

## Vowel-Rounding in Bahrain: An accommodation study based on perceived interlocutor identity\*

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ملخص:

يهتم هذا المقال بكيف يغيّر متكلمو العربية في البحرين خياراتهم اللهجية وخصوصا استخدامهم لما نسمّيه تدوير حرف الألف الصوتي *vowel – rounding* على حسب الخلفيات الاجتماعية لدى المتكلمين بالإضافة إلى الخلفية الاجتماعية لدى محاورهم. ويقدم هذا المقال نتائج تجربة لغوية من نمط "سؤال وجواب" من ٠٣ مشتركين مقيمين في البحرين في العشرينات والثلاثينات من العمر. وتشير النتائج إلى أنّ أهم الدوافع للتغيرات الملحوظة هي الجنس واللهجة التي يتكلمها المشترك. وقد اكتشفنا أنّه يتم تدوير صوت الألف بشكل أقوى في اللهجة السائدة اجتماعيا في البحرين، وأنه أقوى أيضا عندما يحاور المشترك المحاورين الذكور. وإضافة إلى ذلك تستخدم المشاركات الإناث في المجتمع السائد التدوير أكثر من المشتركين الآخرين.

### Abstract

This paper is interested in how Arabic speakers in Bahrain vary their dialect choices and in particular their use of vowel-rounding based on both their own social background and the perceived identities of their interlocutors. It presents results to a Q&A style elicitation task using the verbal response sentences of 30 native speakers in their 20s and 30s residing in Bahrain. The findings indicate that the participants' dialect choice and their interlocutors' gender affect use of rounding. More specifically, the degree of rounding, measured as F2, is increased (F2 is lowered) when speaking in the "mainstream Bahraini" dialect, which coincides with the socially dominant ethnic group. F2 is further lowered when speakers interact with male interlocutors. Additionally, rounding is exhibited most frequently in women from the socially dominant group.

**Key words:** vowel rounding, acoustic phonetics, labialization, Bahraini Arabic

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# 1 Introduction

An old Arabic proverb states, “Every situation has a manner of speech.” (*li kulli maqaamin maqaal*) This expression is often invoked to clarify that a particular situation necessitates a certain comportment that is appropriate to that situation. While the proverb does not usually explain sociolinguistic variation, the idea that one is expected to behave according to the social space one occupies can be thought of as linguistic accommodation, in that a particular situation or interaction may motivate shifts in one’s speech patterns. Studies on linguistic accommodation have shown that speakers vary both the types and frequencies of linguistic features used according to the social spaces they navigate, as well as how they perceive the identities of their interlocutors (Giles, 1984; Giles, Coupland, and Coupland, 1991; Watt, Llamas, and Johnson, 2010).

This study utilizes a third-wave variationist approach to studying dialect variation in Bahrain, focusing on the phenomenon of vowel-rounding in a speech community of ethnolects. Using the frameworks of indexicality and linguistic accommodation, the paper is interested in how Arabic speakers in Bahrain vary their dialect choices and their use of vowel-rounding based on their own social background as well as the perceived identities of their interlocutors. It presents results to a Q&A style elicitation task using the verbal response sentences of 30 native speakers in their 20s and early 30s currently residing in Bahrain. The acoustic results indicate that the interlocutors’ gender and participants’ response dialect choice significantly affect degree of rounding by participants. Auditorily coded data are further presented to triangulate findings.

## 1.1 Background

The linguistic situation in Bahrain presents a compelling case to study. Despite the small geographical size of the archipelago of Bahrain, there is a large degree of linguistic diversity. Each neighborhood has some distinct dialectal features, which previous studies have noted to intersect with ethno-sectarian affiliation (Al-Qouz, 2009; Al-Tajir, 1982; Holes, 1987). There are two such Arabic dialect groupings within Bahrain: the dialect of the Sunni Arab Bahrainis, and that of the Shi‘i Baḥārna (sg. Baḥrāni). Of these, the ‘Arab Bahrainis are of the demographically smaller but socially dominant group, with Najdi ancestry (Al-Rumaihi, 1976; Holes, 1987; Johnstone, 1967; Karimi, 2003). The demographically larger group are the Shi‘i Baḥārna, who were the previous dwellers of Bahrain prior to the ‘Arab’s arrival (Khuri, 1980). The marginalization currently experienced by the Baḥārna community members can be traced back to the 18th century occupation and settlement of the Najdi-originated Āl Khalifa family, who remain the rulers of Bahrain today (Al-Tajir, 1982; Johnstone, 1967; see Holes, 1987; Karimi, 2003, and Sokhey, 2019 for further details on the social structure of Bahrain). Following the traditional scholarship, and for ease of comparison with previous literature on Bahrain (Holes, 1987), the Sunni ‘Arab group will henceforth be called “A,” while the Shi‘i Baḥārna group will be called “B”.

In general, the B dialectal features in particular have been noted to be receding and merging toward the mainstream, socially dominant A type (Holes, 1987). Of the ethnolectal markers documented, the most salient and frequently studied features are the A-dialectal y variant and B-dialectal j (occurring in MSA as j). These are included in the experimental design in this study, alongside two other, less salient ethnolectal features: the A-dialectal d and B-dialectal d (MSA d), and the word ‘ent (A dialect) ~ ‘enta (B dialect) ‘you, m.sg’. (For detailed studies of these and other communal markers, see Holes, 1987 and Al-Qouz, 2009). The noted features are included in the present study since we are interested in evaluating the social status of vowel-rounding within the roughly bi-dialectal Arabic context in Bahrain.

My fieldwork in Bahrain, conducted in 2017-2018, showed variation of the rounded long vowel [a:],

in that it was often realized as [ɔ:]. Holes noted, based on data collected in the 1980s, that the rounded vowel was a regional feature of Muḥarraḡ island, and particularly of Muḥarraḡi women (Holes, 2021, p. 67). Twenty years later, Al-Qouẓ (2009) observed [ɔ:] to occur specifically in the first syllable of the A-dialect first-person pronoun 'aana. As I later demonstrate, the A-dialect form 'aana is usually rounded when it is produced, but not necessarily.

Culturally, the island of Muḥarraḡ holds a special regional significance both internally, within Bahrain, as well as transnationally, in neighboring Gulf countries. Prior to the relatively recent (20th century) oil boom and subsequent modernization efforts that transformed Manama into Bahrain's financial hub, Muḥarraḡ was the old city and economic hub of Bahrain in its pearling era. After a period of neglect, recent efforts were made to revive and preserve the heritage of Muḥarraḡ, and the region has recently become a UNESCO World Heritage Site. Linguistically, the Muḥarraḡi dialect further coincides with mainstream Bahraini, which covaries with A-community (Holes, 1987). The situation of Muḥarraḡ dwellers, in which A and B groups live side by side, is often cited by Bahrainis as an example of coexistence between the main ethnic groups, whose positions are often constructed by outsiders to be absolutely polarized. In day-to-day life, many A and B group members interact naturally, and intermarrying occurs (Karimi, 2003).

During my fieldwork, I observed many ideological references of Bahraini authenticity attached to the island of Muḥarraḡ, its people, and most certainly its dialect. These ideological developments are logical, given Muḥarraḡ's symbolic status representing the "old Bahrain," prior to the arrival of massive numbers of expat workers, coinciding with large modernization efforts that have shifted the cultural landscape. The attachment of these authentic Bahraini reference points have been circulated not only within Bahrain but also abroad, via comedic sketches by Kuwaiti comedians and show hosts, for example. This has been ongoing since at least the 1980s, notably in the Kuwaiti actor Abdel-hussein Abdelredha's performance in the famous play, "Bye Bye London." In the comedic segment, Abdelredha is seen reading a fan-mail from a Bahraini admirer, and proceeds to read the letter in an impersonation of what he interpreted to be the "Bahraini dialect." In the impersonation, the female admirer was noted to be from Muḥarraḡ, and exaggerated use of rounding in words like Bōrby for the character's nickname, Bārby, and salōmy instead of salāmy "my greetings," was put into play. Today, the Bahraini "accent" continues to be both ridiculed as unrefined and also regarded as "cute" and novel abroad, a double-edged attitude that is known to Bahrainis and that likely feeds back into internal sentiments surrounding this sound. Current social media trends and my conversations with many Bahrainis further revealed a fascination with the unique Muḥarraḡi dialect. While much of the regional features have receded (see Holes, 1987, 2021), my observations show that a large number of speakers have adopted specifically the Muḥarraḡi rounded vowel widely in their speech.

Occurring in A and B dialects, rounding is not uniform, and can range from auditorily strong to weak. Generally, rounding can be observed in stressed, closed or open syllables wherever long [a:] is present, such as:

- (1) Long vowel [a:] → [ɔ:]  
 e.g. baačir → bɔɔčir 'tomorrow'  
       'aana → 'ɔɔna 'I, me' (A dialect)  
       kalimaat → kalimɔɔt 'words'  
       'almaania → 'almɔɔnia 'Germany'

- (2) In satirical performances only, rounding is often extended to the short vowel [a] → [ɔ].  
 e.g. il- baḡreen → il- bɔḡreen 'Boḡrain'<sup>1</sup>

<sup>1</sup>Used by comedian Shuaib Rashed in the YouTube show, "Swar Shuaib" to poke fun at the speaking style of a Bahraini social media influencer.

While vowel-rounding can occur surrounding any type of consonant, it is strongest in vowels following labials and weaker and inconsistent following coronals. Velarized, velar and uvular sounds /r<sup>v</sup>, ɫ, t<sup>v</sup>, d<sup>v</sup>, s<sup>v</sup>, g, q, ɣ/ tend to block rounding, but even in these environments, some degree of rounding may seldom occur.

My observations reveal that rounding has spread today across speakers of both A and B backgrounds, and that the meanings being indexed are linked to the Muḥarraqi identity. Through this study, I explore the importance of rounding in real-time interactions via the following research questions:

1. Is rounding a marker of a particular community? In other words: Does rounding covary with marked communal features in the speech of the participants and their interlocutors, or with participants' dialect choice?
2. Does gender affect rounding? I.e. does participants' use of rounding covary with feminine qualities as previously hinted, and additionally, is it affected by the interlocutors' gender?
3. Is there accommodation toward the rounded vowel (ɔ:) by the participant when interacting with an interlocutor who rounds or doesn't round?

## 1.2 Theoretical Framework

This study draws on the theories of indexicality and accommodation. It examines language variation through the framework set forth within third-wave sociolinguistics, which is interested in the process of identity-making. This approach views agency as something that does not require conscious intention, and attributes variation—whether or not it is strategic—to social motivations that are situated in interactions (Eckert, 2016). Of particular importance is the notion that there exists a field of related indexical values, which are ideologies or social meanings that can be invoked by a particular feature, or some combination of a set of features (Eckert, 2008a). The relationship of these indexical values to each other, and the processes of their deployment and evolution, are central to third-wave sociolinguistics, and to the analysis of variation in the present study. Therefore, a brief overview of the concept of indexicality is warranted. Drawing on the works of Silverstein (2003), I study this process in terms of his “orders of indexicality”.

Silverstein argues there are various ‘orders’ or statuses that a particular index may hold. First-order indexicality simply indexes membership in a certain population and generally lies below the level of consciousness (e.g. Detroiters, Martha's Vineyarders, 'Ammani speakers in Al-Wer, 2007; Eckert, 2008b; Silverstein, 2003). This particular linguistic form then becomes available to anyone for use to index a particular (eg. regional / national) identity. If this happens, as soon as the feature is recognized as such, the indicator gains second-order indexicality and becomes a “marker,” which may then be used to index specific social characteristics associated with the group (Silverstein, 2003). If metapragmatic observation occurs, the marker gains a conscious, “stereotype” status, and may be perpetually negotiated and renegotiated by its users, who may assign “higher” orders of indexicality each time it is used (Eckert, 2008b; Silverstein, 2003). Silverstein notes that this process isn't linear, and Eckert (2008a) along with Rampton (2013) and others note that a particular marker isn't simply associated with a single meaning. Rather, an “ideological field” of (possibly overlapping) meanings exists, and any number of these meanings may be indexed contemporaneously via a single linguistic form (Eckert, 2008a). Eckert emphasizes that these fields of indexicality are not static, but rather a continuous process of reinterpretation at any moment, and thus new meanings may be assigned to a particular index via ideological moves.

Because an index can be assumed to be perpetually undergoing renegotiation, the social situations in which these indexes are used are important for understanding the process in which they are created, and in which they are harvested by a particular group to create distinct forms of identities. As such, the ongoing performance (whether staged or unstaged) of these indexically loaded features, and thus the ideological values they hold, plays a vital role in speakers' reification and remixing of the existing archetypes of identities (Butler, 1988; Bauman, 1984; Bucholtz and Lopez, 2011). As this study is interested in accommodation that occurs in real-time exchanges at the interactional level, as well as in gauging how participants vary within and across their ethnic communities, it takes into account that the role of the interactant in influencing production of certain features is as important as the speaker's background. As Watt, Llamas, and Johnson (2010) note, accommodation can take a convergent form, in which speakers will adjust the frequency of forms in their speech which match those of their interlocutors, which may be used to reduce the socio-psychological difference from their interactants, or a divergent form, in which the opposite occurs and in which socio-psychological distance may be maintained or increased.

This paper thus seeks to move the discussion of sociolinguistic variation in Bahrain from a sectarian-based approach to one based on the assumption that moment-to-moment interactions shape the ideological moves that are made by speakers when using particular speech forms. Thus, it involves the study of socio-ethnic identity as variable with every interaction. Theorizing the linguistic expression ethnicity through style and variation, Sharma and Rampton (2015, p. 15) posit that speech accommodation involves "a set of resources that speakers deploy both intentionally and automatically in their day-to-day practice", and propose studying variation through interactional analysis, which examines how variables shift depending on the type of interaction and identity of the interlocutor. Keeping in mind that the linguistic features involved in creating any given identity or persona type are combinative in nature (i.e., involve a set of linguistic features, each individual member of which can carry its own indexical meanings; Eckert, 2008a, 2016), this paper examines variation of the long /a:/ vowel in the context of Bahrain through the frameworks of accommodation and indexicality.

### 1.3 The acoustics of Rounding

Acoustically speaking, the process of rounding involves "a secondary articulation in which lip rounding is added to a sound," usually involving "bringing the corners of the lips towards one another so that the mouth opening is reduced" (Ladefoged and Johnson, 2011). This can involve two main gestures: 1) rounding, which reduces the space between the lips by vertical or horizontal compression, and 2) protrusion of the lips which lengthens the vocal tract, and which commonly accompanies horizontal rounding (Heffner, 1960; Zeroual, Esling, and Hoole, 2011). The second type is more common across languages, and is often associated with labialized back vowels (Sweet, 1890). Acoustically, both of these gestures produce the same effect of lowering (usually higher) formant frequencies (Laver, 1980). F2 in particular provides a distinctive cue for labialization, and is lowered at the onset and midpoint of the vowel following the labialized segment (Zeroual, Esling, and Hoole, 2011).

Recent studies have employed multimodal methods of acoustic analyses involving visual cues on processes involving lip-rounding (Harrington, Kleber, and Reubold, 2011; Havenhill, 2015; Majors and Gordon, 2008). Using F2, in addition to other modes of measurement, Havenhill (2015) found that while some speakers used multiple gestures to maintain /a/ and /ɔ/ contrast, others used only tongue-fronting or lip-unrounding alone to produce fronted /ɔ/.

In my auditory observations, rounding in some participants was audibly coarticulation-like, meaning labialization (particularly following labial consonants) was audible not only in the vowel, but also at the consonantal release. This suggests that it is possible that multiple gestures were used to achieve labialization in the dialects of Bahrain. While utilizing a multimodal method for acoustic analyses

is valuable, collecting visual cues is culturally not preferred or appropriate in the context of Bahrain. Additionally, since F2 is a strong indicator of rounding, and since it will allow us to bypass issues with nasal bilabials confounding F1, this study will utilize F2, coupled with auditory coding of the vowels (as perceived by the researcher), to measure rounding.

## 2 Methods

### 2.1 Participants

The data for this study were gathered between September 2017 and July 2018 in Bahrain. Of the 57 speakers interviewed in total, data from 30 participants who are closer in age (20-30 years of age) and education (i.e. those who are currently studying for or hold an undergraduate degree) were analyzed. This controls for comparability, since the remaining participants are from different age groups and starkly different socioeconomic backgrounds, or have mixed heritage that may influence the results. The 30 participants come from a variety of regions within Bahrain, including: Manama, Muḥarraḡ (Busaiteen and Arad), Sitra, Nuweidrat, Buri, Sanabis, Jablat Habshi, Juffair, Diraz, Isa Town, Budaiya, Bilad Al-Qadim, and some others (See Holes, 1987 for further details on these neighborhoods). Table 1 summarizes the participants by their communal background and by gender. Of the 30 participants included, there were 14 women and 16 men, 11 of whom were from the A community and 19 of whom are from the B community.

<b>Table 1. Number of participants by background and gender</b>						
A Women	5	B Women	9	Total Women	14	
A Men	6	B Men	10	Total Men	16	
A Total	11	B total	19	Total Participants	30	

### 2.2 Experiment

The experiment consists of a simulated Q&A style elicitation task that targets production of token words containing orthographic alif, phonologically the long /a:/ vowel, and tests for evidence of dialect accommodation toward a particular community (A or B) when responding to stimuli voices in A or B dialect, containing either a rounded or unrounded vowel. In this task, participants listened to 32 short “yes or no” questions produced by 4 native speakers from Bahrain. Each question contains one 2-3 seconds-long sentence produced either in the Bahraini (A) or Baḡrāni (B) dialect, and one target word containing either a rounded /ɔ:/ or unrounded /a:/ vowel. These target words, which are meant to test for accommodation toward rounding, are dialect-neutral, but the rest of the sentences each contain 1-3 features marking communal dialect identity. These were the highly salient A ~ B dialectal markers: y ~ j, the somewhat lesser salient markers: ḡ ~ d, and the words enta ~ ent ‘you, m.sg’. The target words chosen were items I had previously observed to possibly contain rounding, and the carrier questions were chosen based on topics I frequently heard around the university campus where I recruited the majority of the participants. The stimuli sentences were meant to simulate naturalistic questions that come up in the midst of a conversation. The preceding consonants included in the target words include labials: /b, m, w/, and the word ‘aana.

The following is an example of a pre-recorded question, with a sample response. The presence or absence of rounding is indicated in parentheses while the dialect markers are in brackets. Note that the vowel in waajid / waayd was kept unrounded in the stimuli. But there was variation in the participants’ response for these words, which were coded for. Participants were told to reply always in the negative, so as to elicit the negative particle maa, and to restate the entire sentence.

- (3) ʃandik wa:[y]d rabaʃ fi alm(a:)nya? (A-dialect)  
 ‘Do you have a lot of friends in Germany?’  
 RESPONSE e.g.: lə: m(ɔ:) ʒandi w(a:)[y]d rabaʃ fi alm(ɔ:)nya (A-dialect)  
 ‘No, I don’t have a lot of friends in Germany’

The elicitation task thus involved reproducing the target tokens, which contain the /a:/ vowel, alongside other phonetic markers of either A or B communal affiliation. The experiment was administered in person: the researcher sent each participant a link to the elicitation experiment via WhatsApp. Using the Qualtrics survey platform, the researcher instructed the participants how to take the survey via their mobile phone. A set of 4 warm-up questions not containing any target sounds were given with the researcher in the room to ensure that participants could complete the survey correctly. Participants manually clicked on the play button themselves in order to play a pre-recorded question (played through earphones connected to their mobile phones) to which they verbally responded. To capture their responses, participants were dressed at the same time with a Shure unidirectional microphone headset connected to a Zoom H4n recorder, set to mono mix at a sampling rate of 44.1 kHz. The researcher then left the room for the duration of 10-15 minutes so that participants could complete the entire survey alone. Participants were not told which dialect to use, but to simply respond with “the first thing that comes to mind.” Follow-up interviews were conducted but not analyzed for this study.

## 2.3 Analyses & Vowel Measurements

I transcribed the data by hand at the sentence level in Praat. The data were then forced-aligned<sup>2</sup>, and I hand corrected the boundaries at the word and phoneme levels. I then coded each sentence for the following: whether or not there was rounding in the stimuli questions (categorical: Round/Unround), communal background of participants (A/B) and the dialect of the stimuli questions (A/B), gender of participants and interlocutors (F/M), the dialect in which the participants responded (A/B), and the auditory quality of each of participant’s vowel, coded as unrounded (a:), backed and somewhat rounded (A:), and clearly rounded (O:).

F2 values at the vowel onset were extracted automatically using a Praat Script for each of the target productions. FIG 1 demonstrates placement of F2 measurement in the item (ma:) about 20% into the vowel. Additionally, each vowel was also measured at midpoint (50% into the vowel), but as mentioned above, some participants were audibly observed to produce more coarticulatory-like gestures involving rounding at the consonantal release, and F2 at onset proved to be the site where most variation was observed.

## 3 Results

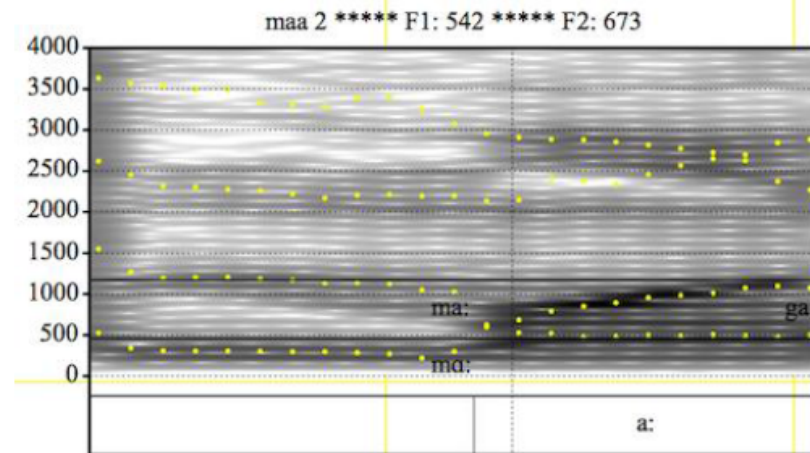
### 3.1 Auditory Trends

Table 2 displays the total number of raw tokens (prior to removing outliers) in the words analyzed. Initially, additional data were gathered on the /a:/ vowel following velars /g/ (215 tokens), and preceding velarized /rʁ/ (234 tokens) consonants as well, but as noted in the introduction, these were found to be environments that blocked labialization, so they are excluded. Additionally, environments in which /a:/ follow alveolar /t/ were excluded as rounding was sporadic and significantly lighter, and some words were not dialect neutral, eg. (B) istaad ~ (A) istaaḍ ‘professor’ (477 tokens).

This leaves 1,704 observations of bilabials, labiovelars and glottal environments preceding /a:/, in

<sup>2</sup>Forced-alignment was made possible thanks to Jalal Al-Tamimi, who developed a forced-alignment system for Arabic dialects using MAUS automatic segmentation system implemented in PraatAlign.

**FIG 1. Autogenerated screenshot from Praat script: Image of (ma:) showing point of F2 extraction (vertical dotted line at 20% into vowel; asterisks not meaningful)**



which variation in rounding was most clearly observed/audible. There were some missing words, especially in aana, which only exists in A-dialect and was thus only produced by the participants who produced that dialect. For this reason, the subset aana was analyzed separately. Similarly, the subset waayd ~ waajid is not dialect neutral, as it contains the y ~ j markers within the word, and one of the words, waayd, contains a diphthong, which requires a different method of acoustic analyses. Due to space constraints, the subset waayd ~ waajid was thus excluded from analyses (423 tokens). This left a total of 1,281 raw tokens in the bilabial and glottal 'aana groups. After assumptions of linearity were checked, and outliers were identified using a script in R and removed once across the 30 participants that were subjected to statistical analysis, the final token count is 1,162 bilabials. The items included in this subset are the negative particle maa, and the words almaanya 'Germany' and baačir 'tomorrow'. The boxplots in FIG 2 show F2 in the three different vowel realizations as auditorily perceived by

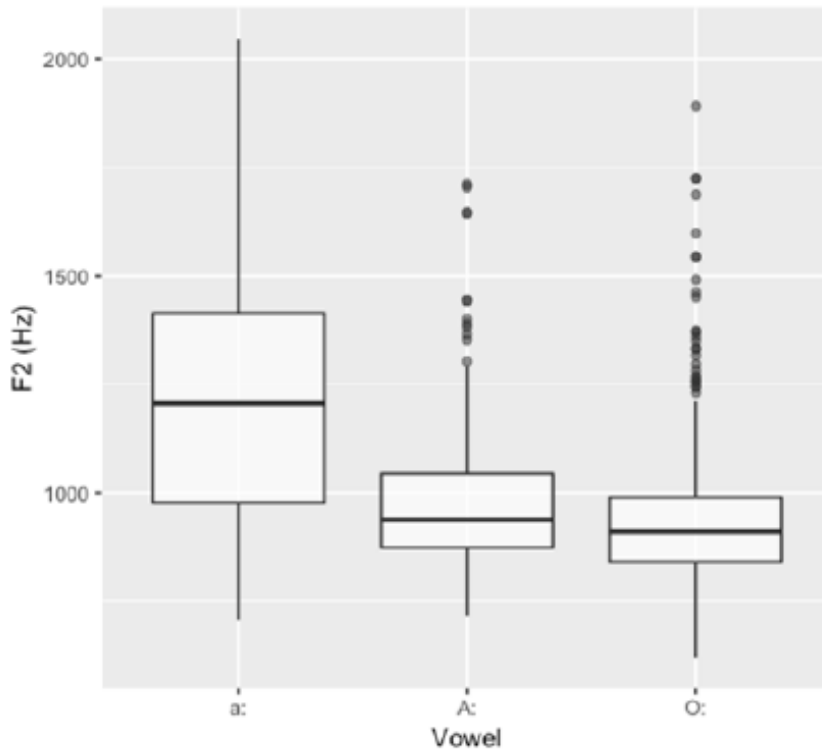
**Table 2. Token count of words analyzed**

Word	n (raw)
TOTAL	1,281
maa	719
almaanya	230
baačir	230
<b>Additional Set:</b>	
'aana	102

the researcher. Tokens were auditorily coded as unrounded (a:), somewhat-rounded (A:), and clearly rounded (O:), and the plot shows that F2 generally covaries with the author's auditory perception, in that F2 is lower in the tokens auditorily coded as rounded (A:, O:), and is higher in the tokens coded as unrounded (a:). This plot includes F2 in women and men, combined. While this information is included to display trends in auditory quality, there is solely one coder at this time. These auditorily coded tokens are not statistically analyzed, but are used to describe the frequency of rounding as it occurs in participants' speech, which can help shed light on the acoustic analyses aimed at measuring the strength of rounding to examine more fine-grained shifts.

The tokens (A:) and (O:) were collapsed into a larger "Rounded" category, and the proportion of tokens rounded are displayed in Table 3. Expressed in terms of frequency (as percent rounded), the women in this study produced rounded tokens more often (49% of the time) than the men did (41%). More specifically, the A women round the most frequently (64%), followed by B men and B women (~ 40%). The A men round the least often (36%). When we consider the interlocutors' background (indicated by "interloc" across, Table 3), neither the gender nor community of the interlocutors appear to auditorily affect the proportions rounded.

**FIG 2. F2 (Hz) of realizations of /a:/ at onset, as perceived by the researcher.  
(a:) unrounded; (a:) somewhat rounded, (O:) clearly rounded; N=2,456**



**Table 3. Token count & proportion of rounding based on auditory coding in the bilabials group**

	<i>Women</i>	<i>A-Women</i>	<i>B-Women</i>	<i>Men</i>	<i>A-Men</i>	<i>B-Men</i>
<i>Rounded</i>	264 (49%)	121 (64%)	143 (41%)	265 (41%)	89 (36%)	176 (44%)
<i>Total</i>	535	190	345	644	248	396
<i>A Women responding to:</i>	<i>Female interloc</i>	<i>Male interloc</i>	<i>B Women responding to:</i>	<i>Female interloc</i>	<i>Male interloc</i>	
<i>Rounded</i>	62 (63%)	59 (64%)	<i>Rounded</i>	73 (41%)	70 (42%)	
<i>Total</i>	98	92	<i>Total tokens</i>	178	167	
<i>A Men responding to:</i>	<i>Female interloc</i>	<i>Male interloc</i>	<i>B Men responding to:</i>	<i>Female interloc</i>	<i>Male interloc</i>	
<i>Rounded</i>	41 (33%)	48 (39%)	<i>Rounded</i>	81 (42%)	95 (47%)	
<i>Total</i>	124	124	<i>Total tokens</i>	195	201	
<i>A Women responding to:</i>	<i>A interloc</i>	<i>B interloc</i>	<i>B Women responding to:</i>	<i>A interloc</i>	<i>B interloc</i>	
<i>Rounded</i>	62 (67%)	59 (61%)	<i>Rounded</i>	77 (45%)	66 (38%)	
<i>Total</i>	93	97	<i>Total tokens</i>	173	172	
<i>A Men responding to:</i>	<i>A interloc</i>	<i>B interloc</i>	<i>B Men responding to:</i>	<i>A interloc</i>	<i>B interloc</i>	
<i>Rounded</i>	47 (37%)	42 (34%)	<i>Rounded</i>	88 (45%)	88 (44%)	
<i>Total</i>	126	122	<i>Total tokens</i>	196	200	

### 3.2 Response Dialect

Table 4 shows the raw token count of Response Dialect, as coded by the researcher, based on whether the carrier sentence contains A or B features (ie. the dialect in which participants responded, regard-

less of the dialect they grew up speaking with family) by participants' community (A/B) and gender (F/M). A small number of 'mixed' responses in which a participant mixed both A and B features were produced but omitted as they were few in number (35 'mixed' out of 1,179 total). Additionally, some responses contained no communal marker (68 instances), leaving 1,076 instances displayed. In general, A speakers do not use any B features (aside from a few stray tokens at a negligible rate of .01% of the time), but B speakers do adopt the A features. While the B speakers keep to using B features the majority of the time, there is a notable gendered difference, especially when examining the interlocutor's dialect: When responding to A interlocutors, B men keep to using B features more so (83%) than B women (65%). B women are more likely than B men to accommodate toward A.

**Table 4. Total token count by dialect and gender, and interlocutor type. N=1,076**

<i>Response</i>	<i>Women</i>	<i>A-Women</i>	<i>B-Women</i>	<i>Men</i>	<i>A-Men</i>	<i>B-Men</i>
<i>A-dialect</i>	248 (52%)	162 (100%)	86 (28%)	299 (50%)	243 (99%)	56 (16%)
<i>B-dialect</i>	225 (48%)	0	225 (72%)	304 (50%)	2 (.01%)	302 (84%)
<i>Total tokens</i>	473	162	311	603	245	358
<i>A Women responding to:</i>	<i>A interloc</i>	<i>B interloc</i>				
<i>A-dialect</i>	80 (100%)	82 (100%)	<i>B Women responding to:</i>	<i>A interloc</i>	<i>B interloc</i>	
<i>B-dialect</i>	0	0	<i>A-dialect</i>	55 (35%)	31 (20%)	
<i>Total</i>	80	82	<i>B-dialect</i>	102 (65%)*	123 (80%)	
			<i>Total tokens</i>	157	154	
<i>A Men responding to:</i>	<i>A interloc</i>	<i>B interloc</i>	<i>B Men responding to:</i>	<i>A interloc</i>	<i>B interloc</i>	
<i>A-dialect</i>	124 (98%)	119 (100%)	<i>A-dialect</i>	30 (17%)	26 (14%)	
<i>B-dialect</i>	2	0	<i>B-dialect</i>	146 (83%)*	156 (86%)	
<i>Total</i>	126	119	<i>Total tokens</i>	176	182	

\*Notable gendered difference

### 3.3 Acoustic Analyses

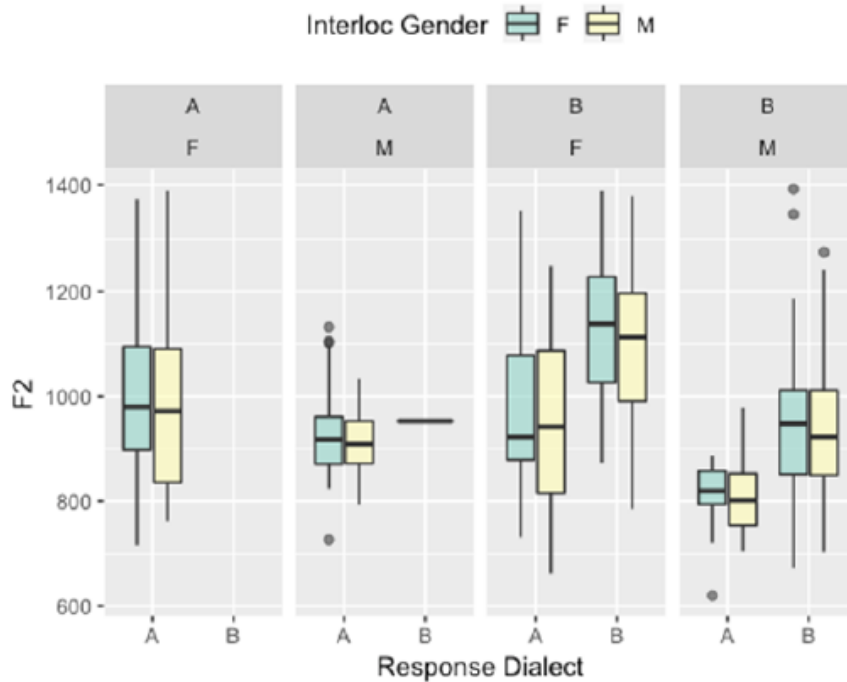
After examining F2 at midpoint and vowel-onset, the statistical results showed that F2 covaried with sociolinguistic variables in the same directions at both 20% and 50%. However, while both Interlocutor Gender and participants' Response Dialect had an effect on F2 at 20%, only Response Dialect had an effect on F2 at 50%. While further, detailed acoustic analyses of labialization within Bahraini, and in Arabic dialects in general are needed, they are beyond the scope of this paper. Since both points of measure show variation in the same direction, this paper presents a detailed look at the sociolinguistic variation of rounding measured in F2 at 20%.

Before presenting the statistical results, plots of F2 by the sociolinguistic variables are examined to reveal useful trends for answering the research questions. The dialect in which participants responded covaries with rounding. Since the A speakers categorically did not produce any tokens in B-dialect (aside from one, likely accidental production in one of the A men; see FIG 3), the comparisons will only be made between the B speakers (top-label: BF and BM in FIG 3). Additionally, as mentioned above in Table 4, a few 'mixed' productions occurred, but were excluded as outliers. The remaining tokens were coded either as an A- or B-dialect response.

As FIG 3 shows, F2 is lowered in the B participants when their Response Dialect is A (x-axis). Thus, the real-time decision to use marked A-dialectal features triggers a stronger degree of rounding. When we examine the trends by gender and communal background, it is apparent that the B men (top label:

“BM”) maintain a similar difference, but with less overlap, as the B women (“BF”) in their F2 based on their response dialect. The trends of interlocutor gender are also evident in FIG 3: male voices (yellow plots) generally trigger lower F2 in participants.

**FIG 3. Boxplots of F2 by participants’ response dialect in Women (left) and Men (right), and by participants’ gender and communal background, and interlocutors’ gender. N=1,076**

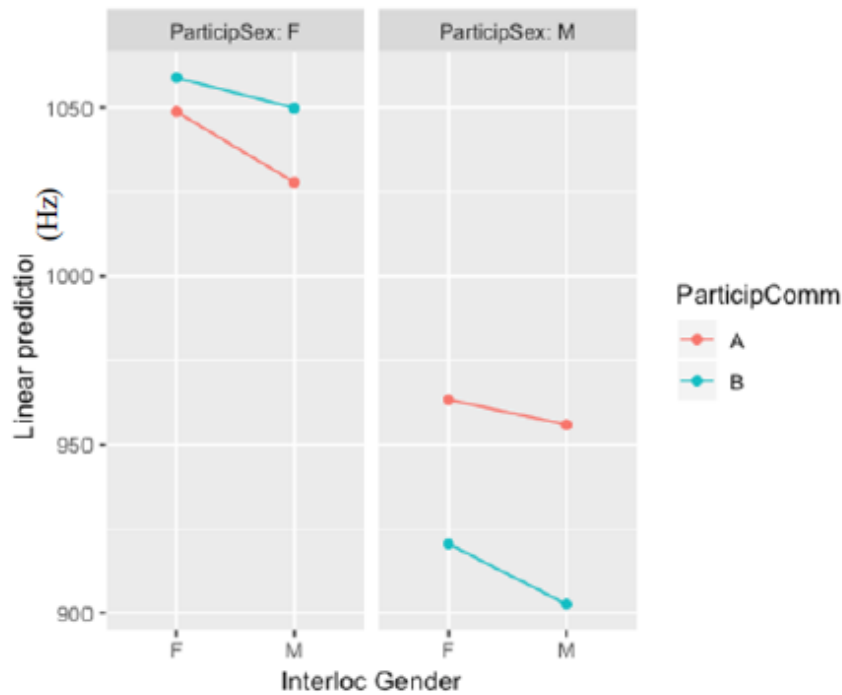


Lastly, whether or not rounding in the stimuli questions triggered rounding in participants had neither a statistical main effect, nor any clear trend when visualized. A mixed effects linear regression model was fitted to examine the effects of the social and linguistic predictors on F2 at onset (20%). Thus, F2 served as the dependent variable tested against the independent variables: Participant Gender & Participant Community, Interlocutor Gender & Interlocutor Community. The dialect carrier sentence in which participants responded was coded as Response Dialect (A/B), and the stimuli sentences were coded for whether rounding was included in that sentence or not (U = Unrounded / R = Rounded); both of these were included as independent variables. The random effect was Participant. A random intercept as opposed to a random slope model was employed since the latter caused model overfitting. In R, the function `lmer` from the package `lme4` (Bates et al., 2015) was used to run the model initially testing for collinearity of the fixed effects. Assumptions of linearity were checked and outliers removed. The same model was then run using the package `afex` (Singmann et al, 2015) to test the sociolinguistic model fitted.

Formant frequencies were not normalized for physiological effects using a traditional normalization scale in order to preserve sociolinguistic variation. Rather, gender was included as an interaction in the linear regression model. Since the differences in F2 correlate with vocal tract length, we can expect the Participant Gender to show up as significantly affecting F2, but this is the gendered effect of vocal tract length (ie. women generally have higher formant frequencies than men). Thus, no generalizations can be made on the effect of participants’ gender on F2 variation using the current method. We can, however, observe sociolinguistic trends within each separate gender group as we have done above, noting the trends in Participants’ communal background and their perception of their interlocutors’ backgrounds.

The statistical results reveal that Response Dialect (the dialect carrier-sentence that participants re-

**FIG 4. Estimated marginal means (EMM) plot of analyzed model by Participant and Interlocutor Gender, and Participant Community**



sponded in based on the voices heard) significantly predicted F2 on the target vowel ( $F=5.24$ ,  $df=3$ ,  $1095.64$ ,  $p=.001$ , Table 5). Interlocutor Gender was also a significant predictor of F2 ( $F=5.34$ ,  $df=1$ ,  $1089.50$ ,  $p=.001$ , Table 5). Using the R package *emmeans* (Lenth et al, 2018) to examine the post-hoc trends, the results confirm the trends observed in the plots discussed above: switching from Response Dialect A to B yielded a contrast estimate of  $-47.6$ ,  $SE = 14.8$ ,  $Df=1008$ ,  $t=-3.2$ ,  $p<.01$ , demonstrating F2-lowering. The post-hoc effects of interlocutor gender is depicted in the EMM interaction plot in FIG 4, which demonstrates F2 lowering in both male and female participants when responding to male interlocutors (x-axis). This shift is steeper especially in the A women and B men, who round to a stronger degree when responding to male stimuli voices.

Note that the other significant effect in the Participant Gender in Table 5 indicates the vocal tract length difference mentioned above, so effects across genders are not interpreted as meaningful, since F2 has not been normalized to account for this difference.

### 3.4 Results for 'aana

The subset 'aana, which is a word that exists only in A dialect, is small in number ( $n=102$ ) and was not subjected to statistical analyses, but the F2 values are visualized and discussed. As FIG 5 shows, the general trends in 'aana follow those of the bilabials above, in that the A women round more strongly than the B women, and the B men round more than the A men.

A notable difference is the asymmetry in which speakers produced this word, as it is not dialect neutral and is ideologically linked to A-community. Note that while there are B women who use 'aana with interlocutors from any community (BF, FIG 5), the B men (rightmost plot) rarely use 'aana with other B male interlocutors but they do use it with A speakers, especially with A women. Thus, B men appear more strategic, but also reluctant in using 'aana, producing only 9 tokens (Table 6), while B women use this feature much more often (24 tokens; compare to A-Women who produced 35 tokens total).

**Table 5. Output table for F2 at onset by Participants' and Interlocutors' Gender and Communal Background, and by Participant's Response Dialect**

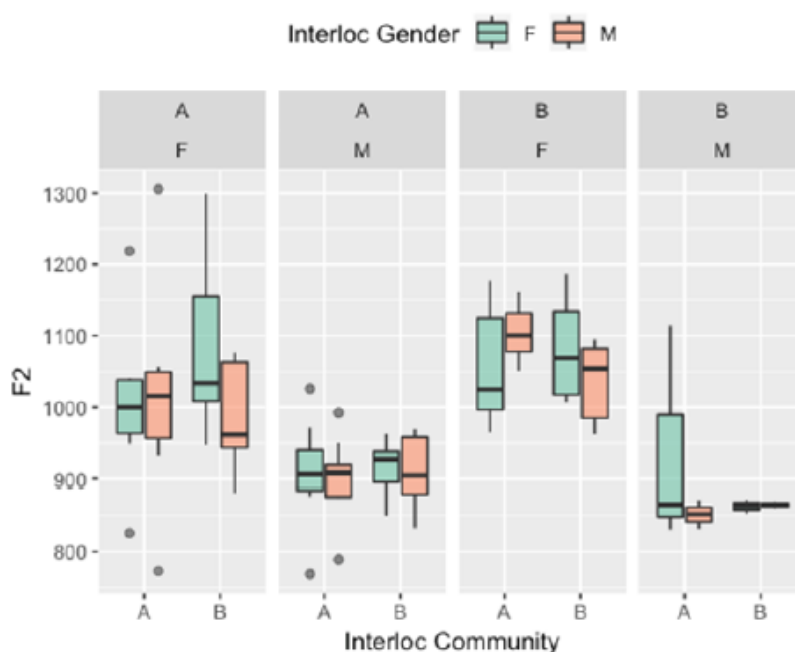
Effect	df	F	p.value
<i>Particip Community</i>	1, 32.21	0.28	.60
<i>Particip Gender</i>	1, 25.85	13.58 **	.001
<i>Interloc Gender</i>	1, 1088.49	5.30 *	.02
<i>Interloc Community</i>	1, 1092.16	0.25	.62
<i>Stimuli Round</i>	1, 1088.79	0.76	.38
<i>Response Dialect</i>	3, 1093.10	5.33 **	.001
<i>ParticipCommunity:ParticipGender</i>	1, 25.92	1.14	.30
<i>ParticipCommunity:InterlocGender</i>	1, 1088.29	0.00	.96
<i>ParticipGender:InterlocGender</i>	1, 1088.38	0.04	.85
<i>ParticipCommunity:ParticipGender:InterlocGender</i>	1, 1088.32	0.87	.35

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '+' 0.1 '.' 1

**Table 6. Token count in (aana) based on auditory coding**

	Women	A-Women	B-Women	Men	A-Men	B-Men
<i>Rounded</i>	49 (83%)	25 (71%)	23 (96%)	27 (63%)	19 (56%)	8 (89%)
<i>Unrounded</i>	11	10	1	16	15	1
<i>Total</i>	59	35	24	43	34	9

Additionally, as Table 6 shows, most speakers round the majority of the time when 'aana is produced, especially B speakers, who round (89-96%), while the A men only round 'aana about half the time. Additionally, similar to the bilabial results from the previous section, the A men vary their F2 the least compared to other speakers. Within all speakers, however, there is clearly variation in the rounded quality of the vowel in 'aana, and the plots reveal that not all speakers round in this word.

**FIG 5. Boxplots of F2 by Interlocutors' & Participants' Community and Gender in 'aana**

## 4 Discussion

This study aimed to examine rounding as positioned in the ethnolectal speech community of Bahrain. Participants responded to stimuli questions in A and B dialects in male and female voices, containing rounded or unrounded /a:/ variants. Of the sociolinguistic variables that were statistically analyzed, only Response Dialect and Interlocutor Gender had main effects on F2. The effect of Response Dialect answers our research question #1, which asked whether [ɔ:] indexes qualities related to the A-community. The effect of Interlocutor Gender answered our research question #2, which asked whether gender (of either the participants or their interlocutors) triggered rounding. Additionally, while not statistically analyzed, the auditory trends demonstrated that rounding is exhibited most frequently in the speech of A women, which is consistent with the previous literature (Holes, 1987). These are discussed alongside the auditory trends observed, and alongside the trends observed in the subsets 'aana. Lastly, question #3 asked whether the presence or absence of unrounded [a:] or rounded [ɔ:] stimuli questions triggered rounding in participants' responses: to this, we found that there is no effect.

### 4.1 Response Dialect

After analyzing the degree of rounding using F2 at vowel onset following bilabials, the results revealed that participants round more strongly when speaking in A dialect, and also with male interlocutors. These trends suggest that rounding is associated with A-related qualities, and reveal some underlying motivations that render it more likely to be used with male interlocutors. While F2-lowering toward male interlocutors occurred generally in speakers from any background, the shifts in response dialect is seen mainly in the B speakers, since only these speakers make use of both A and B dialects, while A speakers do not accommodate toward B.

The fact that rounding is an A-related feature is not surprising, as there were hints of this in previous literature. The links to Muḥarraḡ island is one of these hints, as the Muḥarraḡi dialect coincides with mainstream Bahraini, which covaries with A-community.

Additionally, the vowel /a:/ occurs more often in A-dialect in general. In B, it does not occur in the same environments. This was seen in the genderless, first-person singular pronoun 'aana, which exists only in A. In the B dialect, the same pronoun is gendered and contains a short, either fronted [æ] vowel as in the feminine form [æni], or a 'neutral' non-backed and non-rounded /a/, as in the masculine form [ana]. Additionally, previous works (Al-Qouz, 2009; Holes, 1987) hinted that 'aana commonly undergoes rounding, and the results in this study confirmed this, showing in Table 6 that 'aana often triggers rounding. This is especially true for the B speakers, who nearly always produce only the rounded variants of 'aana.

Additionally, in A, the first-person prefix attached to present-tense verbs is realized with a long vowel: e.g. 'aadrii 'I know', but it is short in B: 'adrii. At the morphophonological level, then, /a:/ occurs more often and in high-frequency words in A. Given that rounding mainly occurs in the long vowel environment, this renders A dialects ideal for rounding. There are many more places in which rounding could occur. As rounded [ɔ:] is available and had already been observed to contain favorable qualities linked to Muḥarraḡi speakers, it is likely to spread, especially through the high-frequency environments noted. Indexicality theory holds that any variable with first-order status becomes available to be internalized in speakers' repertoire, and to index specific elements of character, at which point the variable moves to second-order status. We may hypothesize then that rounding, initially observed as indicator/marker of Muḥarraḡi women, has spread beyond regional boundaries and shows an indexical relationship with A-dialectal features, as the B participants in this study demonstrated.

From an accommodation standpoint, the shifts observed are interesting, since whether or not the inter-

locutors used rounding did not matter, nor did the interlocutor's dialect/perceived community affect rounding in the participants' responses. Rather, rounding occurs as a covariation with the B participants' A-dialect production, and not as a direct accommodation toward their interlocutors' use of A features, or even toward rounding. Thus, B participants' use of rounding can be viewed as more of an accompanying feature, or 'exponent', of the salient A dialectal features that occur during accommodation toward interlocutors' use of those features. The variation captured by Response Dialect, then, indicates that the B speakers' interpretation of rounding isn't directly related to the A dialectal features themselves, but that there are other qualities associated with A identity that contribute to its construction, or that something else associated with A-dialect is being indexed. As posited above, qualities related to the Muḥarraqi identity are candidates. As Eckert notes (Eckert, 2008b), the fact that the same variables often stratify multiple categories, such as gender, ethnicity, and class, supports the theory that stances are involved in constructing these categories. Rounding in Bahrain, at the very least, indexes a regional (Muḥarraqi) stance, which also coincides with and is thus closely related to the A-related qualities indexed by the A dialectal features. Within the indexical field of rounding, however, other closely related meanings may potentially be indexed at any time.

Still, the current status of rounding is in flux: to some of my consultants, it is a marker of Muḥarraqi dialect/identity, as well as other personas related to feminine-ness, while to others (including famous Kuwaiti comedy show hosts) rounding has reached stereotype saliency, in that speakers use exaggerated rounding as one of the features to perform a "Bahraini/Muḥarraqi" persona.

## 4.2 Interlocutor Gender

At the auditory level, there was no clear observable difference in how frequently participants rounded based on the gender of their interlocutors. At the acoustic level, however, interlocutor gender had an effect on F2. This was evident in the fact that F2 generally lowered when interacting with male participants.

In this study, we see that both men and women lower F2 with other male interlocutors. It would be difficult to find a shared motivation between these groups due to differing ideologies. Recall that it is the A women and B men who made the biggest shifts in F2 when speaking with male interlocutors (FIG 4), and likely for different reasons to one another. Women tend to accommodate more than men and more towards male interlocutors than toward female ones; Namy, Nygaard, and Sauerteig (2002) found this in a speech shadowing experiment, and argued that women are likely more perceptive to vocal characteristics and indexical details of speech in general. However, this does not explain the finding in the current study, which is that men also shift F2. While the A women, as the most frequent rounders, could be more perceptive to rounding and its indexical details, the motivation cannot be the same for the B men, who tended to diverge from accommodating toward A features (Table 6). Walker and Campbell-Kibler (2015) note that larger differences -as long as they're within the speaker's repertoire- are likely to lead participants to make larger shifts, since they would need to be able to notice these differences in order to make the shifts (see: Babel et al, 2013). Considering our finding that rounding is an exponent of A-dialect, and that it contains links to the social representation of female speech (and is exhibited most frequently in A women), this suggests that B men are making large shifts across the ethno-dialectal and normative gender boundaries. If the B men are perceptive to (i.e. open to using) rounding, it is possible (and likely) that the indexical field of rounding is expanding.

Lastly, visual cues were not obtained for the cultural reasons noted above. It is possible that different speakers employed different gestures in producing rounding (per Havenhill, 2015), and not all these gestures were fully captured via the current method of measure. Further detailed studies on the articulatory processes and gestures involved in rounding are warranted.

## 5 Conclusion

This study demonstrates that participants make indirect accommodative shifts based on the speech and identities of their interlocutors as well as based on certain qualities associated with the dialect they choose to employ. Participants' ability to notice the saliency of the variables observed are posited to explain these trends. Results suggest that rounded [ɔ:] is an ideologically loaded sound that indexes qualities associated with A-ness, which covaries with stereotypical A-dialectal features. The indexical status of rounding is emergent. While it is exhibited most frequently in A women, its availability renders it a candidate for further repurposing, especially as it is being noticed by B men.

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