Proceedings of SALT 34: 213–232, 2024

Anaphoric demonstratives in Mandarin*

Ankana Saha
Harvard University

Yağmur Sağ
Rutgers University

Jian Cui
Harvard University

Kathryn Davidson
Harvard University

Abstract The goal of this study is to experimentally evaluate contrasting claims in the theoretical literature on the acceptability of Mandarin demonstratives and definite bare nouns in anaphoric contexts. Jenks (2018) argues that Mandarin differentiates between uniqueness-based (weak) and anaphoric (strong) definites through bare nouns and demonstratives, respectively. In contrast, Dayal & Jiang (2022), Bremmers, Liu, van der Klis & Le Bruyn (2022), and Simpson & Wu (2022) claim that both bare nouns and demonstratives can be used in anaphoric contexts in Mandarin, proposing slightly differing explanations with regards to their felicity, tied to factors such as discourse coherence between context and follow-up sentences. Our findings illustrate that Mandarin demonstratives are strongly preferred across the board in anaphoric contexts, patterning with anaphoric definites (rather than demonstratives) in languages such as English, Turkish (Saha, Sağ & Davidson 2023), and Bangla (Saha 2023). Additionally, we observe that definite bare nouns are also felicitous in anaphoric contexts, albeit as a less preferred option. We argue that this preference for demonstratives arises because Mandarin bare nouns can have (i) generic interpretations due to the absence of tense and aspectual marking, and (ii) indefinite interpretations in post-verbal positions (Cheng & Sybesma 1999; Simpson & Wu 2022). Demonstratives, by contrast, are unambiguously anaphoric, driving their overall preference.

Keywords: complex demonstratives, definite descriptions, bare nouns, anaphoricity, focus, Mandarin

1 Introduction

Recent semantic literature has placed significant focus on how languages encode definiteness differently (Schwarz 2009; Arkoh & Matthewson 2013; Jenks 2018

* We thank Gennaro Chierchia, Veneeta Dayal, Florian Schwarz, Dorothy Ahn, and the audiences at the Harvard Meaning and Modality Linguistics Laboratory, ELM 3, and SALT 34 for their helpful comments and suggestions. This project is supported by the grant from National Science Foundation (Award #1844186 to Kathryn Davidson).

i.a.), as well as the role of context in determining the choice of distinct forms (e.g., Ahn 2019; Dayal & Jiang 2022; Bremmers et al. 2022; Simpson & Wu 2022; Hinterwimmer & Patil 2022; Saha et al. 2023, cf. Heim 1982).

The primary approaches to definiteness are grounded in two distinct notions. The first is uniqueness (Frege 1892; Russell 1905; Strawson 1950), which is based on the insight that definite descriptions refer to entities that are unique relative to some domain. The second is familiarity/ anaphoricity (Heim 1982; Roberts 2003), which builds on the insight that definite descriptions pick out referents that are familiar to the discourse participants, where familiarity is often understood as being anaphoric to a preceding linguistic expression.

Languages like English, French, and Spanish do not lexically distinguish between these two notions and employ the same determiner form for all types of definite reference. In contrast, languages such as German (Schwarz 2009, 2013) are noted for having two distinct forms of definite determiners, distinguished by their behavior with prepositions, and these forms are used in different discourse situations.[1] In the presence of certain prepositions such as *zu* 'to', *von* 'from' and *in* 'in, into', one determiner, which Schwarz refers to as the weak definite, contracts with the preposition, while the other, which Schwarz refers to as the strong definite, does not. The weak determiner occurs with referents that are unique in a particular situation or a broader context, as exemplified in (1), while the strong form is used in instances of anaphoric reference, as in (2).

(1) Der Empfang wurde **vom** / **#von dem** Bürgermeister eröffnet.
the reception was by.the$_{weak}$ / by the$_{strong}$ mayor opened
'The reception was opened by the mayor.' (Schwarz 2009: 40)

(2) Hans hat einen Schriftsteller und einen Politiker interviewt. Er hat
Hans had a writer and a politician interviewed he has
 # vom / **von dem** Politiker keine interessanten Antworten
from.the$_{weak}$ / from the$_{strong}$ politician no interesting answers
bekommen.
gotten
'Hans interviewed a writer and a politician. He didn't get any interesting answers from the politician.' (Schwarz 2009: 30)

Distinct morphological paradigms for definite determiners are observed in many other Germanic dialects as well, e.g., Mönchen-Gladbach (Hartmann 1982), Bavarian (Scheutz 1988; Schwager 2007), Cologne (Himmelmann 2014), Rhineland (Heinrichs 1954; Hartmann 1967), and Fering (Ebert 1971). Among them, Fering is

1 The distinction in the forms of the definite determiner in German only manifests when they occur with prepositions.

particularly notable for using two phonologically distinct lexical forms for the two types of definite determiners, as illustrated in (3).

(3) a. Ik skal deel tu **a/** ***di** kuupmaan.
I must down to the$_{weak}$/ the$_{strong}$ grocer
'I have to go down to the grocer.'

b. Oki hee an hingst keeft. ***A/** **D** hingst haaltet.
Oki has a horse bought the$_{weak}$/ the$_{strong}$ horse limps
'Oki has bought a horse. The horse limps.' (Ebert 1971: 161)

On Schwarz's analysis, the semantic denotation of the weak and the strong definites are as shown in (4). The weak and strong definites are both linked to a contextually supplied resource situation given by the situation pronoun s_r, in which there is a unique referent. Strong definites, however, have an additional requirement—uniqueness is evaluated not just with respect to the NP complement of the determiner but with respect to the NP complement *and* a pragmatically supplied index y that the referent of the definite is identical to. This encodes anaphoricity.

(4) a. *weak definite*: $\lambda s_r.\lambda P : \exists!x(P(x)(s_r)).\ \iota[P(x)(s_r)]$

b. *strong definite*: $\lambda s_r.\lambda P.\lambda y : \exists!x(P(x)(s_r) \wedge x = y).\ \iota[P(x)(s_r) \wedge x = y]$

Intriguingly, distinctions in the representations of definiteness have also been noted to occur in many bare argument languages, where bare nouns are claimed to be unique definites, contrasting with another form as anaphoric definites. e.g., Akan (Arkoh & Matthewson 2013), Bangla (Biswas 2012, see Simpson & Biswas 2016 for nuances), and Mandarin (Jenks 2018). The crucial generalization is that one form of representation is used for anaphoric reference, i.e., when an element refers back to an entity previously introduced in the discourse, termed as 'anaphoric definites'. In contrast, a second form is used when a noun phrase refers to a unique individual in a particular context or situation, termed as 'unique definites'. However, these accounts have also been challenged for many languages, e.g., Akan (Bombi 2018; Owusu 2022), Bangla (Yip, Banerjee & Lee 2023), and Mandarin (Dayal & Jiang 2022; Bremmers et al. 2022; Simpson & Wu 2022).

This paper specifically focuses on Mandarin with the goal of experimentally evaluating the differing claims in the literature about Mandarin (definite) bare nouns and demonstratives in anaphoric contexts. We find no evidence of a weak-strong distinction in the language through the bare noun versus demonstrative forms. However, by leveraging distinctions in anaphoricity between demonstratives and definites via existing methodologies (Saha 2023; Saha et al. 2023), we conclude that in anaphoric contexts in Mandarin, what has typically been called a demonstrative

patterns with definites in other languages, connecting to observations about language change.

In the following section, we start by reviewing previous works on Mandarin definites and demonstratives. In Section, 3, we lay out previous cross-linguistic experimental works on definites and demonstratives, whose design we adapt in the current study. Section 4 outlines our Mandarin experiment. Section 5 discusses the findings and compares and contrasts the Mandarin data to the findings in the other languages. Section 6 concludes.

2 Previous approaches to definites and demonstratives in Mandarin

Building on Schwarz 2009, 2013, Jenks (2018) argues that the weak-strong distinction in definiteness holds up in Mandarin as well. Jenks proposes that, in Mandarin, bare nouns function as weak definites, used for a unique referent in a situation, and demonstratives are required to establish anaphoric links to an existing discourse referent. The exception is in subject positions, where bare nouns can also serve as anaphors since they function as continuing topics.

Jenks illustrates these points through the contrasts given below. In (5), we see that the demonstrative determiners are infelicitous in environments licensed only by contextual uniqueness. (6a) shows that a bare anaphoric definite is judged infelicitous in the object position, and (6b) shows that both bare nouns and demonstratives can occur in the subject position, though speakers are reported to show a preference for the demonstrative.

(5) (#Na/ #Zhe ge) Taiwan (de) zongtong hen shengqi.
that/ this CL Taiwan MOD president very angry
'The president of Taiwan is very angry.' (Jenks 2018: 507)

(6) Jiaoshi li zuo zhe yi ge nansheng yi ge nüsheng.
classroom inside sit PROG one CL boy one CL girl
'There is a boy and a girl sitting in the classroom.'

a. Wu zuotian yudao {#∅/ **na ge**} nansheng.
I yesterday meet that CL boy
'I met the boy yesterday.'

b. (**Na ge**) nansheng kanqilai you er-shi sui zuoyou.
that CL boy look have two-ten year or.so
'The boy looks twenty years old or so.' (Jenks 2018: 510)

Thus, Mandarin demonstratives are claimed to denote strong definites in the sense of Schwarz 2009, where anaphoric (i.e., *strong*) definites are differentiated from uniqueness-based (i.e., *weak*) definites by the presence of an index argument.

The idea, then, is that in Mandarin, demonstratives add an index argument. However, Jenks's analysis differs from Schwarz's in certain crucial ways. On Jenks's analysis, the weak and the strong definite are identical in their assertive content (which was not the case in Schwarz 2009 (4)). As illustrated in (7), the distinction between the weak and the strong form lies entirely in their presuppositions—the strong definite has a stronger presupposition, which is met when an anaphoric link is established (Jenks 2018: 513).

(7) a. *weak definite*: $\lambda s_r.\lambda P : \exists!x(P(x)(s_r)).\ \iota[P(x)(s_r)]$
b. *strong definite*: $\lambda s_r.\lambda P.\lambda Q : \exists!x(P(x)(s_r) \wedge Q(x)).\ \iota[P(x)(s_r)]$

In anaphoric contexts, since the presupposition of the strong definite i.e., the demonstrative in this case, is met, the use of the weak form, i.e., the bare noun, is blocked via Maximize Presupposition! (Heim 1991). However, this blocking effect does not arise in the subject position, where bare nouns can function felicitously as anaphors because they are continuing topics, not because they are strong definites. This principle is formalized as *Index!*, which says that all possible indices must be represented and bound. That is, *Index!* requires the use of strong definites as soon as an anaphoric relation can be established, thereby blocking the use of weak definites in anaphoric contexts.

(8) *Index!*
Represent and bind all possible indices. (Jenks 2018: 524)

In their response to Jenks 2018, Dayal & Jiang (2022) present new data, as given in (9b), and argue against a distinction between bare nouns and demonstratives in terms of weak vs. strong definites. They claim that bare nouns are felicitous in both uniqueness and anaphoric contexts in Mandarin regardless of the syntactic position, akin to definite descriptions in English, whereas demonstratives behave as standard demonstratives.

(9) Jiaoshi li zuo zhe yi ge nansheng yi ge nüsheng.
classroom inside sit PROG one CL boy one CL girl
'There is a boy and a girl sitting in the classroom.'

a. Wu zuotian yudao {#∅/ **na ge**} nansheng.
I yesterday meet that CL boy
'I met the boy yesterday.'

b. Nüsheng zuo zai nansheng pangbian.
girl sit DUR boy side
'The girl was sitting next to the boy.' (Dayal & Jiang 2022: 154)

The sentence in (9) introduces a boy and a girl sitting in a classroom. Dayal & Jiang note that while both bare nouns and demonstratives are grammatical in the follow-up sentences given in (9a) and (9b), speakers prefer the bare noun in (9b) and the demonstrative in (9a). They argue that if the initial situation in (9) remains unchanged, speakers have a choice between two felicitous options—the definite denoted by the bare noun and the demonstrative description—and in this case speakers prefer the simpler option, the bare noun, as in (9b). If the situation is extended (e.g., including a new participant, the speaker), as in (9a), the demonstrative description is preferred instead.

Under their view, this is because definites might end up infelicitous if the extension in situation is significant enough to fail the uniqueness requirement of the definite. In contrast, demonstratives would remain felicitous, because they have an anti-uniqueness requirement, and this requirement can be satisfied in a wider situation. As first proposed in Robinson 2005, a demonstrative requires that its referent not be the only member in the set denoted by its NP complement (i.e., 'anti-uniqueness'). This is evidenced by the infelicity of a sentence like *That sun is hot*, in contrast to *The sun is hot*.

Bremmers et al. (2022) ran a parallel corpus study in English, German, and Mandarin and found that the majority of anaphoric demonstrative descriptions in the corpus appear in contexts that take the strong definite in German. Hence, unlike Dayal & Jiang (2022), they argue that Mandarin demonstratives indeed mark strong definiteness, aligning with Jenks 2018 in this respect. However, they also found bare nouns to be felicitous in both anaphoric and uniqueness contexts, that is, Mandarin bare nouns were found in the corpus not only in cases where German used the weak (contracted) definite but also in cases where German used the strong (uncontracted) definite. The latter use contradicts Jenks's predictions. An example of the anaphoric use of the bare noun in the Mandarin corpus is given below in (10). The sentence in (10b) makes a reference to a parcel that was introduced previously in the context, and a bare noun is used in this case in the corpus.

(10) *Context:* As the owls flooded into the Great Hall as usual, everyone's attention was caught at once by a long thin package carried by six large screech owls. Harry was just as interested as everyone else to see what was in this large parcel and was amazed when the owls soared down and dropped it right in front of him, knocking his bacon to the floor.

a. **German:**

Sie waren kaum aus dem Weg geflattert, als eine andere Eule einen
they were hardly out the way fluttered when a other owl a
Brief **auf das Paket** warf.
letter on the parcel threw.

‘They had hardly fluttered out of the way when another owl dropped a letter **on top of the parcel**.’ (Bremmers et al. 2022: 743-744)

b. **Mandarin:**

Tāmen pūshan-zhe chìbǎng gānggāng fēi zǒu, yòu yǒu yī zhǐ
They flutter-ASP wings right fly away, and have one classifier
māotóuyīng xié lái yī fēng xìn, rēng zài **bāoguǒ** shàngmiàn.
owl bring come one CL letter throw to parcel on.

‘They had hardly fluttered out of the way when another owl dropped a letter on top of the parcel.’ (Bremmers et al. 2022: 746)

In their account, the anaphoric use of bare nouns requires the anaphoric link to be in the context situation (referred to as *situation-level familiarity* in their study): this is exactly what we see in (10b), which is anchored to the same situation as the context situation given in (10) (similar to Dayal & Jiang’s observation in 9b). In contrast, bare nouns are deemed to be infelicitous if the follow-up sentence introduces a different situation via a temporal change from the context situation (*text-level familiarity*, in their terms). Bremmers et al. (2022) show this by minimally modifying the corpus example in (10b) to construct (11) (Bremmers et al. 2022: 750). In (11), when given as a continuation of the context in (10), situation-level familiarity is no longer met (since the eventuality of sending the package is spatiotemporally disjoint from the eventualities in the context), and they report that their consultants judge the bare noun *bāoguǒ* ‘parcel’ infelicitous in this context (similar to Dayal & Jiang’s observation in 9a).

(11) Màigé jiàoshòu qián yī tiān jì gěi hāl #(**zhè ge**) bāoguǒ.
McGonagall Professor before one day send to Harry this CL package
‘Professor McGonagall had sent the package to Harry the day before.’

In a similar vein, Simpson & Wu (2022) claim that both demonstratives and bare nouns are felicitous in anaphoric contexts. They attribute the differing acceptance rates of the two forms to two factors. The first is discourse coherence. Bare nouns are fully grammatical when discourse coherence between the context and the follow-up sentences is high, via shared time, location, and speaker perspective. Demonstratives are preferred in case of breaks in coherence and continuity, i.e., when there are shifts in time, location, or perspective between two paired sentences. The other factor that affects the acceptance rate is the post-verbal objection position. This position is generally the locus of new information, and bare nouns tend to be indefinites in this position; thus less preferred as anaphoric definites. They report, based on qualitative observation, “that speakers exhibited hesitation in judging sentences to be acceptable more frequently when bare nouns occurred (as anaphoric definites) in post-verbal object position, rather than other positions." (Simpson & Wu 2022: 318)

To sum up, the claims about Mandarin bare nouns and demonstratives can be broadly grouped into two perspectives. The first, as proposed by Jenks (2018), is that Mandarin distinguishes between weak and strong definites through bare nouns versus demonstratives. The second, supported by other studies, suggests that there is no such distinction; rather, the felicity of bare nouns and demonstratives in anaphoric contexts depends on other factors, such as the degree of situation change from the context sentence to the follow-up sentence (Dayal & Jiang 2022; Bremmers et al. 2022; Simpson & Wu 2022) and syntactic position (subject vs. object) (Simpson & Wu 2022, cf. Jenks 2018; Dayal & Jiang 2022).

3 Anaphoric demonstratives cross-linguistically

While the previous works focused specifically on Mandarin definites and demonstratives, Saha (2023) and Saha et al. (2023) conducted cross-linguistic experimental studies which show that demonstratives across languages exhibit certain differences from definites in their anaphoric behavior. In this section, we discuss these two studies, since we will adapt the same design to Mandarin.

Saha (2023) and Saha et al. (2023) found that the acceptability of anaphoric demonstratives is sensitive to discourse contexts unlike definites. They base their claims on experimental evidence from three languages, one with determiners, e.g., English, and two determinerless languages that encode definiteness differently, e.g., Turkish, via bare nouns, and Bangla, via noun-classifier constructions. The starting point for the studies is the observation that along with situation as mentioned in previous accounts, another discourse factor that seems to affect the acceptability of demonstratives is the presence of a contrasting noun in the context sentence (Ionin, Baek, Kim, Ko & Wexler 2012). This is shown in (12) for English. The first sentence in (12a) introduces a discourse referent, *'a boy'*. In the follow-up sentence, we have a demonstrative that anaphorically refers to the boy, and this sentence is deemed felicitous by speakers of English. In contrast, in (12b) we introduce another contrasting noun in the first sentence, *'a boy* ***and*** *a girl'*. In this case, the use of the demonstrative to anaphorically refer to the boy seems significantly degraded compared to (12a).

(12) a. A boy entered the classroom. That boy sat down in the front row.

b. A boy and a girl entered the classroom. ??That boy sat down in the front row.

Combining this observation with insights from other accounts of demonstratives, which focused on Mandarin, they designed controlled experiments to look at the precise effects and interaction of these two factors on the acceptability of demonstratives cross-linguistically. Their studies crosses two factors:

i. the presence or absence of a contrasting noun in the context sentence

ii. a follow-up sentence anchored to either the same or a different (new) situation from the context situation: new situations introduced both a new event participant and a temporal change.

(13) and (14) show the the entire set of experimental conditions for one test item in English.

(13) {[$_{OneNP}$ A boy]} entered the classroom.

a. The/ That boy sat down in the front row. [Same Situation]

b. I had noticed the/ that boy at a coffee shop yesterday. [New Situation]

(14) {[$_{TwoNP}$ A boy and a girl]} entered the classroom.

a. The/ That boy sat down in the front row. [Same Situation]

b. I had noticed the/ that boy at a coffee shop yesterday. [New Situation]

Saha (2023) and Saha et al. (2023) adopted a dual presentation design presenting the definite and demonstrative follow-up to the participants on the same screen. This design has been advocated in Marty, Chemla & Sprouse 2020, who report that comparisons between conditions on the same screen with a continuous scale and labeled endpoints can draw out even subtle contrasts between conditions more effectively. Such presentational styles attune participants to small judgment differences and help highlight the aspect of the judgment that the experimenter intends the participant to focus on (not, for example, choices of nouns and verbs, overall likelihood of the scenario, etc.). Visual presentations from their studies are presented below in Figure 1, with participants' acceptability ratings on the y axis versus the number of NPs on the x axis. Red bars represent the ratings for demonstratives and blue bars represent definites, and the graphs for the New and Same situations are presented side-by-side for comparison.

Their findings revealed that the acceptability of demonstratives can vary depending on both of the factors that were tested independently. First, the acceptability of demonstratives is sensitive to the presence of a contrasting noun in the context sentence—they were rated significantly lower in the NP contrast cases. Second, the acceptability of demonstratives is also sensitive to the situation of the follow-up sentence—they were rated significantly higher in new situation follow-ups. This pattern is consistently borne out irrespective of how languages choose to express definiteness, thus providing a robust baseline of comparison for Mandarin.

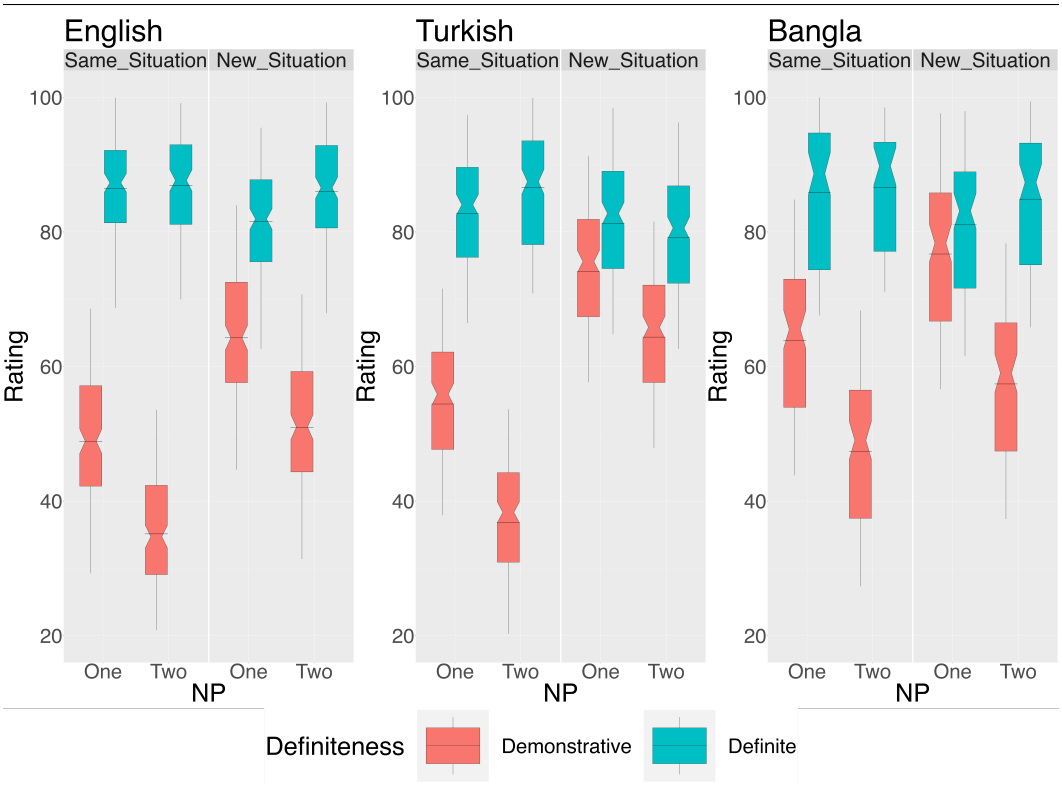

Figure 1 Anaphoric Definites vs Demonstratives: English, Turkish (Saha et al. 2023), and Bangla (Saha 2023)

4 Our experiment

We closely adapt the design in Saha 2023 and Saha et al. 2023, so that findings from Mandarin can be directly compared with baseline from the three other languages.

4.1 Critical manipulation

The Mandarin experiment employed a 2x2x2 design testing the acceptability of definite and demonstrative descriptions (**DEF** vs **DEM**) in anaphoric contexts that differed on the number of competing referents (**ONE** vs **TWO**) and situation (**NEW** vs **SAME**).

For each trial, participants read a short context scenario sentence, at the top of the screen, and were asked to rate the two possible continuations (DEF and DEM), which were always presented below the context in a random order with continuous response bars underneath them. The slider bar responses were stored as an integer from 0 -

100, with 0 being “least natural" and 100 being “most natural". Figure 2 gives an example for the *2 NP New Situation* condition in Mandarin for the experimental item ‘boy’. In the experimental training, it was highlighted that in many contexts both continuations might be acceptable, and responses can reflect this, along with relative contrasts, if any. In general, participants were instructed to rate the continuations based on whether they would naturally use them in their everyday speech, even if both were natural, or both unnatural, or if they had a clear preference.

After the instructions, participants were given three warm-up trials. One of the trials involved a pronominal number mismatch between the context and one of the target sentences. Another trial involved a bare NP in one of the target sentences that mismatched with the noun introduced in the context sentence and a number mismatch in the other target sentence.

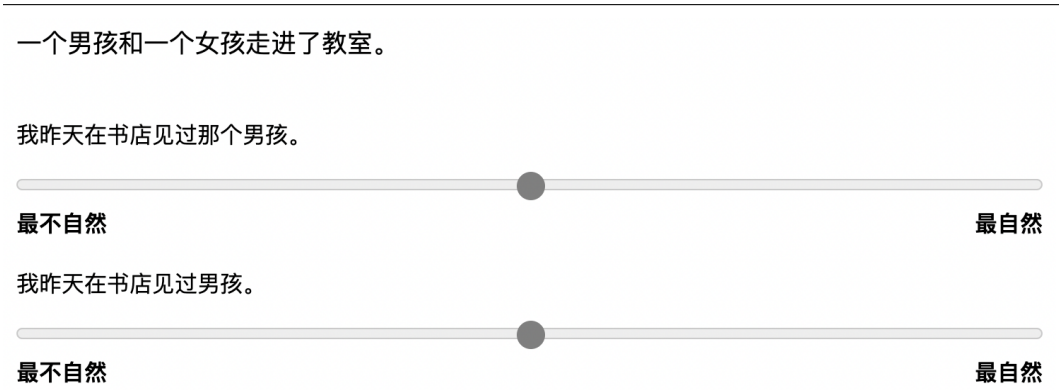

Figure 2 Screenshot of the experiment in 2NP New Situation condition

4.2 Materials and Participants

Materials. We used 12 experimental items across 4 conditions [See (15)-(16)]. The items were balanced for both animacy and syntactic positions of the target NPs. New situations always differed from same situations in being marked by both a new event participant (e.g. speaker or someone else) and a temporal change from the scenario in the context situation.

We used a Latin Square design where each participant saw one condition each from the 12 items, and conditions were evenly presented across participants. These were interspersed with 12 fillers which also functioned as catch trials to ensure participant attention. The fillers were constructed of comparable length and complexity and consisted of clearly grammatical or ungrammatical target sentences. Ungrammatical sentences all had the root of the ungrammaticality inside the DP,

such as pronominal number mismatch, presupposition failure, pronominal animacy/ gender mismatch, etc. Following is a full example of one experimental item across all the conditions [(15)-(16)].

(15) {[$_{1NP}$ yi ge nanhai]} zoujin le jiaoshi.
one CL boy walk.into PERF classroom
'A boy walked into the classroom.'

a. {∅/na ge} *nanhai* zuozai qianpai.
∅/that CL boy sit.at front.seat
'The/That boy sat at the front.' [Same Situation]

b. wo zuotian zai shudian jian guo {∅/na ge} *nanhai*.
I yesterday at bookstore see PERF ∅/that CL boy
'I saw the/that boy at the bookstore yesterday.' [New Situation]

(16) {[$_{2NP}$ yi ge nanhai he yi ge nvhai]} zoujin le jiaoshi.
one CL boy and one CL girl walk.into PERF classroom
'A boy and a girl walked into the classroom.'

a. {∅/na ge} *nanhai* zuozai qianpai.
∅/that CL boy sit.at front.seat
'The/That boy sat at the front.' [Same Situation]

b. wo zuotian zai shudian jian guo {∅/na ge} *nanhai*.
I yesterday at bookstore see PERF ∅/that CL boy
'I saw the/that boy at the bookstore yesterday.' [New Situation]

Participants. Participants (N = 64) were recruited via Prolific.com. Participants could only participate in the study if Mandarin was their first and primary language. The survey was presented via Qualtrics software and took about 15 minutes to complete. Participants were paid for their participation and they were recruited from all countries available on Prolific. To ensure we analyzed data from participants who were attending to and comprehending our task, data from participants were removed from all further analysis if they did not rate ungrammatical sentences in the catch trials in the bottom half of the response bar (this resulted in the removal of 6 participants).

4.3 Results

We fit a linear mixed-effects model in R, with experimental conditions as predictors and random by-participant and by-item slopes for experimental conditions. (`fit = lmer(Rating ~ Definiteness*NP*Situation + (1|ID) + (1|Scenario), data=dataframe)`).

Visual presentation of our results can be seen in Figure 3, which plots participants' acceptability ratings on the y axis versus number of NPs on the x axis. Red bars represent the ratings for demonstratives and blue bars represent definites. Graphs for the New and Same situations are presented side-by-side. We present our results alongside the findings from Saha et al. 2023 and Saha 2023 for direct comparison.

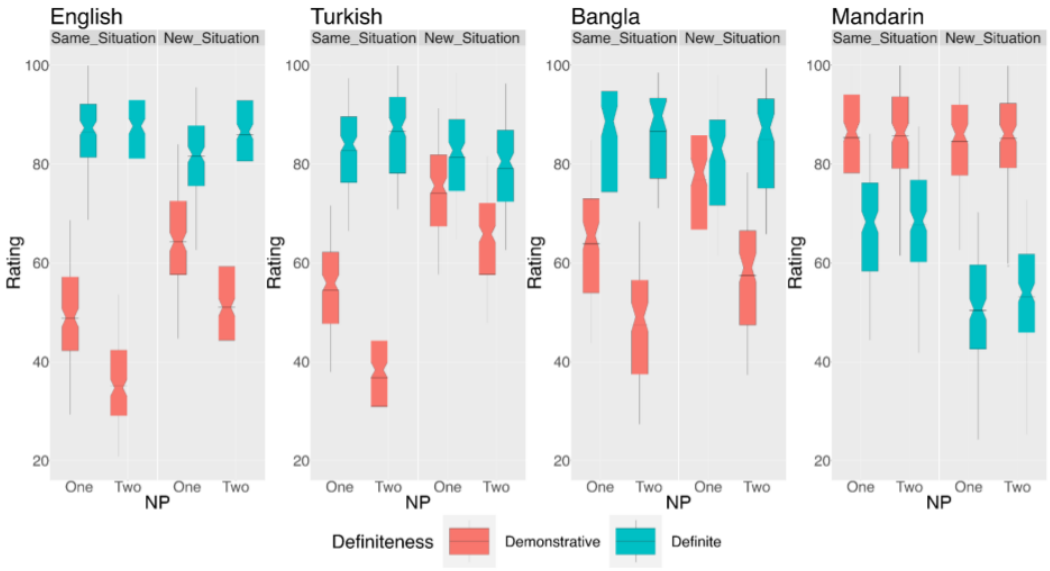

Figure 3 Anaphoric Definites vs Demonstratives: English, Turkish (Saha et al. 2023), and Bangla (Saha 2023) vs. Mandarin (our present study)

In sharp contrast to the consistent patterns found in English, Turkish, and Bangla in the previous experimental studies, there was significant positive main effect of demonstratives being rated significantly higher across the board ($p < 0.05$). We also found a main effect of Situation on the ratings of definite bare nouns—definite bare nouns were rated significantly lower in New Situations.

Additionally, we found that Mandarin demonstratives do not exhibit the sensitivity to discourse contexts seen in the other three languages. Whereas demonstratives in other languages show clear effect of situation change, we do not find this to be the case in Mandarin. They pattern instead with anaphoric definites in this paradigm, compatible with Jenks' (2018) claim of them marking strong definiteness. However, contrary to the prediction of Jenks' *Index!*, which blocks the use of bare nouns in anaphoric contexts, we found bare nouns to be partly felicitous in line with the

other studies. The acceptability of bare nouns improved in the absence of change of situation, but they did not reach or surpass the acceptability of demonstratives, contrary to claims made in the previous literature that deemed anaphoric bare nouns to be fully acceptable when there in an absence of situation change (Dayal & Jiang 2022), i.e., when situation-level familiarity (Bremmers et al. 2022) or discourse coherence (Simpson & Wu 2022) is maintained.

5 Discussion and analysis

Saha et al. (2023) propose a focus-driven approach to explain the contrast between definite and demonstrative descriptions found in Turkish and English. In order to understand the Mandarin pattern, let us overview this analysis first.

Following Schwarz's (2009) weak-strong distinction and building on Dayal & Jiang 2022, Saha et al. argue that demonstratives differ in definedness conditions from definite determiners when used in anaphoric contexts. The definite determiner takes a situation s and an index argument y besides a property P and returns the unique individual that both satisfies P and equals y in s, if defined. On the other hand, the demonstrative determiner has both uniqueness and anti-uniqueness presuppositions. It requires the existence of a unique individual that both satisfies P and equals y in the maximal situation where the demonstrative description is evaluated (i.e., the sum of the situation of the context sentence s_1 and the situation of the follow-up sentence s_2). Additionally, the set denoted by P must have cardinality greater than 1 in the maximal situation (i.e., $s_1 \oplus s_2$). Assuming that the index argument is introduced before the property argument (Elbourne 2005), Saha et al. represent definite and demonstrative determiners in anaphoric contexts, as shown in (17a) and (17b).

(17) a. $[\![\text{DEF}]\!] = \lambda s.\lambda y.\lambda P : \exists! x\,[P_s(x) \wedge x = y].\ \iota x\,[P_s(x) \wedge x = y]$ (Schwarz 2009)

b. $[\![\text{DEM}]\!] = \lambda s.\lambda y.\lambda P : \mathit{Maximal}(s) \wedge \exists! x\,[P_s(x) \wedge x = y] \wedge |P_s| > 1.\ \iota x\,[P_s(x) \wedge x = y]$

Definites are highly acceptable across the board, given that all scenarios involve a unique referent for the definite, such as the boy introduced in the initial sentences of the experimental conditions repeated below.

(18) [$_{OneNP}$ A boy]/[$_{TwoNP}$ A boy and a girl] entered the classroom.

a. The/That boy sat down in the front row. **(Same Situation)**

b. I had noticed the/that boy at a coffee shop yesterday. **(New Situation)**

Furthermore, definites are preferred over demonstratives in the absence of focus in the DP, as in (19a), or when focus is on the entire DP, as in (19b). This is because

demonstratives come with *obligatory focus on the index argument*, as illustrated in (19c), besides the presuppositional distinctions laid out above. Focus placement on the index, which invokes a contrast with alternative boys (*that boy*, contrasted with *another boy*), makes demonstratives most natural in One NP, New Situation cases, as given in (20).

(19) a. the boy (no DP focus) e.g. 1 NP cases
$[\![[\text{DEF } 1\ ] \text{ boy}]\!]^o = \iota x\ [boy(x) \wedge x = g(1)]$

b. the BOY (as opposed to the girl) e.g. 2 NP cases
$[\![[\text{DEF } 1\ ] \text{ boy}]_F]\!]^o = \iota x\ [boy(x) \wedge x = g(1)]$
$[\![[\text{DEF } 1\ ] \text{ boy}]_F]\!]^f = \{\iota x\ [boy(x) \wedge x = g(1)], \iota x\ [girl(x) \wedge x = g(2)]\}$

c. THAT boy (as opposed to another boy) e.g. 1 NP, New S cases
$[\![[\text{DEM } 1_F\ ] \text{ boy}]\!]^o = \iota x\ [boy(x) \wedge x = g(1)]$
$[\![[\text{DEM } 1_F\ ] \text{ boy}]\!]^f = \{\iota x\ [boy(x) \wedge x = g(1)], \iota x\ [boy(x) \wedge x = g(3)]\}$

(20) [$_{OneNP}$ A boy] entered the classroom. I had noticed that boy at a coffee shop yesterday. **(New Situation)**

Demonstratives are degraded in the Two NP cases (as opposed to the One NP cases), as in (21), since these scenarios elicit a contrast between the two discourse referents introduced in the first sentence. This, in turn, results in a tendency towards the placement of focus on the whole DP (*the boy*, contrasted with *the girl*), as shown in (19b), making definites more natural in such contexts.

(21) [$_{TwoNP}$ A boy and a girl] entered the classroom.

a. That boy sat down in the front row. **(Same Situation)**

b. I had noticed that boy at a coffee shop yesterday. **(New Situation)**

Additionally, demonstratives are more acceptable in New Situation trials (as opposed to Same Situation trials), as in (22), since transitioning to a New Situation aligns more naturally with considering a maximal situation that involves other boys (e.g., $g(3)$) to be contrasted with the referent of the demonstrative (i.e., $g(1)$) .

(22) [$_{OneNP}$ A boy]/[$_{TwoNP}$ A boy and a girl] entered the classroom. That boy sat down in the front row. **(Same Situation)**

In summary, the key point in Saha et al.'s analysis that explains the patterns of definite and demonstrative expressions in English and Turkish (and for Bangla in Saha 2023) is the obligatory focus placement on the index argument of the demonstrative determiner.

Building on this approach, we argue that unlike standard anaphoric demonstratives, which mandatorily evoke focus on the index argument, Mandarin demonstratives allow for the absence of focus on the index. Therefore, they follow a pattern similar to definites in other languages, being acceptable across the board. As illustrated in (23) (cf. 19), the Mandarin demonstrative can naturally occur in the absence of focus on the DP or when focus is on the entire DP, akin to definite expressions in other languages. It can also occur when focus is on the index, in that case behaving like a typical demonstrative expression.

(23) The Mandarin demonstrative

a. *na ge nanhai* 'the/that boy' (no DP focus)
$[\![[\text{DEM } 1\ ]\ \text{boy}]\!]^o = \iota x\ [boy(x) \wedge x = g(1)]$

b. *na ge NANHAI* 'the/that BOY' (as opposed to the girl)
$[\![[\text{DEM } 1\ ]\ \text{boy}]_F\!]^o = \iota x\ [boy(x) \wedge x = g(1)]$
$[\![[\text{DEM } 1\ ]\ \text{boy}]_F\!]^f = \{\iota x\ [boy(x) \wedge x = g(1)], \iota x\ [girl(x) \wedge x = g(2)]\}$

c. *NA GE nanhai* 'THAT boy' (as opposed to another boy)
$[\![[\text{DEM } 1_F\ ]\ \text{boy}]\!]^o = \iota x\ [boy(x) \wedge x = g(1)]$
$[\![[\text{DEM } 1_F\ ]\ \text{boy}]\!]^f = \{\iota x\ [boy(x) \wedge x = g(1)], \iota x\ [boy(x) \wedge x = g(3)]\}$

The preference for demonstratives across the board in our data follows from the fact that Mandarin sentences with bare nouns can also have generic readings due to the lack of tense and aspectual marking. Additionally, bare nouns in Mandarin can convey indefinite readings in the postverbal position (e.g., Cheng & Sybesma 1999; Simpson & Wu 2022). In competition with bare nouns that can have this multiplicity of meanings in Mandarin, the Mandarin demonstratives are unambiguously anaphoric, driving their overall preference. In the Same Situation contexts, there is a bias towards referring to entities introduced previously; hence the acceptability of bare nouns as anaphors increases in these scenarios.[2]

As discussed in Section 2, earlier studies on Mandarin definites and demonstratives present contrasting claims about the role of syntactic position in the anaphoric interpretation of bare nouns. To reiterate, Jenks (2018) argues that Mandarin bare nouns are only felicitous as anaphors in subject positions, not because they are strong definites, but because they are continuing topics. In contrast, Dayal & Jiang (2022) argue that there is no sensitivity to syntactic position when it comes to the anaphoric use of Mandarin bare nouns. On the other hand, Simpson & Wu (2022) highlight the effect of postverbal object position, where bare nouns tend to be interpreted as indefinites rather than anaphoric definites.

In light of these conflicting claims, we balanced our stimuli so that our factors of interest were not confounded with syntactic position. Furthermore, we considered

2 See also Simpson & Wu (2022) for a similar conclusion.

syntactic position as a factor in our models of acceptability for bare nouns in the different conditions, and we did not find a significant effect of position. While the results trended in the opposite direction, i.e., anaphoric bare nouns were rated lower in subject rather than object position, the trend was marginal and was not statistically significant. While our data are therefore consistent with a lack of sensitivity to syntactic position in anaphoric uses of Mandarin bare nouns, investigating the precise role of syntactic position remains an open question and is best left for future studies on Mandarin definites and demonstratives to take on directly as a primary experimental factor.

6 Conclusion

Our findings challenge the dichotomy between weak and strong definiteness in Mandarin, as proposed in Jenks 2018. Specifically, we did not observe a clear division between weak and strong definites, with bare nouns also being acceptable in anaphoric contexts, albeit as a less preferred option compared to demonstratives. However, we found clear evidence that Mandarin demonstratives align more closely with definites, rather than with typical demonstratives, in terms of focus and anaphora manipulation. In particular, demonstratives are used in contexts typically associated with strong definites, as suggested by Jenks (2018), in addition to their standard deictic and demonstrative functions.

This pattern is consistent with cross-linguistic studies of semantic change, which highlight the grammaticalization cline from demonstratives to anaphoric definites (Diessel 1999). We speculate that Mandarin-specific properties, such as the lack of tense-aspect marking and the availability of generic and indefinite readings for bare nouns, may be contributing in their own particular ways to this process (see also Simpson & Wu 2022). More precisely, Mandarin demonstratives are under pressure to resolve the ambiguity imposed by bare nouns, which has led to the observed shift toward their use as definites. In contrast, Turkish and Bangla do not exhibit a similar change in their demonstratives, likely because they do not face the same pressures of ambiguity resolution. In Turkish, overt case morphology serves as a crucial factor in differentiating between definite and indefinite interpretations of bare nouns. In contrast, in Bangla, bare nouns cannot express definiteness without the use of a classifier, thus eliminating this ambiguity entirely.

As a final note, we emphasize that our analysis of the Mandarin demonstrative and its expansion to strong definite readings are specific to Mandarin and should not be generalized to the weak-strong debate in other determinerless languages. In fact, when we compare our Mandarin data to previous data in Bangla and Turkish, we see directly that these languages differ clearly along the dimensions we study. Further research on languages where investigations between weak and strong definites have

already been pursued, such as Akan (Bombi 2018; Owusu 2022) and American Sign Language (Irani 2019; Koulidobrova & Lillo-Martin 2016), as well as others we have yet to learn about, could help us understand whether similar factors influence the form of definites in other languages. This would provide a more comprehensive, yet more complex, picture of the cross-linguistic typology of definiteness.

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Ankana Saha
Department of Linguistics
Harvard University
Boylston Hall, 3rd Floor
Cambridge, MA
USA
ankana_saha@g.harvard.edu

Yağmur Sağ
Department of Linguistics
Rutgers University
18 Seminary Pl
New Brunswick, NJ
USA
yagmur.sag@rutgers.edu

Jian Cui
Department of Linguistics
Harvard University
Boylston Hall, 3rd Floor
Cambridge, MA
USA
jiancui@g.harvard.edu

Kathryn Davidson
Department of Linguistics
Harvard University
Boylston Hall, 3rd Floor
Cambridge, MA
USA
kathryndavidson@fas.harvard.edu