

## Chapter 6

# Definiteness across languages and in L2 acquisition

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This paper presents evidence suggesting that article-less languages are not created equal and that this influences how native speakers of these languages acquire article languages like English. The evidence suggests that Mandarin learners of English do not unequivocally bear out the predictions of the Fluctuation Hypothesis, unlike learners of English with e.g. Korean, Russian and Japanese as an L1. I propose a research program that approaches articles as a syntax/semantics interface phenomenon. The program considers the syntax/semantics interface of definiteness in its entirety and makes no *a priori* assumptions about how it is best analysed. Rather, it adopts a data-driven comparative approach with multiple L1s that allows to give a fine-grained answer to the question how L1 influence plays out for definiteness.

## 1 Introduction

The L2 acquisition of the definite article has already played an important role in the debate on L1 influence. It is one of the morphemes that – according to the original morpheme studies (e.g. Dulay & Burt 1974) – is acquired by all L2 learners at the same time. The work of Ionin and colleagues (e.g. Ionin et al. 2004; Ionin & Montrul 2010) has however shown that L1 influence distinguishes between learners with an L1 that has articles and those with an article-less L1. I argue that the time has come to probe further and look into whether L1 influence is identical for all learners with an article-less L1.

I briefly sketch the SLA literature on L2 article acquisition by learners with an article-less L1 (§2), argue that L1 influence from article-less L1s is not uniform (§3, §4), and propose a research program that allows us to investigate this in detail (§5).



## 2 From an article-less L1 to an article L2

Research on the second language acquisition of definite articles by L1 speakers of article-less languages dates back at least four decades (see e.g. Hakuta 1976). Early studies (Huebner 1983; Tarone & Parrish 1988; Thomas 1989) used the typology of definite/indefinite contexts proposed by Bickerton (1981) to analyze the production of L2 learners. This typology is based on two binary features, viz. “speaker reference” [+/-SR] and “hearer knowledge” [+/-HK]. The outcomes of these studies were mixed, e.g. Thomas (1989) argues that L2 learners associate the definite with the feature [+SR] whereas Master (1987) argues that they associate it with the feature [+HK], thus leading to significantly different predictions.

In the early years of this century, an experimental paradigm came up that singled out one specific subtype of [+SR; -HK] contexts. Ionin (2003) initiated this paradigm and hypothesized that the problems that pop up in [+SR; -HK] contexts are primarily due to the fact that learners confuse specificity and definiteness. Specificity in this paradigm is defined as the speaker’s intention to refer to a unique and noteworthy individual in the set denoted by the NP (Ionin et al. 2004). (1) presents an item with a specific referent (*a very important client from Seattle*) while (2) presents an item with a non-specific referent (*a student*):

(1) Specific referent

Jennifer: *Hello, Helen? This is Jennifer!*

Helen: *Hi Jennifer! It’s wonderful to hear from you. I suppose you want to talk to my sister?*

Jennifer: *Yes, I haven’t spoken to her in years!*

Helen: *I’m very sorry, but she doesn’t have time to talk right now. She is meeting with **a very important client from Seattle**. He is quite rich, and she really wants to get his business for our company.* (Ko et al. 2010: 239)

(2) Non-specific referent

Context: At a university.

Professor Clark: *I’m looking for Professor Anne Peterson.*

Secretary: *I’m afraid she is busy. She has office hours right now.*

Professor Clark: *What is she doing?*

Secretary: *She is meeting with **a student**, but I don’t know who it is.* (Ionin et al. 2004: 68)<sup>1</sup>

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<sup>1</sup>I provide examples taken from Ko et al. (2010) and Ionin et al. (2004). These represent the most recent instance of Ionin’s (2003) paradigm by Ionin and colleagues.

Specificity in (1) is operationalized by having Helen add insider details about the referent in the form of modifiers and a follow-up sentence. These details suggest that Helen has a unique client in mind who is furthermore noteworthy. The operationalization of non-specificity in (2) lies in the absence of additional information about the referent and the explicit statement of the lack of knowledge about his/her identity. Ionin et al. (2004) show how Korean and Russian L2 learners of English who are asked to choose between *a*, *the* or  $\emptyset$  as a determiner for *very important client* and *student* are more likely to choose *the* for the former than for the latter.<sup>2</sup>

Ionin's paradigm has generated consistent results in a number of replication studies involving L2 learners of English with an article-less L1 (e.g. Ko et al. 2010 for Russian and Korean; Hawkins et al. 2006 for Japanese). On the most recent interpretation of the data the paradigm has generated (Ionin et al. 2009), the problem L2 learners face is that article systems cross-linguistically come in two varieties, one organized around definiteness, the other around specificity and definiteness. English represents the former (Table 1), Samoan the latter (Table 2).

Table 1: The English article system

	+definite	-definite
+specific	<i>the</i>	<i>a</i>
-specific	<i>the</i>	<i>a</i>

Table 2: The Samoan article system (Ionin et al. 2009)

	+definite	-definite
+specific	<i>le</i>	<i>le</i>
-specific	<i>le</i>	<i>se</i>

<sup>2</sup>In this paper, I do not separately report on native speaker controls but refer to Ionin et al. (2004) and Le Bruyn & Dong (2017a,b) for the relevant data. Native speakers in these studies performed at ceiling on providing indefinite articles both in the indefinite specific and indefinite non-specific condition.

The difference between the two systems lies in the fact that the Samoan “definite” article is also used for specific indefinites. Ionin and colleagues hypothesize that L2 learners need to determine which of the two article systems applies in the languages they are learning, leading them to fluctuate between the two systems and sometimes overproduce definite articles in specific indefinite contexts. This hypothesis is known as the Fluctuation Hypothesis and is the most influential theory-driven explanation about L2 definite article acquisition to date.

### 3 Evidence against the Fluctuation Hypothesis?

This section is named after Snape et al. (2006), a paper that brings together three independently carried out replication studies of Ionin et al. (2004) and finds that Japanese learners of English nicely follow the predictions of the Fluctuation Hypothesis but that Mandarin learners of English do not.

#### 3.1 Snape et al. (2006)

The data from the Japanese learners which Snape et al. (2006) report on comes from Hawkins et al. (2006) and Reid et al. (2006). Tables 3 and 4 provide a summary of the data, focusing on the two contexts that allow us to check the predictions of the Fluctuation Hypothesis: specific indefinite contexts and non-specific indefinite contexts.<sup>3</sup>

Table 3: Percentage of *the* responses by 12 Japanese respondents in the specific and non-specific conditions in Hawkins et al. (2006)

<i>the</i>	
Non-specific	8% (4/48)
Specific	50% (24/48)

Table 4: Percentage of *a* and *the* responses by 14 Japanese respondents in the specific and non-specific conditions in Reid et al. (2006)

	<i>a</i>	<i>the</i>
Non-specific	94%	4%
Specific	70%	29%

<sup>3</sup>To present the cleanest possible picture, I restrict myself to data from experimental items without scopal interactions and data that focus – as in Ionin’s original experiment – on the singular.

Even though some details about the studies are not available and I cannot report the data fully in parallel, the general picture is clear: Japanese learners appear to be sensitive to specificity and their production of English articles bears out the predictions of the Fluctuation Hypothesis. Both in Hawkins et al. (2006) and Reid et al. (2006), Japanese learners overproduce definites in the specific indefinite condition but not in the non-specific indefinite condition.

The data from Mandarin learners that Snape et al. (2006) report on are taken from Ting (2005). They are summarized in Table 5.

Table 5: Percentage of *a* and *the* responses by 8 Mandarin respondents in the specific and non-specific conditions in Ting (2005)

	<i>a</i>	<i>the</i>
Non-specific	94%	4%
Specific	92%	3%

The contrast between the Mandarin and the Japanese learners is striking: while Japanese learners overproduce definites in 29 to 50% of specific indefinite contexts, Mandarin learners seem to behave like native speakers in only overproducing definites in 3% of the same contexts.

Snape et al. (2006) conjecture that the contrast between Mandarin and Japanese learners might be explained by the fact that Mandarin is in a more advanced stage of developing an article system parallel to that of English. It would be grammaticalizing the numeral *yi* ('one') as the indefinite and the demonstrative *nei* ('that') as the definite. L1 transfer could then explain why Mandarin learners perform more native-like.

### 3.2 Assessing data and analyses

Let us – for the moment – take the data of Ting's study at face value. What they indicate then is that there is L1 influence. Whether Snape et al.'s conjecture is on the right track or even plausible is however impossible to tell. The study falls short of providing sufficient motivation at two levels: (i) it does not provide any comparative data that would support the difference in grammaticalization between Mandarin and Japanese, (ii) it provides no systematic way of linking the alleged difference to the performance of L2 learners.

In the remainder of this paper, I will do two things. The first is to provide data from two further small-scale studies that lend support to the idea that Mandarin

learners of English do not unequivocally bear out the predictions of the Fluctuation Hypothesis (§4). The second is to present a new methodology that allows us to systematically study L1 influence in acquisition (§5).

## 4 Mandarin learners and the Fluctuation Hypothesis

Snape et al.'s study is not the only one that has looked into the predictions of the Fluctuation Hypothesis for Mandarin learners. Trenkic (2008) did the same and – unlike Snape et al. – found that Mandarin learners overproduce definites in Ionin et al.'s (2004) specific contexts.<sup>4</sup> In this section, I present two small follow-up studies that seem to pattern more with the data from Snape et al. (2006). The conclusion I draw is that Mandarin learners of English do not unequivocally bear out the predictions of the Fluctuation Hypothesis.

### 4.1 Replicating Ting's null result

The replication of a null result might seem like an irrelevant exercise, but given the small sample size of Ting's original study, I think it is a worthwhile enterprise to convince us that Mandarin learners are likely to be different from learners with other article-less L1s.

I report here on an experiment I conducted with 35 second-year students of the Zhejiang Ruian High School. I selected this population rather than university students in or outside of China to make sure that their general proficiency was unlikely to be higher than that of the Japanese learners Hawkins et al. (2006) and Reid et al. (2006) report on. Their ages matched the year they were in (16 and 17) and none of them had spent time abroad or was proficient in an article language other than English.

I recycled 4 specific indefinite and 4 non-specific indefinite items from Ionin et al. (2004).<sup>5</sup> I furthermore added 36 fillers (partly recycled, partly invented), balancing the anticipated *a* and *the* responses.

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<sup>4</sup>Trenkic (2008) however does not agree with the interpretation of the data. See Trenkic (2008) and Ionin et al. (2009) for discussion.

<sup>5</sup>The specific indefinite items we used were items 25, 26, 27 and 28 from Ionin et al. (2004). For the non-specific indefinite items, I used items 37, 38, 39 and 40. These non-specific items were control items in the original study but do not contain the explicit statement of lack of speaker knowledge criticized in Trenkic (2008). Ionin et al. (2009) indicate that this explicit statement of lack of speaker knowledge is not a crucial part of the operationalization of non-specificity and Ionin et al. (2004) found that their indefinite control items pattern with non-specific indefinite items: there is a significant difference in the responses with the specific indefinite test items ( $p < 0.001$ ) but not with the non-specific indefinite test items.

The items were semi-randomized and presented as a paper and pencil forced-choice elicitation task that was followed by a language proficiency test with the same format. Participation was framed in a classroom setting. As in Ionin et al.'s original study, each item of the experiment came with a blank and three options to choose from: *a*, *the* or  $\emptyset$ . There was no time limit but students all finished the experiment and proficiency test within 45 minutes.

The proficiency test was not designed to classify the level of the learners based on standardized levels like those of the CEFR but to allow for a relative comparison between the subjects of the current experiment and those of three parallel experiments probing the role of modification. As such, the results are less relevant to the current study and I will consequently restrict myself to reporting the results of the experiment itself.

Table 6 presents the descriptive results of the study in parallel with the data in Tables 3–5.

Table 6: Percentages and absolute frequencies of *a*, *the* and  $\emptyset$  responses by 35 Mandarin respondents

	<i>a</i>	<i>the</i>	$\emptyset$
Non-specific	84% (118/140)	9% (13/140)	6% (9/140)
Specific	88% (123/140)	9% (13/140)	3% (4/140)

The data of the non-specific and the specific condition are almost fully parallel. I ran a mixed effects model with item and participant as random factors. Given that the selection of  $\emptyset$  gives no insight into whether subjects consider the item indefinite or definite, I modeled these responses as missing data. As expected, there was no overall effect of condition and pairwise comparisons showed no difference between the two conditions ( $F(1, 165) = 0.002, p = 0.963$ ).

I interpret the data in Table 6 as indicating that Mandarin L2 learners are unlikely to be sensitive to specificity in the way it is operationalized by Ionin et al. (2004). As I indicated before, I am aware of the fact that few to no conclusions can be drawn on the basis of a null result, but I did consider it relevant to at least check whether the null result found in Ting (2005) is not merely due to its small sample size.

## 4.2 Changing paradigms

Le Bruyn & Dong (2017a) designed an alternative paradigm to check the predictions of the Fluctuation Hypothesis. The results reported in Le Bruyn & Dong (2017b) indicate that Mandarin learners behave exactly opposite to the predictions of the Fluctuation Hypothesis.

The paradigm of Le Bruyn & Dong has two experimental conditions: a specific indefinite condition and a non-specific indefinite condition. To operationalize indefiniteness, we used DPs whose semantic content does not guarantee uniqueness and whose referents are non-familiar. This choice was inspired by the fact that DPs whose semantic content guarantees uniqueness involve nouns and adjectives (like superlatives) that typically occur with a definite. Using these nouns would make it hard to distinguish grammatical from collocational knowledge.

To operationalize specificity and non-specificity, we did not resort to adding or leaving out insider details. Rather, we presented specific referents as noteworthy by turning them into the protagonists of a story and presented non-specific referents as non-noteworthy by turning them into secondary characters:

- (3) *Have I already told you about the scariest moment of my life? Well, one day I saw **a girl** on top of a building... All of a sudden, she starts to dance, slips on **a brick** and falls off the building! Fortunately she landed on some cardboard boxes and didn't get hurt...*

The girl is the protagonist in (3): after her introduction, she is immediately picked up as the subject of the next sentence and she remains the main character of the story throughout. The brick is a secondary character: it is introduced but never referred back to. We made 8 stories following the setup of the one in (3): (i) introduction of the protagonist, (ii) story about actions of the protagonist, (iii) optional introduction of a secondary inanimate character, (iv) continuation of the story about the protagonist. A further 8 stories were created as fillers and had a freer structure.<sup>6</sup>

We adopted the forced choice setup used in Ionin et al.'s specificity paradigm but limited the answer possibilities to the definite and the indefinite article. For the experimental items, an article had to be selected for the DP introducing the protagonist (four items) or the secondary character (four items), thus leading to our two experimental conditions. For the fillers, the relevant DPs concerned collocationally and/or grammatically enforced definites (four items) and indefinites (four items):

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<sup>6</sup>To keep the processing cost of the task as low as possible we decided not to increase the number of fillers beyond 8.

- (4) *You'll never guess what happened today! I've seen a woodpecker for **the first time** in my life.*
- (5) *You'll never guess what happened today! You know I have **a sister**? Well, she came to visit me for the first time in 10 years!*

Wherever possible, the similarity between the stories across the two conditions was maximized. We took care, however, to create sufficient variation to prevent subjects from inferring answers. One way of doing so was to use the possessive *my daughter* in the experimental item based on (3) when asking participants to fill in the blank for the backgrounded character.

To create a communicative context for the stories, we inserted them in a pub context in which one character tells them to another. This was done pictorially as in Figure 1 and Figure 2.

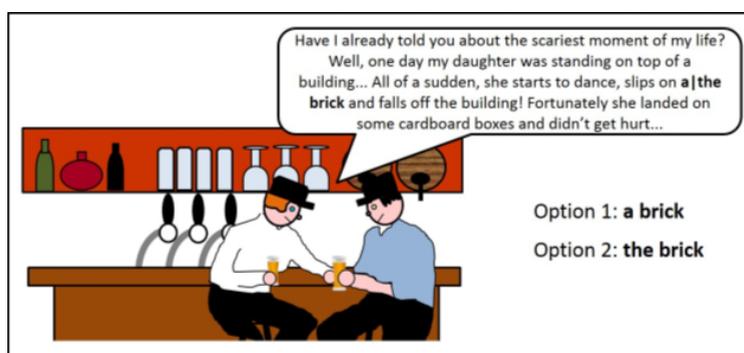


Figure 1: Example of a non-specific/backgrounded item

The participants were 22 L1 Mandarin/L2 English speakers. All were undergraduate students of English at the Beijing International Studies University. The test was administered by a student assistant in a quiet environment at the university. Participants were tested individually. The instructions as well as the 16 semi-randomized test stories (8 experimental items and 8 fillers) were presented in a PowerPoint presentation with one slide for the instructions and one slide for each test story. Participants were asked to indicate for each story whether they preferred the version with the indefinite (Option 1) or the definite article (Option 2). A small language biography survey was orally carried out by the student assistant to check for the potential influence of stays abroad or of other languages. No student had spent time in an English-speaking country or mastered an article



Figure 2: Example of a specific/backgrounded item

language other than English. The participants were given no time limit but all of them completed the experiment in under five minutes.

Table 7 summarizes the results of the 22 participants on the test items. L2 learners are at ceiling in the specific/foregrounded condition but produce 31% of definites in the non-specific/backgrounded condition.

Table 7: Percentage of *a* and *the* responses by 22 Mandarin respondents in the foregrounded and backgrounded conditions in Le Bruyn & Dong (2017b)

	<i>a</i>	<i>the</i>
Non-specific	69% (53/88)	31% (27/88)
Specific	95% (75/88)	5% (5/88)

To determine the significance of these results, we ran a mixed effects model with item and participant as random factors. There was a significant effect of condition. Pairwise comparisons of the model showed that the foregrounded and the backgrounded conditions were significantly different from each other ( $t(174) = 4.576, p < 0.001$ ).

The results indicate that our participants were likelier to produce a definite for non-specific referents than for specific referents. This is exactly the opposite of what we would expect based on the Fluctuation Hypothesis. In combination with the data from Ting (2005) and the data I presented in §4.1, we conclude that evidence is accumulating that suggests Mandarin learners of English are different from learners with other article-less L1s in that they do not unequivocally bear out the predictions of the Fluctuation Hypothesis. In §5, I propose a research

program that aims at establishing L1 influence in article acquisition for learners with an article-less L1. I approach articles as a syntax/semantics interface phenomenon. The setup of the program allows it to be adapted to study L1 influence for other phenomena at the syntax/semantics interface.

## 5 Establishing L1 influence: A research program

Jarvis (2000) set the current standard in transfer research. In order to argue for transfer from L1 to L2, he requires a research design with learners from multiple L1 backgrounds that convincingly shows that: (i) learners with the same L1 background pattern together (*intragroup homogeneity*), (ii) learners from different L1 backgrounds behave differently (*intergroup heterogeneity*), and (iii) differences between the groups are linked to differences in their L1s (*cross-linguistic congruity*).

Demonstrating cross-linguistic congruity presupposes cross-linguistic comparison, the study of the many-to-many mapping patterns between the syntax/semantics interfaces (SSIs) of L1s and Target Languages (TLs). For this comparative groundwork, SLA researchers should be able to rely on syntacticians/semantists. Current work on transfer for articles however shows that the available groundwork will not do. In §3.1, it was shown that Snape et al. (2006) found that Mandarin learners of English outperform Japanese learners on their acquisition of the English article system. They conjecture that this is due to the fact that the Mandarin demonstrative *nei* and numeral *yi* ('one') are close to English *the* and *a*. If they are right, this entails that the meanings of demonstratives and numerals in Mandarin and Japanese partly overlap and partly do not and that their relations to demonstratives, numerals and articles in English are different. A full argumentation for transfer would then need to focus on those contexts for which Mandarin and Japanese differ in their use of demonstratives or numerals. There is however no work in cross-linguistic syntax/semantics with this level of granularity that transfer research can build on.

The example from Snape et al. (2006) shows a realistic picture of cross-linguistic syntax/semantics. Too often, two simplifying assumptions are made: (i) things that superficially look the same are the same (e.g. numerals, demonstratives), (ii) languages either make the same distinctions or are underspecified (definiteness) without there being a (combined) role for other expressions. These simplifications are a limitation in cross-linguistic syntax/semantics. The first challenge which a systematic study of L1 influence in article acquisition faces is thus to force a paradigm shift in cross-linguistic syntax/semantics that gives transfer research the groundwork it needs (*the comparative challenge*).

The example from Snape et al. (2006) is also indicative of another challenge the field faces. Transfer research at the SSI is too often synonymous with L2 morpheme studies. This is a reductionist view in two respects. The first is that the SSI is not a mere sum of morphemes but a system in which all morphemes interact. The second is that the SSI of L2 learners can only be properly understood if we model it as a system in which the SSIs of the learner's L1 and TL come together. We need methodology that allows us to do justice to the full complexity of the SSI of L2 learners (*the L2 interface challenge*). Meeting this challenge allows us to compare the SSIs of L2 learners from the same L1 background and across learner groups (intragroup homogeneity, intergroup heterogeneity) while at the same time comparing them to the L1s and TL of the learners (cross-linguistic congruity).

## 5.1 Iterated Translation Mining

Iterated Translation Mining (ITM) overcomes the comparative challenge through the adoption of a data-driven approach in which translation equivalents are used to identify the semantic features that interact with definiteness and study how they are realized cross-linguistically. The output is – for each language – an analysis of the SSI of definiteness in the nominal domain. The formalization includes an overview of lexical items/constructions with their associated features (henceforth *feature-based lexicons*) and the rules that govern their use in each of the languages (henceforth *grammars*). To be able to guarantee cross-linguistic comparability, I adopt formal semantics to define the semantic features and I set up the grammars in (Bi-directional) Optimality Theory (Prince & Smolensky 2004; Hendriks et al. 2010). Monolingual reference corpus and native speaker experiments allow to overcome the limitations inherent to a corpus-driven approach.

### 5.1.1 Data

ITM uses translation corpora to generate networks of translation equivalents across languages.<sup>7</sup> For example, one takes *a* and *the* as seed words, looks up their uses in the English source texts and matches their translations. These can be demonstratives, specific word orders, case configurations, etc. As a second step, one looks up all uses of the translations of *a* and *the* in the source and target texts and matches the translations of these in all the languages of the corpus. The first step creates one-way contrastive analyses focusing on how English

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<sup>7</sup>A reviewer correctly points out that the parallel methodology severely restricts the number of languages that can be investigated. I hope this is however only a matter of time in the sense that parallel corpora will hopefully become available for many more languages.

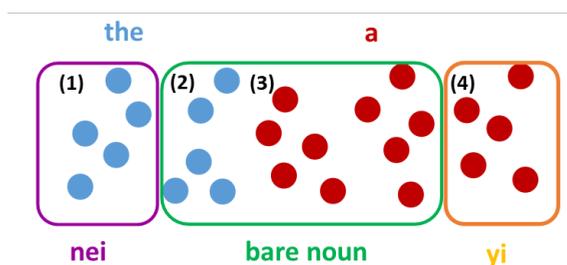


Figure 3: TM

nominal definiteness is rendered in the other languages. The second step creates a many-to-many contrastive analysis that gives access to the paradigms of nominal definiteness cross-linguistically with an equal weight for the different languages.

The output of the data collection is a set of contexts with – for every language – an indication of the markers of definiteness. Multi-Dimensional Scaling (MDS) automatically generates clusters of contexts by maximizing the distances between contexts in which (individual) languages use different markers and minimizing the distances between contexts in which the same markers are used (*Hamming distance*). Based on Analyses of Similarities (Clarke 1993; Oksanen et al. 2017), I determine the significance of these clusters. The combination of the clusters and the contexts that appear in them is an inductively construed semantic map (Haspelmath 1997), the basis for our cross-linguistic analyses. It furthermore allows to shift the focus of transfer research from morphemes to the full SSI.

ITM introduces iterations in the Translation Mining technique (TM) I designed with Henriëtte de Swart and Martijn van der Klis (van der Klis et al. 2017).

### 5.1.2 Analysis

The way the analysis proceeds is close to the one in TM (e.g. de Swart et al. 2017). I illustrate with an example in which I apply TM and ITM to the same (hypothetical) dataset. I restrict my attention to two languages (English and Mandarin) and to a subset of the variation I expect to find.

The points in Figures 3 and 4 represent contexts from a translation corpus. Their colours refer to the forms in English (upper), the coloured groupings to the forms in Mandarin (lower). The clusters that emerge by crossing the form variation in the two languages are numbered.

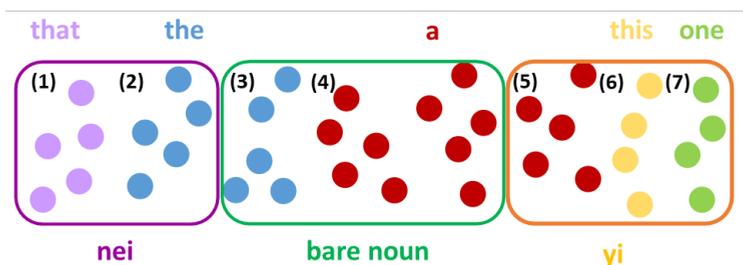


Figure 4: ITM

By inspecting commonalities and differences between clusters, I identify the semantic features at play and the constraints that govern their use. The features are formalized in feature-based lexicons, the constraints in bi-directional OT grammars. TM presents the picture we know from the literature: Mandarin doesn't have articles and uses bare nouns instead with an occasional use of demonstratives like *nei* ('that') for definites and the numeral *yi* ('one') for indefinites. ITM provides the fuller picture we need by translating back the translations of *the* and *a* and providing the relevant oppositions to study the contribution of *the* and *a* when they are not translated by a bare noun and the contribution of *nei* and *yi* when they do function as translations of *the* and *a*. Adding more article-less languages (like Japanese and Russian) as well as all the iterations, allows to complete this picture (different distribution of bare nouns, demonstratives, numerals, case, word order, etc.). The increased complexity is managed through so-called *scenarios* that plot subparts of the data and allow a stepwise analysis of the full picture. The renewed interest in variations of definiteness across languages – not in the least due to Florian Schwarz's work (2009; 2019 [this volume]) – will undoubtedly contribute to the analysis.

## 5.2 LOG-IT

LOG-IT (Logging Lexicons and OT Grammars in Translation) is a data mining technique that uses a custom-made high quality L1 to L2 translation corpus to inductively study the SSI of individual learners at the same level of detail as the output of ITM. It thus overcomes the L2 interface challenge. I use the output of ITM in two ways. The clusters identified through ITM guide the selection of contexts for the translation corpus. For the analysis, I use the ITM feature-based lexicons and OT rules to generate all possible variations on the languages involved. I compare these to the production of the learners and establish individual rankings

of these variations. I establish similar rankings for the languages of the project based on our corpus and experimental data. The rankings allow for the mapping and comparison of the SSI of individual learners, L1 groups and L1/L2s.

### 5.2.1 Data

I chose written L1 to L2 text translation as a data collection protocol for two reasons:

- (a) Data that discriminate between possible rankings are needed. (Semi)-free production tasks cannot target all relevant data per learner.
- (b) Unlike other high control tasks like Forced Choice Elicitation, translation can focus on any level of production (DP/VP, sentence, discourse).

Relying on translation data comes with two risks. The first is a translation bias: learners might be influenced by specific wordings in the source text or resort to general translation processes like simplification. To address this bias, I include two control tasks: a story rewrite task to control for influence from the source text and L2 to L1 translation to control for translation styles. The second risk is overinterpretation of the data: doubts of the learners are not visible in a translation and learners might resort to a word-by-word or sentence-by-sentence strategy while I hope to analyze all levels of production. To address this risk, I exploit the potential of simultaneous key-stroke logging and eye-tracking during translation. I use a combination of measures related to corrections, eye-key spans (Timarová et al. 2011 and references therein), attention units (e.g. Hvelplund 2016), etc., to establish a measure of reliability per data point. The relevant experimental software goes under the name of TRANSLOG II and was developed in the field of Translation Studies (Schwieter & Ferreira 2017).

### 5.2.2 Analysis

I use the semantic features and OT grammar constraints identified through ITM to generate all possible lexical entries for the forms used by the learners and all possible OT grammars. By crossing lexicons and grammars, I generate all possible variations on the languages involved and rank these per learner. Rankings are based on how accurately the variations predict learner production and corpus/experimental data. Accuracy is established as a measure of (weighted) interrater reliability where the output of the learner and the variation are modeled as raters.

The distances between learner/language rankings are calculated based on the Damerau-Levenshtein distance and a dissimilarity matrix is established. This is the input for Analyses of Similarities that statistically assess intra-group homogeneity/inter-group heterogeneity for the L1 groups. I use MDS to graphically represent similarities and differences between individual learners, learner groups and languages (Figure 5). In combination with the underlying rankings, the corresponding graph is an inductively constructed map of L1 influence. The underlying data allow to establish cross-linguistic congruity.

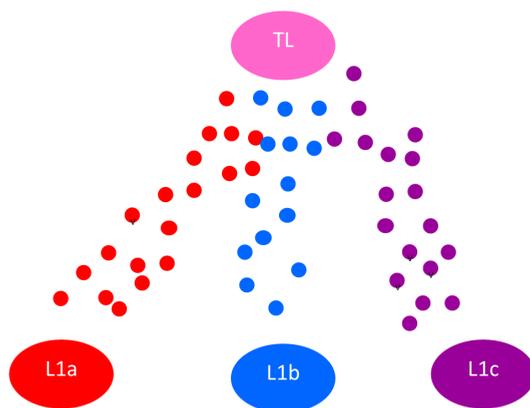


Figure 5: LOG-IT

Characterizing learners in terms of rankings of interlanguages does justice to the variability that characterizes learner languages (Larsen-Freeman 2006; de Bot et al. 2007). The logic behind LOG-IT allows it to deal with L2s and L3s provided the languages of the learner are included in ITM.

## 6 Conclusion

I have presented evidence suggesting that article-less languages are not created equal and that this influences how native speakers of these languages acquire article languages like English. The evidence suggests that Mandarin learners of English do not unequivocally bear out the predictions of the Fluctuation Hypothesis, unlike learners of English with e.g. Korean, Russian and Japanese as an L1.

I have proposed a research program that approaches articles as a syntax/semantics interface phenomenon. The program considers the syntax/semantics interface of definiteness in its entirety and makes no *a priori* assumptions about

how it is best analysed. Rather, it adopts a data-driven comparative approach with multiple L1s that allows for a fine-grained answer to the question of how L1 influence plays out for definiteness.

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