONVERGENCE (Pousada and Poplack, 1982), COVERT INTERFERENCE (Mougeon and Beniak, 1991, chapter 9), and COVERT INFLUENCE (Romaine, 1995, 177).

(6) a. Utterances used progressively surrounded by less context

LESS CONTEXT	monolingual	bilingual
synthetic	13.6% (n=24)	5.6% (n=13)
analytic	86.4% (n=152)	94.4% (n=221)

$\chi^2 = 7.99, p<.01$

b. Utterances used progressively surrounded by more context

MORE CONTEXT	monolingual	bilingual
synthetic	60% (n=39)	9.4% (n=5)
analytic	40% (n=26)	91.6% (n=48)

$\chi^2 = 31.92, p<.001$

Klein's results support her hypothesis—bilinguals do use significantly more of the analytic form than monolinguals. Furthermore, in accordance with her expectation, the effect is most marked in the MORE CONTEXT environment. Here, while monolinguals favor the synthetic form, bilinguals still favor the analytic form. This shows that the preference for analytic forms for bilingual Spanish speakers is not due to ambiguity avoidance but to contact with English.

It is important to note that this generalization is a *quantitative* one. Bilinguals use significantly more of the analytic than monolinguals, but in no case is the effect categorical; neither monolinguals nor bilinguals categorically favor one form over the other. There has been little work in the generative literature on phenomena such as these, and it is not entirely clear how they might be accounted for in most approaches.

3 An OT analysis

Recent work on variation in OT (Anttila, 1997, Boersma and Hayes, 2001, Nagy and Reynolds, 1997) and morphosyntax in OT (Bresnan, 2001, Kuhn, 2001) make this framework a promising one for the development of an analysis of Klein's observations.

In the remainder of the paper, I develop and optimality-theoretic analysis meant to capture the variable nature of Klein's generalizations, using typologically well-motivated constraints that can by applied to other languages, and that ultimately make predictions about possible and impossible types of languages with respect to the phenomena under consideration.

I proceed by discussing first the input contrasts under consideration, following this by the constraints needed to generate these contrasts and their morphosyntactic expression. This is followed by examination of the contextually conditioned variation observed by Klein, and then by the actual analysis.

3.1 The input

The input to the optimizations examined here is a fully specified attribute-value matrix (f-structure) representing habitual or progressive content.

(7) a. Progressive (PROG)

$$\begin{bmatrix} \text{VIEWPNT} & \text{IMP} \\ \text{PROG} & + \\ \text{HAB} & - \end{bmatrix}$$

b. Habitual (HAB)

$$\begin{bmatrix} \text{VIEWPNT} & \text{IMP} \\ \text{PROG} & - \\ \text{HAB} & + \end{bmatrix}$$

Recall that the content of Imperfective forms is underspecified for progressive and habitual content. Because of this, there is no one-to-one mapping between input and Imperfective forms; these always arise by way of neutralization of the underlying Progressive Habitual contrast.

3.2 Constraints

3.2.1 Constraints on aspectual contrasts

Independent of morphosyntactic expression, the languages of the world have different sets of aspectual contrasts, and there is no implicational relationship among possible contrasts under discussion here; all possible sets of contrasts appear to be attested, as shown in (8) (Bybee et al., 1994, Dahl, 1985).

(8) Aspectual realization crosslinguistically

Categories overtly expressed	Language
Progressive, Imperfective, Habitual	Slave
Progressive, Imperfective	Shuswap (also Spanish)
Progressive, Habitual	Inuit
Imperfective, Habitual	Georgian
Imperfective	Modern Greek

In order to account for these possible contrasts, I posit one faithfulness constraint (9a) and two markedness constraints, which are themselves local

conjunctions of constraints disfavoring the occurrence in the output of particular attribute/value pairs. I call these local conjunctions *PROG and *HAB since they disfavor Progressive and Habitual forms in output representations.

(9) a. MAX: input attribute/value pairs are lexically realized in the output.
b. *PROG : *PROG + & *HAB -
c. *HAB : *PROG - & *HAB +

The ranking of either of the markedness constraints above MAX leads to the non-realization of particular PROG and HAB attribute/value pairs, i.e. to the unspecified Imperfective.

3.2.2 Synthetic/analytic competition

In addition to generating the different aspectual contrasts, we also have to account for the synthetic or analytic realization of these contrasts. Why is the Progressive analytic and not synthetic and why is the Imperfective synthetic and not analytic, since as documented by Bybee et al. (1994) and Dahl (1985), we observe both analytic and synthetic Imperfectives, Habituals, and Progressives crosslinguistically. In order to address this matter, the output candidates I consider are a cross-product of form and meaning, and represent various possible crosslinguistic expressions of the aspectual contrasts being considered. Although many of these are unattested in Spanish, they are observed crosslinguistically, e.g. in the languages listed in (10b,d,e,f), a fact which necessitates their consideration in any OT analysis of these phenomena.[4]

[4]A simplifying assumption I make is that there is no homonymy among these output forms, so that additional semantic attributes are marked by additional morphemes, expressed either analytically or synthetically. So, the Imperfective forms, being underspecified for progressive and habitual content (see the representations given above for Spanish), have less affixes/syntactic structure than either the Progressive or the Habitual in a particular language. To take a more concrete example, consider a language with a synthetic Habitual and a synthetic Imperfective (e.g. Slave). The synthetic Habitual has one affix more than the Imperfective, in order to express habituality (the same pattern of affixation can occur with Progressives vis-à-vis Imperfectives). This assumption, which I make for all candidates below, has consequences for the way the constraints under discussion are evaluated. A more complete analysis would take homonymous cases into consideration, possibly dealing with them by way of some sort of anti-homonymy constraint (Deo and Sharma, 2002).

(10) a. analytic Progressive (the Spanish analytic form)
b. synthetic Progressive (e.g. Nimboran)
c. synthetic Imperfective (the Spanish synthetic form)
d. analytic Imperfective (e.g. Kanakuru in past tense)
e. analytic Habitual (e.g. Guaymí)
f. synthetic Habitual (e.g. Slave)

Given both synthetic and analytic expression and no obvious markedness relationship between the two types, there must be constraints that favor each type of expression. Here, I appeal to economy constraints proposed by Sells (1997, 1998).

(11) Economy constraints
a. $*X^0$
b. ...$\gg$*AFFIX$^3\gg$ *AFFIX$^2\gg$*AFFIX^1

The first of these, $*X^0$, disfavors the use of X° nodes in phrase structure, incurring one violation for each X° node present and having the effect of disfavoring synthetic forms. The second of these is a local conjunction power hierarchy, which progressively disfavors greater and greater numbers of affixes attached to a single stem. E.g. *AFFIX^1 is violated by a stem with one or more affixes, while *AFFIX^2 is violated by a stem with two or more affixes. By intermingling $*X^0$ within the *AFFIX power hierarchy, we make a cutoff at which a particular language prefers using affixes to phrase structure for the expression of contrasts.[5]

3.2.3 Capturing contextually conditioned variation

In order to capture the effect observed by Klein that Imperfectives tend to be disfavored in LESS CONTEXT environments where their use could lead to ambiguity, I posit a very general constraint disfavoring indeterminacy, which is not entirely without precedent in the literature (for somewhat similar constraints, see e.g. Pesetsky, 1998, Grimshaw and Samek-Lodovici, 1998). In the present context, this constraint, called here *INDETERMINACY, is violated by Imperfectives in LESS CONTEXT environments, but not in MORE CONTEXT environments. Habituals and Progressives, being fully specified, do not give rise to violations of this constraint in any environment.

[5]Ultimately, this is perhaps too strong, and it seems likely that these economy hierarchies may need to be relativized to particular domains when a larger number of phenomena are considered.

Figure 1: Continuous ranking scale

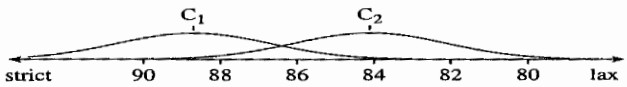

Figure 2: Relative constraint rankings vary

3.3 Spanish progressive aspect in stochastic OT

3.3.1 Stochastic OT

In order to capture the quantitative nature of the difference between the two varieties, I adopt stochastic OT (Boersma and Hayes, 2001), although other types of probabilistic OT analyses are conceivable (Anttila, 1997, Nagy and Reynolds, 1997, among others). Stochastic OT differs from standard OT largely in two ways. First, in contrast to standard OT, constraint ranking in stochastic OT is along a continuous ranking scale, so that constraints can be closer to, or farther apart from one another, as illustrated in Figure 1. The second innovation is stochastic candidate evaluation, as illustrated in Figure 2. Under this assumption, at evaluation time, the position of each constraint is perturbed by a random variable so that the relative rankings of constraints can be disturbed, with the possible degree of disturbance following a normal distribution. The greater the overlap in the distributions of the constraints, the more likely it is that their relative rankings will be disturbed on a particular evaluation. It is changes in relative rankings on particular evaluations that can lead to variation in the output.

Boersma and Hayes also adopt the gradual learning algorithm (GLA), an algorithm for the learning of stochastic OT grammars, which is implemented

in the Praat (Boersma and Weenik, 2002) and OTSoft (Hayes, Tesar, and Zuraw, 2000) software packages. In what follows, stochastic OT and the GLA are used to model Klein's results in (6).

3.3.2 The grammars

Using Boersma and Weenik's Praat software, the GLA was exposed to Klein's frequency distributions in (6), once for the monolingual data and once for the bilingual data. The end result was two distinct grammars: a monolingual grammar and a bilingual grammar.[6] The nature of these two grammars and how the variation in each of them is generated is discussed below.

Monolingual grammar The relative rankings and ranking values of the constraints in the monolingual grammar after learning by the GLA are given in (12).

(12) Constraint ranking values

constraint	ranking value
*HAB	126.262
*AFFIX^2	120.655
*INDET	**111.068**
*X^0	**108.276**
MAX	**107.459**

The most important of these constraints when considering the generation of variation are *INDET, *X^0, and MAX. These are depicted graphically with respect to one another in Figure 3.

*INDET and *X^0 have distributions that overlap with one another, so although *INDET has a ranking value higher than that of *X^0 there will be some evaluations where *X^0 does outrank *INDET. The canonical outcome for a progressive input in LESS CONTEXT environments is illustrated by the tableau in (13).

[6] The following settings/assumptions were made in the learning experiment: (a) Evaluation noise 2; (b) Initial plasticity of 1; (c) 4 plasticities with plasticity decrement of .1; (d) Algorithm exposed to 100,000 learning data per plasticity; (e) Initial ranking of all constraints on the linear scale was assumed to be equal (100).

Figure 3: Relative ranking of *INDET, *X^0, and MAX (monolinguals)

(13)

	PROG	*HAB	*AFFIX^2	*INDET	*X^0	MAX
a. ☞	analytic, PROG				**	
b.	synthetic, PROG		*!		*	
c.	synthetic, IMP			*!	*	*
d.	analytic, IMP			*!	**	*

In LESS CONTEXT environments, avoiding indeterminacy tends to be relatively important, so unambiguous Progressives are favored over potentially ambiguous Imperfectives, which violate *INDET. *AFFIX^2 then dictates that the expression of progressivity not be carried out by way of affixation, leaving this to phrase structure, with the violation of the lower-ranking *X^0. Note, though, that *X^0 and *INDET have distributions that overlap with one another, so there will be evaluations on which *X^0 will outrank *INDET. In these instances, then, it is more important to be phrase-structurally economical than it is to avoid indeterminacy, and a synthetic form must be selected. Due to the high-ranking of *AFFIX^2, this synthetic form must be an Imperfective rather than an unambiguous synthetic Progressive. So, analytic Progressives are favored in LESS CONTEXT environments, but not categorically so. The fact the Progressives are so strongly favored in this environment is formally represented by the distance along the linear ranking scale between *INDET, which favors fully-specified Progressive forms, and *X^0, which favors synthetic forms.

In MORE CONTEXT environments, indeterminacy is no longer at issue since the context helps to support a progressive interpretation. Because of this, the calculation of optimality in these situations tends to be determined by *X^0, which favors synthetic forms. This state of affairs is illustrated by the tableau in (14), which considers the canonical outcome in the monolingual grammar

for a progressive input in a MORE CONTEXT environment.

(14)

	PROG	*HAB	*AFFIX^2	*INDET	*X^0	MAX
a.	analytic, PROG				**!	
b.	synthetic, PROG		*!		*	
c. ☞	synthetic, IMP				*	*
d.	analytic, IMP				**!	*

Note, though, that *X^0 and MAX, which disfavors underspecified Imperfectives, have overlapping distributions, so there will be evaluations on which MAX actually outranks *X^0. On these evaluations, it is more important to be lexically faithful than it is to be phrase-structurally economical, so Progressive forms are favored on these evaluations. Again, due to the disfavoring of synthetic forms by *AFFIX^2, the Progressive form selected must be an analytic Progressive, rather than a synthetic Progressive. In MORE CONTEXT environments, then, we also find variation, with both analytic Progressives and synthetic Imperfectives being used to different degrees for the expression of progressive content. The degree to which the different forms are used is determined by the distance between the constraints *X^0, which favors synthetic forms, and MAX, which favors Progressive forms.

That this grammar actually does generate the correct output frequencies can be demonstrated by repeated stochastic evaluation of habitual and progressive inputs. The results for progressive inputs are given in (15)–(16) and show that the grammar learned by the GLA generates the same output frequencies as Klein's monolingual speakers.

(15) progressive input with LESS CONTEXT (monolinguals)

output	# generated	% generated	% in Klein
a. analytic, PROG	8,533	85.3%	86.4%
b. synthetic, PROG	0	0%	
c. synthetic, IMP	1,467	14.7%	13.6%
d. analytic, IMP	0	0%	

(16) progressive input with MORE CONTEXT (monolinguals)

output	# generated	% generated	% in Klein
a. analytic, PROG	3,911	39.1%	40%
b. synthetic, PROG	0	0%	
c. synthetic, IMP	6,089	60.9%	60%
d. analytic, IMP	0	0%	

Bilingual grammar The GLA was also exposed to the frequency data given by Klein for bilingual speakers. The grammar learned by the GLA upon exposure to these data is given in (17) alongside the monolingual grammar for comparative purposes.

(17) Bilingual grammar compared to monolingual grammar

a. **Bilinguals**

constraint	value
*HAB	124.726
*AFFIX^2	118.604
MAX	**110.614**
*X^0	**106.171**
*INDET	83.125

b. **Monolinguals**

constraint	value
*HAB	126.262
*AFFIX^2	120.655
*INDET	**111.068**
*X^0	**108.276**
MAX	**107.459**

There are two crucial differences between the monolingual and bilingual grammars. First, in the monolingual grammar *INDET is ranked relatively high, while it is ranked relatively low in the bilingual grammar. This difference in relative ranking with respect to other constraints captures the presence versus absence of pragmatic conditioning in the monolinguals and bilinguals respectively (as observed in (6))—context does not play a role in the bilingual grammar, due to the fact that bilinguals already highly favor the fully specified, unambiguous analytic Progressive.

The second important difference in the grammars concerns the relative rankings of MAX and *X^0. While MAX has a higher ranking value than *X^0 in the monolingual variety, the reverse situation holds in the bilingual variety, as illustrated in Figure 4 and the tableau in (18), which considers the canonical outcome in the bilingual grammar for a progressive input in a MORE CONTEXT environment—the environment where we observe a salient difference in behavior between monolinguals and bilinguals (see (6).

(18)

	PROG	*HAB	*AFFIX^2	MAX	*X^0	*INDET
a. ☞	analytic, PROG				**	
b.	synthetic, PROG		*!		*	
c.	synthetic, IMP			*!	*	*
d.	analytic, IMP			*!	**	*

Again, the fact that monolinguals favor the synthetic Imperfective in this environment, while the bilinguals favor the analytic Progressive, is due the difference in relative ranking in the two varieties of MAX and *X^0.

Figure 4: Relative ranking MAX and $*X^0$ (bilinguals)

The actual degree of use of the analytic Progressives and synthetic Imperfectives is accounted for by the distance between MAX and $*X^0$. They have distributions that overlap with one another only slightly in the bilingual variety (see Figure 4), and because of this, the analytic Progressive is heavily favored.

That the bilingual grammar generates the correct output frequencies is demonstrated by repeated stochastic evaluation, as carried out above for the monolinguals. The results of this for progressive inputs in LESS CONTEXT environments are given in (19).[7]

(19) progressive input with LESS CONTEXT (bilinguals)

output	# generated	% generated	% in Klein
a. analytic, PROG	9,412	94%	94%
b. synthetic, PROG	0	0%	
c. synthetic, IMP	588	6%	6%
d. analytic, IMP	0	0%	

4 Discussion and concluding remarks

Space constraints prevent me from examining in detail some of the implications and areas for development of this analysis. One of its more attractive features is that, like other OT analyses, it has consequences that go beyond the language varieties under investigation here. I show in Koontz-Garboden (2002), for example, that the present analysis fails to generate a particular crosslinguistically unattested language type, namely one having at the same time an analytic Imperfective and a synthetic Progressive. What I have been

[7]Due to the fact that *INDET is ranked so low in the bilingual grammar, context is irrelevant. This is also the case in Klein's data in (6), where it can be seen that there is no statistically significant difference along the context axis for the bilinguals.

able to do in this paper is to offer a formal analysis of a set of facts familiar from work in the variationist tradition, but largely unknown in the generative literature. I have shown that the differences between the two varieties of Spanish observed by Klein can be formally captured within a particular approach to optimality theory where variation is generated by way of stochastic candidate evaluation. This does not rule out alternative types of analyses, e.g. a partial ordered approach (Anttila, 1997), but merely constitutes a step towards broadening the body of data for which generative grammar is responsible. In this case, I have taken steps towards developing a formal analysis of a particular instance of the empirical phenomenon known in the sociolinguistic tradition as indirect transfer. It is hoped that further research can generalize this approach to other cases, and make advances toward understanding the formal mechanisms by which indirect transfer operates in bilingual speakers.

References

Anttila, Arto. 1997. Variation in Finnish phonology and morphology. Doctoral Dissertation, Stanford University, Stanford, CA.

Boersma, Paul, and Bruce Hayes. 2001. Empirical tests of the Gradual Learning Algorithm. *Linguistic Inquiry* 32:45–86.

Boersma, Paul, and David Weenik. 2002. Praat software package, version 4.0.5. Available on WWW at *http://www.praat.org*.

Bresnan, Joan. 2001. Explaining morphosyntactic competition. In *Handbook of contemporary syntactic theory*, ed. Mark Baltin and Chris Collins, 11–44. Oxford: Blackwell.

Butt, John, and Carmen Benjamin. 1994. *A new reference grammar of modern Spanish*. Lincolnwood, IL: NTC, 2nd edition edition.

Bybee, Joan, Revere Perkins, and William Pagliuca. 1994. *The evolution of grammar: Tense, aspect, and modality in the languages of the world*. Chicago: University of Chicago Press.

Comrie, Bernard. 1976. *Aspect*. Cambridge: CUP.

Dahl, Osten. 1985. *Tense and aspect systems*. Oxford: Blackwell.

Deo, Ashwini, and Devyani Sharma. 2002. Typological variation in the ergative morphology of Indo-Aryan languages. Ms., Stanford University.

Glasbey, Sheila. 2001. Tense, aspect, and the temporal structure of discourse: Towards and lfg account. In *Online Proceedings of the LFG01 Conference*. CSLI Publications, *http://csli-publications.stanford.edu*.

Grimshaw, Jane, and Vieri Samek-Lodovici. 1998. Optimal subjects and subject universals. In *Is the best good enough?*, ed. Pilar Barbosa et al. Cambridge, MA: MIT Press.

Hayes, Bruce, Bruce Tesar, and Kie Zuraw. 2000. OTSoft. Software package. Available

on WWW: *http://www.linguistics.ucla.edu/people/hayes/otsoft/*.

Klein, Flora. 1980. A quantitative study of syntactic and pragmatic indications of change in the Spanish of bilinguals in the U.S. In *Locating language in time and space*, ed. William Labov, 69–82. New York: Academic Press.

Koontz-Garboden, Andrew. 2002. 'Indirect transfer' effects in generative grammar. Ms., Stanford University.

Kuhn, Jonas. 2001. Formal and computational aspects of optimality-theoretic syntax. Doctoral Dissertation, Universitat Stuttgart, Stuttgart.

Mougeon, Raymond, and Edouard Beniak. 1991. *Linguistic consequences of language contact and restriction: the case of French in Ontario*. Oxford: OUP.

Nagy, Naomi, and Bill Reynolds. 1997. Optimality theory and variable word-final deletion in Faetar. *Language Variation and Change* 9:37–56.

Pesetsky, David. 1998. Principles of sentence pronunciation. In *Is the best good enough?*, ed. Pilar Barbosa et al. Cambridge, MA: MIT Press.

Pousada, Alicia, and Shana Poplack. 1982. No case for convergence: The Puerto Rican Spanish verb system in a language-contact situation. In *Bilingual education for Hispanic students in the United States*, ed. Joshua A. Fishman and Gary D. Keller, 207–240. New York and London: Teachers College Press.

Romaine, Suzanne. 1995. *Bilingualism*. Blackwell, 2nd edition.

Sells, Peter. 1997. Positional constraints and faithfulness in morphology. In *Harvard studies in korean linguistics*, ed. S. Kuno et al., volume 7, 488–503. Cambridge, MA: Harvard University.

Sells, Peter. 1998. Optimality and economy in Japanese and Korean morphosyntax. In *Japanese/Korean Linguistics*, ed. Noriko Akatsuka and et al, volume 7, 499–514. Stanford Linguistics Association, Stanford, CA: CSLI.

Silva-Corvalán, Carmen. 1994. *Language contact and change: Spanish in Los Angeles*. Oxford: OUP.

Smith, Carlota. 1991. *The parameter of aspect*. Dordrecht: Kluwer, 1st edition.

Torres Cacoullos, Rena. 2000. *Grammaticization, synchronic variation, and language contact: a study of Spanish -ndo constructions*. Amsterdam: John Benjamins.

Westfall, Ruth Ellen. 1995. Simple and progressive forms of the Spanish past tense system: a semantic and pragmatic study in viewpoint contrast. Doctoral Dissertation, University of Texas, Austin, Austin, TX.

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