Obligation markers in Mexican Spanish: competing forms in a changing system

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Abstract
Research on diachronic change and modality posit that modal verbs follow certain universal paths of development (e.g. Cornillie, 2007; Bybee & Fleischman, 1995; Bybee, Perkins & Pagliuca, 1994). This study examines the development of Spanish modality in Mexican Spanish using multivariate analyses, relative frequencies, and the comparative method as a means to uncover if and where linguistic changes are taking place and also to expose the subtle differences in patterns of use between two obligation markers – *haber de* 'have to' and *tener que* 'have to' - commonly used between the 16th and 20th centuries.

Using the statistical program GoldVarb, 3,950 tokens were extracted from three corpora, the *Corpus Diacrónico del Español* (CORDE), the *Corpus de Referencia del Español Actual* (CREA) and the Internet Archive (archive.org), and analyzed and compared across centuries. Results indicated an overall shift in preference from *haber de* to *tener que*, suggesting that the system is undergoing longitudinal renewal. A statistical examination of this shift indicated that changes are reflected within tense, verb type, and grammatical person. This study provides evidence from Spanish that corroborates the claim that deontic modals tend to follow a universal path of change.

In recent years research in linguistics has highlighted some of the changes that occur to modal systems across languages (e.g. Coates, 1983; Bybee & Pagliuca, 1984; Brinton, 1991; Bybee & Fleischman, 1995; Bybee, Pagliuca & Perkins, 1991; Bybee, Perkins & Pagliuca, 1994; Narrog, 2005a; Blas Arroyo & González Martínez, 2014; Blas Arroyo & Vellón Lahoz, 2015). Linguists who focus on the development of these systems categorize the changes as grammaticalization (e.g. Meillet, 1912; Hopper & Traugott, 2003). Within this framework there are a number of linguists such as Bybee et al. (1991), Hopper and Traugott (1993) and Bybee et al. (1994) who claim that the paths of grammaticalization of many types of modals are universal. That is, they and others claim that certain types of modality appear to develop in parallel ways across languages. It is thus essential to corroborate these claims of universal paths of change. The present study addresses some of these claims by looking at two competing deontic modals, modals that express strong obligation, in Mexican Spanish, specifically *haber de* 'have to' (1) and *tener que* 'have to' (2). Research on the grammaticalization of deontic modals has shown that as these structures develop they acquire a more subjective meaning, through a process known as subjectification (Traugott, 1989; Bybee et al., 1994; Tagliamonte, 2004; Narrog, 2005; Tagliamonte & Smith, 2006; Tagliamonte & D’Arcy, 2007). As will be illustrated below, we already see evidence of this path within the obligation system of Mexican Spanish.

(1) Señor, ¿con qué mandamiento te he de matar? (Quirós, Francisco Bernardo de, 1656: Corde)
‘Sir, with what order do I have to kill you?’

(2) Siendo esa vuestra opinión, ya no tengo que os decir. (Calderón de la Barca, Pedro, 1649: Corde)
‘This being your (pl) opinión, I don’t have to tell you (pl) anymore.’

Given the large amount of research that has been conducted on modality over the last several decades, only a small amount of that research has centered on the Spanish modal system. Of the literature that does focus on modality in Spanish, very little of it recognizes the pragmatic differences between the aforementioned constructions (c.f. Rabadan, 2006, Blas Arroyo & Lahoz, 2015). Furthermore, there have been few studies in Spanish that examine modality and its diachronic development using a quantitative variationist perspective (c.f. Blas Arroyo & Lahoz, 2015; Blas Arroyo & Martínez, 2014). One may assume, however, that the low number of studies conducted on Spanish can be accounted for by the research conducted on other languages given the recognition by linguists in grammaticalization theory that deontic modality tends to follow a universal path of change (Lyons, 1977; Coates, 1983; Bybee et al. 1994; Bybee & Fleischman, 1995; Palmer 2001). Nevertheless, it is important to provide empirical evidence in various languages to corroborate these claims.

Considering the relative lack of research on the development of deontic modality in Spanish, it is not surprising that there is minimal quantitative data that illustrates how these obligation markers are used. This study seeks to partially fill this gap of knowledge by examining the development of modality in Mexican Spanish prose both diachronically and synchronically through a comparative sociolinguistic approach (Poplack & Meechan, 1998; Poplack & Tagliamonte, 2001; Tagliamonte, 2002; Tagliamonte & Smith, 2006). Synchronically, the data will expose the pragmatic nuances and differences in patterns of use of each of these forms as they move towards more epistemic or subjective contexts (i.e. subjectification). Diachronically, the data will expose how these constructions have changed over time thus revealing the path of change. The comparative analysis will show where in the grammar these changes tend to take place over time.

1. Review of the literature

As previously mentioned, there have been certain universal paths of grammaticalization proposed by linguists such as Bybee et al. (1994), Bybee et al. (1991) and Hopper and Traugott (1993). Specific to the present study, these linguists posit that constructions denoting a notion of possession (see examples (3) and (4) as examples of possession) develop into obligation markers (see examples (1) and (2) above) and later imply intention and future (see (5)) and then ultimately acquire a subjective (i.e. epistemic) meaning (see example (6)). The path then is possession >obligation>future/intention>epistemicity (Bybee et al., 1994). The changes that typically occur within the domain of modality are further described as a general semantic-pragmatic shift. This occurs as they acquire a more epistemic and thus subjective meaning, a process known as subjectification (Traugott, 1989; Bybee et al., 1994; Tagliamonte, 2004; Narrog, 2005; Tagliamonte & Smith, 2006; Tagliamonte & D’Arcy, 2007)1.

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1 It is important to note that subjectification is also a process that occurs independent of grammaticalization (Traugott and Dasher, 2002). Subjectivity is ubiquitous in language and, as Finegan (1995) states, there is an "emerging view of discourse as an instrument not solely [...] designed for communicating ready-made content, but as an
Early research on subjectification focused on defining the process. For example, Langacker (1999) suggests it is a synchronic phenomenon while Traugott (1989) sees subjectification as more of a diachronic occurrence with three distinct stages. Other researchers such as Cornillie (2007) suggest that both Langacker (1999) and Traugott (1989) are accurate and that their views are complementary and illustrate that in many cases of subjectification both views are reflected.

More recently, the research on subjectification has centered on operationalizing the processes that may reflect the shift in meaning. It has been particularly challenging for linguists to operationalize the various degrees of subjectification (Traugott 1989, 1995; Torres Cacoullos & Schwenter 2004; and Company Company, 2004; Aaron & Torres Cacoullos, 2005), although there have been several attempts, most notably Company Company (2004), Torres Cacoullos & Schwenter (2004) and Aaron & Torres Cacoullos (2005). The lack of research available on the operationalization of these processes highlights that clear measures of subjectification are still

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expression of self and, in part, its creation” (p. 6). Therefore, it is difficult to confine subjectification to a sub-process of grammaticalization when in fact it is present in many parts of language since expression of self is the ultimate goal (Finegan, 1995). Nevertheless, the other aspects of subjectification are beyond the scope of this paper.

2 Langacker (1999) defines subjectification as a “shift from a relatively objective construal of some entity to a more subjective one” (p. 297). He explains that an entity is construed subjectively “to the extent that it functions as the subject of conception without itself being conceived” (1999: 297). This definition in fact works well with tener que in the following example where the speaker is essentially offstage and the statement is indeed subjective.

3 In Traugott’s (1989) account she identifies three tendencies in semantic-pragmatic change, all of which represent different levels of subjectification. She describes the first tendency as a shift from meanings centered on the ‘external described event’ to a meaning that is more focused on the ‘internal described situation’ (1989: 34). She explains that the internal situation often entails evaluations and perceptions. As a construction continues to undergo subjectification, another change of meaning can be observed where there is a shift from the “external or internal situation to those meanings based in the textual and metalinguistic situation” (1989: 35). She defines the textual or metalinguistic situation as a shift of the construction towards contexts where it has more of a speech-act like function. She develops this idea by incorporating the third tendency where “meanings tend to become increasingly based in the speaker’s subjective state/attitude toward the proposition” (1989: 35). Although this conceptualization of the process is, on the surface, similar to Langacker’s (1999b) definition and could indicate only a ‘terminological’ difference as Langacker claims, Traugott (1989: 188) disagrees pointing out that, for her, subjectification can only be a diachronic phenomenon where as Langacker’s perspective of subjectification is synchronic.
lacking in the field. Consequently, the present analysis will be based less on the degree or phase of subjectification of these forms, and rather highlight some of the clearly identified characteristics of the process and correlate them with grammaticalization. This is due to the general acceptance in the literature that, in many cases, the subjectification of deontic modals is seen as a subtype of grammaticalization (Bybee et al., 1991; Bybee et al. 1994; Hopper & Traugott, 2003, Brinton & Traugott, 2005; Narrog, 2005a).

Scholars have identified several processes that may be indicative of grammaticalization such as layering, specialization, decategorialization, phonetic reduction, reanalysis, semantic bleaching, and emancipation from the source form among others. At a cursory glance both tener que and haber de appear to have undergone several of the abovementioned processes. For example, these constructions appear to be in direct competition, or fulfilling the same lexical function, as can be seen in (7) and (8). This competition, known as layering, is often an indication of grammaticalization. This variation can also indicate the gradual replacement of one form by another. This replacement, commonly known as renewal, or what Tagliamonte and D’Arcy (2007) refer to as longitudinal renewal, is an alternate way of saying the same thing and is abundant in language (Hopper & Traugott, 1993).

(7) de la doctrina cristiana que todos los niños han de saber...
(Anónimo, 1626, CORDE)
‘from the christian doctrine that all children have to know...’

(8) yo amé ya no tengo que dudar, ni tú tienes que saber...
(Calderón de la Barca, Pedro, 1635, CORDE)
‘that I loved already, I don’t have to doubt, and you don’t have to know.’

In other cases, the choice of forms is reduced. We see this in the obligation system with the now extinct obligation marker tener de 5. This often happens because the other constructions, in this case tener que, start to generalize and move into new contexts. However, specialization does not always entail the reduction of choices. As Hopper and Traugott (2003:115-116) point out, “old forms may continue to coexist therefore specialization does not necessarily entail the elimination of alternatives, but may be manifested simply as textual preferences, conditioned by semantic types, sociolinguistic contexts, discourse genres, and other factors.” This might suggest that as one form generalizes (i.e. tener que), then the other may become specialized and may be relegated to a small number of contexts. It is important to determine how these two constructions are used in contexts that express deontic modality because occurrence in only a limited number of contexts could potentially indicate specialization.

In addition to competing in the domain of obligation, both constructions also derive from words that historically conveyed a notion of possession,6 which indicates that they have suffered both decategorialization (shift from a main to a semi-auxiliary verb) and semantic bleaching (occurring in contexts where obligation can be inferred and, eventually, become part of the semantics of the construction). These forms were also likely reanalyzed as constructions (e.g. haber

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4 For a detailed discussion on why subjectification is considered a subtype of grammaticalization see Company Company (2006)
5 For an in-depth discussion on the development and eventual disappearance of tener de see Olbertz (1998), Honea (2012), Blas Arroyo and González Martínez (2014)
6 For more on the historical development of these forms see Yllera (1980).
'have'>haber de ‘have to’) once they started to become associated more frequently with obligation (Brinton, 1991; Honea, 2012). Once these forms became established as obligation markers, and if they continue to grammaticalize, we should expect to once again see these processes occur as they start to appear more often in contexts that infer future, and later epistemicity as indicated in Bybee et al. (1994).

Apart from the identification of the common processes associated with these paths of change, research on grammaticalization has also highlighted the importance of frequency (e.g. Haiman, 1994; Bybee, 2003; Torres Cacoullos, 2006). A fundamental part of how languages develop and thus change is largely determined by the frequency of the construction. As Langacker (2000: 3) explains, each usage event of a construction leaves a “trace that facilitates [its] recurrence.” There is a large amount of research that cites the importance of frequency in language change (e.g. Haiman, 1994; Bybee, 2003; Torres Cacoullos, 2006). In fact, Bybee (2003) defines grammaticalization in relation to frequency by identifying it as “the process by which a frequently used sequence of words or morphemes becomes automated as a single processing unit” (p. 603). Without increased frequency or an overall high frequency of use many of the above-mentioned processes cannot happen so it is paramount that it is taken into consideration.

In addition to research that looks at grammaticalization or subjectification, there have also been a number of studies connecting the processes associated with the grammaticalization with deontic modals in a variety of languages. For example, several recent studies on modals in English have indicated that these systems undergo longitudinal renewal, in which one or more forms replaces the older forms (Hopper and Traugott, 1993; Tagliamonte & Smith, 2006; Tagliamonte and D’Arcy, 2007). This would suggest that tener que, the newer of the two forms, may be replacing haber de. A study conducted by Tagliamonte and D’Arcy (2007) illustrates how in Toronto English the obligation marker have to has virtually taken over the entire obligation system. A similar trend is observed in Tagliamonte and Smith (2006) where have to is being used in contexts that were historically reserved for epistemic must. This same tendency is found in peninsular Spanish in a study conducted by Blas Arroyo and Vellón Lahoz (2015) in which they reveal that, by the 20th century, the deontic obligation marker haber de is primarily relegated to infrequent areas of the grammar in spite of it being the marker of choice historically. Instead, they find that the more frequent contexts favored the use of tener que (Blas Arroyo & Vellón Lahoz, 2015).

Of the studies that have looked at the development of modals, several factors seem to reflect the aforementioned path of change. For example, Coates (1983), Pietrandrea (2005), and Cornillie (2007) all suggest that the type of verb that follows the modal may be affected by whether epistemicity or obligation is expressed. They find that copular verbs occur more frequently with epistemicity, while action verbs co-occur more often with deontic modals.

Similar to verb type, grammatical person and the animacy of the subject has shown strong tendencies in regards to epistemicity and deonticity, which is not surprising given that the subject is so intricately bound to the verb. Coates (1983) finds that first and second persons are more strongly associated with obligation while Cornillie (2007: 219) finds that deontic tener que occurs with animate subjects 97.75% of the time. Conversely, Coates (1983), Bybee and Fleischmann (1995), and Pietrandrea (2005) suggest that epistemic contexts are more likely to occur with third person subjects. Research also correlates animacy with high focus clauses, which tend to be less grammaticalized than their inanimate, low-focus counterparts (Klein Andreu, 1991; Bybee et al.,
Negation is also mentioned when examining epistemicity. Both Solano-Araya (1982) and Coates (1983) suggest that negation can only be used in limited contexts in English and Spanish respectively. Coates (1983) and Plank (1984: 331) expand on this claim by illustrating that although English must is limited in negative epistemic contexts, it can be replaced with the modal can’t. This suppletive relationship between two epistemic modals is not mentioned in the literature on Spanish modals despite claims of the limitations on negation and epistemic expressions.

Tense may also play an important role in determining where these forms are in their development. Tagliamonte and D’Arcy (2007), for example, look at obligation in Toronto English and find that all non present tenses were categorically used with have to. In their study, it was determined that have to had, in essence, taken over the function of obligation. If this is the case with one obligation system, is it possible that tense has an effect on other systems?

Another conditioning effect considered in the literature is the existence of a preceding clitic. Although preceding clitics have not been considered in previous research on modality, Myhill (1988) looks at clitics with a variety of verb constructions, modals included, and the semantic differences between preceding and attached clitics. He concludes that the position of a clitic largely depends on the status of the construction as a lexical or auxiliary verb. That is, constructions that have higher rates of clitic climbing are more likely to have lost some or all of their original meaning as lexical verbs and are on the path to auxiliarization thus indicating movement along the grammaticalization path (Myhill, 1988).

Based on research on deontic modals in both English and Spanish, we can assume then that the modal systems in these languages are likely undergoing longitudinal renewal and expanding into contexts associated with epistemicity. Nevertheless, it is crucial to make cross-dialectal comparisons in order to get a clearer picture of the development of this system and to confirm whether similar trends are happening across varieties and across languages in order to substantiate claims of universality in deontic modality. Tagliamonte (2002), Tagliamonte and Smith (2006), and Tagliamonte and D’Arcy (2007) have shown differences across dialects of English in terms of the development of English modals and consequently have a clearer picture of the development of modality in English, thus highlighting the importance of analyzing the systems of a variety of dialects in Spanish.

2. Corpus and methodology

The corpora used in this study include Mexican literary prose from the 16th to the 20th centuries. The majority of these works were extracted from two digitalized corpora. The first, Corpus Diacrónico del Español (CORDE), has a total word count of 7,822,486 words in the Mexican section of the corpus. It is comprised of plays, prose, poetry, legal documents, historical documents, religious works, and newspaper articles; however, only prose was used for this study. The second corpus, Corpus de Referencia del Español Actual (CREA), includes the same range of written work as CORDE and has more than 160 million words but the total word count of the works from

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7 Klein-Andreu (1991) relates low-focus contexts to relative and subordinate clauses whereas the high-focus clauses are more likely to be main clauses. Other literature (e.g. Bybee et al. 1994) attributes low focus to clauses that provide background information and high focus to clauses that provide new information. For the purpose of this study, these clauses will be identified primarily by their tendency to occur with the aforementioned factors (e.g. negation, stative verbs, (in)animate subjects).

8 It is possible, although not expected, that these constructions are used differently depending on the genre. Consequently, the study was limited to prose so as to eliminate this possible issue.
Mexico is 16,897,942. In addition, due to the lack of Mexican prose available in some of the earlier centuries, several works from an internet archive (http://archive.org/details/texts) were also included.\textsuperscript{9} Between the two corpora and the internet archive, and after eliminating the non-prose data, the total word count for the dataset in this study is 7,994,144.

The corpora were searched exhaustively for all tokens of both variants of the dependent variable (i.e. tener que and haber de). For the purposes of this study, the dependent variable is obligation and includes all the occurrences of these obligation constructions in the overlapping functional space (see (1) and (2) for examples). Furthermore, it will necessarily exclude instances of the same constructions in contexts where the other construction cannot be substituted or when obligation is not expressed. Thus, a construction like tener que would only comprise contexts where this form had an obligation meaning and not meanings such as possession. In accordance with the variationist approach, only tokens where obligation was expressed were considered and tokens that were not part of the variable context were excluded (n=10). Once the variable context was clearly defined, a total of 3,950 occurrences were extracted.

In order to uncover the underlying grammar of these competing forms and to determine if both constructions continue to undergo grammaticalization and/or subjectification several independent variables were chosen as possible conditioning factors. These factors were selected either because i) previous research on modality has identified them as pertinent or ii) research on universal paths of grammaticalization has categorized them as possible indicators of a grammaticalized form. The independent variables that will be considered in this study are: type of verb, animacy/grammatical person, polarity, preceding clitic, and tense.\textsuperscript{10}

Once the factors were chosen each of these tokens was then coded in regards to its occurrence with the aforementioned markers in an excel spreadsheet. Once all the data were coded they were analyzed quantitatively. For this process GoldVarb (Cedergren and Sankoff, 1974, Sankoff, 1988), a statistical multivariate analysis program that takes the idea of structured heterogeneity (Weinreich, Labov & Herzog, 1968) and quantifies it (Tagliamonte, 2006a), was used. This program allows for probabilistic predictions of the conditioning effects for both of these obligation markers. That is we can examine from a quantitative perspective the surrounding linguistic context to identify which variables condition each obligation marker (Bayley, 2002). This type of analysis allows for the measurement of various factors at one time and orders them in terms of the effect they have on the dependent variable thereby producing what is assumed to be a fine-grained representation of the system under examination and a basis with which to compare the conditioning effects of both variables. Analyzing language from this perspective also demonstrates how many of the semantic functions of these competing constructions are discreet and thus not obvious on the surface. This is in contrast to surface comparisons in which assumptions are made that membership in a general semantic domain (i.e. deontic modality) means that these forms fill the same functions.

In addition to multivariate analyses, the comparative method is also applied to further reveal the underlying grammar and, ultimately, the functional differences of these forms. In order to do this, similarities are determined through a variable rule analysis where the comparison of conditioning effects (factors) across time\textsuperscript{11} is considered (e.g. Poplack & Tagliamonte, 2001; Tagliamonte, 2002, Tagliamonte, Smith and Lawrence, 2005, Tagliamonte and Smith, 2006, Tagliamonte, 2006a, 2006b and Schwenter and Torres Caoullos, 2008) have applied the comparative method to compare conditioning effects across dialects, not time. Nevertheless, the same method can be used to compare dialects across time (e.g. Honea, 2012).

\textsuperscript{9} For a complete list of texts used from the internet archive in this study, see Appendix A.
\textsuperscript{10} See Appendix A for a complete list of the factors within each group.
\textsuperscript{11} Poplack & Tagliamonte (2001), Tagliamonte (2002), Tagliamonte, Smith and Lawrence (2005), Tagliamonte and Smith (2006), Tagliamonte (2006a, 2006b) and Schwenter and Torres Cacoullos (2008) have applied the comparative method to compare conditioning effects across dialects, not time. Nevertheless, the same method can be used to compare dialects across time (e.g. Honea, 2012)
amonte, 2002; Tagliamonte, Smith & Lawrence, 2005; Tagliamonte & Smith, 2006; Tagliamonte, 2006a, 2006b; Schwenter & Torres Cacoullos, 2008). An important element of the comparative sociolinguistic method is the idea of a conflict site (Poplack and Tagliamonte, 2001). This is defined as “a form or class of forms which differs functionally and/or structurally and/or quantitatively across the varieties in question” (Poplack and Meechan, 1998: 132). In other words, once the variable rule analysis has been performed and correspondences have been verified, the conditioning effects of each source are compared. If there are differences in the order of the factors within each significant factor group then this is considered a conflict site. This is particularly important for the present study since these conflict sites are indications of changes occurring in the system. These conflict sites may also help identify where on the cline of grammaticalization these constructions may be in each century (Poplack and Tagliamonte, 2001; Tagliamonte, 2002). Additionally, these conflict sites may pinpoint where in the grammar these changes are reflected.

3. Results and analysis

In order to trace the development of these markers diachronically, raw frequency counts of each of the forms were analyzed. This is due primarily to the dearth of examples of tener que in the earlier centuries. As can be seen in Table 1, the frequency of tener que increases steadily but negligibly until the 19th century and even then there are only 253 examples, or 26% of the total markers that are represented by tener que. Despite the inability to run multivariate analyses during the earlier centuries, the frequency data still reveal important patterns in the data that indicate that tener que appears to be grammaticalizing while haber de recedes.

Table 1
Absolute and relative frequency of both variants per century in the written corpora normalized per 5000 words

<table>
<thead>
<tr>
<th>Century (word count)</th>
<th>Tener que</th>
<th>Normalized per 5,000</th>
<th>Haber de</th>
<th>Normalized per 5,000</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>16th (~2,093,370)</td>
<td>16</td>
<td>.04</td>
<td>633</td>
<td>1.51</td>
<td>649</td>
</tr>
<tr>
<td>17th (~920,670)</td>
<td>38</td>
<td>.21</td>
<td>809</td>
<td>4.39</td>
<td>847</td>
</tr>
<tr>
<td>18th (~403,340)</td>
<td>39</td>
<td>.48</td>
<td>256</td>
<td>3.17</td>
<td>295</td>
</tr>
<tr>
<td>19th (~789,217)</td>
<td>253</td>
<td>1.60</td>
<td>687</td>
<td>4.35</td>
<td>940</td>
</tr>
<tr>
<td>20th (~3,501,511)</td>
<td>865</td>
<td>1.23</td>
<td>354</td>
<td>.51</td>
<td>1,219</td>
</tr>
<tr>
<td>Total N</td>
<td>1,211</td>
<td>2,739</td>
<td>1,211</td>
<td>3,950</td>
<td></td>
</tr>
</tbody>
</table>

3.1. Frequency Results

Recall that frequency plays an important role in the grammaticalization process. There are two types of frequency to consider when looking at a grammaticalizing construction: token and type frequency. Token frequency is the overall frequency of a construction in the data. Type frequency, on the other hand, refers to the variety of lexical elements that are used with a given construction. As is summarized in Table 1 the token frequencies of these constructions reveal a steady pattern. For example, tener que occurs .04 times for every 5,000 words in the 16th century.
By the 20th century, this number jumps to 1.23 times for every 5,000 words, more than 30 times more frequent in this century. The opposite occurs with *haber de* in the 16th century where it occurs 1.51 times per 5000 words, but decreases to .51 in the 20th century. Although this difference may be attributed to dialect, writing style and/or other social differences, these numbers are noticeably large enough to suggest that some change has taken place. This also parallels what is said in many articles regarding the use of these two obligation markers. For example, Traill (1980) and Cornillie, De Mulder, Van Hecke, Vermandere (2009) all point out that in modern Spanish, *tener que* is the marker of choice while *haber de* has essentially been restricted to formal registers or writing.

Based on this change in token frequency, we can assume that there are also changes in type frequency, since an increase in token frequency can often be the result of an increase in type frequency (Bybee, 2003a). To measure the changes in type frequency it is necessary to look at the distribution patterns of these constructions within each factor group. As these markers increase in frequency and grammaticalize, they will start to generalize and occur with more lexical items (Bybee, 2003). For example, in a study on deontic and epistemic modality in German, Heine (1995: 26) found that deontic readings were more associated with action verbs, interrogative sentences, first and second-person subjects, and past or present perfect tense. Given the small inventory of lexical items with which these deontic modals usually occur, their type frequency is relatively low. But as these modals start to increase in frequency they will start to generalize and be used in more contexts, namely those associated with epistemic readings. If a similar pattern is occurring in Mexican Spanish, we would expect to see an increase in frequency in the contexts mentioned above.

When looking at the distribution of the constructions across these factor groups we see a clear pattern, one that seems to parallel what we saw in Table 1 with the token, or overall, frequency of these constructions across time. If we compare the percentage of occurrence across centuries (Table 2) of *tener que* in each of the levels in every factor group we see an increase, with the exception of future tense, across the board. This expansion would suggest that as *tener que* has increased in overall frequency it has also generalized and begun to occur in more and more contexts that had been historically reserved for *haber de*. This generalization, or semantic bleaching, and movement into new contexts is a hallmark of grammaticalization. This trend in the data also supports what much of the literature on deontic modality suggests, that this system is undergoing renewal and that *haber de* is being pushed out or, at the very least, confined to specialized contexts. This is further evidenced by the increase in frequency of *haber de* in one level, future tense, which suggests that, as often happens with specialization, this form has decreased in frequency but has not yet been eliminated. This decrease in frequency is manifested through its use in limited contexts. We see similar results with these markers in Spanish in Blas Arroyo and Vellon Lahoz (2015), where they see a shift from contexts with future tense disfavoring the use of *haber de* in the 19th century to a favoring effect in the 20th century. Results from the multivariate analyses are likely to corroborate the tendencies found in type frequency.

One important comparison that should be made is a parallel between the frequency of the two lexical verbs *haber/tener* ‘to have, possess’ compared with the frequency of their respective constructions *haber de/tener que*. The lexical verb *haber*, which was a possessive marker historically, was supplanted by possessive marker *tener* and completely disappeared in these contexts by the 16th century (Garachana Camarero, 1997) whereas the possessive marker *tener* continues to be the primary marker of possession today. It is likely that this overall decline in *haber* as a
lexical verb has facilitated its demise as an obligation marker. \(^{12}\) While the connection is difficult to make in the data of the present study, the correlation is hard to deny.

### 3.2. Multivariate Analyses

Although the results from the raw frequency data above illustrate that the obligation system in Mexican Spanish has experienced a shift over the last few centuries, they do not give a detailed account regarding which linguistic factors have had the greatest effect on these changes, where in the grammar are these changes reflected, or what the difference in use is between these two forms. Multivariate analyses can help address these questions. Prior to discussing these results, it’s important to mention some of the analytical decisions that were made in order to successfully run the multivariate analyses.

In the both centuries several levels within the factor groups were collapsed for different reasons. With the factor group tense, due to the limited number of examples all verb forms were combined to form the group other besides present tense, past tense, or future (e.g. subjunctive, conditional, etc.). Similarly, in the 19\(^{th}\) century the level of future tense was also collapsed into the level titled other given the limited number of examples. In the factor group grammatical person, a similar decision was made. Based on their similarity of patterns of occurrence with these constructions and the tendency in the literature for both of 1\(^{st}\) and 2\(^{nd}\) person subjects to be associated with deonticity (Coates, 1983), the two levels were combined and titled as the group other in the table. Also within this factor group were examples of inanimate entities that were given animate characteristics. The patterning of this group aligned with the level 3\(^{rd}\) person animate and thus the two groups were collapsed into one. Finally, within the factor group that designates the type of verb, there were also several levels that were collapsed. Given the similarity in patterns of occurrence with both constructions and across centuries, all contexts with the verb hacer were collapsed with action verbs. Also, and this decision was based on the lack of examples and the lack of similarity with other (primary) levels within the group, verbs of perception, verbs of influence, and verbs coded as other were combined to form the level other.

A multivariate analysis was run for both the 19\(^{th}\) and 20\(^{th}\) centuries and the results of these analyses were put side by side so that a comparison between the two centuries could be made. Recall that if there is a change in the order of the constraints within the significant factor groups across time periods then this is an indication of diachronic change. As can be seen in Table 2, there are several factor groups that were significant in both centuries. Within these factor groups, we can see indications that tener que continues to move along the grammaticalization path as it essentially supplants haber de. Across centuries we see changes in the order of the constraints within three factor groups: tense, verb type, and grammatical person and animacy. The changes within these groups may be indicative of where in the grammar change is reflected.
Table 2
Multivariate analysis of 19th and 20th centuries and comparison of constraint hierarchies of tener que.

<table>
<thead>
<tr>
<th>19th Century data</th>
<th>20th Century data</th>
</tr>
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<tr>
<td>n=253, input=.23 Log Likelihood: -456.205</td>
<td>n=865, input=.75 Log Likelihood: -627.625</td>
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<tr>
<td>Chi²/cell: 1.0836</td>
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<table>
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<tr>
<th>Factor Groups</th>
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<th>% of tener que</th>
<th>N of tener que</th>
<th>Factor Groups</th>
<th>Weight</th>
<th>% of tener que</th>
<th>N of tener que</th>
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<td>preterite</td>
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<td>45</td>
<td>imperfect</td>
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<td>188</td>
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<tr>
<td>Imperfect</td>
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<tr>
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<td>87</td>
<td>future</td>
<td>.35</td>
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<td>Action</td>
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<tr>
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<td>.56</td>
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<td>141</td>
<td>Other</td>
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<td>75</td>
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<tr>
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<td>18</td>
<td>3rd person animate</td>
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<td>Preceding clitic</td>
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</tr>
<tr>
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<td>--</td>
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<td>251</td>
<td>Not present</td>
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<td>73</td>
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<td></td>
<td></td>
<td>Range</td>
<td>13</td>
<td></td>
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</tr>
</tbody>
</table>

*The brackets [ ] indicate that this factor was not statistically significant. Type of sentence is not included above but was chosen as nonsignificant in 20th century analysis.*

For example, we see the principle change in tense occurs within the group labeled other, which includes the future form in the 19th century and all other tenses not considered in their own category, between the two centuries. This may suggest that this area in the grammar is a primary source for the diminishing control of haber de in deontic contexts. Similarly, within the factor group verb type there is a change in the order of communication verbs and actions verbs, albeit a minimal change. Taking into consideration that Yllera (1980: 113) finds that historically, specifically the 14th century, the possession marker tener frequently occurred with the verb fablar ‘to speak’ and that Cornillie (2007) finds communication verbs commonly occur in deontic contexts it wouldn't be surprising that communication verbs are possibly one of the first areas in the grammar where tener que starts to gain ground as the obligation marker of choice.

Finally, within the factor group grammatical person and animacy, we also see a shift in the constraint hierarchy, specifically between first- and second-person (i.e. other) and third-person animate. As will be discussed in more detail below grammatical person and its connection to
epistemicity and deonticity is discussed at length in previous literature so it is not surprising that this is where these changes are occurring.

### 3.3. Tense

The tense of the obligation marker was the factor group with the highest magnitude of effect in both centuries. This is not unexpected given that previous literature (e.g. Sirbu-Dumitrescu, 1988; Heine, 1995; Silva-Corvalán, 1995) identifies tense as being associated with both deonticity and epistemicity. In regards to type frequency, as previously mentioned, we see that tener que increases in frequency in all verb tenses except future. We see a particularly sharp increase across centuries with both present tense and imperfect tense. The mere fact that tener que has generalized and is occurring more often in every tense is a clear indication that this construction is becoming the deontic modal of choice.

In Table 2 we see that in the 19th century all non-present tenses favor tener que. We see a similar result in Tagliamonte and D’Arcy (2007) who found that have to, which had similarly increased in frequency in Toronto English, was used categorically in all non-present contexts. In addition, Heine (1995) indicates that in German modals are more likely to express deonticity if they are in past or perfect tenses (p. 26). Parallel tendencies are found in studies conducted by Palmer (1990) and Tagliamonte and D’Arcy (2007) on English modality. The data above show a strong favoring effect with the preterit (.79) which corroborates Heine’s (1995) conclusion.

During the 20th century, with the exception of future tense we see a similar trend. This disfavoring effect of future could, in part, be due to future tense being associated with epistemicity. Bybee et al. (1994), among others, find that as obligation markers expand into new territories, they can often infer intention or future meaning prior to moving into contexts that express epistemicity. The results in Table 2 could then be an indication of tener que continuing to expand its territory and its association with deonticity. Similarly, these results could also illustrate that haber de has already grammaticalized and shifted into contexts that express epistemicity and has also begun to recede (due to increased use of tener que) and become relegated to only specific contexts, in this case, those that clearly express intention or future and possibly present tense.

In his study on German modals, Heine (1995) identifies several important criteria that help identify epistemic contexts. One of these criteria implies that the event cannot have taken place yet. This would implicate future tense in epistemic contexts. One question we may ask then is whether we saw a similar result in the 19th century but due to the lack of examples in future tense (n=15) it is impossible to separate that factor in the analysis. Nevertheless, of the 15 examples eleven (73%) of those occurred with tener que, which is contradictory to the analysis from the 20th century. It is possible then that as tener que has increased in frequency and become more associated with the expression of deontic modality, haber de has been relegated to a limited number of contexts and thus has become the marker of choice in contexts such as future tense or other contexts associated with epistemicity.

### 3.4. Type of verb

The type of verb that follows these constructions can play an important role as to which construction will be used. This factor group is a common conditioning factor in morpho-syntactic variation (e.g. Tagliamonte & Poplack, 1993; Silva-Corvalán, 1994; Casanova, 1999; Mayoral Hernández, 2007; Cornillie, 2007). The literature also shows that, depending on the type of verb
that follows the construction, these constructions can be associated with either obligation or epistemicity.

The results from the 19th century show that communication verbs favor the construction tener que (.61), as do action verbs to a lesser extent (.56). This favoring effect could be present because the form has recently entered the functional space of obligation and, as Yllera (1980) and Cornillie (2007) state, these markers are more likely to express deonticity when they occur with communication and action verbs. Although this could also suggest the retention of the older form (and function), possession. Therefore, there may be traces in certain areas of the grammar where older meanings have been retained. In this case, the retention could refer to a time when tener que, as a new marker of obligation, was limited to contexts in which both an obligation and a possession meaning could be gleaned thus limiting the lexical verb type with which it can appear. The idea that communication verbs and action verbs are part of the original source content is partially based on research conducted on the English obligation system and postulations that the construction have to as an obligation marker was often inferred in contexts such as I have a secret to tell you—I have to tell you a secret and that these contexts commonly contained action or communication verbs (Brinton,1991; van der Gaaf, 1931). This assumption also appears to support a similar finding in Spanish in which, historically, tener que (and the defunct tener de) tended to occur with the communication verb fablar ‘to talk’ before it acquired a meaning associated with obligation (Yllera, 1980). The retention of source semantic content is a common characteristic of a grammaticalized form.

Another factor in the group that could indicate further grammaticalization of these deontic modals is with stative verbs, which includes both the factors copular and psychological states and emotion verbs in both centuries. The results from the multivariate analysis show a strong disfavoring affect for the copular verbs in the 19th century and a strong disfavoring effect for all stative verbs in the 20th century. This might be the result of the construction haber de further grammaticalizing and moving into contexts that are more likely to be associated with epistemicity. Research on modals show a tendency for stative verbs to appear with epistemic modals (Coates, 1983; Pietrandrea, 2005). A similar tendency is echoed in studies such as Klein Andreu (1991), Bybee et al. (1994), and Diaz Campos (2011) where, in their identification of low focus clauses, they find that these clauses are more grammaticalized and are recognized through their association with stative verbs (among other contexts). All of these studies imply that contexts where stative verbs appear are associated with more grammaticalized forms.

In spite of the research that supports the above explanation, there is another possible reason for the strong disfavoring effect for stative verbs across centuries: frequency. We know that grammaticalization co-occurs with increased frequency but, outside of grammaticalization, high frequency forms can also resist change (Bybee & Hopper, 2001). Taking into consideration that copular verbs are typically the most frequent of verbs this disfavoring effect could reflect a resistance to change as opposed to an association with epistemicity (Viberg, 1993).

13 These results contradict the results found in the data from Spain, where Blas Arroyo and Vellón Lahoz (2015) find that speech verbs (i.e. communication verbs) are the verbs most associated with haber de. They suggest that speech verbs that occur with haber de may be examples of fossilized expressions related to letter writing (Blas Arroyo and Vellón Lahoz, 2015: 106). The fact that they exclusively examine letters, memoirs, and diaries may be why a similar result is not found in the Mexican data. In fact, there is an overwhelming tendency for verbs like decir ‘to say’ (84%) and hablar ‘to talk’ (100%) to occur with tener que. Again, this is likely attributed to the difference in genre considered between the two studies.

14 Thanks to an anonymous reviewer for making this point.
3.5. Grammatical person and animacy

Myriad research on modality in various languages has looked at the role grammatical person plays when expressing obligation. For example, Coates (1983), Bybee and Fleischman (1995) Heine (1995), and Pietrandrea (2005) find a pattern with modals and claim that they are more likely to be agent-oriented (i.e. deontic) when the subject is in first-person and more likely to be epistemic when it is in third-person. This would imply that, as these forms grammaticalize and move towards epistemicity, they are more likely to appear in contexts where the subject is in third-person. In regards to animacy, these same researchers find that in contexts with third-person subjects, epistemicity is more likely associated with inanimate subjects. This is similar to what is found in research on high- and low-focus clauses which correlates animacy with high focus clauses, which tend to be less grammaticalized than their inanimate, low-focus counterparts (Klein Andreu, 1991; Bybee et al., 1994; Diaz-Campos, 2011).

Taking this information into consideration, the results show that there is a strong disfavoring effect for tener que with 3rd person inanimate subjects in both centuries. This correlates with the same result found with the stative verbs, that the construction haber de is likely the verb that is chosen the most often in contexts associated with epistemicity. Conversely, with 3rd person animate subjects there is no tendency to favor one construction over the other in the 19th century. Recall that Coates (1983) concludes that first and second persons are more strongly associated with deonticity. We see this reflected in the data in the slight increase in 1st and 2nd (labeled as other) persons as evidenced by the increased favoring effect between the 19th and 20th centuries.

3.6. Sentence Polarity

Negation is often mentioned when examining modality. It has been found to occur in epistemic contexts in limited cases (Olbertz, 1998; Heine, 1995; Silva-Corvalán, 1995; Palmer, 1990; Coates, 1983). Coates (1983), for example, finds that negation in English is limited in terms of its occurrence with epistemic contexts. This limitation on negation in epistemic contexts is echoed in research conducted on Spanish modals by Solano-Araya (1982), although he is unclear about which epistemic modals can or cannot be negated (p. 17). Similarly, Olbertz goes so far as to say that ‘strong truth commitment (i.e. epistemicity) can be expressed in positive terms only’ (1998: 405). These studies hint that there may be barriers when it comes to epistemicity occurring with a negation marker. This however is in contrast to studies mentioned above that focus on low- and high-focus clauses (Klein Andreu, 1991; Bybee et al., 1994; Diaz-Campos, 2011) and associate the more grammaticalized low-focus clauses with negation, inanimate subjects or objects, and stative verbs.

In the multivariate analysis polarity was not chosen as significant in the 19th century. In the 20th century, however, the factor group is chosen as significant and negative sentences disfavor tener que (.38). This means that there is a tendency for haber de to occur with sentences with negation. On the surface, this appears to contrast with previous results that suggest that haber de is moving (or has already moved) into contexts associated with epistemicity. But, considering that negation is associated with low focus clauses, and not with epistemicity, we might say that this result could in fact corroborate previous results in that it indicates that haber de is in an intermediate stage of grammaticalization and has yet to shift completely to epistemicity, although this

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15 There are several studies on scopal relations between negation and modality in syntax that demonstrate that universally not all deontic modals interact with negation in the same way (e.g. Iatridou & Zeijlstra, 2010; 2013).
seems unlikely given its association in other factor groups with epistemicity.

An alternative explanation is that, as the territory of tener que expands, the territory of haber de disappears or specializes. Sometimes this specialization results in the loss of a form but in other cases we see the older form(s) relegated to limited contexts. It may be that negation is just that, a specialized area in the grammar where haber de is the preferred choice.

3.7. Preceding Clitic

Preceding clitic has not been considered in previous research on modality. Recall that Myhill (1988a: 231) looks at clitics and the semantic differences between preceding and attached clitics and concludes that the position of a clitic largely depends on the retention of the original meanings of these verbs. That is, as these constructions move away from their original meanings towards more abstract (i.e. subjective) meanings, clitic climbing is more likely to occur. Given that these obligation markers have grammaticalized and auxiliariability is in fact a part of this process, it is possible that the form that has moved furthest along the grammaticalization path (i.e. haber de) is likely to be favored when a preceding clitic is present. This assumes that the construction is being processed as a unit, so the clitic attaches (or not) to the infinitive based on the status of the obligation marker (as a semi-auxiliary) plus infinitive.\(^{16,17}\)

While there were not enough examples to consider preceding clitic as part of the analysis in the 19th century (there were only 2 examples of tener que with a preceding clitic), the results from the multivariate analysis of the 20th century confirm what was postulated in regards to the pattern identified above by Myhill (1988a) where he concludes that the presence of a preceding clitic suggests that the verb is likely being processed as an auxiliary, or they are closer to an abstract (i.e. subjective) meaning. Contexts without a preceding clitic favor tener que while those with strongly disfavor tener que (33). Nevertheless, the vast majority of the tokens (88%) for both constructions do not contain preceding clitics. These results suggest that these obligation markers are in an earlier phase of the grammaticalization process and thus are not processed as auxiliaries yet. This is supported by Bybee et al. (1994:241) who suggest that agent-oriented modality (i.e. obligation) is at the beginning stages of grammaticalization. This is the other likely reason why preceding clitics do not comprise the majority of the cases.

4. Conclusions

One of the primary goals of this study was to answer several central questions in regards to

\[\text{\footnotesize\[16\]}\text{ Several studies have examined the existence of modal auxiliaries in Spanish. For more discussion on this topic see Yllera (1980), Olbertz (1998), or Fernández (1999).}\]

\[\text{\footnotesize\[17\]}\text{ Many studies have emphasized the difference between modal auxiliaries and periphrastics, highlighting that modal auxiliaries are more susceptible to change (Coates, 1983; Westney, 1995). For example, Westney (1995) claims that modal auxiliaries are more likely to grammaticalize stating that the “periphrastic items tend to manifest epistemic senses only to a relatively restricted degree”(p. 31). In fact, there has been a tendency to separate true modal auxiliaries like ‘must’ and ‘can’ from quasi-modals like ‘have to’ and ‘be going to’ in order to compare the respective progression of these constructions. Consequently, criteria for determining the status of a modal verb as auxiliary or quasi-modal i.e. periphrastic have been established, most notably Palmer’s ‘modal criteria’ (Westney,1995, and references therein). If a verb does not meet these criteria then it is not a modal auxiliary but rather a periphrastic or lexical verb (Westney,1993:15). Considering that these criteria are language specific to English it is questionable whether the claim Westney (1995) makes is valid or not in Spanish. Criteria for determining modal auxiliaries in English have been dubbed NICE properties which define the modal auxiliaries: negation, inversion, code, and emphatic affirmation. For a more in depth discussion on English modal auxiliaries see Coates (1983), Palmer (1987), Westney (1995) or Krug (2000).}\]
the aforementioned markers of obligation such as whether these forms continue to undergo grammaticalization or not, what factors condition the use of these markers, and whether the path of change of these markers corroborates claims of universal paths of grammaticalization in modality.

The results reported above shed light on the path of grammaticalization of obligation markers in Spanish. Essentially, both of these forms appear to reflect a different stage of grammaticalization, which is illustrated through the distribution patterns. This paper has also provided a detailed account of the development of obligation in Mexican Spanish during the 19th and 20th centuries and has highlighted the differences in use between these two constructions. The results of this study not only illustrate that this system is in flux but it also contributes to the existing literature on the grammaticalization of modals in Spanish across dialects by showing that, through competition and renewal, tener que is becoming the deontic modal of choice and haber de is becoming relegated to specialized contexts as it is gradually replaced. The mention of the steady decline of haber de is echoed in a variety of studies (e.g. Traill, 1980; Martínez Díaz, 2003; Cornillie et al, 2009; Blas Arroyo and Vellón Lahoz, 2015).

Based on a combination of the frequency data, as well as results from the multivariate analysis, it is suggested that haber de has ceased to grammaticalize, as evidenced by the decrease in frequency, and its association with specialized contexts. A construction may occur in contexts that could implicate possible movement into new contexts, but without an increase in frequency of use, this movement is unlikely. Recall that grammaticalization typically only occurs when it is accompanied by an increase in frequency of the construction in question. Despite this, there are also indications that haber de may have already grammaticalized and moved into contexts associated with intention/futurity and epistemic contexts prior to the 19th century.

This is primarily evidenced by tendencies in the 20th century data that indicate that it is precisely in contexts associated with futurity/intention and epistemicity where this construction continues to be used. Given that tener que has yet to move into these contexts, per the multivariate analyses, this is an ideal area in the grammar for haber de to specialize. For example, there is strong favoring effect by contexts in future tense in the 20th century and an increase in occurrences in these contexts by haber de across the centuries thus suggesting that this is the construction used when attempting to infer futurity/intention. This is further supported by results found in Blas Arroyo and Vellón Lahoz (2015) who also uncovered a favoring effect when future is expressed for haber de in the 20th century.

Similarly, we see a strong disfavoring effect for tener que in contexts with stative verbs, which as Coates (1983), Piettrandrea (2005), and Cornillie suggest, typically occur with epistemicity. We see an analogous disfavoring effect with 3rd person inanimate subjects, although to a lesser degree. Recall that Coates (1983), Bybee and Fleischmann (1995), and Peatrandrea (2005) find that epistemicity is more commonly expressed with 3rd person inanimate subjects. Taking into account that both futurity and epistemicity are further along the grammaticalization path than deonticity, we would expect to find these contexts to be the area in grammar where lingering instances of haber de occur, which seems to be the case in the current data. A comparable trend is found in Blas Arroyo and Vellón Lahoz (2015) in which they find haber de confined to contexts containing stative verbs and 3rd person inanimate subjects. This only strengthens the argument that this form is becoming specialized to contexts typically associated with epistemicity. There are corresponding results in English on the deontic modal must as well. For example, in their study of the deontic system in Toronto English, Tagliamonte and D’Arcy (2007) found that must had declined dramatically and has become relegated to areas in the grammar primarily associ-
Conversely, *tener que*, through generalization and increased frequency, specifically in contexts identified in the literature as associated with deonticity (i.e. 1st and 2nd person subjects, action and communication verbs), is clearly undergoing a process of grammaticalization. This is further demonstrated in contexts that, although still favored by *haber de*, include an increasing number of occurrences of *tener que* (e.g. see type frequency increase of stative verbs, and 3rd person inanimate subjects). This would suggest that a future study that examines this system in the 21st century may see this construction further moving into contexts reserved for *haber de* as well. What is important though, is that the increasing presence of *tener que* in all contexts suggest further movement along this grammaticalization path. Nevertheless, this form is still not the favored construction in contexts associated with contexts in future tense (intention) or epistemicity by the 20th century thus indicating that *haber de* has moved further along the grammaticalization path.

Aside from the frequency data and what the patterns of distribution reveal in regards to the use of these constructions, another important pattern is salient in the multivariate analyses and seems to parallel results found in Blas Arroyo and Vellón Lahoz (2015). It is in relation to the conditioning factors and the continuity of (non)significant factor groups across centuries. That is, the factor groups that condition these constructions (i.e. tense, type of verb, grammatical person and animacy, and preceding clitic) was relatively constant in both centuries. Even the constraint rankings, with the exception of a couple levels, remained stable across centuries. Hopper and Traugott (1993: 95) suggest that the retention of older meanings “may be reflected in constraints on its grammatical distribution” and as Blas Arroyo and Vellón Lahoz (2015) accurately point out, this may explain why the (non)significant factors don’t alter much across both centuries nor across dialects.

Similar to work done on obligation in English (e.g. Tagliamonte & Smith 2006; Tagliamonte & D’Arcy, 2007), this study offers evidence supporting the claims of a universal path of grammaticalization, specifically the path proposed by linguists such as Bybee et al. (1994), Hopper and Traugott (2003) among others that suggests these forms move from expressing to possession, to expressing obligation, which we can postulate is partially facilitated through action and communication verbs, then intention and future and finally expressing epistemicity. The data substantiates assertions that obligation systems undergo longitudinal renewal and that new markers come into the system because the older forms are no longer expressive enough (Tagliamonte & D’Arcy, 2007). This cross-linguistic pattern could be an indication of changes that are likely occurring outside of the system.

This suggestion is based primarily on results from qualitative studies on obligation systems in other languages. For example, Smith (2003: 263) claims in her explanation on the gradual disappearance of English *must* that “because it is prototypically subjective and insistent, sometimes authoritarian-sounding, root MUST is likely to be increasingly avoided in a culture where overt markers of power or hierarchy are much less in favour...” Traugott (1989) tries to connect changes in deontic modals to the social motivations behind obligation. She claims that any obligation that is based in morals, reason, law or divine decrees is enforced by some outside force and therefore cannot be considered subjective (1989: 39), which is contrary to what Smith (2003) is claiming. If we assume that obligation based in morals, reason etc. are more authoritarian, due to the outside force, then we may be able to relate authoritarian with less grammaticalized obligation markers. If that is indeed the case, we can deduce that the movement from deonticity to subjective, epistemic meanings is also paralleled by a social shift from more authoritarian to
less authoritarian (or what Myhill calls more interactive obligation, 1995). Nevertheless, a more inclusive study would be useful to corroborate this.

Through the adoption of comparative analyses during the 19th and 20th centuries, this study uncovered patterns of change in the system that illustrated the movement of constructions into and out of the semantic space of obligation. We observed where in the grammar these specific changes are reflected through the use of the comparative method. It illustrates how both a diachronic and synchronic variationist examination of the obligation system can expose the path of obligation markers within Spanish, and perhaps across languages.
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## Appendix A
List of texts used in written corpora not included in CORDE or CREA

<table>
<thead>
<tr>
<th>Work</th>
<th>Author</th>
<th>Word Count</th>
<th>Century</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historia verdadera de la conquista de la Nueva España</td>
<td>Díaz del Castillo, Bernal</td>
<td>138,000</td>
<td>16</td>
</tr>
<tr>
<td>Instrucción civil y militar a Francisco Cortés</td>
<td>Cortez, Hernán</td>
<td>2265</td>
<td>16</td>
</tr>
<tr>
<td>Cartas de relaciones</td>
<td>Hernán Cortez</td>
<td>246,000</td>
<td>16</td>
</tr>
<tr>
<td>Crónica de la Nueva España</td>
<td>Cervantes de Salazar, Francisco</td>
<td>400,000</td>
<td>16</td>
</tr>
<tr>
<td>La Linterna Mágica</td>
<td>José Tomás de Cuéllar</td>
<td>35,900</td>
<td>19</td>
</tr>
<tr>
<td>Tomóchic</td>
<td>Frías Heriberto</td>
<td>68,300</td>
<td>19</td>
</tr>
</tbody>
</table>
Appendix B
Complete List of Factor Groups and Factors

<table>
<thead>
<tr>
<th>Verb Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action (e.g. buscar ‘look for’, caminar ‘walk’)</td>
</tr>
<tr>
<td>Psychological/emotional (e.g. sorprender ‘surprise’, pensar ‘think’, entender ‘understand’)</td>
</tr>
<tr>
<td>Communication (hablar ‘talk’, gritar ‘shout’, aclarar ‘to clarify’)</td>
</tr>
<tr>
<td>Copular (ser ‘be’, estar ‘be’ tener cuidado ‘be careful’)</td>
</tr>
<tr>
<td>The verb hacer</td>
</tr>
<tr>
<td>Other (morir ‘die’, vivir ‘live’)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Animacy/grammatical person</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st person animate (e.g. tenemos que ponernos al día. ‘we have get updated’(TQ))</td>
</tr>
<tr>
<td>2nd person animate (e.g. has de morir en Guayaquil ‘you must die in Guayaquil’ (HD))</td>
</tr>
<tr>
<td>3rd person animate (e.g. ya ves que mi mamá siempre tiene que ganar. ‘You see that my mom always has to win’(TQ))</td>
</tr>
<tr>
<td>3rd person inanimate (mi angustia hubo de alcanzar su punto más alto ‘my anguish must have reached its maximum point’ (HD))</td>
</tr>
<tr>
<td>other (entities that have been given animate characteristics for example: Puebla tendría que darle al Presidente la recepción ‘Puebla (the city) must give the President the reception (TQ); Mastretta, CREA)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interrogative (e.g. ¿Tuviste que pasar por alli, por Colima? ‘You had to pass through Colima?’(TQ))</td>
</tr>
<tr>
<td>Declarative (Hay que dar el apoyo a él. ‘We have to give our support to him’(HQ))</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative (Yo no tenía que pasar la noche fuera de mi casa. ‘I didn’t have to spend the night away from my house’TQ))</td>
</tr>
<tr>
<td>Positive (Teníamos que ir a una plática. ‘We had to go to the talk’TQ))</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present indicative: (tiene que aceptar ‘he has to accept’ (TQ))</td>
</tr>
<tr>
<td>Imperfect indicative: (no había qué irnos a veces ‘we didn’t have to go sometimes’(HQ))</td>
</tr>
<tr>
<td>Future indicative: (tendrás que arrepentirte ‘you will be sorry’, Voy a tener que luchar ‘I am going to have to fight’)</td>
</tr>
<tr>
<td>Preterit indicative: (hube de retroceder ‘I had to step back’, tuvo que esperar ‘he had to wait’)</td>
</tr>
<tr>
<td>Other: all other forms (conditional, subjunctive, etc.)</td>
</tr>
</tbody>
</table>