

Regional dialect leveling in Mandarin Chinese

The case of locative variation in the Chengdu dialect

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This paper studies the variation that stems from language contact between the suffix *-tou*, a locative marker in the Chengdu dialect spoken in South-west China, and its standard Chinese counterpart *-mian*. The data are drawn from sociolinguistic interviews with 40 native speakers of the Chengdu dialect. It is shown that the standard Chinese form *-mian* has outnumbered *-tou* in terms of occurrence, suggesting a change in progress over apparent time that essentially involves a dialect leveling that results from language standardization and contact-induced convergence. Meanwhile, the two variants undergo certain stylistic reallocation and begin to serve new socio-stylistic roles. To our knowledge, this is the first study that systematically investigates the variation of Chinese locatives.

Keywords: Chengdu Mandarin, locative markers, dialect leveling, reallocation, morphosyntactic variation

1. Introduction

It has been widely observed in various speech communities that when mutually intelligible but distinct dialects of the same language come into contact, linguistic accommodation happens, as manifested through a range of dialect contact processes including diffusion, leveling, simplification and reallocation. Many previous studies of these processes have been based on dialects in Europe (see, for example, Auer & Hinskens, 1996; Britain, 2002 on the Fenland dialect; Cornips & Corrigan, 2005; Edwards, Trudgill, & Weltens, 1984 on British English dialects). However, only a few studies using quantitative methods have been conducted to understand the various linguistic outcomes of dialect contact among Mandarin

Chinese dialects (Xu, 2010, 2012, 2015; Wang, 2017; among others), even though the contact phenomenon itself is not surprising or unexpected.

In the speech community of Chengdu,¹ a provincial city in Southwest China, the national promotion of standard Chinese (Putonghua) has ‘standardized’ the vernacular Chengdu dialect, giving rise to contact-induced variation between the standard locative marker *-mian* and the local locative marker *-tou*. Very few studies have yet been initiated on the variable use of locative markers as the outcome of dialect contact. A common assumption that people have often made based on their intuitions is that *-tou* is more closely associated with informal speech whereas its counterpart *-mian* more often occurs in formal contexts (Chao, 1968, 2011). However, this division is not categorical. Crucially, there have been no studies to show whether this locative variation forms an ongoing morphological change or whether the locative variation has stabilized across different social environments. This study investigates not only variation in Chengdu dialect, about which little is known, but also more specifically morphosyntactic variation, which is not as commonly explored in variationist work. In this study, we address two major research questions:

1. Is there a change over time in the relative proportions of *-tou* and *-mian* in the Chengdu dialect?
2. What are the possible linguistic and social constraints that govern the distribution of *-tou* and *-mian*?

2. Chengdu and its language: The social and linguistic background

Chengdu, located in mid-Sichuan Southwest China, is the capital of Sichuan province. As a result of modernization and a constant influx of people, the population of Chengdu has increased from eight million to more than 15 million over the last four decades between 1978 and 2019 (Chengdu statistic bureau, 2019).² Notably, the number of people coming from other places has far surpassed that of people indigenous to Chengdu: more than 80% of people living in Chengdu

1. The author wishes to thank speakers from Chengdu for their time and participation. This project would not be possible without their support. Special Thanks to, in alphabetical order, Hongjie Guo, Hai Hu, Meredith Tamminga, Lacey Wade, Xu Xu, Zheng Xu and Bingjun Yang for their input throughout the development of this project. Thanks also to James Stanford, the two anonymous reviewers and editors for their very helpful suggestions, which have greatly improved this paper. An earlier version of this work was presented at NACCL 30 and NAWAV 47. Thanks to the audience for their feedback.

2. Information available on the official website of Chengdu Municipal People’s Government: <http://www.chengdu.gov.cn/english/>

have migrated from other cities in and outside of Sichuan province.³ The dramatic social change is likely to influence the use of Chengdu dialect.⁴

Given its political and economic prominence as the provincial capital, Chengdu dialect has subsequently come to be seen as representative of the larger Sichuan region. As a Mandarin dialect, it belongs linguistically to South Western Mandarin (Li & Thompson, 1981), as suggested in Figure 1. In this respect, Chengdu dialect bears more resemblance to standard Mandarin than other non-Mandarin southeastern Chinese languages.

Standard Mandarin serves as the lingua franca that is widely spoken and written in modern China. It takes “northern Mandarin as its basis, the Beijing Mandarin phonological system as its norm of pronunciation, and exemplary modern baihua [‘vernacular’] literary language [as opposed to classical Chinese] as its norm of grammar” (Xiandai Hanyu Cidian, 1983, p.255). The spread of standard Mandarin as a result of both language standardization and education policy, further coupled with the great social upheaval that boosts geographical and social mobility, eventually gave rise to contact-induced language variation in various aspects.

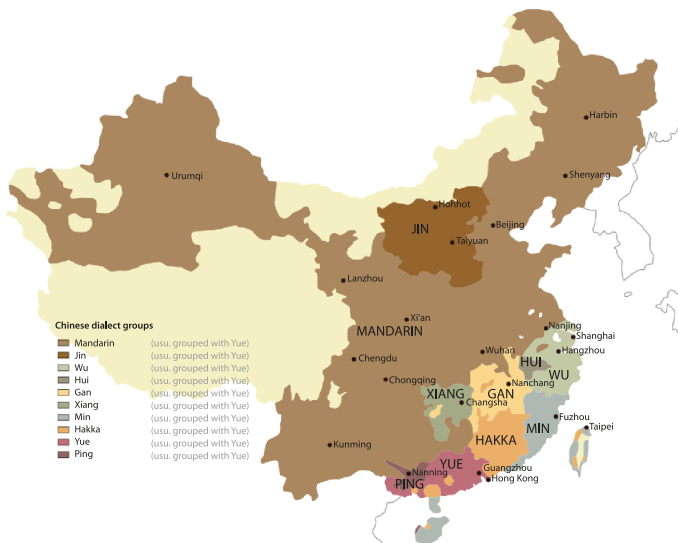


Figure 1. Map of Chinese languages⁵

3. Same as footnote 2.

4. The exact number of native Chengdu dialect speakers who were born and have grown up in Chengdu for generations is lacking: Households registered as Chengdu residents might not necessarily be native speakers.

5. Map downloaded online from *The Language Atlas of China*: https://en.wikipedia.org/wiki/Language_Atlas_of_China

3. The envelope of variation: Chinese locative markers *-tou* and *-mian*

The non-suffix *tou* can stand as a free noun in standard Mandarin to refer to the head of a human body (Sun, 2006). In this case, it takes a suffix and enters into compounds as a full word (Chao, 1968, 2011). For example, *tou* takes a suffix in *tou-nao* (head-brain) ‘brain’ and makes up a compound. As a suffix, *-tou* has several grammatical roles (Chao, 1968, 2011; Lü, 1982): it can be a nominal suffix, for example, *kan-tou* (look-head) ‘being worth watching and appreciating’, or a locative marker as in *shang-tou* (up-head) ‘on/above’.

Similarly, *-mian* can also serve as a morpheme to form words denoting location and direction. The non-suffix *mian* can function as a classifier which either refers to anything that is flat or stretchable in shape such as *yi-mian-jingzi* (one face mirror) ‘one-CL-mirror’, or the number of times to meet, such as *wo-gen-ta-jianguo-yimian* (I and he/she have seen one face) ‘I have seen him/her once-CL’ (Lü, 1982, p.386). As a suffix, *-mian* can be attached to place words to denote location as well. In particular, it can be affixed to other monosyllabic morphemes of direction such as *dong-mian* (east-face) ‘the east of’ and *shang-mian* (up-face) ‘on/above’.

More recent studies of the suffix *-tou* focus on its grammaticalization process. For instance, Chen (2016) uses corpus data to quantitatively document the diachronic change in productivity for *-tou* during its grammaticalization from its lexical meaning of “head” to a suffix, showing that *-tou* has undergone a process of becoming less productive. Gao (2006) describes the suffixation process of *-tou* and finds that cases where *-tou* forms part of a compound tend to appear in historical texts that are vernacular in nature, such as the *Book of Songs*. Wei (2007) descriptively looks at the historical timeline of *-tou* suffixation and emphasizes its grammatical function as a nominalizer and a locative marker. She points out that as a word-formation component, *-tou* also conveys a sense of smallness or endearment, just like diminutives in English.

Similarly, work on *-mian* also lies in its suffixation process from an initial free word to a locative marker and the possible reasons behind the suffixation process. Feng (2008), for instance, shows that in ancient Chinese, *-mian* means “face”, which is later extended to denote more abstract senses related to “surface” as well as “locations”, potentially giving rise to its lexical function as a locative suffix. These studies provide qualitative descriptions for understanding both suffixes but few have investigated them systematically as locative markers. One psycholinguistic study on *-tou* and *-mian* as locative markers does point out that although these two suffixes differ in the metaphorical meaning they bear, they are semantically identical when expressing locality (Yin, 2008). In particular, using corpus data, Yin (2008) suggests that *-tou* and *-mian* differ in the psychological point of

view: when being attached to direction nouns such as *dong*, meaning “east”, *-tou* indicates a notion of “point” whereas *-mian* conveys a “scope” notion. Moreover, despite multiple studies having been conducted for further theoretical clarifications on the grammatical nature of suffix *-tou* and *-mian*, few have attempted to investigate them across different dialect regions/speech communities.

In Chengdu dialect, there are two types of *-tou* when it functions as a locative marker: the categorical *-tou* (cases where only *-tou* can be used), that is, the dialectal usage of *-tou*, and the non-categorical *-tou* (cases where *-tou* alternates with *-mian*). The categorical *-tou* can be attached to substantive nouns of location without the presence of locative particles. Example words include cases like *wu-tou* (house-head) ‘inside the room’ or *xuexiao-tou* (school-head) ‘inside the school’. In this sense, *-tou* serves as an abbreviated form for *li-tou* (inside-head) ‘inside’. Chengdu speakers are inclined to add *-tou* directly to all kinds of place nouns, be it a mono-morphemic localizer or a localizer complex. Words such as *wu-tou* (house-head) ‘inside a room’ or *xuexiao-tou* (school-head) ‘inside the school’ are all abbreviated equivalents to their complete forms *wu li-tou* or *xuexiao li-tou* where *-tou* directly follows the localizer *li* (meter) ‘inside’.

In standard Mandarin, however, no expressions such as *wu-mian* (room-face) are allowed. Locative markers must be attached to localizers. Mono-morphemic localizers with markers therefore are more likely to emerge as *li-mian* (inside-face) ‘inside’, *wai-mian* (outside-face) ‘outside’, etc. These forms should be more frequently used than their dialectal counterparts *li-tou* (inside-head) ‘inside’ and *wai-tou* (outside-head) ‘outside’ in public settings such as conference rooms, schools or over mass media. Variation only exists between *wu-li-tou* and *wu-li-mian*, that is, localizer-*tou*. Interestingly, other than marking spatial, *-tou* and *-mian* can also bear temporal grammatical function, as in *front-tou/-mian*, for “before” and *behind-tou/-mian* for “after”.

Linguistic variables must be alternatives within the same grammatical system which have the same referential value in running discourse (Sankoff, 1988, pp.142–143). It has been observed that when conveying meanings of location, Chengdu speakers use *-tou* and *-mian* alternatively. For instance, they would use both *shang-tou* (up-*tou*) and *shang-mian* (up-*mian*) to mean one object is on top of another object on various occasions. Furthermore, in our interviews, to convey “there is a turtle on the table”, one speaker used *zhuozi shang-mian shi wugui* (table up-MIAN be turtle), while another speaker said the same sentence except that *-mian* was replaced with *-tou*. Moreover, sometimes they would use *hou-tou/mian* (behind-TOU/MIAN) to mean “one event happens after another” or “one object is behind another object”. For example, speakers would express “he sits behind her” by saying *ta zuo.zai ta hou-tou* (*he sit.at she behind-TOU*) and they would also say “afterwards he left” using the same locative form: *ta*

hou-tou zoule (he behind-TOU leave-ASP). A more detailed comparison concerning the interchangeable use of locative markers among Chengdu speakers that has been observed is summarized in Table 1. Words are bolded for cases where temporal locatives are involved. Even though *-mian* seems to be favored by some speakers in certain formal contexts (e.g., when they are asked to use proper location expressions to describe a target picture), the choice of *-tou* and *-mian* is not immediately predictable for most cases. All these facts suggest that on the one hand, the speaker's choice of either *-tou* or *-mian* might be stylistically differentiated (i.e., formal vs. informal); on the other hand, the intraspeaker variation is not simply stylistic variation. The alternation between *-tou* and *-mian* therefore indicates a legitimate test case that might shed light upon language variation and change under the context of language contact. As a side note, there is also tone variation present in addition to the morphosyntactic variation between *-tou* and *-mian*, since it appears that for some speakers, sociotonic variation is happening in concert with their choice of locatives. This presumably is related to the tone system of the Chengdu dialect as compared to standard Mandarin. However, I will leave this question in terms of how tones are involved in locative variation for further work and will not discuss it further in subsequent sections.

Table 1. Cases of locative alternations that have been observed

Meaning	Variant one	Variant two
'on/above'	shang ²¹³ /kau ⁴⁵ tou ²¹ (up/tall-TOU)	shang ⁴ mian ⁰ (up-MIAN)
'below'	xia ²¹³ tou ²¹ (down-TOU)	xia ⁴ mian ⁰ (down-MIAN)
'front'	qian²¹³ tou²¹ (front-TOU)	qian²mian⁰ (front-MIAN)
'back'	hou²¹³ tou²¹ (behind-TOU)	hou⁴mian⁰ (behind-MIAN)
'inside'	li ⁴² /hou ^{13 53} tou ²¹ (inside-TOU)	li ³ mian ⁰ (inside-MIAN)
'outside'	wai ²¹³ tou ²¹ (outside-TOU)	wai ⁴ mian ⁰ (outside-MIAN)

Note. The superscript numbers refer to tone values.

4. An apparent-time study of (*-tou*, *-mian*) variation

An apparent-time analysis is adopted in our current study to understand the locative variation in Chengdu dialect. In future work, of course, real time data should be used to confirm suggestions of language change derived from apparent time data.

4.1 Speakers

The data was collected in the summer of 2017 and a total of 40 native speakers of Chengdu dialect (19 men; 21 women) participated into this study. All of them were contacted through a ‘friend of a friend’ approach (Milroy, 1980). They have been living in the urban area of Chengdu since they were born. Based on their residential area, daily language use, shared social norms as well as cultural tradition that have been inherited, they should belong to the same speech community (Bloomfield, 1933; Hockett, 1958; Hudson, 2000; Labov, 1972a). Since the jurisdiction of Chengdu has extended to many counties, we confined our sampling to people from the major districts (the Inner Chengdu area and Xindu district) that have been formed in a considerable period of time in history. The map⁶ below visualizes the geographic distribution of the 40 speakers. As indicated in the map, all the speakers were either from the Inner Chengdu area (38/40) or from Xindu district (2/40).⁷

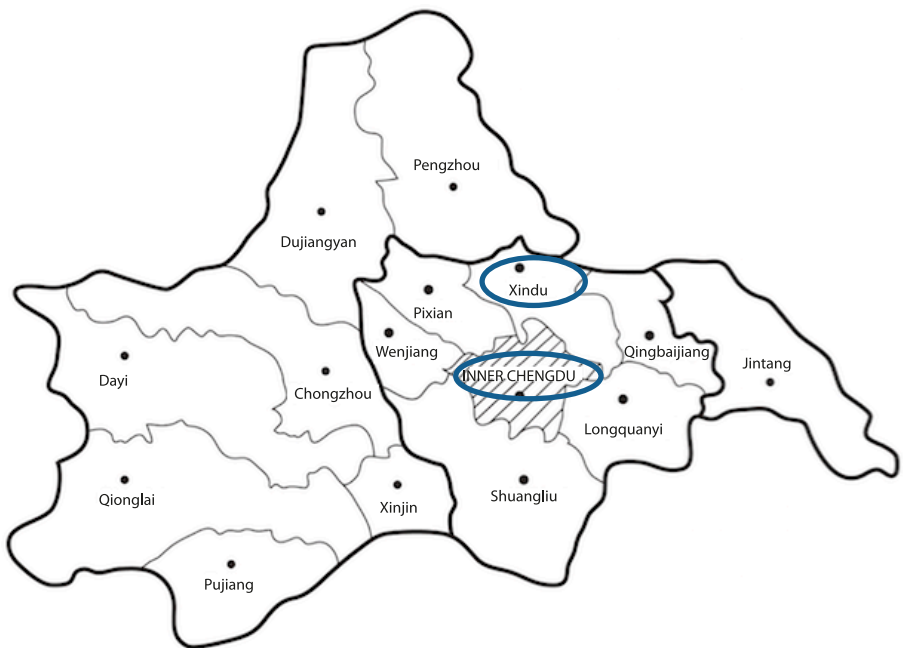


Figure 2. The geographic distribution of the speakers

6. Thanks to Siwen Xiao for making this map. Circles are added by the author. Note: the inner Chengdu in the map stands for the five inner districts: Jinniu district, Wuhou district, Qingyang district, Jinjiang district and Gaoxin district.

7. Please contact the author for more detailed information about the participants.

The high fluidity of people has resulted in an unbalanced distribution of the population in the city as the number of people coming from other places has far surpassed that of people indigenous to Chengdu. As a result, we chose to set our standard for speakers as those who were born in Chengdu and had no previous experience of living in places beyond Sichuan. Referring to the norm of stratified random sampling (Milroy & Gordon, 2003, p.30) conducted in sociolinguistic studies, all of the speakers were stratified according to their gender and birthyear (see Table 2):

Table 2. Stratified random sampling of speakers

Birthyear	Female	Male	Total
Before 1985	8	10	18
1985–1995	7	4	11
After 1995	6	5	11
Total	21	19	40

The year of 1986 was marked as the official initiation of both language standardization policy and the Nine-year compulsory education program, it is thus assumed that speakers born after 1985 would have more exposure to standard Mandarin than those who were born before. Moreover, given that the cohort born after 1995 have internet access basically during their entire life, the increasing contact with standard Mandarin over media might shape their language differently. Therefore, all the speakers were further divided into 3 groups: speakers, born before 1985, aged more than 35 years old were included into Group 1 (Mean age: 53.7), with one aged 36, nine aged 40 to 50 and eight aged more than 50. Group 2 consisted of speakers who were born between 1990 and 1995 and whose age was between 20 and 30 (Mean age: 25.1). Speakers born after 1995 and aged between 15 and 20 formed Group 3 (Mean age: 17.8). Among all the speakers, the youngest one was 17 years old while the oldest was aged 74.

The common use of *-mian* locative in standard Mandarin and the fact that there is no entry of *-mian* locative in earlier dictionaries on the Chengdu dialect (Kilbon, 1917) together seem to suggest that this is likely to be a contact-induced variation. To further confirm this, a monolingual speaker of Mandarin Chinese, a male native speaker of Beijing dialect born after 1995 was interviewed as our baseline to validate the locative variation of interest as contact-induced variation. Beijing Mandarin was selected because it has been considered as the primary dialectal source for standard Mandarin (Li, 1957). We observed that he used exclusively the standard form *-mian* and there was no variation.

4.2 Data collection

Sociolinguistic interviews (Labov, 1972a), picture descriptions, and question-answering pairs were employed as primary means for data collection, followed by a questionnaire scoring the language attitude of the participants. We made reference to both Labov's (1966) model of elicitation and Briggs' (1986) model of open-ended conversation for eliciting relevant data.

4.2.1 *Sociolinguistic interview*

A sociolinguistic interview was used to elicit as much spontaneous speech as possible. Two female native speakers of Chengdu dialect conducted all the interviews. During the interviews, only Chengdu dialect was used. All the interviews were recorded through a digital voice recorder and conducted at participants' homes or locations they selected where the quality of the recording could be guaranteed. To ensure the continuity and stability of narratives, each individual interview lasted at least for 40 minutes. In the end, most of the recordings we obtained lasted between 1 and 1.5 hours. Each speaker was encouraged to take an active part by telling stories that suited their own personal interests. Each interview began with a general introduction of the interviewer, after which some open questions were asked based on their preferences.

In order to avoid the "observer's paradox" (Labov, 1972b, p.209), that is, to guarantee that each conversation could reflect the natural-occurring speech of the participants, not only were the questions tailored to suit different types of people with different personalities, but the form of interviews conducted was also adjusted for data collection: if the speaker was the friend of the interviewer, the interview was carried out between the interviewer and participant; if two speakers were friends, both of them would participate into the same interview in a form of group interaction on a free-talk mode, with the interviewer mainly doing some recording and observation, if necessary, offering topics for discussion. If the speakers were familiar with some friend of the interviewer, this friend would interview the speaker on behalf of the interviewer. More than 40 hours of recording for all participants was collected and qualified as our data for further analysis. On a related note, the change of interview setting potentially adds noise to the data, which will be addressed later in Section 4.3.

4.2.2 *Picture description*

To obtain stylistically-differentiated speech to further investigate the impact of style on the daily use of locative markers, after the sociolinguistic interview, speak-

ers were also asked to describe an assigned picture.⁸ The picture (see Appendix) depicts a room where a table, a lamp and some toys are put in different places. In this task, they were told: “please feel free to describe what is drawn on the picture. You have to describe where each object is placed to complete the task”. Participants would have to describe the exact location of each object to finish this task and in their descriptions, multiple tokens of locative markers would then be elicited. A sample of critical tokens elicited during picture description has been provided in the Appendix as well. Eight senior participants failed to understand the task and eventually did not provide data for picture description.

4.2.3 *Question-answering pairs*

After the picture description task, the interviewer questioned speakers about the relative location of the subject involved in another eight pictures with simple drawings (see Appendix for the sample list of the critical tokens), while the speakers only needed to answer the questions with one sentence. All the questions were in the format of “where is ‘A’” (A is the target object in the picture), and speakers were provided with an answer frame as “‘A’ is at...”. In this case, they only needed to pay attention to locative words inside the sentences. Two pictures not requiring *-tou* or *-mian* to form the locative were included as fillers. From the free interview to picture description and finally to question-answering pairs, the language style becomes more formal, which according to Labov indicates the increasing attention attached to the language used in these tasks on part of the speakers (Labov, 1963). Again, because seven senior speakers failed to understand this task, the data for question-answering pairs from these speakers was not available.

4.2.4 *Questionnaire on language attitude*

Orientation towards a particular language and an associated national identity is what makes speakers identify as speakers of a certain language (Wardhaugh & Fuller, 2014). Language attitude could reflect both positive and negative attitudes held by the members from a speech community towards the language used inside the community (Guo, 2013, p.406). It is hence reasonable to argue for the important role played by language attitude for the individual linguistic behaviors and even the development and death of languages (Xu, 2006, p.80). Language attitude serves as a window to better understand the status quo of a certain language.

8. For speakers in a group-interaction setting, after the interview, they were asked to wait outside and then reenter the interview room one by one to complete the picture description task and the task of question-answering pairs.

After all the tasks, all the speakers took an online survey of 30 questions concerning their language attitude towards Chengdu dialect.⁹ The questionnaire was not given until the end of the data elicitation, since speakers might become more conscious of wording their utterances as they were able to figure out our research purposes (Hoffman & Walker, 2010). All the questions were presented in multiple choice for the purpose of time saving except that two questions about name and birthplace needed to be filled out manually. We assessed speakers' attitude towards the local dialect according to their preferences to speak Chengdu dialect or Putonghua; meanwhile, we examined their attitude towards the local place identity based on their degree of willingness to live in and work for the local community. More information on the scoring system will be given later in Section 4.3. As discussed above, based on the language attitude data we collected from our participants, a good indication of covert preferences for Chengdu speech or standard Mandarin could show possible interaction between language attitude and language use. We could therefore see through language attitude the identity linguistically constructed by each speaker as the membership in one or more social groups or categories (Kroskrity, 2000). To make sure the questions were answered accurately, some of the crucial questions were mentioned again during the interviews in case there would be any inconsistencies in self-reported information.

4.3 Coding and data analysis

All the data garnered from the sociolinguistic interview, picture description and question-answering pairs was transcribed into local and standard Mandarin accordingly.¹⁰ To guarantee the validity of spontaneous speech, neither the beginning nor the final 15 minutes were transcribed. We excluded from transcription three exceptions: (1) sentences where neither *-tou* nor *-mian* was used, for example, *Ta zai wu li-Φ* (She at house inside) 'She is at home'; (2) tokens repeated for the purpose of clarification; (3) tokens that were embedded with other locative markers such as *-fang* or *-bian*, such as *gou zai zhuo zi de xia-fang* (Dog at table DE under-LOC) 'The dog is under the table'.¹¹ Meanwhile, for those cases in which two locative markers appeared as reduplication in one sentence, we

9. Materials available upon request.

10. Chengdu dialect shares the same written language with standard Mandarin. That is Chengdu people use mostly standard written mandarin as their written language. Some local words were transcribed based on either their standard written forms or existing dictionaries for Chengdu dialect.

11. Tokens that involve locative markers such as *-fang* or *-bian* were so rare so that we did not include in our data analysis.

counted them as only one qualified token.¹² A final collection of 2,130 tokens including both categorical *-tou* and non-categorical *-tou* was extracted. Since variation does not exist in those cases with categorical *-tou*, we removed such tokens from our data set. Finally, a collection of 1,641 tokens with non-categorical/variable *-tou* and *-mian* was extracted and coded for both linguistic and social predictors for further statistical analysis.

- **Grammatical function:** We focus on the grammatical function, that is, spatial vs. temporal meaning categories, of the variable. *-tou* is used more frequently in spatial than temporal contexts (Chao, 1968, 2011). Whether this still holds true remains to be tested. Besides, we wonder whether a possible process of grammaticalization, that is, the evolution of lexical items into grammatical forms (Heine, 2017) can be detected, which in our case, should be manifested through an increasing use of temporal meanings over time.
- **Speaker age:** To track the progress of the change, speaker age was coded according to the year of birth. Crucially, if the standard variant *-mian* comes in due to language contact, an age effect should be detected: younger speakers are expected to use the standard form more frequently since they have more exposure to standard Mandarin.
- **Speaker gender:** Speaker gender was coded as male or female. The classic male-female contrast has demonstrated that in change from above, women favor the incoming prestige forms more than men (Labov, 1990). If this holds true in the case of locative variation, women should be found to favor the incoming prestige standard variant *-mian*.
- **Education levels:** Speaker education was coded according to the education level they have completed. We predict that speakers with a higher education level would favor the standard form as the result of more access to the standard variety.
- **Language attitude:** We included language attitude as a potential correlate with (*-tou*, *-mian*) variation by attaching an overall language attitude score to each speaker. We began by scoring between 1 and 5 each informant's response to each question in the questionnaire, with 1 representing the least engagement in the local community while 5 standing for the maximum involvement, and 2 to 4 implying an intermediate or mixed response in the continuum (e.g., hate-1, dislike-2, unsure/both are acceptable-3, like-4, love-5). For instance, for the question on 'which language do the informants prefer to use on daily occasions', those who responded "Chengdu dialect" received a score

12. An example of reduplication cases: *Ta shuo hou-tou, hou-tou ta qu le* (she say behind-TOU, behind-TOU, she go ASP) "She said, later, later she went".

of 5, and the response saying “standard Mandarin” gained a score of 1 since it suggests a less inclination towards the vernacular Chengdu speech. Those replies ranged in the continuum were scored from 2 to 4, with 3 indicating vague answers like “don’t know”. We added up the scores of all 30 questions and arrived at a language attitude index score for each informant. Since the goal in this research is to examine whether attitudes toward the Chengdu dialect predict the use of dialect forms, specifically preferences for locative markers (*-tou* vs. *-mian*), we hypothesize that speakers with more positive language attitudes toward Chengdu dialect would use the local variant *-tou* more frequently.

- **Contextual style:** To further examine the stylistic variation, we coded which task (conversational speech, picture description, and question-answering pairs) each token came from. However, as is noted before, different interview settings have been adopted to elicit conversational speech. Therefore, to check within the interview data, whether conversational speech elicited during group interaction is significantly different from that elicited during one-on-one (participant-interviewer) interviews, a preliminary mixed-effects regression model of *-tou* rate with interview setting, birthyear, and gender as fixed effects was conducted. No statistical evidence was found to show that group and individual interviews are different ($\beta=0.14, p=0.86$). Thus, moving forward, for the purpose of comparing across different intentionally-elicited stylistic contexts, conversational speech collected through both group and individual interviews are combined and treated as recorded interview data. In this case, each speaker would have some conversational speech represented in the data for further analysis. The three tasks are featured with increasing formality in terms of attention paid to speech (Labov, 1966): Compared to picture description where speakers need to pay attention to the locations of various objects described in the picture, the task of question-answering pairs further bears the flavor of “giving a correct and proper answer”, which is intended to further bias speakers to the most careful speech on the formality continuum. It is predicted that the standard variant *-mian* should be favored in relatively formal contexts where the use of standard language is generally assumed by speakers.

Based on all the linguistic and social factors we have chosen to focus on, each token was coded correspondingly, as illustrated through the following example:

- (1) ta jiu shi zai wu-li-*tou* gei wo zhufan naxie ma.
 she just be at home-inside-*loc* for me cook those particle.
 ‘She just does some cooking for me at home.’

(01/1997/Female/Conversation/037/ 75/Spatial/ High school finished)¹³

5. Results

Here is a reminder of the research questions that are of particular interest to the current study: is there a change over time in terms of the relative proportions of *-tou* and *-mian* in the Chengdu dialect? What are the possible linguistic and social constraints that govern the distribution of *-tou* and *-mian*? What is the role of education and language attitude on rates of *-tou/-mian*?

To tackle these questions in practical terms in the following sub-sections, we fit models by subsetting the data in various ways. Constraints on the way the data is distributed make it impossible to examine all factors in every plausible combination in one single model. For instance, only the conversational data is used to investigate change in locative variation over time across different grammatical functions. Conversely, the effect of **contextual style** is modelled using the subset of data where grammatical function is set as “spatial” since temporal cases do not exist in relatively formal styles including picture description and question-answering pairs. Among the total 1641 observations, 57.2% are tokens of *-mian* and 42.8% are *-tou* tokens. In the remainder of this section, we report both descriptive and modelling results to unpack these research questions respectively.

Current analyses were conducted using the R Statistical environment (R Core Team, 2014); generalized mixed-effects logistic regression (GLMM) was conducted using the *glmer* function from the *lme4* package (Bates, Mächler, Bolker, & Walker, 2015).¹⁴ Plots were created using *ggplot 2* (Wickham, 2016). Two coding schemes of GLMM were adopted to resolve comparisons of interest: sum coding and treatment coding. Sum coding is usually employed to compare each level to the grand mean (intercept as the grand mean) whereas treatment coding is implemented when each level needs to be compared to a reference level (intercept as the

13. 01: informant number; 1997: birthyear; Female: speaker gender; Conversation: contextual style; 037: sentence number; 75: language attitude score; Spatial: meaning of the locative; High school finished: speaker education level

14. This is fundamentally the same analysis method that is implemented in a more restricted way by Rbrul (Johnson, 2009), also called multiple logistic regression, which allows for mixed effects modelling but only one type of analysis, that is, logistic regression.

cell mean of the reference group).¹⁵ Model comparison and selection were conducted using a series of likelihood ratio tests (LRTs) to diagnose non-significant predictors and find the model with the optimal fit. The selection process began with the full model with all predictors and interactions considered to be of possible theoretical interest and proceeded backward in a stepwise manner by removing each predictor one at a time and comparing the reduced model with the superset model at each step. A Chi-square test was used to assess the significance of the difference between the two models with respect to the log-likelihood. The superset model is used if $p < 0.05$; otherwise, the subset model is adopted. Finally, R^2 was calculated using the MuMIn package (Nakagawa & Schielzeth, 2013) as a diagnostic for model fits.

5.1 Change over time and the effects of gender and grammatical function on the change of *-tou* rate

Given the nature of the apparent-time paradigm in the standard variationist sociolinguistics literature, we start by showing how the relative proportions of *-tou* and *-mian* change over time using the interview data eliciting conversational speech ($N=1186/1641$). Figure 3 captures how the change of the proportion of *-tou* tokens (the number of *-tou* tokens divided by the total number of variable tokens), unfolds diachronically along with the birthyear of the 40 speakers. It seems that *-tou* used to be the dominant form among the older speakers whereas the younger speakers use both variants equally (as a reminder: since *-tou* and *-mian* are the only two variants, the *-mian* rate is 100% minus the *-tou* rate). Notably, the 40 speakers do not cover the full range of ages. There is a data gap in birthyears from the late 1970s to the 1990s. Whether this reported pattern still holds when speakers from all age groups are examined needs further inquiry.

The question then arises: is the change of *-tou* rates sensitive to different social and linguistic environments? We start with the inquiry of whether the changing *-tou* rate is conditioned by different gender and grammatical function categories: whether there is a gender difference in apparent time in terms of the use of *-tou* for different meaning categories. To address this question, we use only conversational data where both temporal and spatial tokens can be found ($N=1186/1641$). Table 3 contains a descriptive summary of variant rates in the relevant cross-tabulated contexts using data from conversational speech. Note that although Table 3 collapses birthyear into three bins for summary purposes, birthyear is treated as a continuous predictor in the statistical models.

15. More information about different coding schemes in GLMM can be found here: <https://stats.idre.ucla.edu/r/library/r-library-contrast-coding-systems-for-categorical-variables/#User>

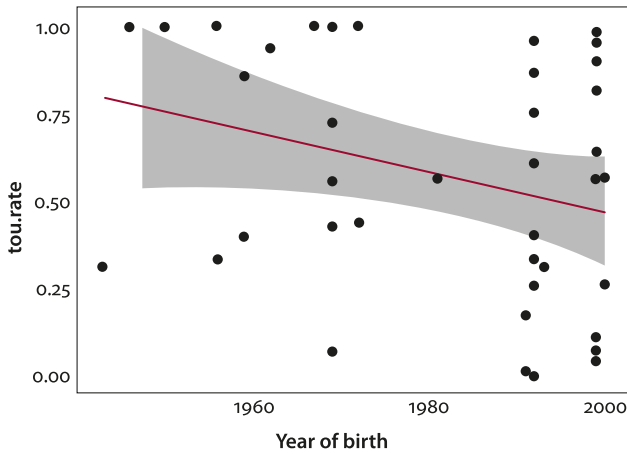


Figure 3. Change of *-tou* rate over time (data = conversational speech; *tou.rate* represents the rate of *-tou* out of the total 1,186 tokens)

Table 3. *-tou* rate in cross-tabulated contexts using conversational speech (birthyear: Grammatical function: gender)

N = 1186/1641% *-tou* represents the rate of *-tou* out of the total 1186 tokens

Birthyear	Grammatical function	Gender	% <i>-tou</i>	N
Before 1985	Spatial	Female	48	137
		Male	69	75
Before 1985	Temporal	Female	89	92
		Male	88	25
1990 – 1995	Spatial	Female	11	114
		Male	33	104
1990 – 1995	Temporal	Female	58	139
		Male	33	30
After 1995	Spatial	Female	46	107
		Male	41	146
After 1995	Temporal	Female	96	102
		Male	27	115

Figure 4 plots the conditioning effect of gender and grammatical function on the change of *-tou* rates over time using data from conversational speech (1186/1641). It reveals that when *-tou* is used for spatial meaning (dashed lines), women

generally pattern with men as rates of *-tou* decrease over apparent time. When *-tou* expresses temporal sense (solid lines), men behave differently from women as the rate of temporal *-tou* decreases drastically over time with a sharper slope among male speakers.

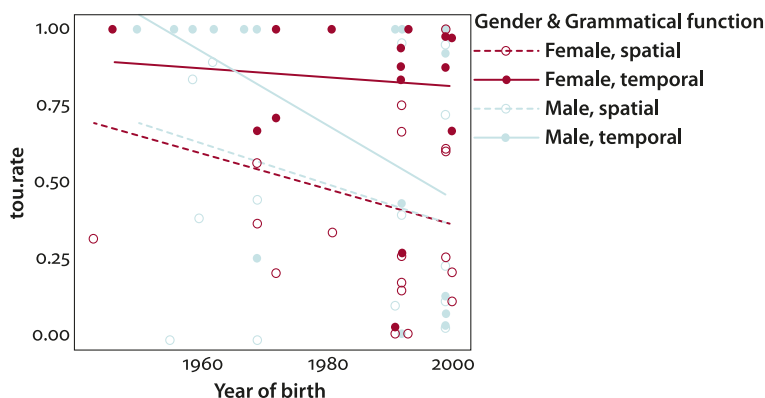


Figure 4. The age and gender effect on the use of *-tou* over time across different grammatical function categories (data = conversational speech; *tou.rate* represents the rate of *-tou* out of the total 1186 tokens)

We fit a logistic mixed-effects model to test how the rate of the local variant *-tou* changes over time by setting up the dependent variable as the form used, with birthyear, gender, grammatical function and the three-way interaction as fixed effects and speaker as a random intercept to account for different baseline rates of variation across different speakers [$\text{variant } -\textit{tou} \sim \text{birthyear} * \text{gender} * \text{grammatical function} + (1|\text{Speaker})$]. All fixed-effect predictors are sum-coded, by which the mean of each level is compared with the grand mean of the dependent variable. Such a model configuration offers the possibility to test whether there is a change over time by averaging all the other predictors. It also provides the chance to see whether this change occurs in different rates given different predictors. Year of birth is manipulated by subtracting the birthyear of each speaker from the birthyear of the oldest speaker such that model coefficients represent whether the younger speakers are systematically different than their older counterparts in terms of the grammatical function and gender patterns.

No predictor is excluded based on LRTs. The model of best fit, as shown in Table 4, captures the joint effects of birthyear, gender and grammatical function on the change of *-tou* rates. There is a main effect of birthyear ($\beta = -0.07$, $p = 0.01$), confirming the apparent time pattern of a decreasing *-tou* rate presented in Figure 3. The main effect of speaker gender is not statistically significant

($\beta = -1.60$, $p = 0.20$), suggesting that, without reference to change-over-time or grammatical function, there is not an overall difference between men's and women's *-tou* rates. There is also an overall difference in grammatical function categories as *-tou* rates in spatial meaning context are significantly lower than the average *-tou* rates across different grammatical functions ($\beta = -1.86$, $p < 0.01$). The interaction between gender and grammatical function is also statistically significant ($\beta = 1.35$, $p = 0.04$), suggesting that the gender difference is smaller in the spatial context than the average gender difference in the temporal context. Crucially, the three-way interaction suggests further that the small difference between men and women in the spatial context becomes significantly smaller over apparent time ($\beta = -0.04$, $p < 0.01$).

However, we do acknowledge that there may not be enough data representing all ages as data points from speakers born from the 1950s to the 1960s are relatively lacking. Cases describing women's usage of locatives before the 1970s are very few and likewise there exists a gap concerning male data from the mid-1970s into the late 1980s. Therefore, research based on speakers from all birthyears should be done in future work to further confirm these patterns reported here.

Table 4. GLMM of best fit predicting *-tou* rate by birthyear, gender and grammatical function using data from conversational speech [variant *-tou* ~ birthyear * gender * grammatical function + (1|Speaker)]

N=1186/1641		R ² =0.75		
	Estimate	SE	z value	Pr (> z)
Intercept	4.03	1.25	3.21	0.00 **
Birthyear	-0.07	0.03	-2.67	0.01 **
Gender=female	-1.60	1.24	-1.29	0.20
Grammatical function=spatial	-1.86	0.66	-2.82	0.00 **
Birthyear × Female	0.04	0.03	1.53	0.13
Birthyear × Spatial	0.01	0.01	1.13	0.26
Female × Spatial	1.35	0.67	2.01	0.04 *
Birthyear × Female × Spatial	-0.04	0.01	-2.79	0.00 **

5.2 Change of contextual style effect over time

We now turn to the analysis of whether the changing rate of *-tou* is conditioned by different types of contextual styles. By looking at the interaction between different social predictors, that is, birthyear, gender and style, we examine whether the distribution of *-tou* is further constrained by different degrees of formality

across three tasks: conversational speech (least formal), picture description (formal) as well as question-answering pairs (most formal). Crucially, to understand the change of style effect over apparent time, we exclude the effect of grammatical function by targeting tokens of spatial *-tou/-mian* since the tasks involved in relatively formal contexts elicit spatial tokens only and render it impossible to analyze the interaction between grammatical function and style in practice ($N=1137/1641$). Table 5 contains a descriptive summary of variant rates in the relevant cross-tabulated contexts using data of spatial tokens.

Table 5. *-tou* rate in cross-tabulated contexts using data of spatial tokens (birthyear: Gender: Style)

<i>N</i> = 1137/1641; % <i>-tou</i> represents the rate of <i>-tou</i> out of the total 1137 tokens				
Birth year	Gender	Style	% <i>-tou</i>	N
Before 1985	Female	Conversation	48	137
		Picture.Description	17	18
		Question.Answering	7	56
Before 1985	Male	Conversation	69	75
		Picture.Description	21	19
		Question.Answering	17	23
1990 – 1995	Female	Conversation	11	114
		Picture.Description	6	63
		Question.Answering	31	45
1990 – 1995	Male	Conversation	33	104
		Picture.Description	14	28
		Question.Answering	0	29
After 1995	Female	Conversation	46	107
		Picture.Description	16	61
		Question.Answering	0	40
After 1995	Male	Conversation	41	146
		Picture.Description	30	37
		Question.Answering	26	35

Figure 5 visualizes the change of spatial *-tou* rates across different contextual styles in apparent time terms. It shows that *-tou* takes up smaller percentages in relatively formal styles. In conversational speech, women generally pattern with men even though younger speakers are becoming less likely to use *-tou*. In both

picture description and question-answering pairs, the style effect also implies gender-based differences: women and men show different levels of sensitivity to different styles as suggested by the different slopes.

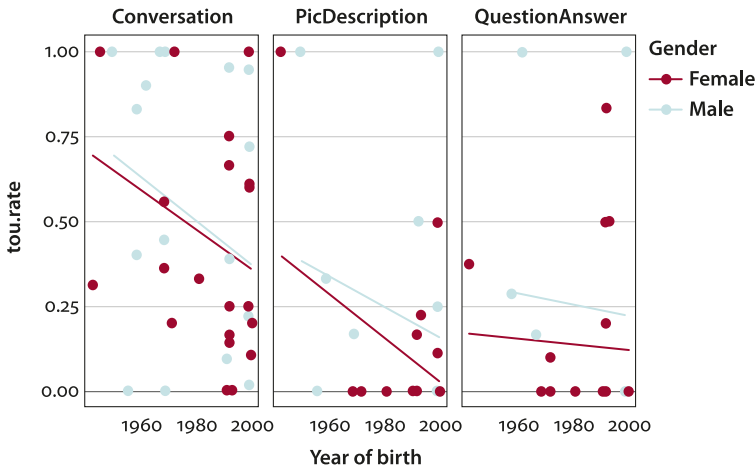


Figure 5. The age and gender effect on the use of *-tou* over time across different styles (data = spatial tokens; tou.rate represents the rate of *-tou* out of the total 1137 tokens)

A similar model configuration is adopted as the previous subsection except that the style effect is targeted in the current case [variant *-tou* ~ birthyear*gender*style + (1|Speaker)]. Therefore, age, gender and style are included as fixed effects (all sum-coded in a three-way interaction) and speaker is included as a random intercept. Model selection is implemented, nonsignificant predictors are removed: the three-way interaction of birthyear, gender and style ($X^2(2) = 2.43$, $p = 0.30$), the two-way interaction of gender and style ($X^2(2) = 1.54$, $p = 0.46$), the two-way interaction of birthyear and style ($X^2(2) = 2.36$, $p = 0.31$), the two-way interaction of birthyear and gender ($X^2(1) = 0.15$, $p = 0.70$), the main effect of gender ($X^2(1) = 0.09$, $p = 0.77$), as well as the main effect of birthyear ($X^2(1) = 3.53$, $p = 0.06$). The optimal model takes style as the fixed effect and speaker as a random intercept. As summarized in Table 6, there is a significant effect of style as *-tou* rates in conversational speech are significantly higher than the average *-tou* rates across all three different styles ($\beta = 1.31$, $p < 0.001$). Conversely, *-tou* rates in picture description are significantly lower than the average *-tou* rates across the board ($\beta = -0.50$, $p < 0.01$). To further examine whether question-answering pairs differ from picture description, we refit the model by treatment coding style, which allows for comparisons between individual levels. It turns out that question-answering pairs are not significantly different from picture description ($\beta = 0.30$, $p = 0.34$).

Table 6. GLMM of best fit predicting *-tou* rate by style using data of spatial tokens [variant *-tou* ~ style+ (1|Speaker)]

$N=1137/1641$ $R^2=0.60$

	Estimate	SE	z value	Pr (> z)
Intercept	-1.51	0.35	-4.29	< 0.001 ***
Style = Conversation	1.31	0.14	9.37	< 0.001 ***
Style = Picture description	-0.50	0.18	-2.82	< 0.01 **

5.3 Educational effect on the change of *-tou* rate

To answer whether the change of *-tou* over time is conditioned by the different **educational levels**, we use a subset of the data with only speakers born before 1988 (older speakers, $N=445/1641$), due to the drastic reduction in illiteracy due to the implementation of a nine-year compulsory education program (and therefore lack of variation in education) among younger speakers. In addition, no participant aged between 15 and 20 received higher education because at their age, they were supposed to go to either middle or high school.

Based on these facts, high school education is treated as the critical separation point: speakers generally fall into two education categories depending on whether they have finished high school education or not. This grouping criterion is essentially motivated by the fact that high school education is considered “fairly educated” by most speakers born before 1980s for historical reasons as mentioned above. In this case, educational effects can be better captured if there do exist differences between speakers who are high school graduates and who are not. Table 7 presents the variant rates in the relevant cross-tabulated contexts using data from speakers born before 1988.

Table 7. *-tou* rate in cross-tabulated contexts using data from speakers born before 1988

$N=445/1641$; %*-tou* represents the rate of *-tou* out of the total 445 tokens

Education level	Gender	% <i>-tou</i>	N
High school.finished	Female	38	93
High school.finished	Male	40	87
High school.unfinished	Female	57	210
High school.unfinished	Male	85	55

According to Figure 6, speakers with lower education level tend to use more *-tou* tokens at least in conversational speech as both female and male speakers who failed to complete high school education prefer the local variant, contrasting

with the relatively lower *-tou* rates for speakers who did finish high school education. Interestingly, for question-answering pairs, the formal setting failed to override the influence of education for male speakers since those who were not high school graduates still prefer *-tou*. These facts point towards complicated patterns associated with gender, education, and style. A model with a full three-way interaction of education, gender and style would be too underpowered to faithfully unveil any of these complexities. For this reason, we decide to model the role of education through the lens of conversational speech from the older speakers without including style in the model ($N=329/1641$).

In this case, a model with two-way interaction is configured by including education and gender as fixed effects (sum-coded) and speaker as a random intercept [variant *-tou* ~ gender*education + (1|Speaker)]. Model comparison based on LRTs suggests removing the two-way interaction between gender and education ($X^2(1)=0.57, p=0.45$) as well as the effect of gender ($X^2(1)=0.07, p=0.79$). The optimal model with education as the fixed effect and speaker as the random intercept is displayed in Table 6. No effect of education is found ($\beta=-1.17, p=0.06$). Despite these tentative null results, patterns of the question answering and picture description in Figure 6 suggest that potential interactions might exist. However, due to lack of data, there is no way to confirm whether such interactions are real or not. This therefore requires further inquiry.

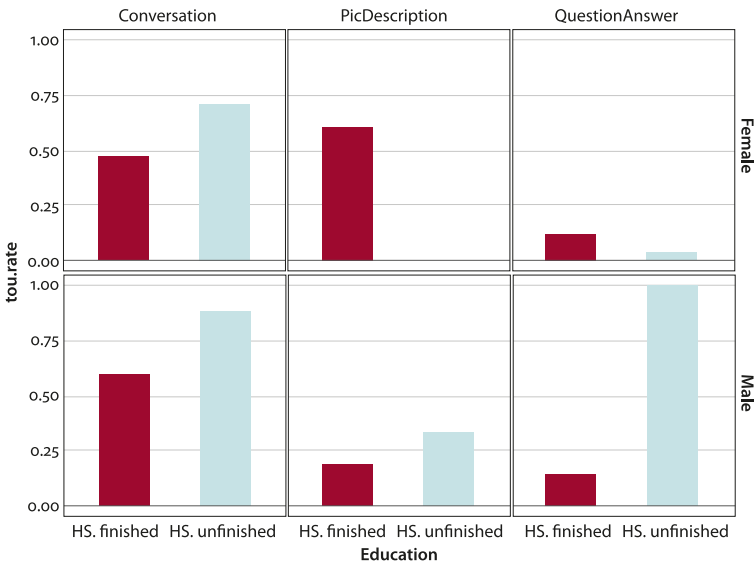


Figure 6. The education and gender effect on the use of *-tou* across different contextual styles (data = tokens from speakers born before 1988; tou.rate represents the rate of *-tou* out of the total)

Table 8. GLMM of best fit predicting *-tou* rate by education and gender using conversational speech from speakers born before 1988 [variant *-tou* ~ education + (1|Speaker)]

$N=329/1641$ $R^2=0.65$

	Estimate	SE	z value	Pr (> z)
Intercept	1.54	0.65	2.39	0.02 *
High school.finished	-1.17	0.62	-1.89	0.06.

In sum, current results based on available data have suggested that locative variation in the Chengdu dialect shows change in progress with the increasing use of the standard form *-mian* as well as synchronic stable variation with multiple constraints governing their distribution as suggested by the analyses of gender, grammatical function and style: There seems to be no gender-based difference in terms of the changing *-tou* rates over apparent time. Temporal meaning (as opposed to spatial) and informal style appear to favor the use of *-tou*. Meanwhile, although men and women do not show significant differences overall in terms of *-tou* rates, they differ significantly in their use of *-tou* in different grammatical function contexts and this difference also seems to be changing over apparent time. Women produce significantly less *-tou* in the spatial meaning category. Despite these facts, it is also worth noting that current conclusions based on a group of only 40 speakers are tentative and more work needs to be done in the future.

5.4 The role of language attitude

Finally, we focus on the role of language attitude in driving use of *-tou* across different social and linguistic environments to better interpret these findings. We focus on younger speakers born after 1988 ($N=1196/1641$) because language attitude covaries with age. This prompts a separate analysis without including age in the same model to de-confound the correlation between language attitude and age.

We begin with the results from the language attitude survey. The score for language attitude ranges from 61 to 85 (mean=75.82), as illustrated in Figure 7. Despite personal differences in terms of their language attitudes, no participant said that he/she hated to live in Chengdu. Meanwhile, nobody disagreed on the language policy of promoting standard Mandarin nationwide and almost every participant considered it an indispensable living skill to speak the standard language. Meanwhile, Figure 7 also implies that language attitude covaries with the

birthyear as older speakers tend to have higher language attitude scores (Pearson's $R = -0.49$, $p < .001$). Further, preliminary data exploration indicates that younger speakers show a larger range of language attitude scores. Therefore, in order to capture the effect of language attitude on *-tou* rates and to de-confound the influence of birthyear, this analysis uses the data of younger speakers born after 1988 ($N = 1196/1641$).

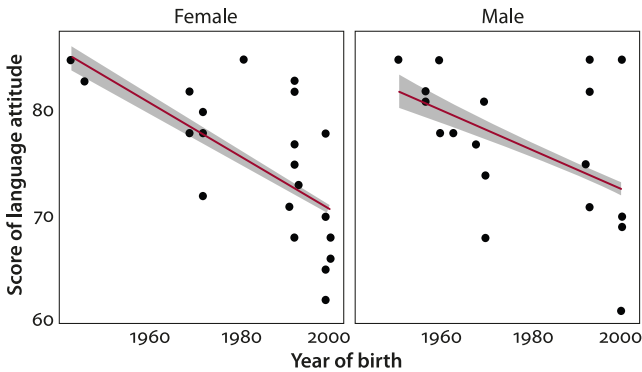


Figure 7. Overall distribution of language attitude scores for all the 40 speakers

We begin by investigating the influence of language attitude, gender and grammatical function on *-tou* rates, using only the conversational speech from younger speakers ($N = 857/1641$). We then continue with the co-influence of language attitude, gender and style on *-tou* rates based on the spatial data, again filtered from younger speakers ($N = 809/1641$). Language attitude score is treated as a continuous variable and is manipulated by subtracting the attitude score for each speaker from the speaker who has the lowest language attitude score so that comparisons can be directly made between speakers who linguistically attach to the Chengdu dialect and those who disprefer the language in general.

Table 9. *-tou* rate in cross-tabulated contexts using conversational speech from speakers born after 1988 (grammatical function: Gender)

$N = 857/1641$; %-*tou* represents the rate of *-tou* out of the total 857 tokens

Grammatical function	Gender	% - <i>tou</i>	N
Spatial	Female	0.28	221
Spatial	Male	0.38	250
Temporal	Female	0.74	241
Temporal	Male	0.28	145

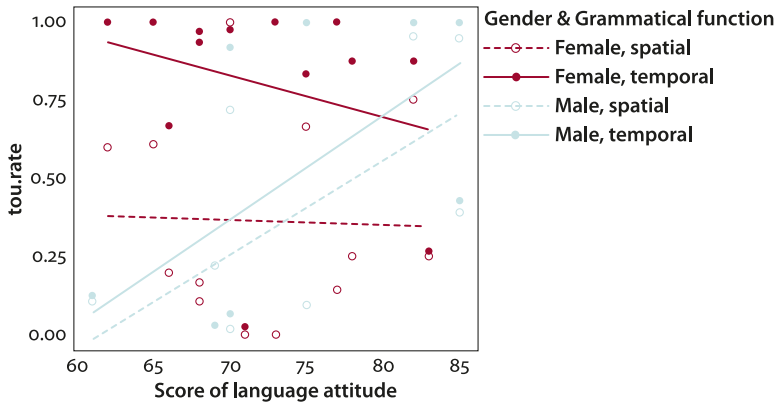


Figure 8. The effect of language attitude and gender on *-tou* rates across different grammatical functions (data = conversational speech from speakers born after 1988; *tou.rate* is represented as the rate of *-tou* out of the total 857 tokens)

Cross-tabulation of grammatical function and gender among younger speakers is summarized in Table 9. Figure 8 further visualizes the conditioning effect of language attitude score on *-tou* rates across different gender and grammatical function patterns. It is visually salient that for men, higher language attitude score boosts the use of *-tou* in both temporal (solid lines) and spatial meaning (dashed lines) categories. However, the direction of this positive effect gets reversed for women as more positive language attitude implies less *-tou* tokens among female speakers.

This in fact signals a qualitative interaction between language attitude and gender, that is, the direction of the attitude effect reverses instead of merely differing in size across different genders. In our view, it is counterintuitive to reason about qualitative interactions as shown in Figure 8 using sum-coded contrasts in models. Because men and women perform qualitatively differently, we use treatment coding of gender to narrow in on this effect and to probe the interaction between language attitude and grammatical function within each gender more straightforwardly.

A mixed-effects regression model with language attitude score, gender and grammatical function as fixed effects and speaker as a random intercept is conducted [variant *-tou* ~ attitude*gender*grammatical function + (1|Speaker)]. Gender is treatment coded, with “Male” as the reference level. Grammatical function is sum coded. Because the fixed effects are in interaction terms and the reference level of gender is “Male”, the main effect of language attitude and grammatical function only refers to the pattern for male participants. No fixed effect is removed after model selection. According to the model of best fit, as shown in

Table 10, there is a main effect of language attitude, confirming that more positive language attitude indeed significantly triggers more tokens of *-tou* among men ($\beta=0.24$, $p=0.02$). The effect of gender is also significant, implying that women deviate from men as they use higher proportions of *-tou* ($\beta=5.93$, $p<0.01$). No main effect of grammatical function is found, suggesting that male speakers with different language attitudes behave similarly across different grammatical function categories ($\beta=-0.45$, $p=.25$).

The negative interaction between gender and grammatical function shows that female speakers use significantly lower rates of *-tou* in the spatial context ($\beta=-2.68$, $p<0.001$). The interaction between language attitude and female implies that the slope of language attitude (as averaged across grammatical functions) is significantly smaller for women than for men ($\beta=-0.36$, $p=0.01$). The interaction between language attitude and grammatical function is not significant: Higher language attitude score does not affect *-tou* rates in either spatial or temporal meaning context for male speakers ($\beta=0.00$, $p=0.90$). This grammatical category difference for women (compared to men) becomes smaller with more positive language attitude, as indicated by the significant interaction between language attitude, gender and grammatical function ($\beta=0.12$, $p=0.00$). When the model is refit with female as the reference level, the effect of language attitude among women is not significant ($\beta=-0.12$, $p=0.24$).

Table 10. GLMM of best fit predicting *-tou* rate by language attitude, gender and grammatical function for speakers born after 1988 [variant *-tou* ~ attitude*gender*grammatical function + (1|Speaker)]

$N=857/1641$ $R^2=0.73$

	Estimate	SE	z value	Pr (> z)
Intercept	-3.84	1.53	-2.51	0.01 *
Language.attitude	0.24	0.10	2.40	0.02 *
Female (vs. Male)	5.93	2.04	2.90	0.00 **
Grammatical.function = Spatial	-0.45	0.40	-1.14	0.25
Language.attitude × Female	-0.36	0.14	-2.52	0.01 *
Language.attitude × Spatial	-0.00	0.03	-0.13	0.90
Female × Spatial	-2.68	0.65	-4.11	<.001***
Language.attitude × Female × Spatial	0.12	0.04	2.82	0.00 **

Next we test the role played by language attitude, gender and style in affecting *-tou* rates using data from younger speakers where grammatical function is coded as “spatial” ($N=809/1641$). Figure 9 illustrates the interaction between gender,

contextual style and language attitude. Notably, men and women show different style patterns as suggested by the different directions of slopes. As for women, the language attitude does not seem to influence the use of *-tou* given their performance in conversational speech and picture description. Nevertheless, it comes into play in the most formal question-answering pairs. Female speakers with more positive language attitude still prefer to use *-tou* even though the task itself is biased towards using the standard language. This however is not true for male speakers: more positive language attitude towards the local dialect boosts the use of the local variant among male speakers across various contextual styles even though the size of the effect might differ.

This scenario suggests that women and men might differ qualitatively in their strategies of treating variants in different social environments. Therefore, to make sure generalizations can be extracted separately for men and women in terms of the effect of language attitude and contextual style, we treatment-coded gender, with “Male” as the reference level, and sum-coded style. A regression model then is fit to test the effect of language attitude, gender and style with language attitude, gender and style as fixed effects and speaker is treated as a random intercept [variant *-tou* ~ attitude*gender*style + (1|Speaker)]. Again, model selection does not exclude any interaction terms or main effects.

Table 11. *-tou* rate in cross-tabulated contexts using spatial tokens from speakers born after 1988 (contextual style: Gender)

N=809/1641; %-*tou* represents the rate of *-tou* out of the total 809 tokens

Contextual style	Gender	% <i>tou</i>	N
Conversation	Female	0.28	221
Conversation	Male	0.38	250
Picture.Description	Female	0.11	124
Picture.Description	Male	0.23	65
Question.Answering	Female	0.16	85
Question.Answering	Male	0.14	64

Table 12 summarizes the output of the optimal model. There is a main effect of language attitude ($\beta=0.19$, $p=0.02$) as the more positive the language attitude is, the more likely that *-tou* men would use *-tou* across all styles. There is no effect of style as contexts with different degrees of formality do not differ significantly in shaping *-tou* rates for male speakers ($\beta=1.21$, $p=0.09$). The negative interaction between female and picture description suggests that for speakers with the most negative language attitude, picture description elicits significantly more *-tou*

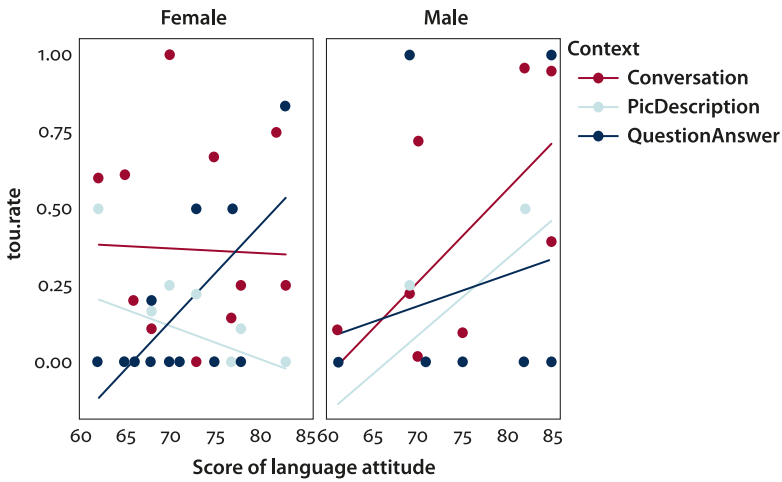


Figure 9. The effect of language attitude, and gender on *-tou* rates across different contextual styles (data = spatial tokens from speakers born after 1988; *tou.rate* represents the rate of *-tou* out of the total 809 tokens)

among women than men on average across different styles ($\beta = 2.59, p = 0.05$). The significant three-way interaction between language attitude, female and picture description ($\beta = -0.23, p = 0.01$) indicates that for speakers with a higher language attitude score, the gender difference across stylistic contexts becomes significantly smaller. It is not immediately apparent why there exists this attitudinal mitigation of cross-gender stylistic differences. I will return to this question in the discussion.

When the model is refit with female as the reference level, the main effect of language attitude is not significant given female speakers with attitudinal differences still behave similarly ($\beta = -2.15, p = 0.22$). There is a main effect of style. Conversational speech defines a distinct contextual style that triggers a significantly higher frequency of *-tou* tokens for women ($\beta = 1.95, p < .001$).

It is therefore not hard to tell that at least among younger speakers, language attitude seems to be represented differently among men and women. For men, more positive language attitude towards the local dialect significantly elicits more *-tou* whereas for women, language attitude does not influence their use of the variant in the same way. Meanwhile, men do not seem to distinguish temporal and spatial types whereas female speakers use distinctively less *-tou* in the spatial context. Other than this, female speakers produce distinctively more tokens of *-tou* in conversational speech.

Table 12. GLMM of best fit predicting *-tou* rate by language attitude, gender and contextual style using spatial tokens from younger speakers (reference level: Men) [variant *-tou* ~ attitude*gender*style + (1|Speaker)]

$N=809/1641$ $R^2=0.63$

	Estimate	SE	z value	Pr (> z)
Intercept	-4.72	1.36	-3.46	<.001 ***
Language attitude	0.19	0.08	2.30	0.02 *
Female (vs. Male)	2.15	1.73	1.24	0.21
Style = Conversation	1.21	0.71	1.70	0.09.
Style = Picture.Description	-1.97	1.16	-1.70	0.09
Language attitude × Female	-0.14	0.12	-1.14	0.26
Language attitude × Conversation	0.02	0.04	0.51	0.61
Language attitude × Picture.Description	0.08	0.06	1.43	0.15
Female × Conversation	0.74	0.87	0.85	0.40
Female × Picture.Description	2.59	1.29	2.00	0.05 *
Language attitude × Female × Conversation	-0.11	0.06	-1.76	0.08
Language attitude × Female × Picture.Description	-0.23	0.08	-2.69	0.01 **

6. Discussion

An apparent-time interpretation of current results suggests a change in progress of locatives in the Chengdu dialect with the increasing use of the standard form *-mian*. Additionally, multiple constraints such as grammatical function, gender, and style have conditioning effects that are stable over time, as shown by the fact that birthyear does not interact with these predictors in conditioning *-tou* rates (and also by extension, *-mian* rates). We propose that these quantitative results motivate the understanding of locative variation in the Chengdu dialect in two respects. First, the attrition of *-tou* rates over time implies emerging dialect leveling that can be attributed to the ongoing language standardization that eventually leads to contact-induced convergence. Second, the gender differences captured in both grammatical function and language attitude shows that on the one hand, men and women behave differently in various aspects; on the other hand, more work needs to be done to shed light on how different cultures define gender roles differently and how these culture-oriented idiosyncrasies function together to shape the use of language.

6.1 Change in progress vs. age-grading

Given the current empirical evidence, we cannot rule out the possibility of age-grading. Nevertheless, we think it is unlikely that the age differences seen here reflect age grading. Real world context tells us that contact with standard Mandarin is not going to reverse but rather is increasing over time. For example, even though some local TV shows are still available, they are favored by older speakers. It is possible, however, that the generational change will not go to completion. Sociostylistic allocation might take place when lower-status local forms are preferred in informal and conservative settings while prestigious variants are more favored in formal contexts (e.g., Labov, 1966). When this happens, we might expect to still see some age differences but more likely with a “U-shaped pattern” (McMahon, 1994, p.241).

6.2 Dialect-to-standard convergence

Although Chao (1968, 2011) has mentioned that the suffix *-mian* is less common than *-tou* in Chinese, he did not point out where the data came from. Current results seem to suggest instead a reversed scenario at least in Chengdu with an increasing use of the standard form *-mian* (57.2% of the total 1641 observations), confirming a change in progress of locatives in the Chengdu dialect. If we adopt the change-in-progress interpretation argued in Section 6.1, then the results presented here offer a new example of dialect-to-standard convergence in the Chinese context: the locatives in the Chengdu dialect of Mandarin are converging towards the standard Mandarin. Language convergence refers to an increase in similarities between dialects in language contact (Auer, Hinskens, & Kerwill, 2005). It usually happens in two dimensions: inter-dialectal convergence and the standard-dialect convergence. Convergence towards the standard language has been extensively observed in the European dialects (Auer, 1998; Auer & Hinskens, 1996): for instance, the dialects in most of Denmark and France have almost disappeared due to the influence of the standard variety.

In the Chinese context, the standard Mandarin usage has spread in a top-down manner as the outcome of language standardization policy implemented in the mid 1980s and has been promoted nationwide ever since. This is further coupled with the great social upheaval that boosts geographical and social mobility, leading to the local shifting from the vernacular to the standard and the reduction of local dialect in use. The increasing use of the standard form *-mian* over apparent time therefore implies its partial abandonment of vernacular linguistic features to further converge towards the incoming prestigious form.

The increase of standard forms can be further attributed to the mounting possibilities of social mobility in current Chinese metropolitans. The upwardly mobile speakers (often speakers with a higher education level) are inclined to display more pronounced increases of the standard variant than their socially stable counterparts, given that the standard language in general gives them a linguistic edge in their working environment. This is related to the role played by the linguistic market, a symbolic market where linguistic exchanges happen (Bourdieu, 1977). It has been adopted in various cases to interpret sociolinguistic variation (e.g., Eckert, 2000; Sankoff & Laberge, 1978; Zhang, 2005). In a linguistic market, linguistic products are not equally valued. Different linguistic varieties are assigned with different market values (Bourdieu, 1977). Since standard Mandarin has been promoted as the main working language in Chengdu, it has become the legitimized linguistic capital. Linguistic features of the standard variety therefore are highly valued. Moving upward on the social ladder turns out to be demanding yet possible by joining the job market with the proper vocabulary welcomed by companies and colleagues. This eagerness for mobility eventually motivates convergence toward the standard language on all accessible linguistic levels.

At the same time, our data shows maintenance of the categorical use of *-tou* among Chengdu speakers. Even though this does not suggest a straightforward innovation or a potential divergence in the face of standard Mandarin encroachment, it is still indicative of the local solidarity embedded in the Chengdu speech that is shared by local speakers. Besides, according to our general observation, the local dialect is still widely spoken through specialized online TV shows and radio channels in Chengdu. Speakers in Chengdu are still willing to speak Chengdu dialect on all possible occasions, which ultimately predicts a slow path of linguistic convergence towards the standard language over the long term. In fact, it would also be interesting to see in future work how the two variants are socially evaluated.

6.3 Morphological reallocation as a result of dialect contact

The stylistic stratification manifested throughout our findings further points to the possibility that the locative variable should be understood as a linguistic marker as the two variants bear stylistically distinct roles (Tagliamonte, 2012): *-tou* is significantly favored in informal, conversational speech and disfavored in formal styles such as picture description and question-answering pairs. More importantly, the survival of both the local variant *-tou* and the standard variant *-mian* indicates a socio-stylistic reallocation as they undergo sociolinguistic refunctionalization during dialect leveling.

It has been observed that when mutually intelligible but distinct dialects of the same language come into contact, the final outcome of the reduction process is not always a single victorious variant (Britain & Trudgill, 1999). In the famous study on past tense BE in the Fenland dialect of eastern England conducted by Britain (2002), it occurs when two or more variants in the dialect mix survive the leveling process but are refunctionalized to serve new grammatical roles.

Morphologically speaking, *-tou* and *-mian* are synonymous given their word formation properties and their semantic sense of denoting location and time. Both can be positioned after locative particles *shang*, *xia*, *li*, *wai* to form a locative complex with the same meaning; for instance, both *shang-tou* and *shang-mian* mean “on top of”. The existence of *shang-tou* does not block the possibilities of using *shang-mian* due to similarities in form and meaning. Both forms have survived during dialect-standard leveling to serve different socio-stylistic roles given their distribution across different styles. Variants *-tou* and *-mian* work under different contextual restraints and are preferred by different social groups with different language attitudes. In this case, they are synonymous regarding word formation rules but begin to be reallocated for stylistic purposes: *-mian* is favored in formal speech whereas *-tou* is more favored in informal speech. Alternatively, as noted by one reviewer, the finding that *-tou* tends to be used proportionally more among older speakers by those with lower education (even though did not reach statistical significance due to lack of data) can be better captured as if they are associated with different social settings: *-mian* is favored in school settings where as *-tou* is more favored in non-school settings. All these facts are in fact consistent with the fundamental idea of variation analysis known as “form and function asymmetry”, i.e. the possibility of using multiple forms for the same function (Tagliamonte, 2006).

6.4 Gender dynamics in grammatical function

Weiner and Labov (1983) open up the discussion over the possibility of interactions between internal and external constraints. Their analysis of the alternation between agentless passive and generalized active suggests that there should be no interaction between internal and external constraints. They showed that passive/active variation was consistent across different gender, class, age and ethnicity. Similar patterns have also been reported in other studies (e.g., Braga, 1982; Guy & Boberg, 1997). Our results partially support this hypothesis as both men and women use *-tou* more for temporal than spatial context. Nevertheless, men and women do differ in their treatment of the different grammatical functions that locatives bear given the effect size shown in the statistical models: compared with their male counterparts, women are even more inclined to use *-tou* in tem-

poral contexts. In other words, women show a greater effect of grammatical function than men, albeit in the same direction, posing the unexpected interaction between the linguistic and the social: the size of the meaning effect is increasing for women, but decreasing for men in apparent time.

Although the quantitative results seem to indicate that men and women have different linguistic conditioning for the *-tou/-mian* variable, there is reason to be cautious in drawing the conclusion that there exists a true gender by grammatical function interaction. Instead of arguing against the putative non-interaction hypothesis, we treat these gender differences in terms of grammatical function categories with caution. In our case, the gender difference in production in terms of grammatical function conditioning in fact can be multifactorial. A possible confound is that men and women may have brought different stylistic behaviors to the interview context. In particular, narratives can be biased towards the temporal usage of the locatives given the nature of conversational discourse as constrained by different topics involved. For any given story, it is likely that time might be more relevant than space, which triggers more temporal locatives in general. Meanwhile, women tend to use proportionally more temporal *-tou/-mian* than men (Female: 48% temporal (333/691) vs. Male: 34% temporal (170/495), as indicated by Table 3). This asymmetry, that is, the more robust use of temporal locatives among women, further leads to greater retention of *-tou* in temporal cases by the female speakers as well as the gender-based differences in *-tou* rates in this environment.

Relatedly, speakers were given much freedom in choosing what to talk about, which could exert a potential impact if women happened to have topics with more temporal elements. Within the conversational speech, it is expected that there exists presumably a stylistic differentiation within that speech. Different grammatical functions are more likely to be subject to topic-related restrictions instead of the different degrees of formality as related to the distinct types of talking mode. Therefore, we cannot rule out the possibility what appears to be in interaction between gender and grammatical function is actually an interaction between gender and style, coupled with the fact that the model itself is not capturing stylistic differences and grammatical function might be unevenly distributed against the hidden stylistic differentiations in the conversational speech. Further inquiry on how different topics might shape the use of *-tou* across grammatical functions may require more detailed stylistic-coding and discourse analysis beyond what is presented here.

6.5 Gender dynamics in language attitude

The existence of gender differences is by no means surprising in sociolinguistic literature and it has become an established fact that, in many speech communities, women tend to use higher proportions of prestige forms than men (Queen, 2013). However, in our present case of locative variation, despite the fact that women and men do not use *-tou* at significantly different rates, that is, they treat the local and incoming variants similarly, language attitude seems to exert a stronger influence on men than on women. As for men, more positive language attitude triggers more cases of the local variant *-tou* whereas for women, *-tou* rates do not appear to be conditioned by various language attitudes.

This intriguing finding makes one wonder whether in the Chengdu speech community, the attitude-behavior relations are not distinguished on a community level, but rather are gender-differentiated in a way that men make direct use of different levels of integration of attitudinal orientations whereas women do not. In the case of language attitude, the answer to why language attitude works differently among men and women might be rooted in the social and cultural aspects of Chengdu. It is possible that the construction of gender roles positions men and women differently with respect to local authenticity and hence results in different orientations towards language attitude. A full explanation of these complexities is currently not obvious and requires further inquiry. However, this indeed provides a fantastic opportunity to further disentangle those complexities that are involved in the interrelationship between language attitude and linguistic performance. Finally, more work is also necessary to see whether these gender-based differences in language attitude could be consistently found for different age groups when more data become available.

7. Conclusion

This study offers new empirical evidence for a better understanding of regional dialect leveling in Mandarin Chinese using the locative variation in the Chengdu dialect as a test case: the local form appears to be converging towards its standard counterpart whilst socio-stylistic reallocation emerges. Not only the use of standard variant *-mian* is increasing over apparent time due to language standardization and contact, but also the two forms appear to be favored in different stylistic contexts. In particular, the local form *-tou* is more favored in informal contexts, i.e., conversational speech, whereas the standard variant *-mian* is more preferred in relatively formal situations such as picture description and question-answering pairs. The gender dynamics displayed in terms of grammatical function as well as

language attitude differences point towards both different potential explanations as well as challenges for future work. Findings further shed light on how language convergence and divergence work under the context of language contact, and contribute to a growing body of research in dialect contact as well as quantitative sociolinguistics.

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Appendix. Pictures used in data collection

1. For picture description



Sample list of critical tokens elicited during picture description task (target words are emphasized):

ji zai xiangzi *li.mian*. (Chicken are inside the box).

shafa *shang.mian* youge guashi. (There is a fresco hanging over the sofa)

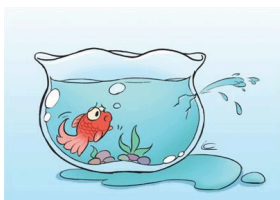
shujia *shang.mian* doushi shu. (Books are all on the bookshelf)

nage zhuozi de zhuzhu *shang.tou* youge woniu. (There is a snail creeping on the table leg)

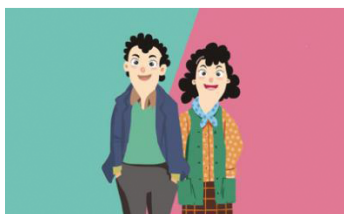
zhuozi *xia.tou* youge mao. (There is a cat under the table)

2. For question-answering pairs

Critical pictures:



Filler pictures:



Sample list of critical tokens elicited during the task of question-answering pairs (target words are emphasized):

Q: yu zai naer? (where is the fish?)

A: yu zai yugang li.mian. (The fish is inside the fish tank.)

Q: lvse de qiche zai near? (Where is the green car?)

A: lvse de qiche zai lanse de qiche hou.mian. (The green car is behind the blue car.)

Q: xuesheng zai naer? (where are the students?)

A: xuesheng zai chuanguhu wai.mian. (The students are outside the window.)

Q: haizimen zai near? (where are the kids?)

A: haizimen zai zhuozi de xia.mian. (The kids are under the table.)

Q: pingguo zai near? (where is the apple?)

A: pingguo zai guizi shang.mian. (The apple is on the cupboard.)

Abstract (Mandarin Chinese)

本文研究基于语言接触产生的成都话方位词词缀“-头”与普通话中对应“-面”缀之间的变异分布与竞争模式。研究数据来源于对40名成都话母语使用者的社会语言学访谈录音。结果表明，普通话形式的“-面”在数量上已经超过“-头”，体现了基于显象时间的历时演变，即语言均一化。而这种演变从根本上源于语言标准化和语言接触引起的语言趋同。同时，这两种词缀变体经历了一定的文体重新分布，并开始服务于新的文体风格。据笔者所知，本研究是现有文献中首次系统考察汉语方位词词缀变异分布的社会语言学定量研究。

关键词： 成都话、方位词缀、语言均一化、文体再分布、形态变异

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Publication history

Date received: 11 September 2020

Date accepted: 3 May 2021

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