MIGHT SHOULD WE CONSIDER THIS?: DOUBLE MODAL INVERSION IN SOUTHERN UNITED STATES ENGLISH*

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1. Introduction

While standard varieties of English do not allow iterative sequences of modals, Southern United States English (henceforth SUSE) is among the dialects of English that permit a double modal construction, as illustrated in (1).[1]

(1) a. I don't think I have any grants you **might could** apply for.
b. This thing here I **might should** turn over to Ann. (Di Paolo 1989: 195)

Existing analyses of the SUSE double modal construction (e.g. Di Paolo 1989, Battistella 1995, Hasty 2012b) offer divergent predictions for the interaction of the modals with syntactic processes, such as subject-auxiliary inversion. While elicitation studies (e.g. Di Paolo et al. 1979, Di Paolo 1986, Hasty 2012a) have tested for double modal inversion patterns in SUSE, the results are mixed. Furthermore, these studies differ in methodology and regional scope, rendering comparisons infeasible.

To address these issues, an acceptability judgment task study was conducted with speakers of Kentucky, Tennessee, and Texas Englishes. The results show that joint inversion (e.g. *Might should we...?*) is preferred in some SUSE varieties; however, at least in Tennessee, second modal inversion (e.g. *Should we might...?*) is also acceptable. By furthering our empirical understanding of English syntactic variation, these results facilitate the evaluation of theoretical analyses for SUSE double modals.

This paper is organized as follows. Section 2 provides a brief overview of the SUSE double modal construction. Section 3 reviews the mixed evidence for double modal inversion in questions and outlines the inversion patterns predicted by three main theoretical approaches. Section 4 presents the acceptability judgment task study. Section 5 concludes with an overall summary as well as directions for future work.

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[1]SUSE refers not to a homogeneous dialect, but rather to the generalized linguistic patterns found in a range of regional varieties. SUSE dialects are mainly spoken in the southern coastal states, from Virginia to Texas, and in Arkansas, Kentucky, Oklahoma, Tennessee, and West Virginia (Carver 1987, Hickey 2014).

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2. The SUSE double modal construction

Double modals are used, at least to some extent, by SUSE speakers from all age groups, genders, and social classes (Bernstein 2003). Attestations have been made throughout the Southern United States (Montgomery 1998), although research has largely focused on usage in individual regional varieties.[2] The construction is most frequently employed in informal, one-on-one settings, such as conversations with family and friends or negotiations with strangers, wherein it serves as a pragmatic expression of indirectness or politeness (Mishoe and Montgomery 1994).

Lexical combinations of double modals are subject to individual and regional variation; however, in SUSE, first-place modals are typically limited to *may*, *might*, and (occasionally) *must*, which may be followed by any one of a range of possible second-place modals (Mishoe and Montgomery 1994, Montgomery and Nagle 1994, Fennell and Butters 1996). The combinations *might could*, as in (1a) above, and *might should*, as in (1b), are among the forms most frequently attested and most commonly accepted in elicitation studies (Butters 1973, Coleman 1975, Di Paolo et al. 1979, Hasty 2011).

3. Double modal inversion patterns in the literature

The logically possible subject-auxiliary inversion patterns for *might could* in a *yes/no* question are illustrated in (2).

(2) a. **Might could** you go to the store for me?
b. **Could** you might go to the store for me?
c. **Might** you could go to the store for me? (Hasty 2012b: 1718)

This section reviews the extant evidence for joint (2a), second modal (2b), and first modal inversion (2c) in SUSE followed by the predictions of the theoretical analyses.

3.1 Evidence for double modal inversion patterns

Naturalistic data are scarce for the usage of double modals in questions in SUSE. Drawing on published and unpublished sources, Reed and Montgomery (n.d.) have compiled almost 2,000 examples of naturalistic and elicited multiple-modal constructions in SUSE and other varieties of English. Among their published sources for naturalistic SUSE data, only a few attest double modals in questions (Boertien 1986, Di Paolo 1986, Mishoe and Montgomery 1994). Second modal inversion has been attested in spontaneous speech, as in (3); however, neither joint nor first modal inversion has been attested in any of the sources compiled in Reed and Montgomery's (n.d.) corpus.

[2]For instance, Feagin (1979) discusses the double modal construction as found in Alabama; Close (2004) in Arkansas; Butters (1973) and Coleman (1975) in North Carolina; Mishoe and Montgomery (1994) in North and South Carolina; Hasty (2011, 2012a, 2012b) in Tennessee; and Pampell (1975), Boertien (1979, 1986), Di Paolo et al. (1979), and Di Paolo (1986, 1989) in Texas.

(3) a. Heather, could you might find you a place somewhere?
b. Would you might wanna wait til the 8 o'clock flight when it's cheaper?
(Di Paolo 1986: 148)

While only second modal inversion has been attested, the number of naturalistic examples is too small to conclude whether this is the only possible pattern in SUSE.

A number of elicitation studies have examined double modal inversion patterns in diverse varieties of SUSE (Coleman 1975, Pampell 1975, Boertien 1979, Di Paolo et al. 1979, Di Paolo 1986, Close 2004, Hasty 2012a). These studies vary in methodology as well as the size and regional scope of their population samples. Three large-scale studies are discussed below: Di Paolo et al. 1979, Di Paolo 1986, and Hasty 2012a.[3]

Di Paolo et al. (1979) used a sentence completion task with an undisclosed number of Texas English speakers. During each trial, participants were orally presented with a context sentence (e.g. (4a)) and then a test sentence containing a single modal (e.g. (4b)). They were asked to repeat the test sentence, with the option of adding a second modal in any position, if this sounded natural. An example of a declarative trial is given in (4).

(4) a. How would you fill in the following dialogue? If someone says to you, "I'm going to the store—can you use some eggs?", you answer:

b. "I might use some." (Di Paolo 1979: 42)

Di Paolo et al. (1979) report that in questions, participants tended to add a second modal in a fronted position, resulting in joint double modal inversion. However, the authors are unclear as to how frequently other inversion patterns were used, if at all.

Di Paolo (1986) used a sentence imitation task during interviews with 62 speakers of Texas English. During each inversion trial, participants were orally presented with a context sentence (e.g. (5a)), followed by a sequence of alternative *yes/no* question formulations (e.g. (5b)). Participants were asked to repeat which question sounded the most natural. If none sounded natural, a participant was asked to report "how he or she would say it or how people in the area would say it" (Di Paolo 1986: 115). An example trial is given in (5).

(5) a. Billy is a very polite boy. Yesterday he said,
b. i. "Mom, might could I write on the walls?"
ii. "Mom, might I could write on the walls?"
iii. "Mom, could I might write on the walls?" (Di Paolo 1986: 128)

Di Paolo (1986) reports a speaker preference for inverting the second modal in *might could* (63%) and in *might would* (64%). No dominant pattern emerged for *might should*, although joint inversion (55%) was more frequent than second modal inversion (30%). Di Paolo (1986) concludes that there is an overall preference for second modal inversion in Texas English, but speaker judgments are subject to lexical variation.

[3]For a comprehensive review of the previous work, see Chapter 2 of Williamson 2018.

Hasty (2012a) performed face-to-face interviews with 30 speakers of Tennessee English. To test for acceptable inversion patterns, he used a respondent-generated question formation task and a binary forced-choice task. In the first task, participants were orally presented with declarative sentences containing double modals. They were then asked to produce minimally-distinct *yes/no* question forms of these sentences. In the second task, participants were asked to choose between two alternative question formulations, which included joint and second modal inversion.

The respondent-generated question task revealed a preference for second modal inversion (63%). The forced-choice task revealed the same preference (70%). Hasty (2012a) concludes that only second modal inversion is possible in Tennessee English.

In summary, among the three large-scale elicitation studies that have used inversion data to date, Di Paolo et al. 1979 finds joint double modal inversion to be preferred in Texas English, whereas Di Paolo 1986 finds it to be marginal in Texas English as compared to inversion of the second modal. Finally, Hasty 2012a finds second modal inversion to be preferred in Tennessee English. No study to date has found first modal inversion to be generally acceptable. Since the existing studies used differing experimental methods in different varieties of SUSE, a cross-study comparison is not feasible.

3.2 Theoretical predictions for double modal inversion patterns

While various generative models have been proposed for the double modal construction, three main approaches are notable in the SUSE literature. Some authors, such as Di Paolo (1989), construe the double modal as a syntactic unit under a single head. Others, such as Battistella (1995), consider the first modal to be an adverbial modifier, while Hasty (2012b), among others, has proposed that the first modal heads a functional projection.

Di Paolo (1989), in her analysis of Texas English double modals, suggests that these constructions are multi-word lexical items. Di Paolo (1989: 213) argues that these modal-modal compounds, "like noun compounds [or] verb-particle constructions," are idiomatic and form single syntactic (T) heads. While this lexical analysis predicts the availability of joint inversion, its present formulation does not account for second modal inversion.[4] As both modals form a single head, T-to-C movement can only target the construction as a unit: it cannot select the second modal on its own. This prohibition may be problematic if, as Di Paolo (1986) suggests, second modal inversion is preferred in Texas English.

For Battistella (1995: 24), the "spurious" first-place modal is, in fact, an adverbial that modifies the second-place modal and is licensed by T. This adverbial analysis predicts the availability of second modal inversion through T-to-C movement. Since the first modal is a modifier, raising of the first modal or of both modals is disallowed. Nevertheless, Battistella (1995) suggests that the joint "inversion" pattern may be accounted for if the first modal

[4]While Di Paolo (1989: 215) acknowledges that double modals—like other multi-word lexical items, including verb-particle constructions—display both "unit-like and non-unit-like behavior," she does not provide an explicit mechanism for the latter. It is therefore unclear how this analysis would account for second modal inversion while simultaneously prohibiting first modal inversion.

is base-generated as a modifier to C instead of T. He argues that T-to-C movement of the second modal "can 'transmit' the relevant head feature" (Battistella 1995: 33) to enable licensing between C and the first modal. This yields a surface form that resembles the result of joint raising. Note that in the absence of T-to-C movement, such licensing is impossible: independent first modal "inversion" is therefore ruled out. Thus, in contrast to Di Paolo (1989), Battistella (1995) can account for the possibility of joint and second modal (but not first modal) inversion.

Finally, Hasty (2012b) posits that the first modal in a double modal construction heads an MP (Modal Phrase), an optional projection above TP. This modal lacks syntactic tense, but hosts an [EPP] feature, which motivates raising of the subject to [Spec, MP]. In questions, Hasty (2012b) argues that through Probe and Goal feature checking, C probes its complement for a tense-valued element to raise. This analysis predicts that the second modal must undergo T-to-C inversion; the tenseless first modal cannot. Joint inversion is prohibited since this would require C to simultaneously target two heads for raising.

Overall, the three main approaches to the SUSE double modal construction differ in their predictions for patterns of double modal inversion in questions. Di Paolo's (1989) lexical item analysis only permits joint inversion; Battistella's (1995) adverbial account allows both joint and second modal inversion; and Hasty's (2012b) functional head approach only predicts second modal inversion to be acceptable.

4. The experiment

A web-based acceptability judgment task study was deployed to native speakers of English raised in Kentucky, Tennessee, and Texas to investigate the relative acceptability of double modal inversion patterns in questions in SUSE. This experiment addressed two questions: (i) is joint subject-auxiliary inversion of double modals acceptable in SUSE? Moreover, (ii) are there regional differences in inversion patterns within SUSE?

4.1 Method

4.1.1 Participants

247 native English speakers raised in Kentucky, Tennessee, and Texas participated in the study.[5] 94 participants were born and spent the majority of childhood, i.e. up to age 12, in Kentucky. Similarly, 47 participants were born and raised in Tennessee, and 106 participants were born and raised in Texas.

4.1.2 Design

The experiment involved two independent variables (INVERTED MODAL, REGION) in a mixed 4×3 factorial design.

[5] A total of 290 participants completed the online study. However, only 247 of these met the inclusion criteria, i.e. were adult native English speakers born and raised in either Kentucky, Tennessee, or Texas.

INVERTED MODAL was a within-subjects factor with four levels: *joint*, *first*, *second*, and *single*. Thus, the experimental conditions reflected all potential subject-auxiliary inversion patterns with a double modal construction. An additional control condition exhibited single modal inversion, as in a Standard English question containing only one modal.

REGION was a between-subjects factor with three levels: *Kentucky*, *Tennessee*, and *Texas*. In order to compare the results of this experiment to those of the previous large-scale studies, samples were drawn from the populations considered in Di Paolo et al. 1979 and Di Paolo 1986, i.e. Texas English speakers,[6] and Hasty 2012a, i.e. Tennessee English speakers.

4.1.3 Materials

32 sets of test items were constructed, resulting in a total of 128 test sentences. The sets were divided evenly between items containing *might could* and *might should*. These are among the most commonly accepted double modal combinations as found in previous elicitation studies in SUSE (Butters 1973, Coleman 1975, Di Paolo et al. 1979, Hasty 2011), minimizing any potential rating differences due to lexical frequency effects.

A test item set with the lexicalization *might could* is shown in (6), and a set with *might should* is shown in (7).[7]

(6) a. Billy is at the park with his mother. He says to her:
  b. i. "Might could I play on the monkey bars?" (*joint* condition)
  ii. "Might I could play on the monkey bars?" (*first* condition)
  iii. "Could I might play on the monkey bars?" (*second* condition)
  iv. "Could I play on the monkey bars?" (*single* condition)

(7) a. Katie is confused by the many questions on a form. She says to her co-worker:
  b. i. "Might should I fill out this section?" (*joint* condition)
  ii. "Might I should fill out this section?" (*first* condition)
  iii. "Should I might fill out this section?" (*second* condition)
  iv. "Should I fill out this section?" (*single* condition)

In all items, the first sentence (a) was a context sentence, which introduced two characters and a particular setting. The second sentence (b) was the target *yes/no* question, reflecting one of the four levels of INVERTED MODAL. This was given as a line of dialogue spoken by one character to the other. Contextual dialogue was used in order to investigate

[6] Although Di Paolo (1986) recruited two groups of participants, from Dawson County and Rusk County, she did not report any significant differences in inter-group inversion patterns. Thus, the present study used a single, state-wide grouping of Texas English speakers.

[7] The modal in the *single* condition corresponded to the second modal in the other conditions. Since first-place *might* primarily contributes to the "hedging, politely suggestive, and nonintrusive" sense of the double modal construction (Di Paolo 1989: 198), this accordance ensured that the underlying sense of the construction—e.g. ability or permission—was maximally preserved in the *single* condition.

non-standard forms that may be restricted to spoken registers (Henry 2005, Hasty 2014), despite the study's reliance on written experimental materials.

32 filler items appeared alongside the test items in the experiment. Eight declarative sentences containing either *might could* or *might should* (8) were used to identify speakers whose judgments reflected local double modal dialects and not the prescriptive norms of Standard English (Henry 2005). Eight double modal items involved either unacceptable—or at least extremely rare—modal combinations (9) (Mishoe and Montgomery 1994, Montgomery and Nagle 1994, Fennell and Butters 1996) or a non-infinitive verb following the modals (10). The remaining fillers consisted of acceptable/unacceptable Standard English items as distractors.

(8) a. Julie is thirsty from playing in the yard. Her mother says:
b. "I might could make us some iced tea." (*DM-acceptable*)

(9) a. Sally is excited and jumping on the bed. Her mother says:
b. "You could might get hurt doing that." (*DM-unacceptable*)

(10) a. Paul is looking for a particular brand of cereal at the store. A clerk says:
b. "We might could ordered it in for you." (*DM-unacceptable*)

4.1.4 Procedure

The test items for the experiment were divided among four lists in accordance with a Latin-Square design. Each list contained 32 unique test items (eight per condition), which were supplemented by eight practice items and 32 fillers; therefore, each participant saw 72 stimuli in total. The test items and fillers were presented in a pseudo-randomized order such that at least one filler intervened between each pair of test items.

The experiment was implemented as a web-based survey, created and hosted using the software Ibex Farm (Drummond 2013). The experiment took approximately 15–20 minutes in total to complete.

At the beginning of the experiment, a participant read a description of the acceptability judgment task and was advised to rate each sentence according to its naturalness in his or her local dialect. A sentence was defined as *natural* if the participant "might utter it, or some sentence like it, to friends or family." This instruction emphasized (i) what an individual speaker could say and (ii) informal, conversational usage, thus minimizing the bias of Standard English prescriptivism in participants' judgments concerning the non-standard double modal construction (Henry 2005, Hasty 2014).

Each experimental trial was presented as a pair of sentences in the center of the participant's computer screen. A 7-point Likert scale appeared below the sentences as a set of boxes labelled 1–7 (additionally, 1 was labelled "Unnatural" and 7 was labelled "Natural"). The participant was asked to judge the acceptability of the target sentence by clicking one of the boxes with the mouse, or by typing an appropriate number on the keyboard. The software then recorded the participant's response as a scalar value (1–7).

4.2 Results

Acceptability ratings were initially z-score transformed (Schütze and Sprouse 2013) to mitigate scale bias, such as that resulting from some participants using only a subset of the scale. However, for comparison, analyses were performed on the raw ratings as well as the transformed ratings, and similar results were obtained. For ease of interpretation, the results reported in this section reflect the raw acceptability ratings. All analyses were conducted in R (R Development Core Team 2016).

4.2.1 Filler items

The filler items were designed to identify participants who were not making judgments on the basis of prescriptive norms, but whose judgments rather reflected an acceptance of the non-standard double modal construction. A participant was considered to accept double modals if his or her mean z-score rating for *DM-acceptable* was greater than or equal to 0. That is, the participant judged such items to have above-average acceptability.

By the above criterion, 108 participants recognizably accepted double modals in their local dialects. Of this subset, 44 were from Kentucky, 27 were from Tennessee, and 37 were from Texas. Figure 1 gives the mean (raw) acceptability rating for each filler type in the experiment for all 247 participants. Figure 2 gives the mean rating for each filler type among the subset of participants who accepted double modals in declarative sentences.[8]

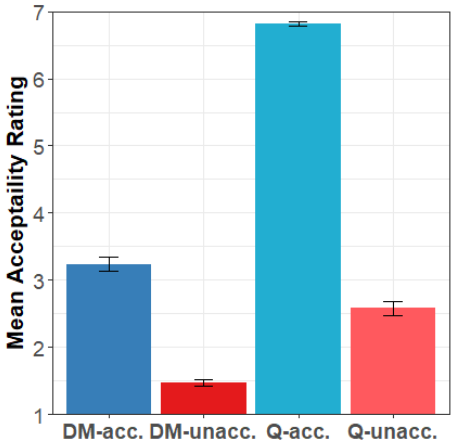

Figure 1: Mean rating of filler items (247 participants)

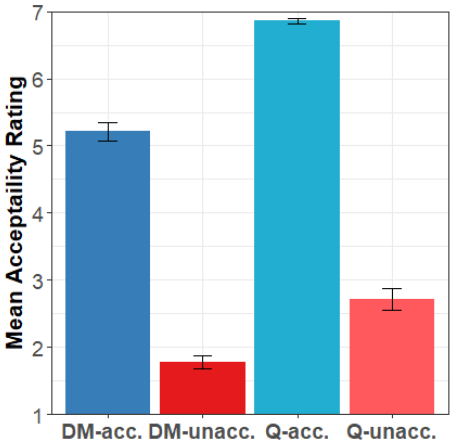

Figure 2: Mean rating of filler items (108 participants)

[8] *DM-unacceptable* included four items with unacceptable/rare modal combinations and four with double modal-verb form mismatches. For this subset of participants, items containing *could might* and *should might* (mean = 1.66, SE = 0.07) were rated slightly lower than items with modal-verb mismatches (mean = 1.91, SE = 0.08). This indicates that for these speakers, while *might could* and *might should* are readily available in the grammar, *could might* and *should might* are not. Hence, in the present analysis, *might* is always interpreted as a first-place modal, and *could* and *should* are always interpreted as second-place modals.

4.2.2 Test items

Analyses were carried out on the test data from the 108 participants who accepted the double modal construction. Among these participants, the *single* control condition was consistently rated high (mean = 6.85, SE = 0.021), and was excluded from subsequent analyses. Figure 3 gives the mean acceptability rating for the remaining three levels of INVERTED MODAL in each region.

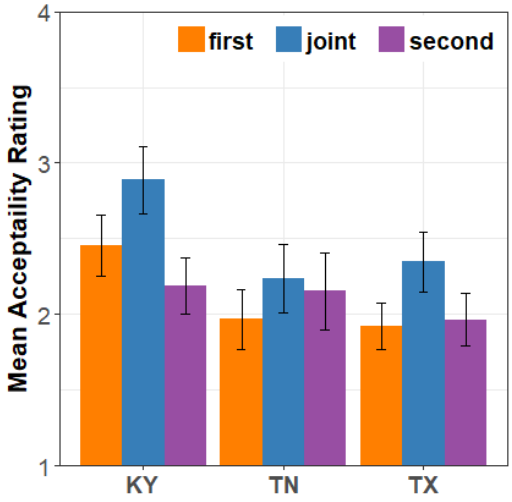

Figure 3: Mean rating of test items

To compare acceptability ratings for *joint* inversion against those for *first* and *second* inversion, a linear mixed-effects model (Bates et al. 2015) was fit with INVERTED MODAL and REGION as fixed factors, and item and participant as random factors. Likelihood ratio tests revealed a main effect of INVERTED MODAL ($\chi^2(2) = 55.53$, $p < .001$), but no significant effect of REGION ($\chi^2(2) = 3.32$, $p = .19$). Overall, across the three regions, *joint* was rated significantly higher than *first* (est. $= 0.37$, SE $= 0.06$, $t = 5.68$, $p < .001$); *joint* was also rated significantly higher than *second* (est. $= 0.39$, SE $= 0.07$, $t = 6.01$, $p < .001$). There was a significant interaction between INVERTED MODAL and REGION ($\chi^2(4) = 17.04$, $p < .01$). While *joint* was rated higher than *first* in all three regions, and *joint* was rated higher than *second* in Kentucky and Texas, *joint* and *second* were rated similarly in Tennessee.

The regional data were considered separately in three linear mixed-effects models fit with INVERTED MODAL as a fixed factor, and item and participant as random factors. In Kentucky, *joint* was rated higher than *first* (est. $= 0.43$, SE $= 0.11$, $t = 3.99$, $p < .001$); *joint* was also rated higher than *second* (est. $= 0.70$, SE $= 0.11$, $t = 6.57$, $p < .001$). A planned comparison of *first* and *second* indicated that *first* was rated higher (est. $= 0.27$, SE $= 0.10$, $t = 2.74$, $p < .01$). In Tennessee, *joint* was rated higher than *first* (est. $= 0.25$, SE $= 0.12$, $t = 2.04$, $p < .05$), but there was no significant difference between *joint* and

second ($p = .53$). A planned comparison did not reveal any significant difference between *first* and *second* either ($p = .13$). In Texas, *joint* was rated higher than *first* (est. $= 0.43$, SE $= 0.10$, $t = 4.14$, $p < .001$), and *joint* was rated higher than *second* (est. $= 0.38$, SE $= 0.10$, $t = 3.72$, $p < .001$), but a planned comparison did not reveal any significant difference between *first* and *second* ($p = .63$).

Given the marginal ratings for the test items in general, planned comparisons were performed for *joint* and *first* against the filler condition *DM-unacceptable*. A linear mixed-effects model was fit with CONDITION (*joint*, *first*, *DM-unacceptable*) and REGION as fixed factors, and item and participant as random factors. Overall, *joint* was rated significantly higher than *DM-unacceptable* (est. $= 0.73$, SE $= 0.22$, $t = 3.32$, $p < .01$); however, ratings for *first* and *DM-unacceptable* were not significantly different ($p = .13$).

Individual regional models were also constructed with CONDITION as a fixed factor, and item and participant as random factors. In Kentucky, *joint* was rated higher than *DM-unacceptable* (est. $= 1.05$, SE $= 0.25$, $t = 4.20$, $p < .05$), but there was no significant difference between *first* and *DM-unacceptable* ($p = .07$).[9] In Tennessee, *joint* was rated marginally higher than *DM-unacceptable*, but this difference was not significant ($p = .08$); ratings for *first* and *DM-unacceptable* were not significantly different ($p = .22$). In Texas, *joint* was rated higher than *DM-unacceptable* (est. $= 0.53$, SE $= 0.11$, $t = 4.98$, $p < .001$), but ratings for *first* and *DM-unacceptable* were not significantly different ($p = .34$). Figure 4 gives the mean rating of *joint*, *first*, and *DM-unacceptable* in each region.

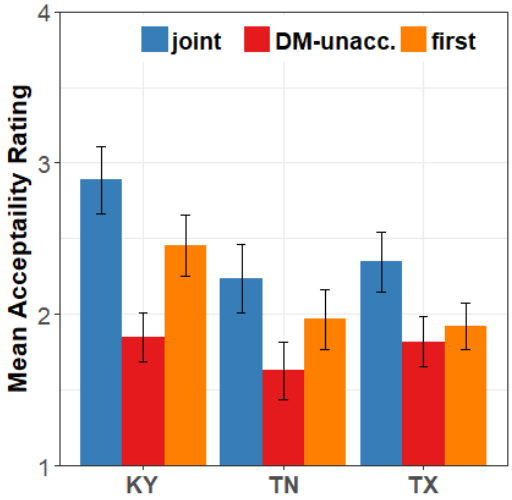

Figure 4: Mean rating of *joint*, *first*, and unacceptable double modal filler items

[9]In Kentucky, *first* was rated marginally higher overall. However, during planned comparisons, it was found that two older (50+) Kentucky English participants were outliers who did not rate *joint* significantly different from *first* ($p = .77$). After removal of these two participants from the regional model, the difference between *first* and *DM-unacceptable* was not significant ($p = .13$).

4.3 Discussion

The results of this experiment demonstrate that for at least a subset of SUSE speakers, inversion of a double modal construction in a *yes/no* question is at least marginally acceptable. Overall, and within each region assessed, participants rated joint subject-auxiliary inversion of a double modal significantly higher than inversion of a first modal. Since previous elicitation studies suggest that first modal inversion is unacceptable in SUSE (see Section 3.1), this result suggests that joint inversion, by contrast, is at least marginally acceptable in SUSE. Moreover, the results of planned comparisons showed that overall, and within each region, ratings for first modal inversion items and for unacceptable double modal filler items were not significantly different. By contrast, at least in Kentucky and in Texas, participants rated joint inversion items significantly higher than the unacceptable fillers. Although the difference between these conditions was only marginally significant in Tennessee, participants in this region still rated joint inversion items higher than first modal inversion items. These findings further suggest that joint inversion is acceptable in SUSE.

Although joint inversion items were preferred as compared to first modal inversion items in all three regions in the experiment, the relation between joint and second modal inversion acceptability ratings varied by region. In Kentucky and Texas, joint inversion was rated significantly higher than second modal inversion. However, no significant difference between these experimental conditions was found in Tennessee. These results suggest that, while joint inversion is preferred in Kentucky English and Texas English, joint and second modal inversion are equally available in Tennessee English.

The relationship between first and second modal inversion ratings also varied by region. While these conditions were not found to be significantly different in Tennessee and Texas, first modal inversion was rated significantly higher than second modal inversion in Kentucky. Since the acceptability judgment task in this experiment investigated the relative sizes of differences, rather than qualitative differences in acceptability (Schütze and Sprouse 2013), it is uncertain whether these results indicate some qualitative distinction in the status of first modal inversion in Kentucky English. It may be the case that first modal inversion is (at least marginally) acceptable for speakers of this dialect. Certain empirical facts challenge this hypothesis, however. First, in the present experiment, ratings for first modal inversion and unacceptable double modal filler items were not found to be significantly different in Kentucky: such a difference would be expected if first modal inversion is a generally accepted pattern. Second, to date, no elicitation study has found first modal inversion to be generally acceptable in any dialect of SUSE.[10] Therefore, it is unlikely that first modal inversion is generally possible in Kentucky English.

The results of this experiment can be compared to those of the large-scale elicitation studies reviewed in Section 3.1: Di Paolo et al. 1979, Di Paolo 1986, and Hasty 2012a.

First, in Texas English, Di Paolo et al. (1979) observe that, in a sentence completion task, their participants tended to add an additional modal in a fronted position; they thus

[10]To the authors' knowledge, double modal question-formation strategies have not been qualitatively assessed in Kentucky English, however.

conclude that joint inversion is acceptable in Texas English. This experiment supports this claim for Kentucky English and Tennessee English as well as for Texas English.

Next, Di Paolo (1986) reports a sentence imitation task study in which Texas English participants preferred to invert a second modal in forming questions with *might could* but exhibited no dominant preference for either joint or second modal inversion with *might should*. While the present experiment did not address lexical differences between modal combinations, the results suggest that Texas English speakers prefer joint inversion overall. This divergence is possibly due to methodology. Since the order of alternative question formulations in Di Paolo 1986 was not randomized, for *might could* items, participants most often heard second modal inversion last. Thus, a serial position effect (Colman 2009) might have biased participants toward selecting this pattern for *might could*.

Sociolinguistic factors are another possible source of discrepancy. Di Paolo (1986) restricted her sample to members of long-time, relatively non-mobile families from Dawson County (West Texas) and Rusk County (East Texas). In contrast, the participants in this experiment were recruited from the University of Texas at Austin community, whose home counties were distributed throughout the state: the regions with the greatest representation were the Upper Gulf Coast (24.3%), North Texas (21.6%), and Central Texas (18.9%). Thus, the results may reflect dialectal differences between geographic regions of Texas. They may also reflect age or generational differences: Di Paolo (1986) considered three generations of speakers at the time of her study, whereas the majority of Texas English speakers in this experiment were between ages 30 and 50 (54.1% were aged 30–39; 21.6% were aged 40–49).

To investigate these possibilities, separate linear mixed-effects models of the Texas test data were constructed with INVERTED MODAL and either GEOGRAPHIC REGION or AGE RANGE as fixed factors, and item and participant as random factors. Likelihood ratio tests found no significant effect of GEOGRAPHIC REGION ($\chi^2(6) = 4.13$, $p = .66$); there was no interaction between GEOGRAPHIC REGION and INVERTED MODAL, either ($\chi^2(12) = 16.60$, $p = .17$). By contrast, while there was no main effect of AGE RANGE ($\chi^2(2) = 0.20$, $p = .90$), there was an interaction ($\chi^2(4) = 14.33$, $p < .01$): for older (60+) speakers, *joint* and *second* ratings were not significantly different ($p = .20$). The results from this group may reflect Di Paolo's (1986) earlier observation that both joint and second modal inversion are (at least marginally) available in Texas English; if so, the tendency of younger speakers to prefer joint inversion in the present study may indicate a syntactic change in progress. This hypothesis might be tested in a follow-up study by consulting with larger samples of Texas English speakers from each age group.

Finally, Hasty (2012a) used a respondent-generated question formation task and a binary forced-choice task with Tennessee English speakers. Both tasks revealed a preference for second modal inversion, whereas the present experiment found no significant difference in acceptability ratings between joint and second modal inversion for Tennessee participants. Regional differences may have impacted these results. While Hasty (2012a) recruited speakers in the Tri-Cities area (Eastern Tennessee), only 33.3% of the Tennessee English speakers in this experiment were born and raised in Eastern Tennessee; the largest

group were from Middle Tennessee (48.1%). Similarly, participant age may have affected the results: while the participants in Hasty 2012a were equally distributed by age range (19–29, 30–59, 60+), the majority of Tennessee English speakers in this experiment were under age 40 (63.0% were aged 30–39; 22.2% were aged 20–29).

To explore these potential effects, linear mixed-effects models of the Tennessee test data were constructed as above, with either GEOGRAPHIC REGION or AGE RANGE defined as a fixed factor. Likelihood ratio tests found a main effect of GEOGRAPHIC REGION ($\chi^2(3) = 9.35$, $p < .05$) and an interaction ($\chi^2(6) = 14.91$, $p < .05$): in Eastern Tennessee, in contrast to the other areas, *second* was rated slightly higher than *joint*, although this difference was not statistically significant ($p = .13$). The results from this area may reflect the preference for second modal inversion that Hasty (2012a) previously observed in Eastern Tennessee. Consequently, it may be that there are true regional differences in inversion patterns within the state, and that different areas exhibit either the exclusive availability of second modal inversion or the availability of both joint and second modal inversion. A follow-up study with larger samples of speakers from each intra-state region might test this hypothesis. There was no significant effect of AGE RANGE ($\chi^2(2) = 1.25$, $p = .53$) and no interaction between AGE RANGE and INVERTED MODAL ($\chi^2(4) = 4.67$, $p = .32$).

The results of this experiment provide a means of evaluating theoretical approaches to the SUSE double modal construction. As noted in Section 3.2, previous analyses predict the availability of either joint inversion (Di Paolo 1989), second modal inversion (Hasty 2012b), or both joint and second modal inversion (Battistella 1995). Notably, none of these analyses predict first modal inversion to be possible: the results of this experiment support this hypothesis for Kentucky, Tennessee, and Texas Englishes. Furthermore, the results show that joint inversion is at least marginally acceptable in some regional variants of SUSE; however, second modal inversion is also acceptable, at least in Tennessee English. Thus, the restrictions of the previous analyses cannot be generalized across SUSE. Instead, an adequate theoretical analysis of the SUSE double modal construction must account for regional variations in the relative acceptability of joint and second modal inversion.

5. Conclusion

This experiment investigated the relative acceptability of double modal inversion patterns in questions in SUSE. In a web-based acceptability judgment task study, it was found that participants generally preferred joint subject-auxiliary inversion of double modals, as compared to first and second modal inversion. Moreover, judgments were found to vary by region: in Kentucky and Texas, participants demonstrated a significant preference for joint inversion overall, whereas in Tennessee, there was no significant preference for joint inversion as compared to second modal inversion.

This observed regional variation cannot be immediately reconciled with previous theoretical analyses of the SUSE double modal construction, which predict the exclusive availability of joint, second modal, or both joint and second modal inversion. To adequately account for observed variations in the accepted patterns of inversion, one potential avenue

is a Tree Adjoining Grammar (TAG) based model of double modals, in which first-place modals are introduced via separate auxiliary trees that adjoin to the main clausal elementary tree. This possibility is explored in Williamson 2018.

It remains for future work to generalize beyond the scope of the present study. Double modal inversion patterns in numerous regional varieties of SUSE, such as Alabama English and Louisiana English, remain to be investigated. It also remains for future work to determine the extent to which sociolinguistic variables such as educational background, social class, and age influence speaker judgments for double modal inversion in SUSE.

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