

THE ACQUISITION OF ENGLISH ARTICLES BY CHINESE LEARNERS

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ABSTRACT

Despite high frequency and early input, English articles (*the*, *a*, and the zero article \emptyset) remain a generally acknowledged marked feature for [-Article] Chinese learners. The purpose of this study was to investigate acquisition orders and underlying processes in terms of article accuracy and use by Chinese learners. The theoretical approach adopted here was Bickerton's (1981) semantic wheel model, marked by the features, [\pm Specific Referent (\pm SR)] and [\pm Assumed Known to the Hearer (\pm HK)]. The measures employed for data analysis were SOC (Supplied in Obligatory Contexts), TLU (Target-Like Use), and UOC (Used in Obligatory Contexts). A total of 55 Mandarin Chinese speakers drawn from three proficiency groups (Advanced, Upper-Intermediate, and Lower-intermediate) participated in an article cloze test. ANOVA procedures along with Scheffé and Bonferroni follow-up tests were performed to identify the acquisition orders. The results show that SOC reveals an order of *the* = *a* > \emptyset , and TLU, *the* > *a* > \emptyset , across the groups. UOC indicates that TLU is a more reliable acquisition measure, and SOC serves better as an index of accuracy level. In addition, UOC also reveals that \emptyset goes through a flooding-then-trickling process, *the* experiences a U-shaped behavior highlighted by an overgeneralization stage, and *a* follows *the* by undergoing U-shaped development as well. Furthermore, the difficulties underlying acquisition processes were also identified: Chinese learners have difficulty distinguishing [\pm HK] (e.g., misuse of *the* for *a* or \emptyset) and [\pm Countability] (e.g., misuse of *a* for \emptyset , or \emptyset for *a*). This study sheds some light on article pedagogy in view of the acquisition orders, patterns in acquisition processes, and actual difficulties in article choice for Chinese learners.

Mandarin Chinese is generally acknowledged as a language with no functional equivalent of the English article system, which consists of *the*, *a*, and \emptyset (the zero article). Definiteness and indefiniteness in Chinese are marked by means of word order or the use of determiners, such as *zhèi* 'this', *nèi* 'that', and *yì* 'one' (Robertson, 2000). For [-Article] Chinese speakers, although English articles are traditionally introduced in the first few lessons of the beginner's course, these seemingly simple morphemes, *the*, *a*, and \emptyset , can hardly be mastered until a very late stage of second language development. It is fairly intriguing that the earliest structure you are exposed to turns out to be the last you acquire.

In addition to early input, the articles *the*, *a*, and \emptyset are highly frequent morphemes in English. According to the COBUILD frequency count, in a corpus of 20 million English words (Sinclair, 1991), the definite article *the* is by far the most frequent word, with a frequency rate of 25.1%,

outnumbering *of* (12.6%), *and* (12.5%), and *to* (11.1%). The indefinite article *a* (10.5%) follows closely as the fifth most frequent item. As for the zero article \emptyset , Master (1993) compared the frequencies of *the*, *a*, and \emptyset in five written genres in a total corpus of 197,644 words, and found \emptyset to be the most frequent article in a frequency order of $\emptyset > the > a$ (48.0% > 36.3% > 15.7%).

Despite high frequency and early input, English articles remain a widely recognized marked feature for Chinese learners. Article acquisition appears to be late, due to the fact that article choice is complicated, context-specific, and sometimes beyond simple rules, and that articles are usually unstressed function words and hence perceptually non-salient and semantically light-weight. So the purpose of this study was to investigate acquisition orders and underlying processes in terms of article accuracy and use, and further to seek pedagogical implications for Chinese learners.

There are three major theoretical approaches to research on article acquisition: The first approach is Bickerton's (1981) semantic wheel for noun phrase reference, marked by the features, [\pm Specific Referent (\pm SR)] and [\pm Assumed Known to the Hearer (\pm HK)], as shown in Figure 1. Bickerton's semantic wheel model has been widely adopted in a number of later studies (Huebner, 1983a; Master, 1987; Parrish, 1987; Tarone & Parrish, 1988; Thomas, 1989; Young 1996). The second approach is Master's (1990, 1997) binary system, dichotomized by the characteristics of classification and identification, along with his six-point hierarchical schema (1983, 1986a, 1986b, 1988a, 1988b, 1994) designed primarily for article pedagogy. Master's six-point schema suggest systematic article instruction in the following hierarchical sequence: the distinction of countable/uncountable, indefinite/definite, premodified/ postmodified, specific/generic, common/proper, idiomatic/nonidiomatic. The third approach is Gundel, Hedberg, and Zacharski's (1993) six implicationally related cognitive statuses in the Givenness Hierarchy: In focus > Activated > Familiar > Uniquely identifiable > Referential > Type identifiable. According to Gundel et al., the six cognitive statuses in the hierarchy are relevant to the appropriate use of the form of referring expressions in natural discourse, which provides a theoretical framework for Kim's (2000) study on the acquisition of English nominal reference by Korean speakers.

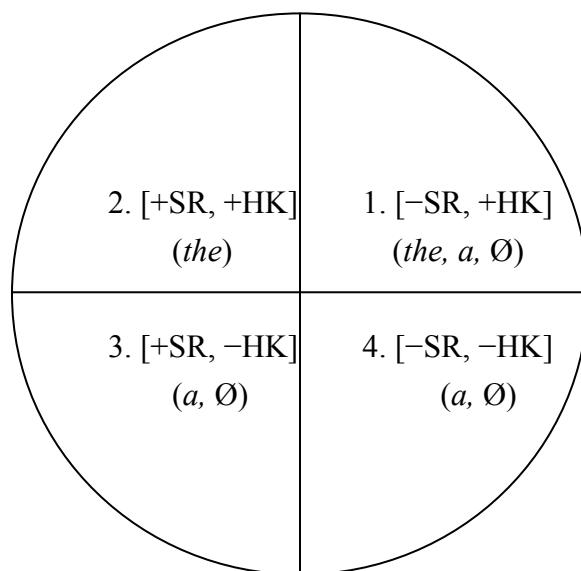


Figure 1. Bickerton's semantic wheel for noun phrase reference (from Huebner, 1983a)

Most developmental studies of article acquisition have followed the first approach, Bickerton's (1981) semantic wheel model. Based on Bickerton's (1975) dynamic paradigm notion, Huebner (1979, 1983a) argues that early morpheme studies (Brown, 1973; Dulay & Burt, 1973, 1974; Bailey, Madden, & Krashen, 1974; Larsen-Freeman, 1975), which had only inspected obligatory contexts, were unable to discern variation in the use of a morpheme in an evolving interlanguage, and thus failed to delineate a complete picture of acquisition processes. Moreover, Huebner (1983a) believes that the obligatory/optional/ ungrammatical trichotomy used in early studies was not refined enough for article analysis. Therefore, Huebner (1983a) adopted Bickerton's semantic wheel model, and suggested that pre-noun contexts be classified in terms of four semantic categories, [\pm Specific Referent (\pm SR)] and [\pm Assumed Known to the Hearer (\pm HK)] (see Table 1 for examples, drawn from the test items in Master, 1994):

1. [-SR, +HK], (*the*, *a*, \emptyset): Generics
2. [+SR, +HK], (*the*): Unique, previously mentioned, or physically present referents
3. [+SR, -HK], (*a*, \emptyset): First-mention NPs, or NPs following existential 'has/have' or 'there is/are'
4. [-SR, -HK], (*a*, \emptyset): Equative NPs, or NPs in negation, question, or irrealis mode

In his longitudinal naturalistic study, Huebner (1983a) investigated the use of the definite article *da* by his subject, Ge, an adult Hmong speaker with basic-level English proficiency. Based on his observations over one year, Huebner identified six stages in Ge's learning trajectory of marking *da* for NPs: Initially, Ge used *da* with [+SR, +HK] NPs. Then *the*-flooding marked

Stage 2, at which time Ge overgeneralized *da* to all NPs. At Stage 3, Ge began to screen *da* out of the [–SR, –HK] contexts that share no semantic function with the feature [+SR, +HK]. But Ge still retained the use of *da* in the other three contexts. At Stage 4, when he began to realize that the feature [±HK] served as a primary distinction for *da* marking, Ge restricted the use of *da* with [+HK] NPs. At Stage 5, Ge tested his hypothesis by using *da* again with [+SR, –HK] NPs, except the existential *haev(a)* (have a) constructions. At Stage 6, Ge rejected his previous hypothesis and returned to the rule governing Stage 4, namely, using *da* for [+HK] NPs only. Although Huebner did not conclude that Ge’s learning trajectory might be universal, his finding did provide evidence of systematic variability, rather than random choice, in article use in his subject’s interlanguage development.

Table 1

Environments and Examples for the Semantic Categories [±SR, ±HK]

Category	Article Environment	Example (drawn from the test items in Master, 1994)	Item No
1. [–SR,+HK]	<i>the, a, Ø</i> Generics	The favorite food of <i>the</i> jaguar is <i>the</i> wild pig.	48, 49
		<i>Ø</i> Wild pigs move in bands of fifteen to twenty.	50
2. [+SR,+HK]	<i>the</i> Unique, previously mentioned, or physically present referents	What is <i>the</i> diameter of <i>the</i> moon?	8,
		Once there were many trees here.	9
		Now, <i>the</i> trees are gone.	10
		<i>The</i> air in this city is not very clean.	16
3. [+SR,–HK]	<i>a, Ø</i> First-mention NPs, or NPs following existential ‘has/have’ or ‘there is/there are’	I would like <i>a</i> cup of coffee, please.	11
		I always drink <i>Ø</i> water with my meals.	5
4. [–SR,–HK]	<i>a, Ø</i> Equative NPs, or NPs in negation, question, or irrealis mode	There is <i>an</i> orange in that bowl.	1
		What is the sex of your baby? It’s <i>a</i> boy!	4
		Einstein was <i>a</i> man of great intelligence.	17

In the wake of Huebner’s longitudinal study, three comparable studies on article acquisition emerged: Parrish (1987), Master (1987), and Thomas (1989). Parrish conducted a longitudinal study of a 19-year-old beginning-level Japanese learner of English, Mari, who carried out a

story-telling task every ten days for four months. The second study is Master's pseudo-longitudinal study of 20 adult L2 learners, who were drawn from three groups of [-Article] L1 speakers (Chinese, Japanese and Russian) and two groups of [+Article] L1 speakers (Spanish and German). To approximate a longitudinal study in a shorter period, four subjects in each group of the same native language represented four stages of interlanguage development: Basilang (BA), Low-Mesolang (LM), Mid-Mesolang (MM), and High-Mesolang (HM). An informal interview was conducted to elicit spontaneous speech from each subject. The third study is Thomas' cross-sectional study of 30 adult L2 learners from nine native language backgrounds divided into two groups: 23 subjects in the [-Article] group and 7 in the [+Article] group. Each group contained three proficiency levels: Low, Mid, and High. The subjects were paired to complete a picture-description task. Instead of Huebner's concentration solely on the definite article, Parrish, Master, and Thomas expanded their investigation to the three articles *the*, *a*, and \emptyset across four semantic categories. Additionally, they all discussed article usage in proper nouns and idiomatic expressions, which were excluded from Bickerton's semantic wheel design.

Consistent with Ge's use of *da* for [+HK] NPs in Huebner (1983a), the [-Article] group in Master (1987) used *the* considerably in [+HK] contexts, and used *a* or \emptyset to a greater extent in [-HK] contexts. As opposed to Huebner and Master, Parrish (1987) and Thomas (1989) claim that *the* is initially associated with [+SR] rather than [+HK] contexts. In Parrish's study, Mari's use of *the* was restricted to [+SR] contexts for *the* was remarkably lacking in [-SR] contexts. Likewise, in Thomas' study, L2 subjects overgeneralized *the* to [+SR] contexts rather than [-SR] contexts. Besides, Thomas points out that Huebner and Master's claim of the initial association of *the* with [+HK] contexts needs careful consideration because their findings are heavily dependent on high frequency of *the* in [+SR, +HK] contexts, but short of support from the rarely produced generic NPs in [-SR, +HK] contexts.

In regard to acquisition processes, Huebner's claim of early *the*-flooding in all contexts is confirmed by the evidence in Andersen (1977), Master (1987), and Chaudron and Parker (1990). Huebner's subject, Ge, began with using *da* for [+SR, +HK] NPs, which suggests that the use of *the* for [+SR, +HK] NPs is an unmarked feature for an L2 learner. Once L2 learners use *the* successfully in [+SR, +HK] contexts, they are likely to overgeneralize the rule to all contexts, just like Ge at Stage 2. In contrast, Parrish and Thomas did not find *the*-flooding but overgeneralization of \emptyset in *a* and *the* contexts. Because \emptyset was overused considerably more by the [-Article] group than by the [+Article] group, Thomas surmises that \emptyset -overgeneralization may be attributed to L1 transfer. Also, Master (1987) found that the Basilang group overgeneralized \emptyset extraordinarily: SOC (number correctly Supplied in Obligatory Contexts) for \emptyset was close to 100%, and UOC (number Used in Obligatory Contexts) for \emptyset was about 230%. Although overuse of \emptyset decreased as proficiency increased, UOC was higher for \emptyset than for *a* or *the* across

the four levels of the [-Article] group. Like Thomas, Master also argues that overuse of \emptyset might be due to the fact that [-Article] L1 speakers use \emptyset in their first languages. At this point, Master and Thomas have come to an agreement on L1 interference of \emptyset usage.

Unlike *the* or \emptyset , *a* has rarely been found to have the phenomenon of overgeneralization or flooding at an early stage. However, Master detected a zigzag pattern of *a* usage in [+SR, -HK] contexts, which Master claims may be due to L2 learners' adjustment of noun countability. Similarly, Parrish found that *a* showed a more erratic curve than did *the* or \emptyset . Despite discrepancies in the findings of Parrish, Master, and Thomas, a consensus has been reached that *a* is acquired later than *the*. Consistently, Chaudron and Parker (1990) provide evidence that Japanese learners also acquired *a* later than *the*. Chaudron and Parker found that the lower-level learners tended to use \emptyset for indefinite contexts, and *the* for definite contexts, and that they increased use of *a* to encode indefiniteness as proficiency advanced.

Since the previous studies have revealed that variation in article use is systematic in some patterns, both article accuracy and frequency have thus been correlated with L2 learner's English proficiency (Master, 1987; Thomas, 1989; Chaudron & Parker, 1990). For instance, Master found that Total Common SOC (i.e., the overall accuracy of article use with common NPs) continuously increased as the proficiency level advanced for both [+Article] and [-Article] groups. Moreover, Master proposes that Total Common SOC can be used as an article-based interlanguage measure. Also, Thomas found that the accuracy of *the* and *a* had a parallel rise as proficiency increased. In addition, Chaudron and Parker (1990) show that Japanese learners were progressing from the structurally less marked article, \emptyset , to the more marked article, *a*, with increasing proficiency. Furthermore, Wolfe-Quintero (2000, lecture in SLS 640 English Syntax course at UHM) proposes a five-stage developmental sequence in L2 frequency of article production, based on the frequencies revealed in Kim's (2000) data from Korean learners of English:

- Stage 1. $\emptyset > the > a$: \emptyset is the most frequent article, followed by *the*, and *a* is used only occasionally.
- Stage 2. $\emptyset = the > a$: Use of *the* is frequent enough to compete with use of \emptyset .
- Stage 3. *the* > $\emptyset > a$: *the* becomes the most frequent, and *a* is still the least frequent.
- Stage 4. *the* > $\emptyset = a$: Use of *a* increases and appears to be as frequent as use of \emptyset .
- Stage 5. *the* > *a* > \emptyset : *a* becomes more frequent than \emptyset , but still less frequent than *the*.

On the other hand, if accuracy reflects acquisition, the acquisition orders of the articles can be summarized in Table 2, based on the accuracy rates shown in the studies, including Parrish (1987), Master (1987), Thomas (1989), as well as Yamada and Matsuura's (1982) study on article acquisition by Japanese high school (the Intermediate group) and college (the Advanced group) students. In general, the acquisition orders are inconsistent with one another in terms of

proficiency. For example, the acquisition order for the Mid-Mesolang and High-Mesolang groups in Master's study, i.e., $\emptyset > the > a$, is inconsistent with the order for the Mid and High groups in Thomas' study, i.e., $the > \emptyset > a$, but is consistent with the order for the beginning learner, Mari, in Parrish's study. Moreover, Thomas' study shows the same acquisition order across the three groups, whereas Master's and Yamada and Matsuura's studies demonstrate different orders for different groups.

Table 2
Acquisition Orders in the Previous Studies

Acquisition Order	Previous Study: Proficiency Level
$\emptyset > the > a$	Parrish (1987): Beginning Master (1987): Mid-Mesolang, High-Mesolang, the [-Article] group
$\emptyset > a > the$	Master (1987): Basilang
$the > \emptyset > a$	Master (1987): Low-Mesolang Thomas (1989): Low, Mid, High, the [-Article] group Yamada and Matsuura (1982): Advanced
$the > a > \emptyset$	Yamada and Matsuura (1982): Intermediate

Note. '>' means 'acquired earlier than,' or 'produced more accurately than.'

In fact, inconsistency in morpheme acquisition orders has long existed in the literature. Brown (1983) attributes this condition of "variegation" to "the variety of methodological approaches, and disparities in data-gathering procedures" (p. 25). Leaving aside task effects or sample sizes, a number of reasons can account for inconsistency in article acquisition orders: First, different methodological approaches were employed, such as longitudinal (Huebner, 1983a; Parrish, 1987), pseudo-longitudinal (Master, 1987), and cross-sectional (Yamada & Matsuura, 1982; Thomas, 1989) studies. Second, there is no shared placement standard for the participant's English proficiency. For instance, Master used Cazden, Cancino, Rosansky, and Schumann's (1975) negation criterion as a proficiency measure; Parrish, the Michigan Test; Thomas, a one-hour, in-house placement test; Yamada and Matsuura, the division between high school and college students; and Kim (2000), developmental stages based on NP usage profiles. Third, the [-Article] participants represented a combination of various L1 speakers, including Chinese, Japanese, Korean, Finnish, and Russian. So direct comparison of L2 acquisition orders may not take into account linguistic idiosyncrasies underlying each language. Overall, even though the acquisition orders differ across studies, the first article acquired appears to be the choice between

the and \emptyset because *a* has been overwhelmingly observed to emerge later.

The acquisition orders summarized in Table 2 were all based on the SOC measure. SOC (Supplied in Obligatory Contexts) was devised by Brown (1973) and has been widely used in various morpheme studies (Dulay & Burt, 1973, 1974; Bailey, Madden, & Krashen, 1974; Larsen-Freeman, 1975; Andersen, 1976, 1977, 1978; Hakuta, 1976; Master, 1987; Parrish, 1987; Thomas 1989) to estimate an L2 learner's accuracy level. According to Pica (1983), SOC was formulated as follows:

$$\text{SOC} = \frac{(\text{number of correct supplings in obligatory contexts} \times 2) + (\text{number of misformations in obligatory contexts} \times 1)}{(\text{number of obligatory contexts} \times 2)}$$

In this formula, a weighted scoring system was used to give half credit to the misformed morpheme. However, because English articles have no such misformations as other morphemes, like past regular or irregular verb marking, a simplified version of the SOC measure was commonly used in article acquisition studies:

$$\text{SOC} = \frac{\text{number of correct supplings in obligatory contexts}}{\text{number of obligatory contexts}}$$

However, SOC has been criticized for its failure to consider over-suppliance of a morpheme in non-obligatory contexts (Andersen, 1977; Hakuta, 1976; Hatch, 1978; Lightbown, Spada, & Wallace, 1980; Stauble, 1981; Pica, 1983). If the morpheme is over-supplied or overgeneralized, SOC will overestimate the learner's accuracy. So, suppliance in non-obligatory contexts, i.e., morpheme overgeneralization, should be taken into account in the accuracy measure. The TLU (Target-Like Use) measure was designed to redress this potential inflation of SOC, and it was formulated as follows (Pica, 1983):

$$\text{TLU} = \frac{\text{number of correct supplings in obligatory contexts}}{(\text{number of obligatory contexts}) + (\text{number of supplings in non-obligatory contexts})}$$

While SOC and TLU are used to measure article accuracy, UOC is used to measure article use. Master (1987) devised UOC to be a complementary measure to observe the learner's overuse or underuse of the article:

$$\text{UOC} = \frac{\text{the total number of supliances in both obligatory and non-obligatory contexts}}{\text{number of obligatory contexts}}$$

Like TLU, supliances in non-obligatory contexts is also taken into consideration in UOC, so the learner's overall use of a certain morpheme can be inspected. Master explains that UOC and SOC share the same denominator, so comparisons between accuracy and use can be easily spotted. Statistically, SOC and TLU cannot exceed 100%, but UOC can. So UOC is able to indicate overuse or underuse of the morpheme.

For ideal native-like use, SOC, TLU, and UOC will all equal one. Juxtaposition of these three measures yields a better understanding of morpheme acquisition: SOC indicates simple but potentially overestimated accuracy, TLU reveals a de-inflated estimate of accuracy level, and UOC shows learners' actual use or overuse of the morpheme. However, none of the studies summarized in Table 2 employed the improved accuracy measure, TLU: Parrish (1987), Thomas (1989), and Yamada and Matsuura (1982) looked at SOC only, except that Master (1987) used SOC and UOC.

In light of an overview of the literature on article acquisition, the research questions for the study reported below are as follows:

1. What do the three measures, SOC, TLU, and UOC, reveal about the acquisition of English articles by Chinese learners?
2. In what semantic contexts (Bickerton, 1981) are the articles, *the*, *a*, and \emptyset , overgeneralized? And, in what semantic contexts are there areas of difficulty underlying article choice for Chinese learners?

METHOD

Participants

A total of 55 Mandarin Chinese speakers (26 males and 29 females, aged 17-37) participated in this study (see Table 3 for the distribution of the participants). Of all the participants, 40 were recruited from the Taiwanese Student Association and Chinese Scholar and Student Association at the University of Hawai'i at Manoa. They were composed of 32 graduate and six undergraduate students in various programs at UH, as well as two short-time visiting graduate students from Taiwan and China. The other 15 participants were recruited from the Private Jin-Wen Senior High School in Taipei, Taiwan. This high school runs a TOEFL preparation program, designed for students who are planning to study in U.S. colleges. In this case, the 15 high school participants took TOEFL practice tests, whereas the 40 UH participants took the real TOEFL. According to the TOEFL score, all the participants were divided into three groups: the

Advanced group in a score range of 597-660 ($M = 622.11$, $SD = 19.04$); the Upper-Intermediate group, 503-590 ($M = 553.78$, $SD = 25.89$); the Lower-Intermediate group, 400-497 ($M = 452.73$, $SD = 31.25$). Regarding the country of origin, 34 participants came from Taiwan, and 21 from China. The average length of residence in English-speaking countries was 19.35 months, ranging from 0 to 102 months ($SD = 26.23$ months). Because the recruited Chinese learners with a TOEFL score below 400 were too scarce to form a representative group, a lower-level group was not possible.

Table 3
Distribution of the Participants

	Advanced	Upper-Intermediate	Lower-Intermediate	Total
<i>N</i>	21	19	15	55
Age	23-36	20-37	17	17-37
Gender: Male	11	6	9	26
Female	10	13	6	29
Nationality: Taiwan	9	10	15	34
China	12	9	0	21
Education: Graduate	21	13	0	34
Undergraduate	0	6	0	6
High School	0	0	15	15
Length of stay (months) in English-speaking countries:	34.48	17.63	0.33	19.35
<i>M</i>	32.57	18.73	1.29	26.23
<i>SD</i>	6-102	0-66	0-5	0-102
Low-High TOEFL Score:				
<i>M</i>	622.11	553.78	452.73	549.60
<i>SD</i>	19.04	25.89	31.25	72.40
Low-High	597-660	503-590	400-497	400-660

Materials

A multiple-choice cloze test was employed as the testing instrument to elicit articles from the participants. This type of cloze test has been administered in several article studies, such as Yamada and Matsuura (1982), Master (1994), and Takahashi (1997). The cloze test, borrowed from Master (1994), comprises 58 items in two parts: discrete sentences and a descriptive paragraph (see Appendix). The participants were asked to fill in the blank by circling the best article, among *a*, *an*, *the*, and \emptyset , on an answer sheet.

As for validity, Master's article test is considered to be a legitimate instrument for this study for the following reasons: First, the test covers the entire range of article usage, including the four semantic categories, [\pm SR, \pm HK]. Second, the test was designed to test article usage for

non-native speakers of English, so it is also suitable for Chinese learners. Third, Yamada and Matsuura (1982) claim that the cloze test is one of the best instruments for this purpose because the EFL learner's proficiency is best demonstrated in reading and writing, rather than listening and speaking.

As for reliability, the Cronbach alpha (α) for this test in this study was .77. The estimate of .77 was very close to the K-R20 of .79 reported for Master's pilot test that was taken by 75 L2 learners at five different levels of the ESL courses at UCLA. The Cronbach α , instead of the K-R20 formula, was used because the participants, with their TOEFL scores of 400-660, homogeneously scored above 50% accuracy on the article test, so the restricted variance of the test scores would affect the K-R20 estimate. Therefore, the Cronbach α , a split-half procedure for internal consistency, was chosen to measure test reliability. Statistically, the K-R20 and Cronbach α values are underestimates of the true reliability of the test (see Brown, 1996), so this article test with a Cronbach α of .77 can be accepted as reasonably reliable.

Procedures

The article test was first administered at the University of Hawai'i at Manoa in March 2001. And, in June 2001, the same test following the same procedures was administered again at the Private Jin-Wen Senior High School in Taipei, Taiwan. Prior to the test, the participants were assured of anonymity and confidentiality, and signed a consent form. Then, they were given a brief explanation to facilitate the administration, and were asked to respond to the test items as spontaneously as possible. On average, it took approximately 15-20 minutes to finish the test, although there was no time limit. Upon completion of the administration, the participants were offered a small monetary compensation for their participation.

Analyses

The theoretical approach adopted in this study was Bickerton's (1981) semantic wheel model, [\pm Specific Referent, \pm Assumed Known to the Hearer] (i.e., [\pm SR, \pm HK]), which does not include proper nouns or idiomatic expressions. For data analysis, 48 items, instead of the full 58 items, on the article test were used for the following reasons: First, because only common nouns are bounded in Bickerton's semantic categories, proper nouns and idiomatic expressions (i.e., Items 6, 36, and 44) were excluded from the data. Parrish (1987), Thomas (1989), and Master (1987) separated idioms and proper nouns from their data, except that Master incorporated idiomatic expressions, such as *go to Ø school*, into the [$-$ SR, $+$ HK] (i.e., generics) contexts. Based on Hakuta's (1976) prefabricated pattern notion, Parrish (1987) explains that L2 learners use idioms and proper nouns "without knowledge of their underlying structure, but with the knowledge of which particular situations call for which patterns" (p. 377). In addition, Master (1987) argues

that the article rules for proper nouns are somewhat idiosyncratic, and that the learner's knowledge of those rules tends to count on individual experience in the world. For example, it seems arbitrary that rivers take *the* (e.g., *the Nile*, *the Mississippi*), but parks take \emptyset (e.g., \emptyset Hyde Park, \emptyset Yosemite Park). Besides, geography teachers or travelers know and use geographical names better than other people do. Moreover, since the subjects did not produce every type of proper nouns, and some types of proper nouns were rarely used, Master (1987) decided to exclude proper nouns from his analyses.

Second, the items that allow two possible options contingent upon the speaker's semantic intention (i.e., Items 20, 29, 30, 41, and 54) were also excluded because of taxonomic difficulty. For instance, either *the* or *a* could be used in Item 29: "If you want to read, why don't you turn on _____ light?" The choice of *the* or *a* depends on whether the light is assumed known to the hearer (i.e., [\pm HK]). If it is, *the* will be chosen for the [$+$ SR, $+$ HK] context. If it is not, *a* will be selected for the [$+$ SR, $-$ HK] context. So Item 29 could be allotted in either of the two semantic categories, depending on the participant's semantic intention. Items like Item 29 make comparisons of SOC, TLU, and UOC even more complicated and less reliable because the obligatory context fluctuates for each participant. Therefore, items with two possible choices were not included in the data analysis.

Third, Items 33 and 34 were excluded from the data for their possibility of being biased in the analysis. Because the noun phrases in Items 33 and 34, *the jaguar* and *the wild pig*, occurred in the title of the paragraph, they were inevitably repeated in the text, for instance, in Items 48 and 49. If the repeated NPs with the same semantic feature were responded to incorrectly again, the same error would be counted twice. In order to give equal weight to each item, Items 33 and 34 were excluded to avoid a double penalty. Although a total of 10 items were left out of the statistical analyses, they remained on the test to keep the same conditions as in Master's pilot test. The final point needing to be clarified was the choice between *a* and *an* in the test. Since the present study focused on the distinction between *the*, *a*, and \emptyset , both *a* and *an* were tallied correct in the indefinite article contexts, even if *an* was incorrectly replaced by *a*, or vice versa, just as Master (1987) and Thomas (1989) did for their studies.

The measures employed for the data analyses were SOC (Supplied in Obligatory Contexts), TLU (Target-Like Use), and UOC (Used in Obligatory Contexts). First of all, frequencies of *the*, *a*, and \emptyset in each of the [\pm SR, \pm HK] contexts were counted for each participant. Next, the SOC, TLU, and UOC for *the*, *a*, and \emptyset were calculated for each participant as well as for each proficiency group. Then, the means of SOC and TLU for each group were compared to identify the acquisition order in terms of article accuracy. Also, the means of UOC for each group were compared to examine overuse or underuse of the articles.

Two-way analysis of variance (ANOVA) procedures with repeated measures were conducted

for SOC and TLU, respectively, in order to confirm whether there were significant differences in means. The two independent variables were Article (with three levels: *the*, *a*, and \emptyset) and Group (also with three levels: Advanced, Upper-Intermediate, and Lower-Intermediate). The dependent variable was the scores for *the*, *a*, and \emptyset , measured by SOC and TLU, respectively. A repeated-measures design was necessary because the same groups of participants were examined for their usage for each article type.

The principal assumptions underlying the two-way repeated-measures ANOVA (see Brown, 1992) were met in this study: The first assumption – normality of the distributions – was met. This can be confirmed by checking the means and standard deviations of the distribution for each group. The descriptive statistics in Table 4 show that the distribution for each group allows about two standard deviations on either side of the mean. Also, normality of the distributions can be confirmed because the values of the skewness and kurtosis are smaller than the values of the standard error of skewness and kurtosis, respectively. The second assumption – equal variances – was also met because the Levene’s Test of Equality of Error Variances indicated that none of the variances of SOC or TLU for the articles, except SOC for \emptyset , was significant, $p > .05$. The two assumptions – normality of the distributions and equal variances – were checked and found to be met. Therefore, accurate application of the two-way repeated-measures ANOVA can be assured.

Table 4
Descriptive Statistics of the Test Scores

Proficiency	<i>n</i>	<i>k</i>	<i>M</i>	<i>SD</i>	Low-High	Skewness	<i>SE</i> of Skewness	Kurtosis	<i>SE</i> of Kurtosis
Advanced	21	48	39.48	2.68	35-45	.401	.501	.156	.972
Upper- Intermediate	19	48	35.58	3.42	30-42	.356	.524	-.565	1.014
Lower- Intermediate	15	48	31.53	3.27	25-38	-.042	.580	.180	1.121
Total	55	48	35.96	4.43	25-45	-.170	.322	-.407	.634

RESULTS

Table 5 shows the means of SOC for the three article types. The source table for the two-way repeated-measures ANOVA, shown in Table 6, indicates that the main effects for Group and Article were both significant, $p < .025$, power = 1.00 (The recommended power is .80 up to 1.00, see Kirk, 1982). The interaction effect for Article and Group was also found to be significant, $p < .025$, power = .882. Figure 2 also shows the significant interaction between Article and Group on the SOC measure: The lines for the three groups are wider apart at \emptyset , which indicates that those greater mean differences result in the significant interaction. But the lines for the Advanced and Upper-Intermediate groups nearly meet each other at a , which indicates that the narrow mean difference of 3.60% (see Table 5) may not be significant, but rather may be due to chance alone. In addition, the lines for the three groups are fairly systematic in a similar pattern. Also, the mean differences between *the* and a , ranging from 1.38-3.16% across the groups (see Table 5), are too small to expect a significant difference. Therefore, it seems that the SOC measure reveals an acquisition order, $the = a > \emptyset$, across the groups. That is, the obligatory use of *the* or a is acquired earlier than \emptyset .

Table 5

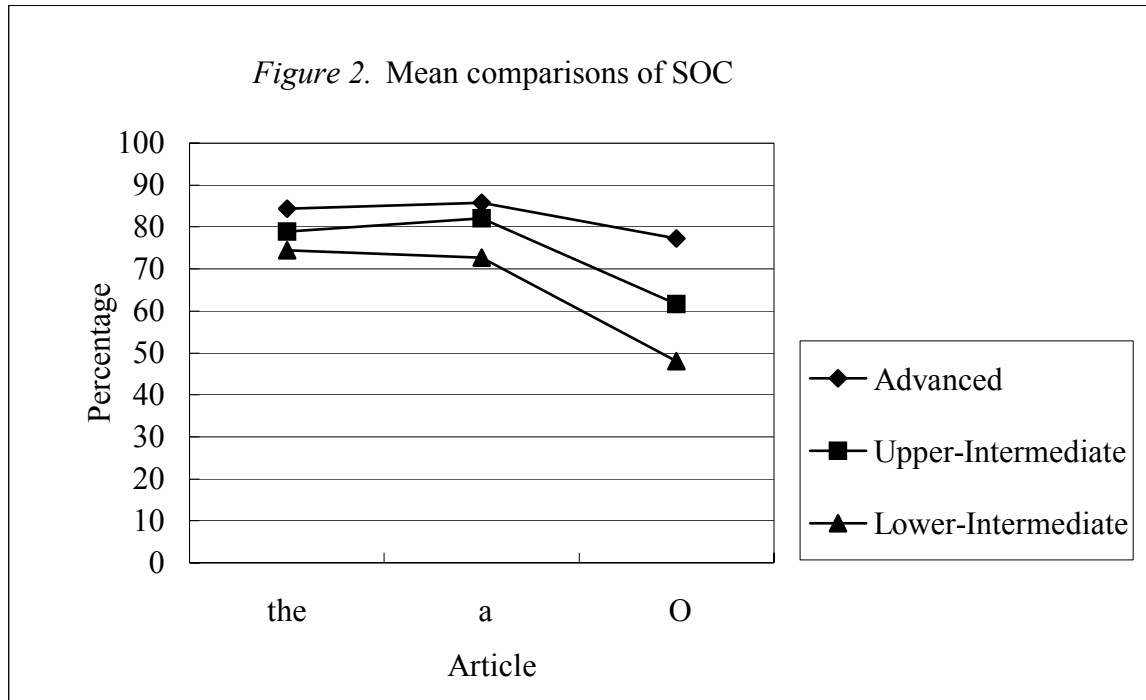
Means of SOC for the Article Types

Proficiency	<i>n</i>	SOC			Average (<i>the</i> , a , \emptyset)
		<i>the</i>	a	\emptyset	
Advanced	21	84.33	85.71	77.21	82.42
Upper-Intermediate	19	78.95	82.11	61.65	74.24
Lower-Intermediate	15	74.44	72.67	48.09	65.07
Total	55	79.77	80.91	63.90	74.86

Table 6

Two-Way Repeated-Measures ANOVA for Group and Article on SOC

Source	SS	df	MS	F	Partial			
					p	Eta ²	Power	
Between-Subjects Effects								
Group	7933.581	2	3966.791	25.045	.000*	.491	.185	1.000
Error	8236.174	52	158.388			.509	.192	
Within-Subjects Effects								
Article	10882.670	2	5441.335	40.932	.000*	.440	.254	1.000
Article × Group	2034.550	4	508.638	3.826	.006*	.128	.047	.882
Error	13825.191	104	132.935				.322	
Total	42912.166							

* $p < .025$ 

In order to test the hypothesis of the acquisition order, $the = a > O$, for SOC, two one-way ANOVAs (one with repeated measures) were performed, and then the Scheffé and Bonferroni follow-up tests were used respectively to adjust the significance level for multiple mean

comparisons. The one-way ANOVA for the Group effect on the overall SOC means of the three articles combined was found to be significant, $p < .0125$, power = 1.00. The Scheffé post hoc test was then used to make multiple comparisons between the groups, and the results also indicated that the mean differences between all possible pairs of the groups were significant, $p < .0125$. This suggests that the groups were truly differentiated by proficiency in article accuracy. That is, article accuracy increases with proficiency in a similar pattern across the groups.

In addition, the one-way repeated-measures ANOVA for the Article effect on the overall SOC means of the three groups combined was also found to be significant, $p < .0125$, power = 1.00. The Bonferroni test was then used to make pair-wise comparisons between the articles. The results of the Bonferroni test in Table 7 show that all pair-wise comparisons were significant except *the* and *a* comparison, $p < .0125$. So there was no significant difference between SOC for *the* and *a*. Therefore, it can be confirmed that the SOC 1measure reveals the acquisition order, $the = a > \emptyset$, across the groups.

The same ANOVA procedures, as described above for SOC, were conducted again to identify the acquisition order for the TLU measure. Table 8 shows the means of TLU for the three article types. As shown in Table 9, the two-way repeated-measures ANOVA for the main effects of Group and Article on the means of TLU was found to be significant, $p < .025$, power = 1.00. The interaction effect for Article and Group, however, was not significant, $p > .025$, perhaps because of a lack of power (power = .675). Figure 3 shows that the lines for the three groups are so parallel and systematic that no significant interaction can be found, which suggests that the three groups might have only one acquisition pattern for TLU, as they do for SOC. Therefore, it was hypothesized that the TLU measure reveals an acquisition order of $the > a > \emptyset$ across the groups, which means that the use of *the* is more targetlike than *a*, which is more targetlike than \emptyset .

Table 7

Bonferroni Test for Pairwise Comparisons of SOC

SOC (I)	SOC (J)	Mean Difference (I-J)	Standard Error	<i>p</i>
<i>the</i>	<i>a</i>	-1.136	1.811	1.000
	\emptyset	15.878	2.471	.000*
<i>a</i>	<i>the</i>	1.136	1.811	1.000
	\emptyset	17.014	2.576	.000*
\emptyset	<i>a</i>	-17.014	2.576	.000*
	<i>the</i>	-15.878	2.471	.000*

* $p < .0125$

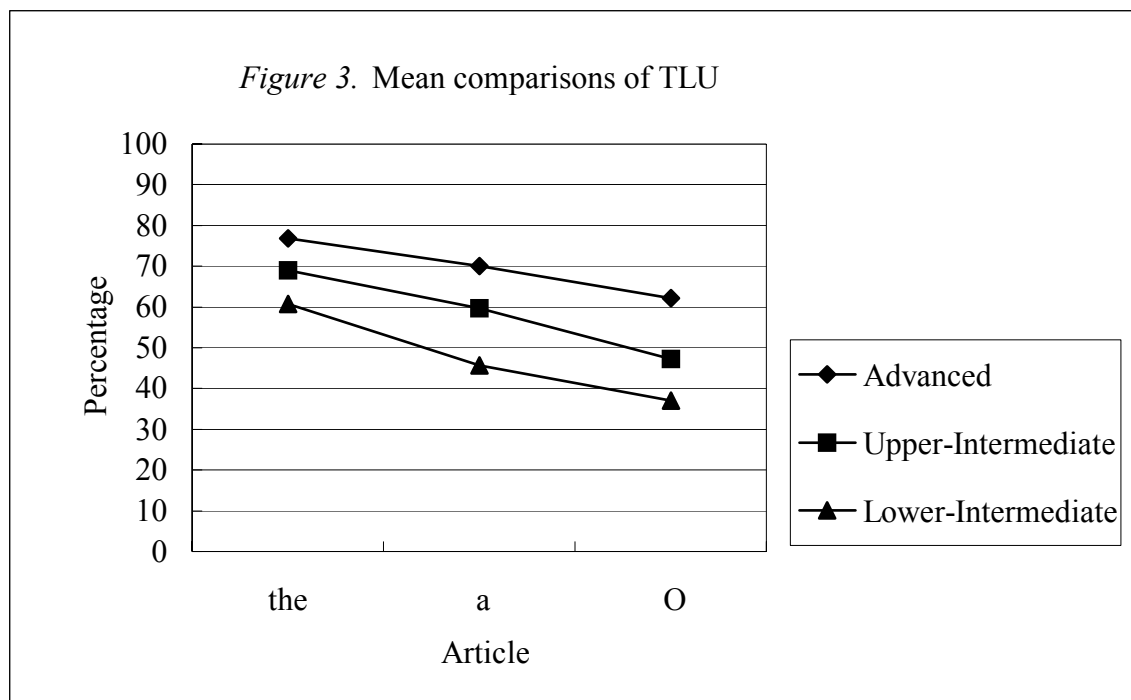
Table 8
Means of TLU for the Article Types

Proficiency	<i>n</i>	TLU			Average (<i>the</i> , <i>a</i> , \emptyset)
		<i>the</i>	<i>a</i>	\emptyset	
Advanced	21	76.88	70.02	62.17	69.69
Upper-Intermediat	19	68.98	59.69	47.21	58.62
Lower-Intermediat	15	60.74	45.63	37.03	47.80
Total	55	69.75	59.80	50.14	59.90

Table 9
Two-Way Repeated-Measures ANOVA for Group and Article on TLU

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	Partial		
						Eta ²	Eta ₂	Power
Between-Subjects Effects								
Group	12720.157	2	6360.078	26.883	.000*	.50	.29	1.000
Error	12302.225	52	236.581			.49	.28	
Within-Subjects Effects								
Article	10861.736	2	5430.868	92.957	.000*	.64	.25	1.000
Article × Group	563.284	4	140.821	2.41	.054	.08	.01	.67
Error	6076.008	10	58.423	0		.5	.3	.5
Total	42523.410	4					.3	

* $p < .025$



Similarly, in order to test the hypothesis of the acquisition order, $the > a > \emptyset$, for TLU, two one-way ANOVAs (one with repeated measures) and the Scheffé and Bonferroni follow-up tests were administered respectively. The one-way ANOVA for the Group effect on the overall TLU means of the three articles combined was found to be significant, $p < .0125$, power = 1.00. The Scheffé post hoc test was then used, and the results also showed that the mean differences between all possible pairs of groups were significant, $p < .0125$. Next, the one-way repeated-measures ANOVA for the Article effect on the overall TLU means of the three groups combined was also found to be significant, $p < .0125$, power = 1.00. The Bonferroni test was then used, and the results in Table 10 show that all pair-wise comparisons between the articles were significant, $p < .0125$. Therefore, it can be confirmed that the TLU measure reveals an acquisition order, $the > a > \emptyset$, across the groups.

Table 10
Bonferroni Test for Pairwise Comparisons of TLU

TLU(I)	TLU (J)	Mean Difference (I-J)	Standard Error	<i>p</i>
<i>the</i>	<i>a</i>	9.955	1.412	.000*
	∅	19.607	1.234	.000*
<i>a</i>	<i>the</i>	-9.955	1.412	.000*
	∅	9.653	1.786	.000*
∅	<i>a</i>	-9.653	1.786	.000*
	<i>the</i>	-19.607	1.234	.000*

**p* < .0125

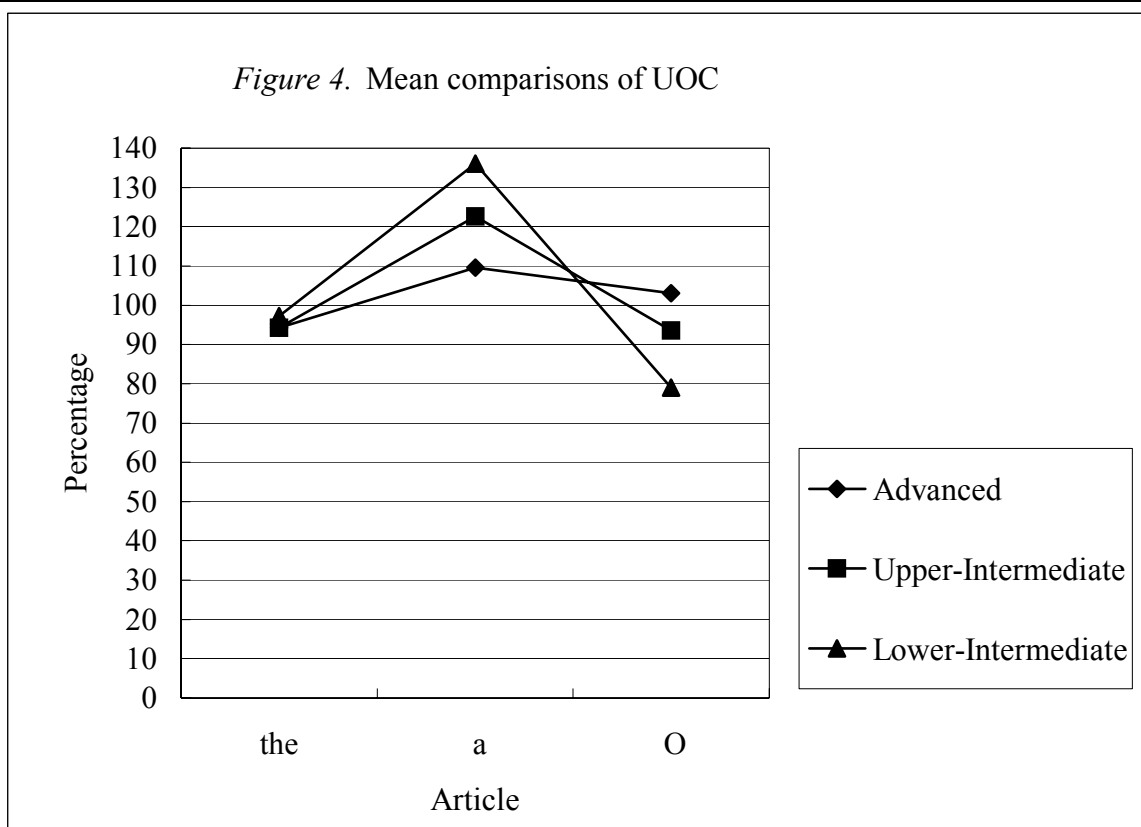
Notice that the η^2 for the Group effect on the TLU means is 29.9% (see Table 9), which indicates that proficiency group accounts for 29.9% of the variance. In contrast, the η^2 for the Group effect on the SOC means is 18.5% (see Table 6), so proficiency group accounts for only 18.5% of the variance. In contrast, the η^2 values for the Article effect on TLU and SOC are almost the same: 25.5% and 25.4% respectively, which indicates that the article types equally account for about one-quarter of the variance. This implies that proficiency accounts for more variance in TLU than it does in SOC, so TLU probably reveals a more reliable acquisition order than does SOC.

Table 11 shows the means of UOC for the three article types, which is plotted in Figure 4. UOC discloses that *a* was overused at the rate of 109.52%, 122.63%, and 136.00% for the Advanced, Upper-Intermediate and Lower-Intermediate groups respectively, whereas UOC for *the* remains very stable and a little bit underused in the range of 94.25–97.22% for the three groups. Obviously, overgeneralization of *a*, which can be easily noted in Figure 4, resulted in an inflated SOC rate. Because the SOC measure does not take overuse into consideration, the means of SOC for *a* (72.67–85.71%, see Table 5) are much higher than the means of TLU for *a* (45.63–70.02%, see Table 8). This provides evidence that SOC tends to overestimate accuracy and needs to be revised by a more accurate measure, TLU, as Stauble (1981) and Pica (1983) have suggested. Recall that the η^2 values in the source tables for the two-way repeated-measures ANOVAs (see Tables 6 and 9) also suggest that TLU reflects proficiency better than does SOC, so TLU is probably a more reliable accuracy measure. Therefore, the acquisition order, *the* > *a* > ∅, identified by TLU, is probably more reliable than the *the* = *a* > ∅ order, identified by SOC.

Table 11

Means of UOC for the Article Types

Proficiency	<i>n</i>	UOC			Average (<i>the</i> , <i>a</i> , \emptyset)
		<i>the</i>	<i>a</i>	\emptyset	
Advanced	21	94.25	109.52	103.06	102.28
Upper-Intermediate	19	94.30	122.63	93.61	103.51
Lower-Intermediate	15	97.22	136.00	79.05	104.09
Total	55	95.08	121.27	93.25	103.20



Moreover, Table 11 shows that overuse of *a* decreases as proficiency increases. Conversely, overuse of \emptyset increases with proficiency. Because UOC for *the* stays very stable (94.25–97.22%), it makes sense that UOC for *a* goes up (109.52% → 122.63% → 136.00%) while UOC for \emptyset goes down (103.06% → 93.61% → 79.05%) across the groups, like a seesaw movement. This

suggests that the Lower-Intermediate learners tend to overuse *a* and thus underuse \emptyset , whereas the Advanced learners tend to decrease overuse of *a* and thus increase use of \emptyset towards target-like use. In the meantime, use of *the* stays very stable. Figure 4 clearly shows that the degree of deviation from 100% in UOC for *a* and \emptyset decreases as proficiency increases. That is to say, the Lower-Intermediate learners have more difficulty in article choice between *a* and \emptyset . And in most cases, they tend to overuse *a* in \emptyset contexts.

Concerning Research Question 2, since there was disagreement in the previous studies about whether *the* is overgeneralized to all specific nouns in [+SR] contexts (Parrish, 1987; Thomas, 1989), or to all known nouns in [+HK] contexts (Huebner, 1983a; Master, 1987), the contexts for *the*-overgeneralization were first examined. Table 12 shows SOC, TLU and UOC for *the* in [+SR] and [+HK] contexts. The UOC for *the* indicates that *the* was slightly overused in the [+SR] contexts at the rate of 104.05%, 102.89%, and 106.33% for the Advanced, Upper-Intermediate, and Lower-Intermediate group respectively, but *the* was underused in [+HK] contexts at 84.92%, 80.48%, and 77.50% for the three groups, respectively. Therefore, the present study is consistent with Parrish and Thomas, rather than Huebner and Master: *the* is more associated with [+SR] than with [+HK] contexts. The juxtaposition of SOC, TLU, and UOC for *the* in Table 12 suggests that *the* was overused in some [+SR] contexts that it was not supposed to occur in. On the contrary, the use of *the* in [+HK] contexts was very stable on the three measures within each group: for example, the SOC of 84.33%, the TLU of 83.83%, and the UOC of 84.92% for the Advanced group. This indicates that *the* was not overgeneralized in [+HK] contexts.

Table 12

Use of the in [+SR] and [+HK] Contexts

Context	Advanced (<i>n</i> = 21)			Upper-Intermediate (<i>n</i> = 19)			Lower-Intermediate (<i>n</i> = 15)		
	SO C	TL U	UOC	SOC	TLU	UO C	SOC	TLU	UO C
[+SR]	93.10	83.91	104.05	88.6 8	77.6 5	102.89	85.3 3	70.5 2	106.33
[+HK]	84.33	83.83	84.92	78.9 5	77.7 5	80.4 8	74.4 4	72.2 4	77.5 0

Note. [+SR] combines [+SR, +HK] and [+SR, -HK];
 [+HK] combines [+SR, +HK] and [-SR, +HK].

Since the feature [+SR, +HK] demands the article *the*, the key feature that causes

the-overgeneralization in [+SR] contexts lies in [+SR, –HK], where *a* or \emptyset is required. So it is necessary that the marked [+SR, –HK] contexts be examined closely on an item-by-item basis in order to discover the actual difficulties underlying article choice. Table 13 presents the frequencies and item facilities of *the*, *a*, and \emptyset in [+SR, –HK] contexts. It also shows that *the* was misused in *a* contexts at the rate of 6.55%, 5.26%, and 15.83% for the Advanced, Upper-Intermediate, and Lower-Intermediate groups, respectively, and that *the* was misused in \emptyset contexts at a much higher rate of 13.89%, 20.18%, and 24.44% for the three groups, respectively. Generally, based on item facility (IF), Items 27 and 46 (IF = .19 & .62) are more difficult for *a* usage, and Items 28, 32, and 51 (IF = .00 – .62) are more difficult for \emptyset usage across the groups. What was found about the misuse or overgeneralization of *the* in *a* or \emptyset contexts is that Chinese learners had difficulty in distinguishing [\pm HK]. For example, in Item 25 (\emptyset bottles of vodka), Item 27 (*a* length of 12 meters), Item 28 (\emptyset copies of rare books), and Item 51 (*in* \emptyset bands of fifteen to twenty), Chinese learners tended to substitute *the* for *a* or \emptyset in *of*-phrase structures, which is in tune with the finding in Takahashi (1997). In other words, Chinese and Japanese learners are likely to overgeneralize *the* in *of*-phrase structures, regardless of [+SR, +HK] or [+SR, –HK] contexts. Moreover, the Lower-Intermediate group misused *the* for *a* or \emptyset (IF = .40 – .60) in Item 45 (\emptyset most animals have...), Item 55 (*I* once read *a* story), and Item 58 (*attack* \emptyset human hunters), but higher-level learners had more knowledge (with correspondingly higher IFs of .68 – 1.00 for the same items) to distinguish [+SR, –HK] from [+SR, +HK] contexts. Therefore, it can be said that overgeneralization of *the* in [+SR, –HK] contexts can be attributed to the learner's difficulty in the distinction of [\pm HK].

In addition, *the* was not the only article misused in [+SR, –HK] contexts; *a* was also misused for \emptyset , or \emptyset for *a*. As shown in Table 13, *a* was misused in \emptyset contexts at the rate of 4.76%, 14.91%, and 20.56% for the Advanced, Upper-Intermediate, and Lower-Intermediate groups, respectively. Conversely, \emptyset was misused in *a* contexts at 10.12%, 14.48%, and 13.33% for the three groups, respectively. For instance, in Item 46 (*a* favorite food), Item 27 (*a* length of 12 meters), and Item 52 (*have* \emptyset great courage), Chinese learners tended to substitute \emptyset for *a*, or vice versa, even when they could distinguish [+SR, –HK] (i.e., *a* or \emptyset) from [+SR, +HK] (i.e., *the*) contexts. This suggests that Chinese learners have difficulty judging the countability of noun phrases, which results in the misuse of *a* or \emptyset in [+SR, –HK] contexts. Overall, it can be concluded that Chinese learners' difficulties in article choice lie in the distinctions of [\pm HK] and of [\pm Countability].

Table 13

Frequencies and Item Facilities (IF) of *the*, *a*, and \emptyset in [+SR, -HK] Contexts

Target Article	Item #	Advanced (n = 21)				Upper-Intermediate (n = 19)				Lower-Intermediate (n = 15)			
		IF	<i>the</i>	<i>a</i>	\emptyset	IF	<i>the</i>	<i>a</i>	\emptyset	IF	<i>the</i>	<i>a</i>	\emptyset
<i>a</i>	1	1.00	0	21	0	1.00	0	19	0	1.00	0	15	0
	2	0.95	1	20	0	0.95	1	18	0	0.73	4	11	0
	11	1.00	0	21	0	1.00	0	19	0	1.00	0	15	0
	12	1.00	0	21	0	1.00	0	19	0	0.87	2	13	0
	21	0.95	1	20	0	0.84	0	16	3	0.87	0	13	2
	27	0.62	7	13	1	0.47	5	9	5	0.53	4	8	3
	46	0.19	1	4	16	0.26	1	5	13	0.27	0	4	11
	55	0.95	1	20	0	0.90	1	17	1	0.40	9	6	0
Total	k = 168		11	140	17	k = 152	8	122	22	k = 120	19	85	16
	Percentage(%)		6.55	83.33	10.12		5.26	80.26	14.48		15.83	70.83	13.33
\emptyset	5	1.00	0	0	21	1.00	0	0	19	1.00	0	0	15
	15	1.00	0	0	21	1.00	0	0	19	0.87	1	1	13
	23	0.76	5	0	16	0.68	6	0	13	0.87	2	0	13
	25	1.00	0	0	21	0.68	4	2	13	0.47	6	2	7
	28	0.62	8	0	13	0.42	11	0	8	0.13	11	2	2
	32	0.05	11	9	1	0.00	4	15	0	0.00	3	12	0
	37	0.95	0	1	20	0.58	1	7	11	0.47	0	8	7
	45	1.00	0	0	21	0.68	6	0	13	0.53	7	0	8
	51	0.62	6	2	13	0.53	7	2	10	0.40	6	3	6
	52	0.90	2	0	19	0.58	2	6	11	0.47	2	6	7
	53	0.90	2	0	19	0.79	2	2	15	0.80	1	2	12
	58	0.95	1	0	20	0.84	3	0	16	0.60	5	1	9
Total	k = 252		35	12	205	k = 228	46	34	148	k = 180	44	37	99
	Percentage(%)		13.89	4.76	81.35		20.18	14.91	64.91		24.44	20.56	55.00

DISCUSSION

Based on the results of the ANOVAs, and the Scheffé and Bonferroni follow-up tests, the acquisition orders across the groups were identified as being the following:

SOC reveals the acquisition order: $the = a > \emptyset$.

TLU reveals the acquisition order: $the > a > \emptyset$.

While SOC and TLU help identify the acquisition orders in terms of article accuracy, UOC helps interpret the acquisition processes underlying the orders in terms of article use. As revealed in Table 11 and Figure 4, UOC provides an explanation for the difference between the two orders, $the = a > \emptyset$ and $the > a > \emptyset$, namely, the relationship between *the* and *a*. Because of *a*-overgeneralization, the SOC for *a* was inflated, and thus the SOC measure recognized an acquisition order, $the = a > \emptyset$. However, the TLU measure takes overgeneralization into consideration, so the $the > a > \emptyset$ order, identified by TLU, was found out to be more reliable than the $the = a > \emptyset$ order, identified by SOC. In addition to the relationship between *the* and *a*, UOC also aids in understanding the relationship between *a* and \emptyset . As shown in Table 11 and Figure 4, the Lower-Intermediate learners had more difficulty in *a* or \emptyset usage than in *the* usage, and mostly they tended to misuse *a* for \emptyset .

With regard to article use, Chaudron and Parker (1990) provide significant findings that help this study delineate article acquisition processes at a fuller scale. As for the use of *a*, Chaudron and Parker found that the Low group had native-like use of *a*, whereas the High group overgeneralized *a* in *the* (i.e. [+SR, +HK]) contexts. Based on Kellerman's (1985) U-shaped behavior notion, Chaudron and Parker conjecture that *a* might be undergoing an overgeneralization stage in the U-shaped process after *the* had completed it. Since the 40 Japanese subjects in Chaudron and Parker were drawn from students in a pre-university intensive English program, their English proficiency is assumed to be equivalent to, or a little lower than, the Lower-Intermediate group (with 400-497 on the TOEFL) of this study. So a continuum of proficiency levels can be constructed: The Low, Mid, and High groups in Chaudron and Parker precede the Lower-Intermediate, Upper-Intermediate, and Advanced groups in this study on a proficiency continuum. If the findings of these two studies are examined together, a U-shaped curve for *a* comes into view: First, *a* started with native-like performance by the Low group, and was then overgeneralized by the High group in Chaudron and Parker (the left side of the U shape). The UOC for *a* stayed relatively high for the Lower-Intermediate group, and was followed by a gradual decrease as proficiency increased in this study (the right side of the

U shape). Therefore, the present study offers support for Chaudron and Parker's hypothesis of U-shaped behavior for *a*.

As for the use of *the*, the UOC for *the* stays very stable (94.25–97.22%, see Table 11), while the UOC for *a* indicates overgeneralization. This shows a sign that *the* might have gone through the overgeneralization stage while *a* was experiencing it, which well matches Chaudron and Parker's hypothesis that *the* completes the U-shaped behavior prior to *a*. In addition, recall that Ge's 6-stage learning trajectory for *da* (i.e., *the*) in Huebner (1983a) also shows a U-shaped behavior: Ge first used *da* with [+SR, +HK], and then overgeneralized *da* in all contexts, and finally restricted the use of *da* only in [+HK] contexts after going through a hypothesis-testing process. Therefore, based on the findings in Chaudron and Parker, Huebner, and the present study, it makes sense to assume that the use of *the* shows a U-shaped behavior, and that *a* undergoes a U-shaped process after *the* has completed it.

As for the use of \emptyset , lower-level learners in Chaudron and Parker first overgeneralized \emptyset in *a* contexts. When proficiency increased, the use of \emptyset decreased and the use of *a* increased. In contrast, the present study shows that the use of \emptyset increased with proficiency (the UOC for \emptyset : 79.05%, 93.61%, 103.06% for the Lower-Intermediate, Upper-Intermediate and Advanced groups, respectively, see Table 11). In fact, these two studies do not contradict each other, but rather confirm a pattern of \emptyset usage, based on Huebner's (1983b) flooding and trickling notion: Lower-level learners initially overgeneralize \emptyset , and then reduce the use of \emptyset when testing hypotheses by trying the other articles (shown in Chaudron and Parker), and then gradually increase the use of \emptyset again as proficiency advances (shown in the present study).

Consistently, Master (1987) also identified a flooding-then-trickling pattern of \emptyset usage: The [–Article] group started with \emptyset -flooding, and then shifted to a \emptyset -trickling stage when they realized that English must have a specifier, *the*. So, they tested their hypothesis by flooding NPs with *the* and simultaneously trickling the use of \emptyset . A dramatic change from \emptyset -flooding to *the*-flooding occurred at the Low-Mesolang level. When the Mid-Mesolang learners recognized that \emptyset could also be a specifier, they began to increase the use of \emptyset . In addition, both the Basilang group in Master (1987) and Mari in Parrish (1987) achieved higher SOC rates for \emptyset than for *a* and *the*. This does not necessarily imply that they first acquired \emptyset because their concept of \emptyset may be equivalent to non-use of any article, rather than the same concept of \emptyset for the features, [+SR, –HK] or [–SR, –HK]. Therefore, it is very likely that early \emptyset -flooding is attributed to L1 transfer of [–Article] languages (Master, 1987; Thomas, 1989), and also results in the highest SOC rate for \emptyset for beginning learners.

Furthermore, the patterns in article acquisition processes discussed above are consistent with Wolfe-Quintero's (2000) proposal of a five-stage developmental sequence in L2 frequency of article production, based on Kim's (2000) data: Stage 1, $\emptyset > the > a$, Stage 2, $\emptyset = the > a: \emptyset$,

Stage 3, $the > \emptyset > a$, Stage 4, $the > \emptyset = a$, and Stage 5, $the > a > \emptyset$. This developmental sequence suggests that \emptyset is flooding at first, and then trickling when the stage advances. During the \emptyset -trickling stage, *the* and then *a* begin with limited target-like use, and then continue with an overgeneralization process, respectively, so as to compete with the frequency of \emptyset . Moreover, *the* goes through the overgeneralization stage before *a* does in a U-shaped behavior.

To sum up the discussion for Research Question 1, the three measures, SOC, TLU, and UOC, reveal the following about the acquisition of English articles by Chinese learners: In terms of article accuracy, SOC tells us about the difficulty order, $the = a > \emptyset$, and TLU informs us of the acquisition order, $the > a > \emptyset$ for higher-level Chinese learners. In terms of article use, UOC confirms the patterns of acquisition processes, proposed in the work of Chaudron and Parker (1990), Huebner (1983a), Master (1987), as well as Wolfe-Quintero's (2000) proposal: \emptyset first goes through a flooding stage and then a trickling stage for hypothesis testing, *the* experiences a U-shaped behavior, highlighted by an overgeneralization process, and *a* follows *the* to undergo the U-shaped overgeneralization process as well.

Let us now turn to Research Question 2: In what semantic contexts (Bickerton, 1981) are the articles, *the*, *a*, and \emptyset , overgeneralized? This investigation should help identify the areas of difficulty underlying article choice for Chinese learners. As revealed in Table 12, the present study supports Parrish and Thomas' claim that *the* is associated with [+SR] contexts, rather than with [+HK]. So, [+SR, -HK] was recognized to be the key marked feature that causes *the*-overgeneralization. Similarly, there is plenty of evidence in the research on both L1 and L2 acquisition of articles that shows overgeneralization of *the* in [+SR, -HK] contexts: In Cziko (1986), L1 children could distinguish [+SR, +HK] and [-SR, -HK] by using *the* and *a* correctly at an early stage, but they tended to substitute *the* for *a* with the first-mention NPs in [+SR, -HK] contexts. As for L2 acquisition of articles, Parrish (1987) and Thomas (1989) found that *the* was overgeneralized prominently in [+SR, -HK] contexts. In Chaudron and Parker (1990), Japanese learners overgeneralized *the* to a greater degree in first-mention [+SR, -HK] contexts. Also, Takahashi's (1997) study shows that Japanese college students had a tendency to use *the* instead of *a* in a certain structures in [+SR, -HK] contexts, such as indefinite prepositional phrases and indefinite relative clauses. For example, as in the sentence

“Robert is listening to *a* record of Mozart music.” (p. 107), *a* tended to be mistakenly replaced by *the* to mark a specific referent that is assumed unknown to the hearer (i.e., [+SR, –HK]). Moreover, recall that Ge in Huebner (1983a) withdrew *the* from [+SR, –HK] contexts at the final stage. Therefore, it can be concluded that *the* tends to be overgeneralized in [+SR, –HK] contexts. In addition, Tarone and Parrish (1988) found that L2 learners’ accuracy in article use was significantly lower in [+SR, –HK] contexts than in [+SR, +HK] and [–SR, +HK] contexts. So the feature [+SR, –HK], positioned right between the two clear features [+SR, +HK] and [–SR, –HK] in Bickerton’s semantic wheel model, is much more marked and problematic for both L1 and L2 learners.

In addition, based on an item-by-item investigation in [+SR, –HK] contexts, the areas of difficulty underlying article choice for Chinese learners were identified: Chinese learners misuse *the* for *a* or \emptyset because they have difficulty distinguishing [+SR, –HK] from [+SR, +HK] contexts (i.e., the distinction of [\pm HK]). Even when they can distinguish [\pm HK], Chinese learners misuse *a* for \emptyset , or vice versa, due to their difficulty in distinguishing [\pm Countability]. Recall that the zigzag pattern of *a* usage in Master (1987) was ascribed to the judgment of [\pm Countability]. Master (1987, 1997) points out that [–Article] speakers fail to use *a* or \emptyset correctly because they have difficulty judging the countability of noun phrases. Likewise, Yoon (1993) found that Japanese learners had trouble with the article choice between *a* and \emptyset due to insufficient knowledge of countability. Moreover, in Bickerton’s semantic wheel model, *a* and \emptyset share the same contexts, but they differ in the feature [\pm Countability]. Also, it is evident in Master’s binary system that *a* and \emptyset are used to mark the feature “classification,” whereas *the* is used to mark the feature “identification.” [\pm Countability] is the subset underlying the choice of *a* or \emptyset within the same feature “classification.” To sum up, Chinese learners’ difficulties in the distinctions of [\pm HK] and of [\pm Countability] echo Master’s (1997) assertion that three elements are required for article choice: “In the article system, the elements are countability, number, and definiteness, which must all be considered in arriving at the correct choice of article” (p. 220).

CONCLUSION

In retrospect, very few studies have been undertaken to examine article acquisition by Chinese learners, with the exception of the Chinese group that was subsumed in the five language groups in Master (1987). However, the four subjects representing four

proficiency levels in that study can hardly be said to be a representative sample. Although there is a recent study by Robertson (2000) investigating article use by Chinese learners, Robertson was more interested in the principles underlying systematic variability than in acquisition orders and processes. Therefore, the present study sought and identified the acquisition order of higher-level Chinese learners (i.e., *the* > *a* > \emptyset , revealed by the TLU measure), the patterns in acquisition processes (i.e., the flooding-then-trickling process for \emptyset , and the U-shaped behavior for *the* and then *a*), as well as the actual difficulties underlying article choice (i.e., the distinctions of [\pm HK] and of [\pm Countability]). Based on Pienemann's (1988) teachability hypothesis that "if formal input is constructed in contradiction to natural sequences, it impedes rather than promotes language acquisition" (p. 101), this study hopes to shed some light on article pedagogy in view of the acquisition order, patterns in acquisition processes, and actual difficulties in article choice for Chinese learners.

Regarding the measure for article acquisition, although TLU is the best accuracy measure, none of the previous studies employed TLU: Parrish (1987), Thomas (1989), and Yamada and Matsuura (1982) used SOC only, and Master (1987) used SOC and UOC, but not TLU. So it is hoped that TLU will be employed in future studies on article or other morpheme acquisition. Clearly, the patterns of article acquisition processes (i.e., the flooding-then-trickling process for \emptyset , and the U-shaped behavior for *the* and then *a*) need further confirmation in future research. In addition, due to lack of a data from beginning and low-level learners, it is hard to know definitively whether Chinese learners at different proficiency levels exhibit the same acquisition order, as found in Thomas (1989) and this study, or whether each level exhibits a different acquisition order, as found in Master (1987) and Yamada and Matsuura (1982). Moreover, oral production tasks should be used in continued research in order to compare or contrast with the use of a written cloze test, as was used in the present study. Tarone and Parrish (1988) found that L2 learners' accuracy rates for article use varied when different tasks were performed. In Tarone (1985), the article accuracy of the written test was found to be significantly lower than those of two oral tasks, the interview and narrative. Therefore, further studies should be conducted with lower-level Chinese learners, as well as studies performed with oral tasks, in order to build up a complete profile of article acquisition for Chinese learners.

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Appendix
(from Master, 1994, p. 250)

I. Choose the correct article (*a, an, the, Ø*) in the following sentences. Mark your answers on the answer sheet only.

- a. There is 1 orange in that bowl.
- b. Carlos is 2 student at our university.
- c. What is 3 sex of your baby? It's 4 boy!
- d. I always drink 5 water with my meals.
- e. Is your brother 6 man enough to join 7 army?
- f. What is 8 diameter of 9 moon?
- g. Once there were many trees here. Now, 10 trees are gone.
- h. I would like 11 cup of coffee, please.
- i. My father earns \$25,000 12 year.
- j. 13 evening sky was really beautiful.
- k. A man knocked on my door. 14 man was bleeding.
- l. People who smoke 15 cigarettes often get lung cancer.
- m. 16 air in this city is not very clean.
- n. Einstein was 17 man of great intelligence.
- o. In this family, 18 first child inherits everything.
- p. Check 19 rearview mirror before you change lanes.
- q. Smith was appointed 20 chairman of that committee.
- r. She owns 21 enormous house in Pasadena.
- s. 22 fool though he was, he was clever with 23 money.
- t. That was 24 worst storm of 1985.
- u. We found 25 bottles of vodka in every cupboard.
- v. 26 restaurant in which we ate was quite expensive.
- w. This room has 27 length of 12 meters.
- x. 28 copies of rare books should always be preserved.
- y. If you want to read, why don't you turn on 29 light?
- z. John was hired as 30 special assistant to Judge Lee.
- aa. I ordered a bottle of wine, but 31 bottle of wine was too cold.
- bb. Dr. Engelberg, 32 physician to Marilyn Monroe, would not comment on her death.

II. Choose the correct article (*a, an, the, Ø*) in the following paragraph.

33 Jaguar and 34 Wild Pig

When hunters visit 35 southwestern part of 36 United States, they often find 37 large, catlike tracks along 38 ground. These tracks are made by 39 spotted jaguar, 40 greatest hunter of all 41 North American animals and 42 largest member of 43 cat family on 44 American continent. 45 most animals have 46 favorite food. 47 favorite food of 48 jaguar is 49 wild pig. 50 wild pigs move in 51 bands of fifteen to twenty. They have 52 great courage and 53 strength in 54 group. I once read 55 story about 56 courage and strength of these wild pigs. 57 story pointed out that these pigs sometimes even attack 58 human hunters.

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