Naturalistic Double Modals in North America

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Abstract

Double modals are a well-known non-standard feature of some regional varieties of English in North America, but due to their rareness in spoken language, questions remain as to the inventory of possible combinatorial types and the geographic extent of their use in contemporary naturalistic speech. This study investigates double modals in the *Corpus of North American Spoken English* (*CoNASE*), a 1.2-billion-word corpus of time-stamped and geolocated automatic speech recognition (ASR) YouTube transcripts from the United States and Canada. Double modal sequences were identified in the corpus using regular expressions, then verified via manual examination of videos. The study represents the first large-scale, continent-wide analysis of double modals based entirely on recent naturalistic production data, rather than data such as elicited responses or sentence acceptability judgments, and it demonstrates a larger double modal inventory and a broader geographic range of use for the feature than has previously been documented, including in Canada.

Keywords

Modals, corpus linguistics, spoken language, dialects, YouTube

Author biography

Steven Coats is a lecturer in English at the University of Oulu, Finland, with interests in corpus linguistics, dialectology, and computer-mediated communication. He recently created the 1.25-billion-word *Corpus of North American Spoken English* and is a member of the steering committee of the CMC-Corpora Conference Series, a conference for the development, analysis, and processing of corpora of computer-mediated communication and social media for research in the humanities.

1. Introduction

One of the non-standard features most strongly associated with Southern English in the United States is the use of double modals, or more than one modal auxiliary in a verbal phrase.[1] The archetypal Southern double modal, *might could*, is often used in polite speech with an epistemic meaning, expressing a degree of uncertainty about a possible outcome (Schneider 2003), but other combinatorial types are common, typically with *might* or *may* as the first modal and *can*, *could*, *should*, *will*, or *would* as the second (Bernstein 2003). In North America, double modals have occasionally been documented outside the US South, for example, in the Middle Atlantic states or the Midwest, but the feature is difficult to study in naturalistic speech due to its rareness – as noted by Fennell and Butters, double modals "occur with very low frequency in real-life utterances, and they are quite difficult to elicit in sufficient quantities and in a reliable fashion" (1996, 265). As well as being infrequent, double modals may be subject to contextual and pragmatic constraints, at least in Southern US English: they are "restricted to informal face-to-face

interactions" (Schneider 2004, 285), and mostly occur in "situations of caution and sensitivity" (Montgomery 1998, 96).

In addition to being an emblematic regional syntactic feature, double modals are interesting from the perspective of language history: they are attested in varieties of English from Northern England, Scotland, and Northern Ireland (Brown 1991, Beal 2004, Corrigan 2010, Bour 2014), among other regional dialects, implying the feature in North America is an inheritance of the speech of settlers from the British Isles. From a theoretical perspective, double modals are of interest for what they tell us about possible configurations and constituent ordering in the English verbal phrase, for example, in questions or negative statements. Because double modals are rare, studies investigating the sociolinguistic parameters of their use (e.g. Feagin 1979, Di Paolo 1986, Hasty 2011, Williamson 2018) or their syntactic properties (Boertien 1986; Di Paolo 1986, 1989; Batistella 1995; Nagle 2003; Hasty 2012a, 2012b, 2014) have often relied on non-naturalistic data such as elicited utterances or acceptability judgement surveys collected from localities in US Southern states (for example, in Alabama, Kentucky, North Carolina, Tennessee, or Texas: Butters 1973; Di Paolo 1986, 1989; Hasty 2011, 2012a, 2012b, 2014; Williamson 2018). The geographic extent of the feature's use in North America, however, is not entirely clear, and the non-congruence in the attested double modal inventories for the Southern US and the British Isles has led to various interpretations of the theory of trans-Atlantic transmission, with some proposing that American forms may have, at least in part, developed independently since the 19th century (for a discussion, see Mishoe and Montgomery 1994; Fennell and Butters 1996; Montgomery 1989; Montgomery and Nagle 1994; Schneider 2003; Schneider 2004). Like many Southern US English features, double modals have been attested in African-American speech in non-Southern cities (Labov 1972), but their overall use in North American regions outside the South has not been extensively investigated.

Important sources of data for double modal occurrence in the US South are two regional linguistic atlases based on interviews conducted between 1933 and 1983: the *Linguistic Atlas of the Middle and South Atlantic States* (*LAMSAS*, McDavid and O'Cain 1980; Kretzschmar et al. 1994) and the *Linguistic Atlas of the Gulf States* (*LAGS*, Pederson et al. 1986–1992).[2] Data from *LAGS* and *LAMSAS*, as well as data from individual studies conducted with various methodologies in the US and elsewhere, has been compiled into the *Multiple Modal Database* (*Multimo*, Reed and Montgomery 2016).[3] A handful of double modals have been attested in data from the Midwestern, North Central, and Rocky Mountain states, but as far as is known, the feature has not been considered (or attested) in California, the Pacific Northwest, or Canada.

In this study, the geographic distribution of double modals is presented on the basis of data from the *Corpus of North American Spoken English* (*CoNASE*, Coats in review), a 1.2-billion-word corpus of automatic speech recognition (ASR) transcripts from YouTube videos of local government channels in the United States in Canada.[4] The paper is organized as follows: In Section 2, a summary of some of the research literature on double modals is presented. In Section 3, the corpus used in the study (*CoNASE*) is briefly introduced, the methods used to identify double modal sequences are explained, and the procedures employed for the manual verification of double modals described. Section 4 presents the results for each authentic double modal type as a heat map of the number of occurrences at state/province level and summarizes the inventory of double modal forms in North America in comparison to previous research. Syntactic variants used in questions and negations from the *CoNASE* data are also briefly considered. In Section 5, the discussion of the findings focuses on three main points. First, although double modals are concentrated in the US South, they have a broad geographic distribution: they can be

heard in speech from across the North American continent, from Florida to Alaska and from California to Ontario. The discussion proposes that double modals are not restricted solely to specific regional dialects, but are rather an (infrequently used) resource available to most speakers of North American English for the careful expression of modality. Second, the inventory of North American double modals is briefly discussed in comparison to findings from previous studies: more combinatorial two-tier types are attested in this data than in previous studies. Third, the semantic status and the geographic spread of the more common double modals in North America, those beginning with *might* or *may*, are discussed in light of recent analyses of the semantics of the modal auxiliaries and the pragmatics of careful face-to-face encounters in the context of a possible "epistemic expansion" (Abraham 2002).

Section 6 presents several important caveats pertaining to the data, methods, and tentative interpretations, then outlines the possibilities for future work with the data or for data collected using similar methods. These pertain to corpus creation procedures, the nature of the speech acts recorded in the video transcripts, ASR transcript accuracy, the manual annotation method, and the frequency results for the different multiple modal types.

2. Previous work

Double modals have been known to be a feature of the spoken English of the American South since the 19th century.[5] In North America, they were attested during data collection for *LAMSAS* in the middle of the 20th century, and since the 1970s, they have been the focus of sustained scholarly attention, focused mainly on the determination of which double modals are most frequently used and establishing their geographic extent, as well as investigating their syntax and semantics and the sociolinguistic parameters of their use, mainly in the South.

Atwood (1953) briefly mentions *might could* in data collected for *LAMSAS* from the Carolinas and Viginia, extending as far north as central Pennsylvania, noting that "cultured informants as a rule avoid this construction" (35). Butters (1973) administered a survey to undergraduate students in North Carolina on their familiarity with and use of *might could, might should, might shouldn't, might ought to,* and *might would*. It was found that students hailing from Southern states were familiar with and/or used double modals, in contrast to students from other parts of the US. Coleman (1975) studied double modal usage in North Carolina, mainly by means of a questionnaire. Double modals beginning with *might* and *may* were reported to be widely used. Feagin (1979), in a detailed study of the sociolinguistics of a speech community in Alabama, documented naturalistic use of *might could*, *might can, may can,* and *used to could*. She found that double modals are used by all social classes.

Several studies have focused on the syntax of double modals. Butters (1973) agreed with an observation by Labov (1972) that *might* in *might could* could be analyzed as an adverb. Pampell (1975) established an approach that would be used by others in later studies by eliciting acceptability ratings for double modals in different syntactic configurations: in tag questions (*you might could, couldn't you?)*, negations, pronunciations with different stress patterns, questions with subject-auxiliary inversion or Wh-words, so-pronominalizations (*you might could help, and so might could she)*, with floating quantifiers (*you might all could help*), and with niching (*you might, it seems to me, could help*). Based on data from six Texas informants, Pampell showed that ratings of double modal constructions are highly variable.

Boertien (1986) and DiPaolo (1986, 1989) also used acceptability ratings from Texas informants. In Boertien (1986), five informants from Texas were asked to rate double modal sentences with negation, contraction, noun phrase-auxiliary inversion, tag question formation, quantifier floating, and niching. The results were used to suggest two syntactic analyses for double modal constructions: one in which the construction is a single constituent, and one in which each modal is a full verb. In Di Paolo (1986, 1989), 62 informants from two Texas counties rated the acceptability of different questions, negative sentences, and past tense constructions containing double modals. In addition, participants, who were stratified according to sex, age, and location (East Texas or West Texas), were asked to assign epistemic, dynamic, and deontic meanings (i.e., pertaining to possibility, ability, or permission/obligation) to example sentences containing double modals. The results of the study showed that word order variation is more acceptable for *might could*, compared to other double modals such as *might should* or *might would*. For the most part, differences in double modal acceptability ratings did not differ significantly among different age groups, between the two locations, or for the sexes. In addition, Di Paolo found that the dynamic meaning of *might could* is preferred over deontic and epistemic meanings. The results were interpreted as evidence for double modals being used as idioms or multi-word single lexical items, an interpretation challenged by Hasty (2012a, 2012b) on the basis of the apparent compositional independence of individual modal verbs in double modal constructions. In addition to the acceptability judgement survey results, Di Paolo listed 25 double modal combinations in naturalistic use in Texas that had been reported to her by volunteers.[6]

Mishoe and Montgomery's analysis (1994) was based in part on a collection of double modal occurrences overheard or reported to the study's authors from the Carolinas over the course of ten years. They proposed that the lack of certain double modal combinations in the historical record and in data from studies of the feature may not be conclusive, but rather reflects the fact that the feature is restricted to particular pragmatic contexts, as well as being quite rare: "It is far from clear what the limits to the combinability of modals are" (p. 11). Close (2004), in a study of auxiliaries and auxiliary contraction in non-standard Englishes, elicited acceptability judgments of double modals from 14 informants in Arkansas and additional informants in Tennessee, using a written survey. She proposed that in double modal constructions, *might* is an adverb in Arkansas, a non-finite modal verb in Tennessee, and a true modal verb in Scotland. Schneider, discussing results from Montgomery (1989), Montgomery and Nagle (1994), Mishoe and Montgomery (1994), and Nagle (2003), among others, noted that double modal inventories in the American South are different from those of Northern England, Scotland, or the Caribbean, and proposed that although the feature may represent an inheritance of settler English varieties, it has developed independently in the American South, for the most part since the 19th century (2004, 287).

Hasty (2012a, 2012b) considered the syntax and sociolinguistics of double modals using data from acceptability judgements elicited from informants in Eastern Tennessee and utterances from the Verilogue Corpus, an 80-million-word corpus of transcribed doctor-patient interactions in the United States containing a total of 95 double modals (ten distinct types), 80% of which occurred in Southern or Midlands states. Hasty et al. (2012) noted that the exceeding rareness of double modals in spontaneous, naturalistic speech has created difficulties: the "lack of naturally occurring usage data has left several basic sociolinguistic questions unanswered regarding the regions of the South in which the double modal construction is common" (41). Williamson (2018) conducted a survey of acceptability judgments for inversion of double modals with speakers from Kentucky, Tennessee, and Texas. While joint inversion

(*might could we…?*) was found to be the preferred pattern, second modal inversion (*could you might…?*) was judged to be acceptable by Tennessee respondents.

The feature is attested in data from the two major North American linguistic atlas works that cover the American South, *LAGS* and *LAMSAS*, as responses to an elicitation question designed to capture *might could*, but also as responses to direct questions about the informant's typical speech and to questions about the typical speech of persons in the locality in which the interview was conducted, as well as, in some cases, spontaneous production of a double modal in conversation (Montgomery 1998; Bailey and Tillery 1999; Tillery 2000).[7] The worksheets used for *LAMSAS* and *LAGS* interviews included an item designed to elicit or suggest *might could*: "Suggesting possibility of being able to do something, you say, 'I'm not sure, but I ___.' Again at end you might fish around and even suggest *might could* if you have to" (McDavid 1981, 82).

Aggregated responses from *LAMSAS* and *LAGS* record *might could* as the most frequent double modal type by far (Montgomery 1998), as well as other combinations of modals that mainly express a primarily epistemic meaning, *may can* or *might would*, but very few combinations are attested with a first-tier modal other than *may* or *might*.[8] Bailey and Tillery point out that for *LAGS*, many occurrences of *might could* did not occur spontaneously as a response to the worksheet item, but were responses to the "fishing around" follow-up question. Here, the practices of fieldworkers varied: some followed up the worksheet item with a direct question about the use of *might could*, while others did not (1999, 395).[9] Noting the heterogeneity of methods used to elicit double modals in *LAGS* data as well as the less-than-natural pragmatic context of the interviews, Montgomery remarks that "it is doubtful that atlas data can more than give us an outline of the prevalence and distribution of MMs" (1998, 103).

The *Multimo* website (Reed and Montgomery 2016) presents in tabular form instances of double or multiple modal usage summarized from various research studies, including the ones noted above, *LAGS* and *LAMSAS*, the *Corpus of Contemporary American English* (Davies 2008–), and other sources such as unpublished master's theses and the authors' own data. To the extent that the information is available from the aggregated sources, individual records are annotated for location as well as for speaker gender, race/ethnicity, age, level of education, home community, year, relation to addressee, medium, sentence structure, and status (whether naturalistic or elicited). For those instances associated with a location, the database includes usages from 34 US states, as well as Scotland, England, Jamaica, the Bahamas, and Belize. The states in the database with the largest number of recorded usages are from the US South: South Carolina has 376, Texas, 285, Georgia 206, North Carolina 183, Alabama 135, Virginia 119, Tennessee 118, Mississippi 71, Louisiana 68, Florida 63, and Arkansas 42 instances. Pennsylvania, the non-Southern state with the highest number of recorded double or multiple modals, has 35 records in the database. No Canadian usages are recorded.

Zullo et al. (2021) considered the status of multiple modals in different varieties and creoles of English, primarily in varieties bordering the Atlantic in the United States, Great Britain, and the Caribbean. Based on 549 instances of multiple modal attestations from *Multimo* and other sources, and drawing upon typological distinctions between 26 English and creole varieties summarized in the *eWave* resource (Kortmann and Lunkenheimer 2013), they assigned semantic values to each modal, then assessed the 26 varieties in terms of their inventories of attested double modal forms. They found that in Southern US varieties, multiple modal inventories include forms in which the first modal tier expresses epistemic

possibility (e.g., *might could*), whereas in Caribbean Englishes and creoles, multiple modals with first-tier deonticity are also attested (e.g., *must can* and creole equivalents).

While existing research on double modals has been extensive, it has mostly been based on elicited data or acceptability judgments obtained from small numbers of informants in specific localities in the American South, rather than on naturalistically-produced usages sampled in a broad geographic context. In the next section, the methods used to identify naturalistic double modals in video data from across North America are detailed.

3. **Data and methods**

YouTube and other crowdsourced video platforms provide access to billions of hours of spoken language, some of which may be of interest for the comparative study of varieties and dialects of English (Schneider 2016). The data used in this study, from the *Corpus of North American Spoken English* (*CoNASE*, Coats 2019; Coats, in review), was created from 301,847 ASR transcripts for 154,041 hours of video from 2,572 YouTube channels in the United States and Canada, totaling 1,252,066,371 words. The channels sampled in the corpus are associated with local government entities such as town, city, or county boards and councils, school and utility districts, regional authorities such as provincial or territorial governments, or other governmental organizations. The time-stamped video transcripts, which have been assigned exact latitude-longitude coordinates using a geocoding script, are primarily of recordings of public meetings, although other genres are also present, including interviews, vlog-style commentaries, or live commentaries on school sporting events. The recordings and transcripts used to create the corpus are relatively recent. For those videos represented in the corpus that contain a year in their title, (e.g., "Council Meeting 2-5-2019"), the largest number are from 2019, followed by 2018, 2017, and 2016. The corpus thus represents the relatively recent speech situation in North America. Because local government meetings in North America are often organized in the same way and deal with similar topical content, most of the transcripts in the corpus are comparable in terms of pragmatic styles and discourse content. In addition, it is likely that most of the speakers in the transcripts are residents of the localities their YouTube channels represent (see Coats 2020 for further details).

3.1 Regular expressions

In a first step, regular expressions were used to find sequences of two modal verbs in the corpus. Then, the videos were inspected at the corresponding times to verify the double modals, which were annotated as authentic or as false positives of various types.

The starting point was the "core modals" (Facchinetti et al. 2003, vi) *may*, *might*, *can*, *could, shall, should, will, would,* and *must*. To these, *ought to*, *oughta, used to*, and the truncated modal form *'ll* were added. All possible two-tier combinations were generated from these 13 types, excluding repetitions (e.g., *might can*, *might could*, *might ought to*, etc., but not *might might*). Each of these 156 sequences was then included in a regular expression designed to capture not only the modals in sequence, but also perfective constructions containing *have/'ve* such as *might have can* or *might've can* and negations such as *might not can, might can't, mightn't have could*, and others. In order to assess the extent to which second modal

inversion may occur in question forms, the regular expressions also captured sequences with an intervening personal pronoun such as *could I might* or *oughtn't we've should*.[10] Finally, a less complex regular expression was used to check for sequences of three modals. As relatively few three-modal sequences were found (55), and almost all were deemed to be false positives during the manual annotation step (see below), they are not further considered.

In total, 24,485 double modal sequences were found in the corpus, corresponding to 121 different two-tier sequences (2,102 unique sequences if all unique permutations of perfect auxiliaries, negative forms, and pronouns are considered). Many of these hits were false positives – they did not represent true double modals, but rather various types of false positives. In order to assess the extent of true double modals in the search hits, a table was generated in which each double modal was assigned to a row with the URL of the corresponding video at a time three seconds before the double modal utterance. This table (Figure 1) was then used to manually check a subset of the 24,485 hits. The columns of the table show the id of the match, the province/territory name of the channel for the video in which the match was found, the name of the channel from which the transcript was retrieved, the two-modal sequence, the exact sequence (including negators, auxiliaries, and pronouns), the URL of the corresponding video, and two columns for annotation. In the first annotation column, codes were entered to identify the usage as authentic or as a false positive of different types (see below). The second annotation column was used to enter additional notes that may be relevant in the context of future analyses – for example, the correct transcription, if the ASR transcript was incorrect.

10216	California	City of Palm Springs	would might	would might	https://youtu.be/lWW1l8BO8zE?t=4382		
10217	California	City of Palm Springs	would might	would might	https://youtu.be/U07yRIEoGZE?t=4241	fp o2	3-speaker overlap
10218	California	City of Tehachapi	would might	would might have	https://youtu.be/DPS2JiLJZiA?t=4884	fp a1 u	u
10219	California	City of Villa Park	would might	would might	https://youtu.be/HbmSChC7jsw?t=6779	t	"that would might expedite the process"
10220	California	City of Yuba City	would might	wouldn 't might	https://youtu.be/PaieMjWTf_8?t=9438		
10221	California	CityOfEastvale	would might	would might	https://youtu.be/w7aP0IYcohY?t=2958	fp a2 sr d	"I would, I'd ask for a motion"
10222	California	CityOfEastvale	would might	would might	https://youtu.be/FeNSuqU9GOk?t=8827	sr p	
10223	California	CityOfEastvale	would might	would might	https://youtu.be/PQQqIqwAqIw?t=5029	sr p t *	
10224	California	County Of Del Norte	would might	would might	https://youtu.be/5nuwVzXLOHE?t=3924		

Figure 1: Excerpt from table used to annotate double modals

For this study, an effort was made to inspect and annotate approximately 10% of the search hits in the corpus and at least 10% of the most frequent combinatorial types. Types known to be established in use (such as *might could*) were more extensively annotated. Overall, 3,370 of the search hits were manually annotated (13.7% of the total number of hits in the corpus). Of these, 1,035 were annotated as "true" double modals.

3.2 Annotation criteria

The false positives returned by the regular expression searches fall into three basic categories: transcript errors, in which the ASR algorithm has assigned an incorrect lexical item to the speech signal, passages in

which two modal verbs in sequence are correctly transcribed, but are not part of the same verbal phrase (or are uttered by different speakers), and corrections ("self-repairs": Schegloff, Sacks, and Jefferson 1977), in which a speaker begins with one modal, then interrupts their speech and corrects to a different modal. Based on the fact that speech errors that result in corrections are typically accompanied by disfluencies in word timing and prosody (Levelt 1983; Postma 2000; Lickley 2015), instances were judged to be true double modals (and assigned the code *t*) if there were no disfluencies and the speech was semantically and logically coherent and consistent. Table 1 shows the codes used for annotation, descriptions, and examples from the ASR transcripts, along with the correct corresponding manual transcription (if applicable).

Table 1: Annotation codes used to classify search hits

Annotation code	Description	Examples (correct transcription in parentheses)
fp hn ("false positive homonym")	Transcript is correct, but item is not a modal verb	"The trash **can should** be placed on the street"
fp hp ("false positive homophone")	Transcript is incorrect: the item is a homophone of a modal verb	"If we **can will** do it" (if we can, we'll do it)
fp o1 ("false positive overlap type 1")	Transcript is correct, but the sequence of two modals overlaps a phrase/clause boundary	"if I **might could** I ask a question" ("if I might, could I ask a question")
fp o2 ("false positive overlap type 2")	Transcript is correct, but the sequence is from two turns by different speakers.	"you **may** have **can** I ask" ("…you may have." "Can I ask…")
sr d ("self-repair disfluency")	Transcript is correct, but a speaker begins with one modal auxiliary (or a word segment that is homophonous with a modal auxiliary), then corrects to a different modal auxiliary (or restarts the mispronounced reparandum), accompanied by a noticeable disfluency such as a change in rhythm, pitch, stress, or other prosodic qualities.	"you **will could** have" ("you will- could have") "how it **might can** conform with" ("how it might con- conform with")
sr p ("self-repair pause")	As above, but with a perceptible pause between the reparandum and the correction	"we **could would** promise" ("we could… would promise")
fp a1, fp a2, fp ab ("false positive ASR 1st tier, 2nd tier, both tiers")	ASR error in the first tier, the second tier, or both tiers	"you know **may** they **can** determine" ("you know, um, they can determine") "**will shall**" ("will show") "**can used to**" ("continues to")
fp u ("false positive audio")	Due to poor audio quality, it could not be determined what was uttered.	
fp i ("false positive unavailable")	Transcript did not correspond to the video (for unknown reasons) or video was no longer available (for example, because it was removed by the uploading account, made private, or deleted by YouTube)	
*	Borderline case as judged by annotator	

The proportion of search hits judged to be authentic double modals varies according to the two-tier type: For example, 72% of *might could* instances and 63% of *might can* instances were judged to be authentic, but only 36% of *would may* and 12% of *will could* instances. Overall, 30% of manually annotated types were judged to be true double modals (or borderline true cases), 27% ASR errors, 33% self-repairs,

and 17% clause/phrase or speaker overlaps.[11] Few instances were assigned the codes for audio error or video unavailable.

4. Results

In this section, the geographic distributions of double modals judged to be authentic are discussed in order of their overall frequencies in the data. Considering all authentic two-tier types, at least one authentic double modal was found in 48 (of 63) states, provinces, or territories in the United States and Canada. Figure 2 shows the locations of all double modals judged to be authentic. Although the largest number of double modals were found in the Southeastern United States, authentic double modals were found in almost all US states. Only Delaware, the District of Columbia, Hawaii, Montana, Vermont, and West Virginia recorded no double modals.[12] In Canada, double modals were found in Alberta, British Columbia, and Ontario. Figures 3–11 show frequency by state/province for occurrences judged to be authentic.

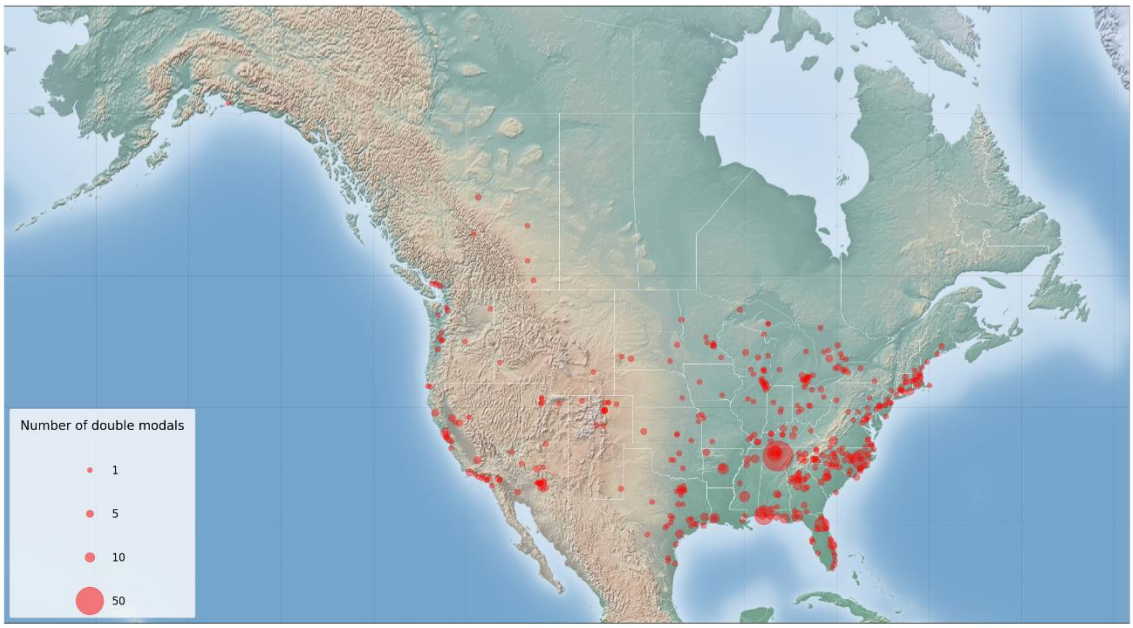

Figure 2: Number of authentic double modals

4.1 Frequency of types by state/province

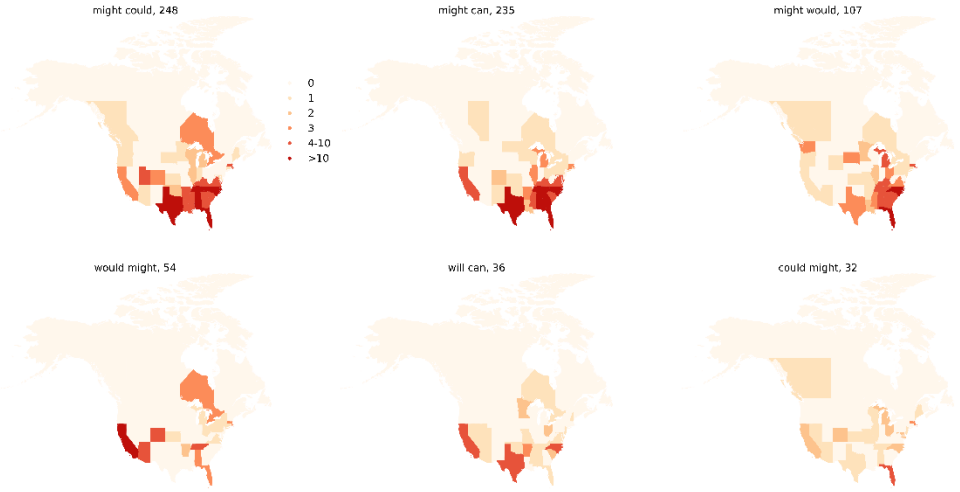

Figure 3

The most frequent type in the data is the archetypal double modal *might could*, with 248 authentic occurrences. The type is most frequent in this data in Tennessee, North Carolina, Florida, Alabama, and Texas, and is common in the other Southern states of Louisiana, Mississippi, Georgia, Arkansas, South Carolina, Kentucky, and Virginia, as well as the Western state of Utah. *Might could* is not restricted to the speech of the American South: it is also found in local governmental meetings in Midwestern, Northern, Midlands, Western, and New England states, as well as in British Columbia and Ontario in Canada. For *might can,* with 235 occurrences, the geographic pattern is similar: concentrated in the Southern states of the USA, but attested in speech from across the North American continent. These geographic distributions are largely in accord with the patterns shown by the data aggregated in the *Multimo* resource, in which most attestations are from the Southern US states, but a few occurrences are attested for non-Southern states (Colorado, Michigan, Missouri, Iowa, New Jersey, Pennsylvania, and Utah for *might could* and Nebraska, Arizona, California, Indiana, New York and Utah for *might can*). The type *might would*, with 107 occurrences, is most frequent in Florida and North Carolina, but is also relatively common in Michigan, and is attested in governmental meetings from the Upper Midwest, the Pacific coast states of California, Oregon, and Washington, as well as three Canadian provinces. In contrast, *might would* in the *Multimo* resource is attested only in the American South, with the exception of one attestation in the Verilogue Corpus by an African-American speaker in Massachusetts. The next most common type in the *CoNASE* data, *would might*, does not show a Southern concentration: it is most frequent in California, followed by Arizona and Colorado, as well as Tennessee. In *Multimo*, the 7 attestations of *would might* are from South Carolina, Tennessee, and Texas.

Will can has presented difficulties for accounts of the historical transmission of double modals from the British Isles to North America: As reported by Mishoe and Montgomery (1994) and Montgomery and Nagle (1994), it is a relatively frequent double modal in Scotland, but almost unknown in American English. The non-correspondence of double modal inventories of North America and the British Isles, according to

Schneider, is “a fact which rules out simple transmission as a convincing explanation” (2004, 285). The 36 authentic *will can* instances in *CoNASE* demonstrate that this form, in fact, continues to be used in North American English and is not restricted to Southern English.[13]

Could might is most common in Florida, but is otherwise shows a relatively balanced geographic distribution across North America. In *Multimo*, the 11 *could might* occurrences are from Texas, South Carolina, and Georgia, as well as one occurrence from New York by an African-American speaker.

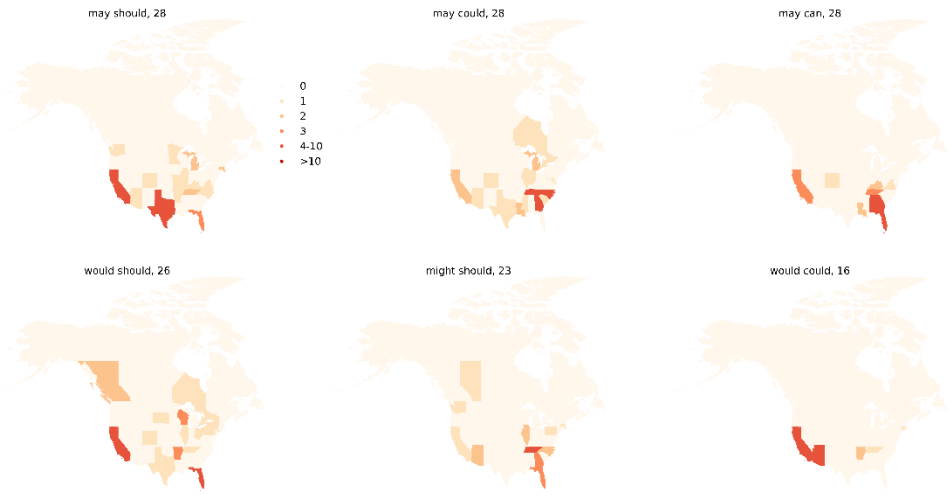

Figure 4

Figure 4 shows the state/province-level geographic distribution and frequencies for the 6 next most frequent authentic double modal types: *may should*, *may could*, *may can*, *would should*, *might should*, and *would could*. *May should* does not show a geographic concentration in the American Southeast, but rather a relatively even spatial distribution. *May could*, on the other hand, is distinctly concentrated in the Southeast, in Georgia, North Carolina, and Tennessee, as is *may can*, in Georgia, Alabama, and Florida, and *might should*, in Tennessee, Georgia, and Florida. In the *Multimo* resource, these types are attested primarily in Southern states, with a handful of occurrences in Chicago (by an African-American speaker) and in Indiana (from the Verilogue Corpus).

The types *would should* and *would could* have mostly not been considered in previous research into American double modals, which has focused primarily on types in which the first modal tier is epistemic (usually *might, may,* or *could*). *Would should* is distributed across the continent, while *would could,* a form previously reported from Scotland (Montgomery and Nagle 1994), but not North America, is concentrated in California and Arizona. Like other double modals, these forms may express more than one meaning, but the discourse contexts of *would should* in the videos in which it occurs suggest that it may be used to communicate partial conditional obligation: under a certain set of circumstances, a condition of (weak) deontic obligation obtains. Likewise, *would could* may express a partial conditional weak possibility. It should be noted, however, that during the process of manual annotation, the overwhelming majority of

occurrences of *would should* and *would could* were found to be self-repairs (i.e., were accompanied by disfluencies). In *Multimo*, *would could* is documented once in New York state and once in Texas, as well as ten times in Northern England and Scotland, while *would should* is not attested.

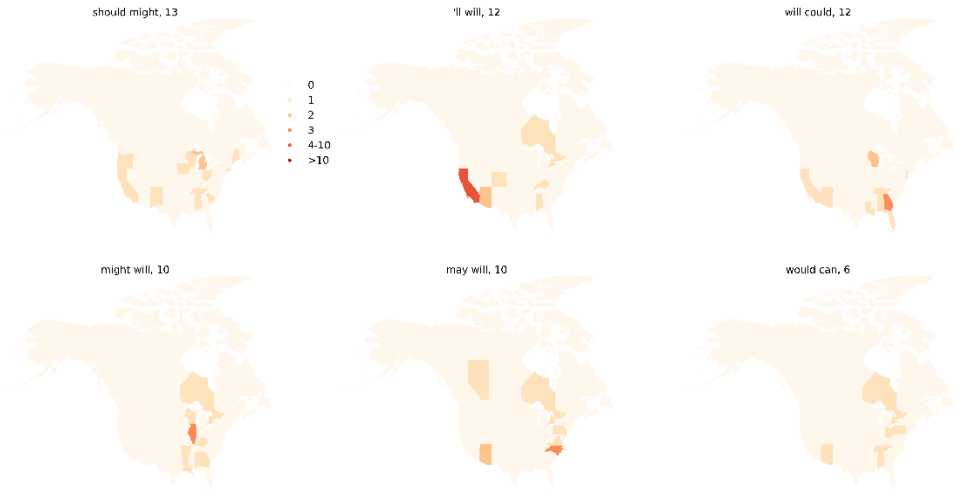

Figure 5

In Figure 5, the lower-frequency double modal types *should might*, *'ll will*, *will could*, *might will*, *may will*, and *would can* are shown. Only *will could* shows a Southeastern concentration; the other types are relatively widely distributed. The form *'ll will*, which in the recordings typically occurs in the sequences *it'll will* or *that'll will*, may result from the clitic *'ll* no longer being perceived as an autonomous word and thus for speakers being less subject to conscious suppression in double modals.[14] This interpretation, in accord with some formal syntactic accounts of the phrase structure of nouns and reduced auxiliaries, posits that *that* and *'ll* in *that'll* are simultaneously two distinct syntactic words, but represent a single morphological word (Wescoat 2005).

For comparison, in *Multimo,* the first-tier epistemic types *might will* and *may will* are attested in the Southern states of North Carolina, South Carolina, Georgia, Florida, Texas, Maryland, and Virginia, as well as in Massachusetts, Ohio, and Rhode Island (from the Verilogue Corpus) and in New York, by an African-American speaker. *Should might* is attested twice (in Texas and North or South Carolina). *Will could* and *would can* are not attested in *Multimo* from North America (*will could* is attested once in Scotland).

Figure 6

Figure 6 shows *must might*, *may ought to*, *might must*, *'ll might*, *can might*, and *may might*. These types do not show a distinct regional distribution. For *must might*, a sequence not reported in the existing literature, as far as is known, the occurrences were noted during the annotation stage to be questionable – although lacking distinct prosodic marking indicating a self-repair, they could represent instances of unmarked repairs with no prosodic disfluency (see Section 5 below). The two instances of *'ll might* from Ontario, along with the *'ll will* (Figure 5), may indicate that the grammaticalization of clitic *'ll* itself could be a phenomenon worthy of study in Ontarian or Canadian English.

In *Multimo*, *must might* is not attested; *may ought to* is attested a total of five times from North Carolina, Mississippi, and Georgia. *Might must* and *'ll might* are not found in *Multimo*, *can might* is attested once from North Carolina and Texas, and *may might* is attested twice from the Carolinas and once from Illinois for an African-American speaker.

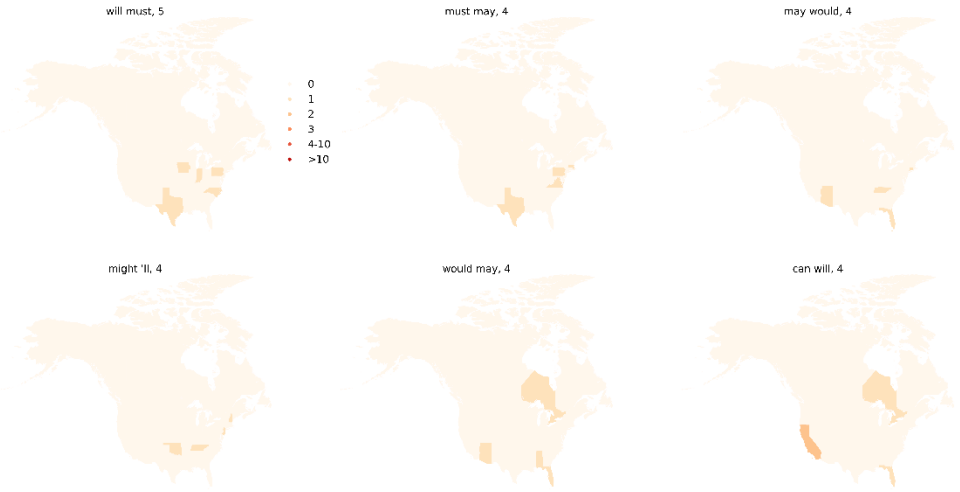

Figure 7

Figures 7–13 show low-frequency types (5 or fewer authentic occurrences). Several of the types in Figure 7 are not previously attested in data from the US or Canada (*will must, must may*, *might 'll*, *can will*), while *may would* is attested in the Carolinas, Tennessee, Alabama, and Georgia, as well as, from the Verilogue Corpus, once each in Utah and in Michigan. *Would may* is attested once in *Multimo*, from Virginia. In aggregate, several of the types are attested in Tennessee (the state with the largest number of double modals in the *CoNASE* data), but overall, these types do not show a strong regional pattern.

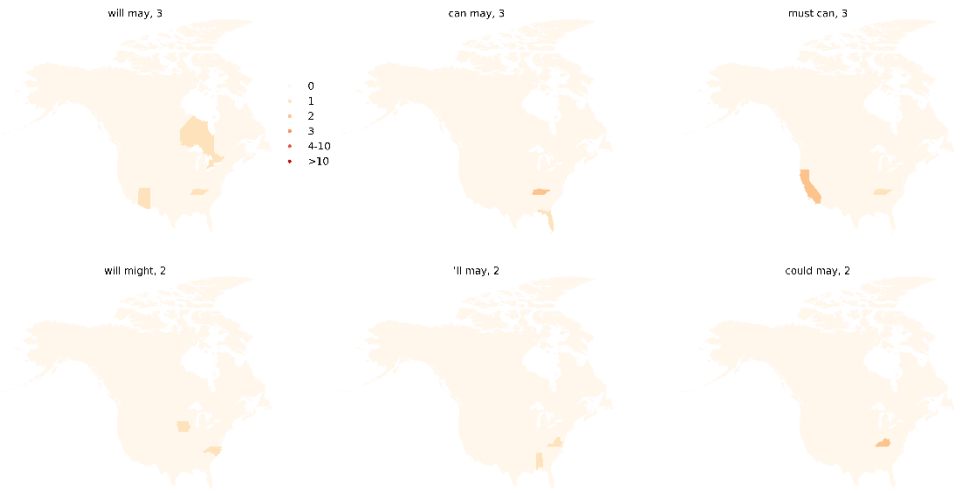

Figure 8

For the infrequent types depicted in Figure 8, only *must can* is attested in *Multimo* data for North America.

Figure 9

The rare types shown in Figure 9 are attested in a broad geographic range, from Alaska to Florida. None of the types have been previously documented in American English, according to *Multimo*.

Figure 10

Figure 10 shows rare, mostly previously-unattested types. According to *Multimo*, *might may* has been reported once from North Carolina and once from Tennessee (as well as once from Scotland), while the other forms have not been previously attested.

Figure 11

Of the *hapax legomena* types depicted in Figure 11, none have been previously reported from North America. *Will should* is reported once from Scotland, and *must could* is reported once from Scotland and once from England, with an additional occurrence recorded in *Multimo* as from an unknown location.

Figure 12

Of the types shown in Figure 12, *might oughta* (*might ought to*) has previously been reported, with multiple occurrences documented from Southern US states in *Multimo*. *Should can* is also recorded in *Multimo* as a type elicited from an African-American speaker in Illinois, and *oughta would* (in the form *ought to would*) is documented in the resource with one occurrence from Georgia.

Figure 13

Of the *hapax* types shown in Figure 13, *oughta (ought to) could* is reported from Texas, Missouri, and Pennsylvania in the *Multimo* data, and *must would* was elicited from two Texas informants in one study.

4.2 Inventory of double modals

Table 2 summarizes the information in terms of the multiple modal inventory attested in the *CoNASE* data and compares it with data aggregated in *Multimo*. Of the 67 two-tier sequences, presented in Table 2 in order of their frequency in *CoNASE*, 37 are not attested in previous studies. The third column shows states or provinces where the form was previously unattested. For frequent types, the authentic forms from *CoNASE* are found in many parts of the continent outside the American South. For types not previously attested, many are found in Southern states, but some are found in speech from other regions.

Table 2: Summary of state/province locations of authentic double modal forms

Type	New double modal? (compared to *Multimo*)	Newly attested in these states/territories (compared to *Multimo*)
might could		CA, CT, IL, IN, KS, WI, ME, MN, OK, OR, SD, WA, MA, BC, ON
might can		CO, CT, IL, KS, WI, RI, OH, MD, MI, MN, OK, OR, NM, PA, ND, MA, ON, AB
might would		AZ, CA, CT, IL, KS, KY, OH, MI, MN, MO, OR, SD, NJ, PA, NY, WA, WY, BC, ON, AB
would might		AL, AZ, AR, CA, CO, CT, FL, KS, OH, MI, PA, NY, VA, MA, ON
will can		AL, AZ, AR, CA, FL, OH, MD, MN, MO, OK, NV, NH, MS, NJ, NC, TX, TN, VA, UT, ON
could might		AL, AZ, CA, CO, FL, IL, KS, WI, ME, OH, MD, MI, MO, NV, NJ, NC, TN, MA, BC, AB
may should		AZ, AR, CA, CO, FL, KY, RI, MI, MN, MO, TX, VA, WA, MA
may could		AZ, CA, CO, IL, IN, LA, MD, MI, MS, ON
may can		CA, CO, KY
would should	new	AR, CA, CO, FL, IL, WI, OH, SD, PA, NY, TX, TN, BC, ON
might should		AZ, CA, PA, WA, AB
would could		AZ, AR, CA, CT, TN
should might		AL, CA, CT, IA, WI, ME, OH, SC, MI, OR, NM, TN
'll will	new	AL, AZ, CA, CO, KY, ON

will could		AL, AZ, CA, FL, GA, WI, LA, NJ, TN
might will		AL, AR, GA, IL, KY, ON
may will		AZ, NJ, PA, NC, ON, AB
would can	new	AL, AZ, OH, PA, TN, ON
must might	new	CA, MN, PA, MA
may ought to		AL, CA, TX, TN
might must	new	CA, WI, MI, NE
'll might	new	AL, AZ, CA, ON
can might		AZ, MD, NY, TN
may might		AZ, CO, KS, OR, VA
will must		IN, IA, PA, NC, TX
must may	new	PA, TX, VA, MA
may would		AZ, CT, FL
might 'll	new	OK, NH, NJ, TN
would may		AL, AZ, FL, ON
can will	new	CA, FL, ON
will may	new	AZ, TN, ON
can may	new	FL, TN
must can		CA, TN
will might		IA, NC
'll may	new	AL, VA
could may	new	KY
would oughta	new	FL, MN
can would	new	CA, TN
'll can	new	CA, ON
could ought to	new	AK, OR
could used to		MA
could will	new	OH, ON
can must	new	FL, KY
may must	new	MN, ON
can could	new	CT, FL
might may		TN, ON
should shall	new	KS
would must		KS
could should	new	AZ
could would	new	ON
will should		CT
can should	new	KS
must could		SD
'll could	new	TN
should must	new	BC
might oughta	new	NC
should may	new	FL
should can		IN
shall would	new	WI
oughta would	new	MI
oughta should	new	LA
oughta could		MN
oughta can	new	ID
must would	new	AB
must will	new	PA
must should	new	IL
should oughta	new	TN

4.3 Negations and question forms

Negations and questions formed from double modals can exhibit different constituent ordering patterns: for negations, after the first modal (*I might not could*) or after the second modal (*I might could not*), and for questions, with raising of both modals (*might could you help me?*), raising of the first modal (*might you could help me?*), or raising of the second modal (*could you might help me?*). Previous analyses, based primarily on acceptability judgment ratings, have shown a lack of consensus as to the acceptability of the

different ordering possibilities. Pampell (1975) and Boertien (1986) both found about half of their Texas informants rated question forms in general to be acceptable or marginally acceptable, with second modal inversion slightly more likely to be rated acceptable, compared to the other question patterns. Although most questions containing double modals were judged to be unacceptable according to DiPaolo's (1986) Texas informants, raising of the second modal (*could you might*) was the form most likely to be judged acceptable, a finding confirmed by Hasty (2012a, 101) for judgments by Tennessee informants. Williamson (2018) found raising of both modals to be the form most likely to be accepted by survey respondents from Tennessee, Texas, and Kentucky; respondents from Tennessee were more likely to judge second modal raising to be acceptable.

Seven of the authentic double modal forms from the data for this study were annotated as questions, corresponding to the sequences *might would you be willing, could I might, could we might, what might could we do, will that must, should we might,* and *could may we*. Of these, four of the forms show raising of a single modal and three raising of both modals.[15] While an analysis of naturalistic questions containing double modals will require more of the *CoNASE* data to be manually annotated, the preliminary results suggest that question formation from double modals exhibits variability and that no syntactic configuration is dominant, a result that is in line with earlier acceptability judgment findings.

For negations, Pampell (1975) and Boertien (1986) found that informants were slightly more likely to accept negation after the first modal. In contrast, DiPaolo's (1986) informants rated patterns with a negator following the second modal to be more acceptable than after the first modal (162), although fewer than half of test sentences containing negated double modals were rated acceptable overall. Hasty (2012a) reported that in a task in which participants from Tennessee were instructed to create negated double modal sentences, about half placed the negator after the first modal and half after the second modal (101).

The negated double modals from *CoNASE* exhibit similar variability: Of the 83 negated authentic double modals in the annotated data, 40 show negation after the first modal, and 43 after the second modal.

The additional syntactic constituency configurations considered by Pampell (1975) and others in test sentences administered in acceptability judgment surveys (i.e., tag questions, stress patterns, so-pronominalizations, floating quantifiers, and niching) were not sought using regular expressions – given the rarity of double modals overall and the unusual syntax of these constructions, they are unlikely to be present in the corpus in large numbers. However, considering the fact that only 13% of double modal hits have been annotated and that the regular expressions used to find double modals were not designed with these specific syntactic configurations in mind, it may be possible to use the corpus to explore naturalistic use of these or similar constructions in future studies.

The naturalistic data from question forms and from negations suggests that overall, there is no dominant syntactic configuration for the movement of modals within a double modal verbal phrase.

5. Discussion and caveats

Previous studies of double modals in North America have mostly not been based on naturalistic usages and have not sufficiently gauged use of the feature in speech from all regions of English-speaking North America. The reasons for this are twofold: they are quite rare in naturalistic speech, and were thought to be used primarily in the American South, and to a lesser extent in the Mid-Atlantic states and the Midwest, but not in other regions of North America. Of the attested uses, many are from *LAGS* and *LAMSAS*, whose worksheets were designed to elicit *might could* and related types, but not types with primarily dynamic and deontic first-tier modals, which are therefore underrepresented in the record. The data from this study show that the multiple modal inventory in North America is larger than has been previously attested. Types thought to be used primarily in Scotland, Northern England, or Northern Ireland (*will can, will could, would could, should can*) are used in contemporary spoken English in North America, as are combinatorial types that have previously received little or no attention (*would should*, *'ll will*, *would can*, *must might*, *may must*, and others). In this point the remark of Mishoe and Montgomery, that a larger inventory of double modals "probably reveals… what any patient observational study can collect" (1994, 10) seems apropos: *CoNASE* is much larger than other corpora of transcribed speech from North America, and large corpora are more likely to contain instances of rare phenomena such as double modals (Davies 2014).

This geographic breadth of attested usages and the large number of combinatorial types in the data suggest that the ability to spontaneously employ a double modal may be a conversational resource available to most speakers of English in North America. The rarity of double modals stems in part from the limited range of pragmatic and contextual situations in which using a double modal would be appropriate for the expression of modal meanings (Montgomery 1998), but also, for many North American speakers, the internalization of prescriptive norms that proscribe the construction, reducing the chance that a double modal is articulated and left uncorrected in speech.

Evidence from the annotated data set may give insight into the speech planning and production process, demonstrating that some speakers (often non-Southerners) naturally produce double modals, but then immediately correct them to single modals.[16] In addition, the ratio of double modals which are self-repairs (i.e. are accompanied by perceptible disfluencies and/or pauses) to authentic double modals is higher for states and provinces outside the South, regions in which the use of double modals is more closely proscribed and speakers may be more likely to initiate a repair during the speech planning process if they find themselves spontaneously producing a double modal. These considerations suggest that speakers may produce double modals automatically, but for some speakers, external language norms are more likely to prompt self-repair or correction. Nevertheless, double modals are possible for speakers from most parts of English-speaking North America, under the right conditions. Further annotation of the data used in this study will likely reveal additional locations and combinational types, as will other similar large data sets of naturalistic North American speech.

The study confirms the widely acknowledged fact that double modals with the first-tier epistemic modals *might* or *may* are the most common types. Types in which the first tier is a deontic or dynamic modal, occasionally reported in previous studies but largely absent from inventories of American double modals,[17] are attested in this data. The approach taken in this study, which demonstrates that given increasing corpus size, a larger inventory of double modals will be attested, suggests that an analysis of the historical diffusion and evolution of double modals could benefit from more detailed occurrence data,

and that analyses based on inventories that in some cases reflect very small samples of elicited data may not be sufficient for understanding the dynamics of double modal using in a historical-geographic framework.

There are a number of important caveats that should be taken into account when considering the analysis of double modals presented in this study. They relate to the nature of the underlying data, the methods used for corpus creation, and the methods used for the identification and manual annotation of double modals.

First of all, *CoNASE* consists primarily of transcripts of local government meetings. Meetings of local government such as city or town councils, zoning committees, school boards, and other bodies are by their very nature often engaged in the discussion of future potentialities: they make decisions on how budgets will be allocated, where construction will be undertaken, or who will have the authority to make decisions on behalf of the community. Processes of decision-making where multiple, often competing interests are advocated represent an interactional and discourse environment in which cautious expressions of possibility, potentiality, obligation, and volition need to be carefully negotiated: in other words, a natural environment for the use of modality. Nevertheless, the speech of local government meetings cannot be considered representative of speech in general in North America. Although the communicative contexts of such meetings may be conducive to the type of careful, polite, face-preserving interaction that is well-suited for the use of some double modal constructions, they are more formal than many other speech situations in which the feature can be used. There are relatively few transcripts of informal face-to-face communication of two interlocutors in the corpus, and interactions between, for example, family members or groups of close friends are likely to be underrepresented in *CoNASE* data.

The nature of the corpus transcripts, which are not diarized (i.e., there is no indication of speaker turns), means that without additional annotation, speech cannot be assigned to categories typically used in sociolinguistic analyses such as gender, age, race/ethnicity, or income. The design of the corpus, however, allows double modals (or other features of interest) to be very quickly examined in the corresponding videos. Future work with this data set could use a similar manual annotation procedure to assign speakers to categories such as apparent gender, ethnicity, or approximate age, making a sociolinguistic analysis more feasible.

In some cases, the CoNASE data may contain multiple copies of the same speech material, because the same recordings or portions of the same recordings have been uploaded twice to the same channel with different titles, presumably as the result of human error (for example, these two recordings from Prattville, Alabama: https://youtu.be/UQR4WsmOEuA, with the title “11-16-2011 Council Meeting”, and https://youtu.be/pri2NSlde0o, with the title “12-16-2011 Council Meeting”). While care has been taken during the corpus creation process and during the manual annotation of the double modal search hits to remove entries with transcripts that are duplicates, in a few cases, partial recordings of videos already represented in the data were discovered. Overall, however, errors such as this are rare, with only a handful of occurrences in the 3,370 manually-examined videos.

As discussed in Section 3 above, the criteria for manual assignation of the “true” code to a double modal instance was based on discourse-semantic and prosodic qualities: utterances in which two modals were used in sequence in coherent discourse with no obvious prosodic marking were considered to be authentic. This procedure is subject to two potential pitfalls: first, it relies on the judgment of the annotator (the study’s author) as to the coherence of the discourse (i.e., the semantic acceptability of the

double modal in the immediate context) and the lack of prosodic marking. Ideally, the double modal utterances under consideration should be rated by multiple annotators and the authenticity of the usage in question determined by annotator agreement. Such a procedure, however, was not within the scope of this study.

False positives were filtered by manually checking the regular expression hits, but annotation procedure cannot account for false negatives, or instances in which a true double modal has been uttered, but not recorded in the transcript (for example, due to an ASR error). Determining the extent of false negatives would require a large sample of videos that have been manually transcribed and checked to ensure their accuracy. While imperfect, a preliminary method was devised to estimate the extent of false negatives in the data, consisting of the following steps: First, the annotation codes in the manual annotation table were used to identify all instances in which an ASR error had resulted in a false positive. Then, on the basis of the correct transcriptions of these false positives manually entered in the "notes" column of the table, a frequent false positive sequence was selected: the sequence *Mike could*, which had been incorrectly transcribed by the ASR as *might could* 21 times. A search in the entire *CoNASE* corpus for the sequence "Mike could" returned 189 hits. Twenty of these, selected randomly, were checked, and none were found to be *might could*. While this method does not guarantee false negatives are not present in the transcripts, it suggests that they are not common. Furthermore, the discovery of false negatives in the data would not contradict the implications of this study, namely, that double modals are used in a broader geographic context and with a greater combinatorial diversity in North America than has previously been found on the basis of acceptability judgment or regional linguistic atlas data.

An additional point concerns instances of correction/self-repair in which a speaker corrects an utterance without retracing any material that has already been spoken (Levelt 1983, 44–45). While errors are typically marked by prosodic changes and are often accompanied by editing terms such as word repetitions or fillers (*uh, um,* etc.), this is not always the case: as noted by Lickley, "it is possible that what is perceived by typical listeners, under typical listening conditions, as fluent speech, still contains minor disfluencies" (2015, 468). For this data, this would mean that some speakers may have begun an utterance with one modal, but then replaced it with a second modal without any overt retraction, filler, pause, or other prosodic marking. It is unclear from the speech pathology literature how common such unmarked repairs might be, but presumably, for most speakers, errors and self-repairs show prosodic marking. In any case, such unmarked repairs could only be detected after conferring with the speaker of the utterance about the usage in question, which may be possible for experimental studies, but is not realistic for a corpus-based approach.

As for modals in English overall, the relative frequency of modal verbs in *CoNASE* was found to be 17.1 per 1,000 words, a value comparable to results found for other corpora. Leech et al. (2009) estimated the relative frequency of core modals in the *Longman Corpus of Spoken American English* to be 19.9 per 1,000 words (100), slightly less than in the spoken portion of the BNC (21.2 per 1,000, 102). In light of evidence that the frequencies of core modals were in decline in the latter half of the 20th century, particularly in North America (Leech 2003; Leech et al. 2009), and for modals deontic meanings, which are being displaced by semi-modal constructions such as *have to* or *need to*, the *CoNASE* evidence may provide evidence for a further decline in the frequencies of the core modals at in North American English at the beginning of the 20th century.

One possible explanation for the somewhat unexpected geographic prevalence of double modal constructions in North American English may be that the spread of double modals to regions in which they were hitherto undocumented results from the complex and changing semantic status of modal verbs in American English (Myhill 1995), a development which has shifted the meanings of some modals towards increased epistemicity (Traugott 1989). Biber et al. note that in the Longman Corpus, *could* is no longer primarily a marker of dynamic ability, but has overtaken *might* as the most frequent modal verb denoting logical possibility (1999, 483). The shift towards epistemicity may also have resulted in semantic bleaching of single modal forms such as *might* and *could*, setting the stage for the use of two modals for the expression of careful, strong epistemic meanings. To this end, Nagle, in an analysis of the historical development of double modals in Southern American English, remarks that that "the development and structured ordering of double modal auxiliaries in the American South may be seen as a further evolutive step in the grammaticalization of epistemicity in English" (1994, 209). In light of evidence that double modals have spread and are now in (infrequent) use in contemporary North American English in regions where they have previously not been documented, an "hypothesis of epistemic expansion" (Abraham 2002, Dollinger 2008) may partially account not only for their use in the American South, but also their spread to non-Southern speech. This interpretation, however, is highly speculative. Towards this end, future work with the data could consist of the annotation of semantic categories to double modals, as well as single modals and semi-modals. Another promising method to investigate this hypothesis may be the use of natural language processing methods such as distributional semantics based on word vectors.

6. Conclusions and future outlook

This study, the first which considers the use of double modals in North America based on verifiable naturalistic data, rather than elicited responses or judgment surveys, documents the use of over 1,000 instances of double modals, including in areas in which they have not previously been attested, such as Western and Northwestern states of the US and in Canada. The inventory of double modals in North America, with 67 distinct two-tier combinatorial types, is larger than has previously been reported, and includes types thought until now to be primarily or exclusively British, as well as new, previously undocumented types. Because only a fraction of the search hits in the corpus have been manually checked, it is probable that the inventory is larger still. These facts may invite a reconsideration of theories of native development of double modals versus historical transmission of the feature to North America from the British Isles.

The fact that double modals are attested in speech from across the continent suggests that they may represent a grammatical resource which can be realized spontaneously by most speakers, particularly for the expression of careful epistemicity, but whose usage is governed by speakers' self-monitoring and orientation to the prescriptive norms of standard grammar, norms which for some Southern speakers are differently realized.

The question form and negation double modals in the data show that there is significant variability in constituent ordering in naturalistic double modals, confirming earlier findings from acceptability judgment ratings. More detailed studies of the syntax of double modals using *CoNASE* data may shed further light on the syntactic constraints on their use in different regional varieties by establishing a starting point for more focused investigations of micro-syntactic variation (Zanuttini & Horn 2014,

Zanuttini et al. 2018). If Arkansas or Tennessee speakers, for example, not only use different double modal types (Close 2004, Williams 2018), but also have access to different underlying mental representations of double modals which result in different judgments as to the acceptability of possible syntactic configurations, then studies of regional syntax involving acceptability judgments or targeted elicitations could be informed by the naturalistic data presented in this study. Experimental investigations of the processing of double modals (Zaharchuk et al. 2021) could also use naturalistic data as a starting point.

CoNASE data could permit the study of double modals in the context of broader investigations of modality in spoken North American English: as Montgomery remarks: "we know nothing, for instance, about whether MMs relate to other means of expressing multiple modalities in English clauses, such as by adverbs (for example, are *probably can* and *maybe could* acceptable only to users of MMs? Should they be considered types of MMs?) or by other exponents of modality" (1998, 94).

In the future, it seems likely that large ASR corpora will open up new possibilities for the corpus-based study of spoken English in North America, whether from a broad geographic perspective, or focusing on language variation in specific regional varieties. For double modals, this may could contribute to our understanding of the history, syntax, and meaning of a language feature that, although it continues to be an emblematic feature of Southern speech, appears to be more widespread than has previously been documented.

Notes

[1] Because sequences of three modal verbs have occasionally been attested, the term *multiple modals* is also used in the literature. Nagle, noting that some of the attestations of triple modals may be questionable, claims the "centrality of a two-place modal system" (2003, 354). In this study, the term *double modals* is used, as the data consist of two-modal sequences.

[2] The worksheets for the *Linguistic Atlas of New England* (Kurath et al. 1939–1943), for example, did not include items designed specifically to elicit possible double modals, as did those used for *LAMSAS* and later regional American linguistic atlases. Eight instances of *might could* are attested in the data for the *Linguistic Atlas of the Upper Midwest* (Allen 1973–1976, vol. 2: 46), from informants in Minnesota, North Dakota, Iowa, and Nebraska. According to the notes on the informants, one *might could* was used by an African-American with parents from the South, and three others were used by informants with parents from Norway, Germany, and the Netherlands. covering the territory of Iowa, Nebraska, Minnesota, and the Dakotas. Allen also notes that most double modals in the *LANCS* data was from Kentucky (ibid.). Antieau (2003; 2006, 228; 2012) attests *might could* from Colorado, *might would* from Utah, and *used to could* from Colorado, Utah, and Wyoming in interviews collected from 1988–2004 for the *Linguistic Atlas of the Middle Rockies*, a planned, but unpublished subproject of the not-yet-completed *Linguistic Atlas of the Western States*. See http://www.lap.uga.edu/Site/Atlas_Projects.html.

[3] https://artsandsciences.sc.edu/multimo.

[4] https://cc.oulu.fi/~scoats/CoNASE.html.

[5] See Montgomery and Nagle (1994) and Fennell and Butters (1996) for a summary of the history of double modals in the United States.

[6] These include constructions which may not be double modals according to a strict interpretation, such as *may need to*, *might better*, or *might had better* (1989: 197).

[7] Tillery (2000) distinguishes between "self-reports" and "other-reports", i.e., reports about one's own linguistic behavior, in contrast to intuitions about others' linguistic behaviors, and proposes that in the absence of naturalistic production data, the former are more reliable.

[8] The summarized transcribed responses to all questions on page 58 of the LAMSAS worksheets are available at http://www.lap.uga.edu/Projects/LAMSAS/Text%20Data/.

[9] The different elicitation styles for multiple modals can be heard in the LAGS recordings. For example, an 82-year-old man from Varnell, Georgia, interviewed in 1979, responds to a question with *I'd like to do that*. The interviewer then asks *would you ever say you might could*, to which the informant responds *I might could, yeah* (http://www.lap.uga.edu/Projects/LAGS/Speakers/LAGS(INF066B)/Audio/LAGS(INF066B)4/LAGS(INF066B)4%2011%20Verbs_Modals.mp3, beginning at 00:02:30). Other fieldworkers did not follow up with a direct question: an example can be heard in an interview with a 20-year-old female from Jacksonville, Florida, conducted in 1979 (http://www.lap.uga.edu/Projects/LAGS/Speakers/LAGS(INF232)/Audio/LAGS(INF232)3/LAGS(INF232)3 13 Verbs_Modals.mp3, beginning at 00:02:47).

[10] The basic regular expression pattern used was `"\\s+("+x[0]+"n?_\\w+_\\S+\\s+(?:i?_\\w+_\\S+\\s+|we?_\\w+_\\S+\\s+|you?_\\w+_\\S+\\s+|he?_\\w+_\\S+\\s+|she?_\\w+_\\S+\\s+|it?_\\w+_\\S+\\s+|they?_\\w+_\\S+\\s+|haven?_\\w+_\\S+\\s+|'ve_\\w+_\\S+\\s+|'t_\\w+_\\S+\\s+|not_\\w+_\\S+\\s+){0,3}"+x[1]+"n?_\\w+_\\S+\\s+(?:haven?_\\w+_\\S+\\s+|'ve_\\w+_\\S+|not_\\w+_\\S+\\s+|'t_\\w+_\\S+\\s+)?)",` where x[0] and x[1] represent the two modal verb slots. The search was conducted 156 times on the entire 1.2b-word corpus to account for all possible double modal combinations. A filtering step removed results with the pattern pronoun-modal-pronoun-modal, which were found after inspection to consist entirely of corrections or of discourse overlapping two clauses (*if I might, I would ask…*, etc.).

[11] More than one code could be assigned to each hit in the corpus.

[12] Wolfram and Christian found double modals lacking in a study of Appalachian English from West Virginia (1976, 97). Three instances of *mout could* and one of *might could* are recorded in the *LAMSAS* data for informants from West Virginia (http://www.lap.uga.edu/Projects/LAMSAS/Text%20Data/LAMSASpage58.xlsx).

[13] The 36 authentic occurrences represent 15% of the 237 checked hits; if this proportion is accurate, the entire *CoNASE* corpus, with 1,054 hits, would contain approximately 150 authentic *will can* instances.

[14] For example, in https://www.youtube.com/watch?v=8XSH6ftMD_k&t=1215s, from Minto, Ontario: …*and I'm thinking that it'll will likely be the first meeting…*

[15] Based on the higher frequencies of the underlying unraised patterns *might could*, *might should*, and *will must* in the raw *CoNASE* data, it seems likely that three of the question forms show second modal raising and one (*will that must*) first modal raising.

[16] For example, a speaker from Kern County, California corrects *may can* to *may*: https://youtu.be/wzVEmswMlTA?t=2076. A speaker from Woodland, Washington corrects *would might* to *would*: https://youtu.be/9Gx3LXD7bQQ?t=4703. A speaker from Palm Springs, California corrects *could we might* to *could we perhaps*: https://youtu.be/HyF9PnAnGag?t=8763.

[17] Mishoe and Montgomery (1994) report one instance of *musta coulda* from the Carolinas as well as *must didn't*. Hasty (2011) reports that only 4 of 30 Tennessee informants judged *must can* to be acceptable.

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