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# Individual variation in performing reading-aloud speech among deaf speakers

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**Abstract:** The study examines the stylistic variation (interview vs. passage-reading) of socially meaningful variables among orally educated deaf speakers of Mandarin in Taipei, Taiwan. I examine the use of the retroflex and alveolar fricatives across two groups: deaf persons who received speech therapy or training, and those who did not receive speech medicalization. The two groups acquire the metalinguistic awareness of sibilant variation in different ways. Results show that the former group utilize the variables in the same way as hearing persons do – increasing the degree of retroflexion in reading-aloud speech. The latter group engage with the variable in an opposite way – decreasing the degree of retroflexion, which nevertheless also indexes able-bodiedness, possibly via the embodied link between a stronger hiss and a fronted sibilant. I argue that we need to carefully look at what different linguistic variants index through locating the variants in each speaker's personal history.

**Keywords:** articulatory setting; disability; embodiment; fricative; medicalization; speech therapy; style-shifting; Taiwan Mandarin

**摘要:** 針對具有社會意義的台灣華語語言變項，本研究調查台灣口語族聽損者在訪談與段落朗讀兩種語域間的語言風格轉換。本研究討論兩組研究參與者對捲舌與齒槽擦音的口語產出：接受與未接受過語言治療或訓練之聽損者。這兩組研究參與者從不同的途徑獲得他們對於擦音變異之後設語言意識。本研究發現，參與語言醫療化行為的受試者在段落朗讀時增加了擦音的捲舌程度，就如同聽人如何表現朗讀言說；未曾參與語言治療或訓練課程的受試者則在段落朗讀時降低了擦音的捲舌程度，然而，這種口語產出行為依然是用以展演健全身體，這可能是來自於舌頭向前與較強的「噓聲」間的體感連結。本文指出，社會語言學分析必須謹慎地考慮個別說話者的生命史，才能準確了解口語產出的方向是指向什麼社會意義。

## 1 Introduction

This article presents inter-speaker variation among deaf speakers of Taiwan Mandarin in terms of stylistic variation between interview and read speech. Variationist sociolinguists point out that self-conscious speech does not necessarily elicit standard linguistic styles from speakers (Gafter 2016; Hall-Lew et al. 2021; Sandow 2022; Schilling-Estes 1998; Stuart-Smith et al. 2013; Wan 2021). This article highlights the importance in sociolinguistic analysis of carefully locating the social evaluation associated with reading-aloud speech. Also important to note is how different speakers engage with the same reading task.

When speakers pay more attention to their speech production, they may utilize speech production in performing various axes of the self. For instance, Hebrew speakers of Middle Eastern descent in Israel utilize stigmatized ethnic phonetic variants to perform ethnic identity in read speech, for reading is a social activity rooted in their cultural tradition (Gafter 2016). An analysis that focuses on how a group identity is indexed by style-shifting is based on a *macrosocial indexicality model*.

However, not all speakers aim to do the same identity work in the same social activity. Individual sociobiographical factors mediate the style-shifting process where speakers shift to standard or non-standard linguistic variants. In addition to a community-wide indexical field (Eckert 2008), individuals have different

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personal histories in engaging with a linguistic variant. Sharma (2021: 244) argues that “acquisitional ordering or style ‘dominance’ can be a source of social meaning, independent of shared group meanings for those lects or variants”. Individuals may use a kind of “real me” style-shifting where they shift to their early-learned style from a later-learned style to interactionally highlight a certain stance they are taking (Sharma 2018). This is called a *biographical indexicality model* (Sharma 2018, 2021). Yet, this model hasn’t been applied to analyses of read speech.

Members of strongly marginalized communities may have very different views of how they should stylistically present themselves (Levon 2020). This article demonstrates how we should combine both a macrosocial indexicality model and a biographical indexicality model to account for inter-speaker variation in engaging with socially meaningful variables in read speech, especially when working with marginalized communities. This article explores how orally-educated deaf speakers of Taiwan Mandarin engage with socially-meaningful variables – /s/ and /ʃ/ – in the register of ‘reading-aloud’. As the variation in the sibilants is not accessible to some deaf listeners, some deaf speakers develop strategies to sociolinguistically engage with the variation after they acquire the metalinguistic awareness of the sibilant variation. Some shift to the standard sibilant variant of hearing people in read speech, and the others shift to the non-standard variant of hearing people (i.e., people who are not deaf or hard of hearing). I argue that the inter-speaker variation in style-shifting is derived from how individual speakers develop the metalinguistic awareness of the different variants in their personal histories. This article starts with contextualizing reading-aloud speech in deaf communities in Taiwan, followed by research design and data analysis.

## 2 ‘Reading-aloud’ and D/HH people in Taiwan

Taiwan has seen a government-held ‘National Language Competition (NLC)’ since 1946, as a part of the Mandarin-only movement. NLC included a speech competition, a reading-aloud competition, etc. To win the competitions, participants not only need to be proficient in Mandarin; they also need to perform their speech in a particular accent, known as 演說腔 *yǎnshuō qiāng* (‘accent for delivering a speech’) or 朗讀腔 *lǎngdú qiāng* (‘reading-aloud accent’). Such an accent is a Beijing-oriented accent, imagined as a standard accent, and is hardly used in everyday life in Taiwan (Brubaker 2012).

Since 1979, there has been a separate NLC for deaf students every two years. Oral deaf students compete in the Mandarin Group. Due to the increasing popularity of early intervention, the emphasis has been not only about how deaf students can talk in Mandarin but also about how the students can talk like how hearing people talk in NLC. For instance, in 2016, an 8-year-old boy, Kuo, won the first prize in the deaf people’s Mandarin NLC. He had been invited by the hospital where he received his cochlear implant to “perform” reading aloud. In the news article, Kuo’s “talent” of reading aloud was described as embodied by his 京片子 *jīngpiànzi* [‘standard Beijing accent’]. Kuo’s case indicates that reading aloud as a social activity has become an embodied practice of able-bodiedness, or hearingness in this context (Henner and Robinson 2021a). We can expect to see deaf speakers make use of self-perceived standard speech styles in a reading-aloud speech.

## 3 Research design

### 3.1 Linguistic variable

This study looks at /s/ and /ʃ/ in Taiwan Mandarin. /s/ and /ʃ/ are in an alveolar-retroflex phonemic contrast which is merging in the direction of the alveolar (Kubler 1985; Tso 2017). This article focuses on only fricatives but not affricates in an alveolar-retroflex contrast, for sibilant fricatives are auditorily much more challenging for deaf speakers to acquire, thereby receiving much attention from both deaf speakers and speech pathologists (Yang et al. 2017).

While the retroflex consonant is known as 捲舌音 *juǎnshé yīn* ‘tongue-curling sounds’ in Mandarin phonics in Taiwan, Taiwan Mandarin speakers who demonstrate a clear alveolar-retroflex distinction produce the retroflex consonant by elevating the tongue tip and blade (Chiu et al. 2020). The retroflex is produced with a constriction at the alveolar zone (Chen and Chang 2015). Acoustically, if the contrast is maintained, retroflex sibilants receive lower spectral centre of gravity (CoG) than alveolar sibilants do. A fronted sibilant leads to a higher CoG.

Full retroflexion in /ʃ/ is ideologically loaded. Mandarin speakers from China are perceived by Taiwanese people to demonstrate full retroflexion. For instance, Taiwanese pop singers do full retroflexion to style Chineseness (Lin and Chan 2022). As the imagined standard accent of Mandarin is believed to be oriented to a Beijing accent, there is a decline of 200–300 Hz in the CoG of /ʃ/ when hearing speakers shift to read speech from interview speech (Tso 2017). In contrast, stylistic variation usually does not involve the alveolar sibilant: if anything, speakers might hypercorrect it as a retroflex sibilant (Kuo 2018).

Variation in the sibilants is auditorily inaccessible for many deaf speakers. As the alveolar-retroflex contrast is highly socially meaningful, it is one of the targets in speech therapy when therapists work with deaf children. That is, it is expected to see deaf persons who engaged in medicalization of their speech more aligned with hearing people’s community pattern of realizing the contrast. For instance, the 8-year-old boy Kuo knows what specific phonetic variants are considered prestigious by hearing people in the context of reading aloud, after training. In contrast, others who engaged less in speech medicalization may have the idea that they are expected to shift to a speech style which can embody able-bodiedness when reading aloud, but they might not be familiar with how hearing people perform prestige.

### 3.2 Participant and data collection

A total of 10 deaf participants are included in the present analysis (Table 1), all recruited from Taipei through advertisements in public Facebook groups between December 2018 and January 2019. The average age is 24.3 (max = 44; min = 18). In the recruitment text, it’s specified that this study aims to record and describe deaf speech without evaluating the correctness of deaf speech.

Only one participant (Huei) identifies as culturally deaf because she is actively learning Taiwan Sign Language and connecting herself to deaf signing communities.

The researcher is a hearing man from Taipei, aged 25 at the time of interview. All the data used were recorded by a Zoom H5 (sampling rate = 44.1 kHz), with built-in microphone. All names are pseudonyms offered by the participants.

**Table 1:** Participants discussed in this article.

Pseudonym	Age	Gender	Education	Identifying as culturally deaf	Received speech therapy or training
Canny	44	Woman	Masters	No	Yes
Huei	20	Woman	Undergraduate	Yes	Yes
Kai	22	Man	Undergraduate	No	No
McCrispy	22	Woman	Undergraduate	No	No
Peiyu	18	Woman	Undergraduate	No	Yes
QPM	36	Woman	master’s	No	No
Sandy	24	Woman	bachelor’s	No	No
Squirrel	21	Man	Undergraduate	No	Yes
XiaoFan	19	Woman	Undergraduate	No	Yes
XiaoYou	19	Woman	Undergraduate	No	Yes

Each participant participates in a reading task and an interview. The interview includes questions including various aspects of how they deal with deafness in everyday life.

To investigate stylistic variation, read speech and interview speech are compared. For read speech, participants are invited to read two passages out loud. One of the passages is about a royal story in Qing Dynasty of China, and the other one is about an allegory of the relationship between deaf people and hearing people. The stylistic variation between the two passages is examined in another article of this project (Wan in press).

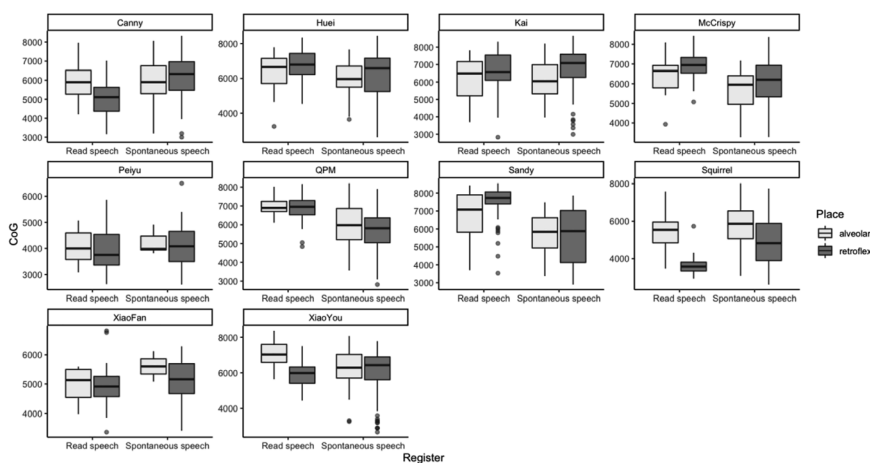
There are 47 tokens with /ʃ/ and 10 tokens with /s/ in read speech. For interview speech, I used the /ʃ/ and /s/ tokens produced when participants responded to my first interview questions, including “which identity label do you identify as?” “how do you see your relationship with Taiwan Sign Language?” and “could you tell me about your medical history of deafness?” The first two questions are answered before the reading task, and the third question is answered after the reading task.

CoG has been observed to be a robust spectral moment that indicates the articulatory setting of realizing retroflex sibilants (Chang and Shih 2015; Chiu et al. 2020). Thus, this study uses CoG as an indicator of the tongue movement in producing sibilants. The midpoint CoG value of the frication interval of each token is automatically extracted by a Praat script (Reetz 2020), using a 25 ms Gaussian window (Boersma and Weenink 2020). A high-pass filter is set at 1,000 Hz to eliminate low frequency noise and co-articulatory voicing from the surrounding segments (Chang and Shih 2015). Tokens whose duration is less than 30 ms are excluded.

While the use of retroflexion among hearing speakers may be affected by the ideological differentiation between Chineseness and Taiwanese-ness (Brubaker 2012; Chen 2018), data about political identity were not collected from the participants. The interview is completely about deafness and disability. Individual political identity is not primed at all, and the current political climate does not emerge as a theme in the interview either. Although one of the passages is a Chinese royal story from 300 years ago, it is not about contemporary China. In addition, the participants explicitly point out that they are not familiar with the story and are not fans of Chinese harem dramas. In this article, I therefore focus the analysis of stylistic variation on disability-relevant biographical factors.

## 4 Statistics and data analysis

Figure 1 shows the visualization of each participant’s realization of the two sibilants across register. While linguistic factors have not been controlled for, we can see two general trends of doing reading aloud. Not



**Figure 1:** Each participant’s realization of the alveolar-retroflex contrast in read speech and interview speech.

every speaker utilizes the retroflexed fricative to do the reading-aloud accent. For instance, XiaoYou engages with the alveolar fricative more than she engages with the retroflex sibilant. Some speakers, in contrast, engage with the retroflex sibilant. For example, Squirrel and Canny clearly lower the CoG of the retroflex sibilant in read speech. Some speakers make use of both alveolar and retroflexed fricatives in the same direction to do the reading-aloud accent. We can see, for instance, McCrispy, QPM, and Sandy raise the CoG of both the sibilants in read speech.

## 4.1 Statistical analysis

Linear mixed effects models were fit into the CoG data by the *lme4* package (Bates et al. 2015) in R (R Core Team 2019). Data points whose CoG is not within two standard deviations from the mean are excluded respectively from the alveolar fricative dataset and retroflex fricative dataset. As there are only four tokens followed by [e] (all from interview speech), they are excluded from the data. The two datasets are then merged, resulting in a total of 2,238 observations (Tables 2 and 3).

Models were expanded incrementally from the null model. Fixed factors were added one by one. Fixed effects of linguistic constraints (Table 4) considered during model selection included place of articulation (alveolar vs. retroflex), the following vowel, and log-transformed frication duration (Chang and Shih 2015). The following vowel has been observed affecting the CoG of frication (Chang and Shih 2015; Chiu et al. 2020). The effect of prosodic prominence was already considered in the factor of frication duration (see Chang and Shih 2015), so no separate factor of prosodic prominence was considered.

Gender balance was not achieved during data collection. Among the 10 participants, there are eight women and two men. Gender and its interaction with register or place of articulation failed to achieve statistical significance, nor did they improve the model fit. This was also the case for age (continuous). Therefore, gender and age are not further discussed in the following statistical analysis. Educational levels of the ten participants are relatively homogenous. There is no theoretical motivation to believe educational level as a binary variable (bachelor's vs. master's) has any effect on the use of the linguistic variables.

As mentioned, whether a participant underwent speech therapy or private speech training may have an influence on how they engage with the target variables. Thus, it is considered in statistical modeling here, referred to as the factor of “medicalization” (Yes vs. No).

Interaction terms among register, place of articulation, and medicalization were subsequently added to the model where possible. Likelihood ratio tests were run to determine whether the model fit of an expanded model is improved. By-speaker intercept was included as a random effect. By-speaker random slopes were included where possible. Model expansion continued until incorporating another independent variable did not improve the model fit.

## 4.2 Findings

The best-fitting model is  $CoG \sim Vowel + Sibilant\ duration + Place\ of\ articulation * Medicalization * Register + (1 + Place + Register|Speaker)$  (Table 5).

**Table 2:** Number of datapoints by register and place of articulation.

	Read speech ( <i>N</i> = 553)	Interview speech ( <i>N</i> = 1,685)
Alveolar fricative ( <i>N</i> = 364)	97	267
Retroflex fricative ( <i>N</i> = 1,874)	456	1,418

**Table 3:** Number of datapoints by following vowel.

	[a]	[ə]	[i]	[o]	[u]
Number	159	299	1,196	118	466

**Table 4:** Linguistic factors considered during model selection.

Factors	Levels	Predictions
Place of articulation	Alveolar/ retroflex	Retroflex sibilants receive lower CoG than alveolar sibilants
Following vowel	[a]/[ə]/[i]/[o]/ [u]	Sibilants followed by [u] receive lower CoG, followed by those followed by [i], and those followed by [a] (Chang and Shih 2015); retroflex sibilants followed by [o] receive lower CoG than those followed by [a] (Chiu et al. 2020).
Log-transformed frication duration	Continuous	Retroflexion accompanies shorter frication duration (Chang and Shih 2015); longer frication receives higher CoG (Calder 2019)

**Table 5:** Summary of the best-fitting model (non-significant interaction terms are not shown).

	Estimate	SE	t-Value	p-Value
(Intercept)	7032.21	429.65	16.36	<0.001
<b>Vowel = [ə]</b>			n.s.	
<b>Vowel = [i]</b>			n.s.	
<b>Vowel = [o]</b>	-288.2	129.07	-2.23	0.025
<b>Vowel = [u]</b>	-800.6	98.07	-8.16	<0.001
<b>Sibilant duration</b>	556.21	74.33	7.48	<0.001
<b>Place of articulation = retroflex</b>			n.s.	
<b>Medicalization = yes</b>			n.s.	
<b>Register = interview speech</b>			n.s.	
<b>Place of articulation = retroflex × Medicalization = yes</b>	-1,080.53	344.10	-3.14	0.005
<b>Place of articulation = retroflex × Medicalization = yes × Register = interview speech</b>	685.13	284.06	2.38	0.015

As predicted, sibilant duration is positively correlated to CoG (Chang and Shih 2015). Tokens followed by [o] or [u] have significantly lower CoG than those followed by [a], consistent with previous research (Chang and Shih 2015; Chiu et al. 2020).

Place of articulation is not a significant effect for non-medicalized speakers. In contrast, the significant interaction between medicalization and place of articulation indicates that, at the reference level (i.e., read speech), the retroflex fricative receives lower CoG than the alveolar fricative does, among medicalized speakers; this effect is significantly reduced in the interview speech (as indicated in the significant three-way interaction).

As shown in Figure 2, among speakers who underwent speech therapy or training, the retroflex sibilant becomes more retroflexed in read speech, compared to the spontaneous speech. In contrast, the alveolar fricative barely shifts, which is also indicated by the lack of significant interaction between register and medicalization. This is consistent with how hearing people in Taiwan shift the CoG of the retroflex sibilant rather than the alveolar sibilant when reading aloud (Tso 2017).

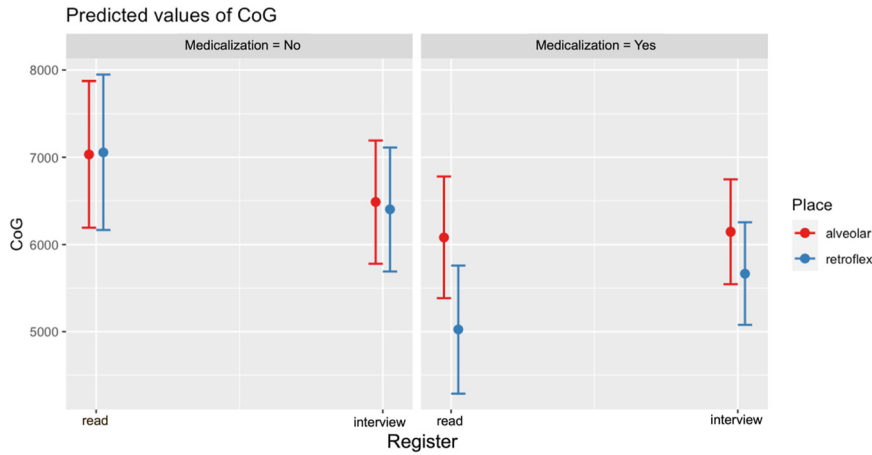


Figure 2: The interaction among register, medicalization (yes/no), and place of articulation.

Among the non-medicalized speakers, there is no significant change in the CoG across register, but we see a tendency for raising the CoG in read speech, regardless of the place of articulation. As there is no group-level effect of register in the non-medicalized speakers, it is useful if we know whether particular speakers among them raise the CoG in read speech to a larger extent. The best-fitting model has already considered the factor of medicalization. We need a model which only controls for the linguistic constraints, showing how the speakers exactly engage with the reading-aloud register.

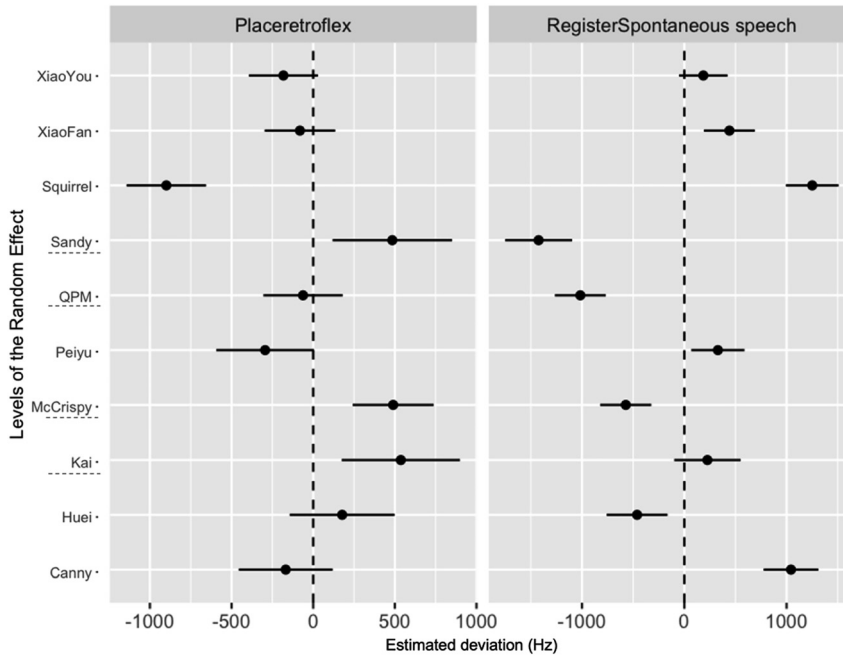
I fitted a model without the factor of medicalization to the data:  $CoG \sim Vowel + Sibilant\ duration + Place\ of\ articulation * Register + (1 + Place + Register|Speaker)$ . The effects of following vowel, and sibilant duration remain in the same direction (Table 6). The model summary shows that there is no significant fixed effect of register. The two-way interaction is not significant, either.

After we only control for the linguistic constraints, random slopes show what individual speakers do in read speech. A growing amount of sociolinguistic research has made use of random effects to explore how the same linguistic effect (including register) varies across individuals (e.g., Drager and Hay 2012; Hall-Lew 2013; Forrest 2015; Schlee 2021).

In Figure 3, we can see the individual-level deviations from the group-level fixed effects of register (which does not achieve statistical significance) and place of articulation (which achieves statistical significance) (Drager and Hay 2012). Four speakers – Sandy, QPM, McCrispy, and Huei – increase alveolar constriction in read speech. Their personal slopes of register have 95% confidence intervals which do not overlap 0, which means they increase alveolar constriction to do the reading-aloud accent.

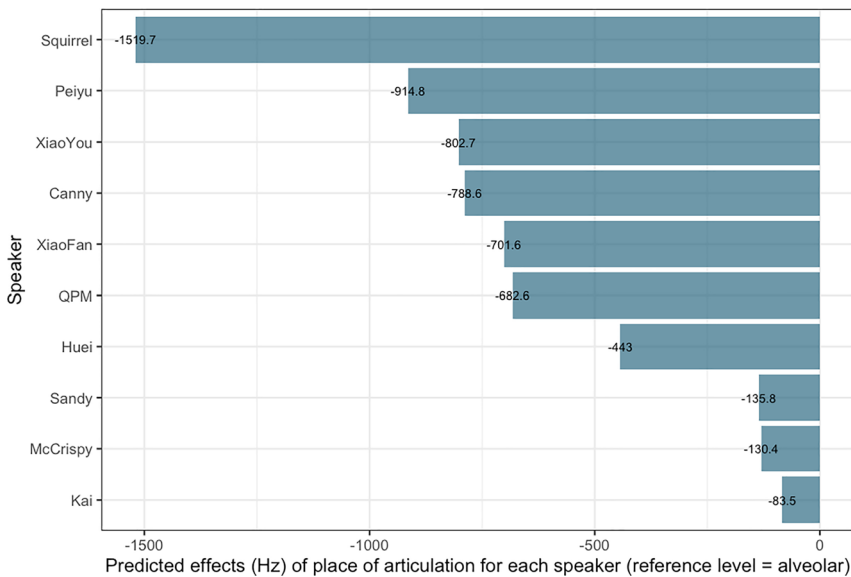
Table 6: Summary of the model where medicalization is not included.

	Estimate	SE	t-Value	p-Value
(Intercept)	6456.76	335.92	19.22	<0.001
Vowel = [ə]			n.s.	
Vowel = [i]			n.s.	
Vowel = [o]	-285.16	129.22	-2.20	0.027
Vowel = [u]	-795.56	98.16	-8.10	<0.001
Sibilant duration	555.89	74.34	7.47	<0.001
Place of articulation = retroflex	-620.31	193.27	-3.20	0.004
Place of articulation = retroflex × Register = interview speech	259.46	140.99	1.84	0.065



**Figure 3:** Estimated deviations from the group-level fixed effects of place of articulation and register (non-medicalized participants are underlined).

In addition, not every speaker demonstrates the same CoG difference between places of articulation. Sandy, McCrispy, and Kai demonstrate personal slopes of place of articulation with 95% confidence intervals which do not overlap 0. The difference between retroflex and alveolar sibilants is less distinct than the one indicated by the group-level effect. With the *coef* function in the *stats* R package, the predicted effect of place of articulation for individual speakers is extracted (considering both the fixed slope and random slope) (Figure 4).



**Figure 4:** Predicted effects of place of articulation for individuals.



### 4.3 Analysis

We have identified the variation pattern. What motivates the style-shifting we have seen so far? It is not surprising to see speakers who engaged in speech medicalization shift to hearing people's community pattern in read speech. The only exception is Huei.

Huei is the only person who identifies as culturally deaf. She received a cochlear implant and engaged in speech therapy as a child. She also follows the hearing people's community pattern to articulate the phonemic contrast – retroflex sibilants receive lower CoG than alveolar sibilants do. However, she diverges from the hearing people's community pattern of engaging with the reading task. That is, in the self-conscious reading task performed in front of a hearing researcher, Huei uses her first-learned style rather than a corrected speech style added to her repertoire later in life. While it seems that Huei might exploit her first-learned style (the 'deaf accent') to perform a certain culturally deaf identity, such an account presumes that individuals utilize linguistic resources to index a group identity (Sharma 2021). In the interview, Huei points out that she does not favor the term 'deaf accent' because she thinks every person talks differently but "naturally" and that the ways deaf people speak shouldn't be highlighted, lumped together, or studied by speech pathologists. She also emphasizes that she does not speak Mandarin in a way that follows what's described by speech pathologists as deaf speech and points out that many hearing persons have said her pronunciation is standard. In other words, to some extent, Huei rejects any attempt to list her speech style as an example of 'deaf speech' and takes the "real me" stance that performs how her 'natural' way of speaking is a legitimate way of speaking. Thus, in the reading task, Huei does not perform a deaf identity so much as present a personal 'natural' way of speaking as a kind of embodied able-bodiedness, which is disassociated from hearing people's way of doing able-bodiedness (i.e., the idea of a standard speech). Note that we should not too optimistically take Huei's stylistic practice here to mean that deaf speakers have much social agency in negotiating with ableism. Compared to reading-aloud in a context like the National Language Competition, a reading task in the sociolinguistic interview is not co-present with a large audience and a dominant linguistic market (Bourdieu 1977) where a particular linguistic variety is explicitly valued the most. Thereby, this possibly creates an atmosphere where marginalized speakers like deaf people can exhibit more agency in negotiating with the hegemonic standard language ideology which is entangled with able-bodiedness.

Sandy, QPM, McCrispy and Kai did not receive speech therapy or training. Kai is the only one of them who utilizes retroflexion in read speech. While Kai did not receive speech therapy, he has a strong metalinguistic awareness of the alveolar-retroflex contrast. According to Kai, he could not hear the difference between the retroflex and the alveolar sibilants, so he usually does not differentiate the two sibilants in speech production (as shown in Figure 4). He also explicitly points out that the alveolar variant is his unmarked variant because he knows hearing people use the alveolar variant in conversational speech. For Kai, the retroflex sibilant as a marked variant is his later-learned speech style. His metalinguistic awareness may mobilize retroflexion in read speech.

In contrast, Sandy, QPM and McCrispy utilize increased alveolar constriction in read speech. Even if they acquired the phonological representation of the alveolar-retroflex contrast (Figure 4), they utilize a fronted sibilant to a larger degree when shifting to read speech.

First, we need to make sure the three speakers make use of spoken Mandarin "as a measure of proximity to hearingness and thus ability" (Henner and Robinson 2021b: 18). Gafter (2021) points out that not every person has the same stylistic goal in a reading task. One possibility is that the three speakers might distance themselves from hearingness in the reading task. However, in the interviews, all the three participants expressed their positive stance towards hearing speech and found 'deaf accents' not desirable. For instance, in the interview, McCrispy highlights a 濁 *zhuó* 'turbid' quality in her own voice (Extract 1; my own translation):

## Extract 1 (M: McCrispy; R: Researcher)

1. M:但是我有時候還是會發現(.)	1. M: but sometimes I still find(.)
2. 就是真的不太一樣(.)	2. it's really not the same(.)
3. 而且是- 就是喉嚨用力的方式的感覺	3. and it's- it's the feeling of the way the throat is used
4. R: 喉嚨用力的方式	4. R: the way the throat is used
5. M: 對啊(.)就是腔- 腔的感覺(.)	5. M: yes(.)it's the feeling of vocal tract (.)
6. 不是- 不只是咬字(.)對(.)	6. not- not just about pronunciation (.) yes(.)
7. 然後我也不知道要怎麼改	7. and I don't know how to change
8. R: 你說整個肌肉的感覺	8. R: you say how the muscle feels
9. M: 恩:::	9. M: umm:::
10. R: 那你怎麼會感覺到不一樣就是-	10. R: then how can you feel the difference it's-
11. 就是你也[你也]	11. it's like you [you]
12. M: [你說]發聲[的方式]	12. M: [you mean] the voicing [manner]
13. R: [就是你]也不知道	13. R: [you] don't know
14. 我的喉嚨是什麼感覺[哈哈哈哈哈]	14. what my throat feels like [hahaha]
15. M: [哈哈哈哈哈]	15. M: [hahaha]
16. 恩:::	16. umm:::
17. R: 是跟你三歲以前的感覺不一樣嗎?	17. R: different from how you felt before three years old?
18. M: 就是感覺會比較濁	18. M: it feels more turbid
19. R: 濁(.)比較濁喔(.)OK	19. R: turbid(.)more turbid(.)OK
20. M: 恩(.)比較沒有清澈的感覺(.)	20. M: yes(.)it doesn't feel clean(.)
21. 呵呵呵呵(.)我也不知道	21. hahaha(.)I don't know

In Extract 1, McCrispy uses the term *zhuó* to locate a quality of her speech that she wants to change (line 7). The “turbid” quality is undesirable, and it is contrasted with a “clean” quality (line 20). McCrispy reports that she acquired deafness at the age of 3. She believes her first-learned speech style is relatively clean, largely based on her perception of how hearing people talk. This “clean” quality may be picked out from the ideological position of able-bodiedness (cf. Kusters 2020). In a further explanation, McCrispy points out that the “turbid” quality leads to the perception that “all the words stick together”, resulting in an unclear speech style. Without experiences with speech medicalization, a fronted sibilant might be a “semiotic hitchhiker” (Mendoza-Denton 2011), employed by McCrispy as a part of a “clean” (able-bodied) speech. McCrispy might shift to her first-learned speech style in the reading task to perform her once-owned hearingness.

Yet, what leads to the link between an increased alveolar constriction and able-bodiedness? McCrispy does not explicitly comment on it, whereas Sandy does. Sandy is the person who raises the CoG of the sibilants the most among the three speakers. She mentioned she was told by a teacher at her elementary school that she needed to “expel a breath” (吹氣 *chuīqì*) when pronouncing the sibilants. This refers to the hiss in /ʃ/. Before Sandy learned this speech style, she realized it as an affricate [tʃ], for the hiss is not auditorily accessible to Sandy.

She takes the word 老師 *lǎoshī* ‘teachers’ for example, where the second syllable starts with /ʃ/. She repeats the phrase twice: “老師的師” (*lǎoshī’s shī*) (Figure 5). When she singles out the second syllable, the sibilant receives a higher CoG value than when it is unfocused; sibilant duration does not change. That is, to emphasize the hiss, she advances her tongue. The fronted sibilant is actually treated as the standard variant in her stylistic repertoire. In the reading task, Sandy shifts to her later-learned speech style to perform able-bodiedness.

As a side note, the observation can advance our understanding of how a fronted sibilant is usually treated as the embodiment of a harsh speech style (Calder 2019; Eckert 2017). Eckert (2017: 1,201) points out that “language is embodied, and that sound symbolism builds on that embodiment”. She observes that “attenuating fortition attenuates the meaning” of a hiss: when the tongue is retracted, a hiss becomes less harsh and sharp. Previous research explores the social qualities associated with sibilant variants mainly from the perspective of auditory perception. For example, a higher CoG is iconic of smallness, and further

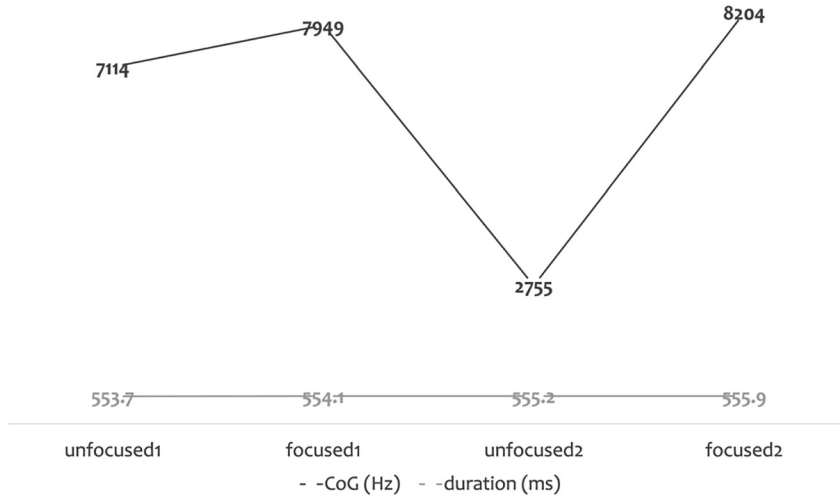


Figure 5: CoG and duration of the sibilant /ʃ/ in the word *lǎoshī* by Sandy.

ideological associations can be made with the quality of smallness (Eckert 2017); or, such an “extreme acoustic manifestation” generates the feelings of sharpness, harshness, and thereby fierceness (Calder 2019). Here, I argue from a perspective of articulatory settings (e.g., Pratt 2019; Podesva 2021). An advanced tongue leads to a narrower constriction area in the alveolar zone, which focuses the stream of air more intensely, resulting in greater air particle velocity (Stevens 1998). Sandy is not aware of how hearing people move the tongue to realize a standard retroflex sibilant. Thus, the embodied feeling of the link between a fronted sibilant and a stronger hiss is not overridden by any metalinguistic discourse informed by medical professionals. In fact, a sibilant with a relatively low CoG is more perceptible for deaf people (Maniwa et al. 2008). If Sandy attempted to produce a sibilant noise that sounds clearer to her, the tongue should have been retracted. That is, it is the feeling induced by the articulatory gesture, rather than an acoustic quality, that is prioritized here when the ‘standard’ speech is performed.

## 5 Conclusion

This article demonstrates how deaf speakers of Taiwan Mandarin utilize different variants of socially meaningful variables to negotiate with able-bodiedness in read speech. By combining macrosocial indexicality and biographical indexicality, this article investigates details of what is indexed by a variant in each speaker’s read-aloud stylistic practice. While deaf speakers in this study may perform able-bodiedness in read speech, the way they approach able-bodiedness and perform it varies across individuals.

When individuals develop metalinguistic awareness of the difference between sibilant variants through speech medicalization, they are exposed to the standard language ideology and utilize the variants according to hearing people’s community pattern. Yet, one can resist doing so and reveal the “real me” by shifting to one’s first-learned speech style in performing one’s ‘natural’ speech style as a kind of able-bodied speech. By doing so, able-bodiedness is pluralized and disentangled from standard language ideology.

When individuals develop metalinguistic awareness outside a medical setting, they might engage with the variants in different ways but still perform able-bodiedness via interacting with the idea of standard speech. This article highlights the importance of grounding our indexicality analysis in each speaker’s personal history and stylistic repertoire.

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