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Anaphoric Expressions in Thai Narratives: A Corpus Study on Accessibility and Distributional Tendency

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Abstract

This study examines the relationship between Thai anaphoric expressions and their antecedents' Accessibility, analyzing 3,453 expressions from Thai-Zlatev Corpus (Zlatev and Yangklang 2001), Aakanee Website (Aakanee, "Thai Recordings") and Thai Folktale Database (Princess Maha Chakri Sirindhorn Anthropology Centre, "Folktales"). Grounded in Ariel's Accessibility Theory (1988, 1990), which asserts that referring expressions are universally arranged on an Accessibility scale but marking systems vary by language, we propose an Accessibility Marking Scale for Thai anaphoric expressions, informed by the factors of Distance, Competition, Saliency and Unity. Some anaphoric expressions showed no significant differences in mean Accessibility, leading them to share ranks. Our newly identified anaphoric expressions align on the scale with those of similar discourse function and pattern. The study also reveals that factors like Saliency and Unity account for the distinctions between the Thai Accessibility Marking Scale and the English Accessibility Marking Scale as proposed by Ariel.

Keywords

accessibility – anaphoric expressions – referring expressions – Thai – Accessibility Marking Scale – referential choices

1 Introduction

Referring expressions are linguistic forms that denote a specific "referent," such as a person, place or object. These expressions, which include linguistic devices like pronouns, proper names, quantifier phrases, etc., can play different roles in discourse. In this article, we focus on "anaphoric expressions,[1]" a subset of referring expressions that specifically function as anaphors. While the term "anaphor" underscores its function of referencing a previously mentioned entity, known as the "antecedent," "anaphoric expressions" spotlight the linguistic form used to express that reference. The choice of these referential forms in discourse is influenced by various factors. As highlighted by Kibrik et al. (2016), attributes like number, animacy, gender, person, grammatical roles, types of phrases and the distance between anaphors and antecedents critically shape the choice between full noun phrases and pronouns in English.

A key component of Ariel's Accessibility Theory (1988, 1990) posits that referring expressions indicate the "Accessibility" or memory availability of their antecedents or referents in discourse. Essentially, the form of a referring expression reflects how readily available its corresponding mental representation is. References to easily recalled entities, such as subsequent mentions of referents, differ from those of 'new' entities, which are less mentally accessible. Ariel contends that these expressions, acting as Accessibility markers, guide comprehension and facilitate smooth discourse. While the degree of Accessibility predominantly concerns the antecedents of anaphors, it is a property intrinsic to all referring expressions. To provide a clearer framework for this idea, Ariel (1990) established an Accessibility Marking Scale, ranking referring expressions from those signaling low Accessibility, like 'Full name + Modifier,' to those indicating high Accessibility, such as 'Unstressed pronouns' and 'Zeros.'

Ariel (1988, 1990) acknowledged that her proposed Accessibility Marking Scale might have limitations, especially regarding its universality. For

1 These are sometimes termed "anaphoric referring expressions," but for clarity and consistency, we will use "anaphoric expressions" throughout the article. It is essential to note that when we use the broader term "referring expressions," its specific function remains unspecified.

instance, some referring expressions are not encompassed by the scale and its applicability can differ based on a language's specific linguistic tools. Izumi and Sato (2008) observed that due to social factors, several referring expressions—including first names, last names and titles—share the same ranking on the Accessibility Marking Scale. Turning to Chinese, Huang (2013) identified unique positions within the scale for unincorporated referring expressions: Complex noun phrases with relative clauses indicate the lowest degree of Accessibility, preceded by possessive phrases. These insights suggest that the application and interpretation of the Accessibility Marking Scale might differ across languages, prompting questions about how new referring expressions fit within the scale and the factors influencing these variations.

For Thai, while Ratitamkul (2007) has provided preliminary insights into referential choices, the intricacies of the Accessibility Marking Scale remain uncharted. We specifically center our examination on anaphoric expressions, aligning our investigation with Ariel's (1988, 1990) foundational guidelines on concrete measures which significantly influence the Accessibility of antecedents. By categorizing and examining the Accessibility levels of these expressions, we aim to propose an Accessibility Marking Scale tailored specifically for Thai anaphoric expressions in narratives. This comprehensive exploration seeks not only to bridge existing research gaps but also provide informed responses to the questions previously outlined.

2 Background

2.1 *Accessibility*

The theory of Accessibility assesses how speakers gauge the Accessibility of a referring expression for hearers. Ariel (1990) posits that languages provide mechanisms to denote the Accessibility levels of mental constructs. This is not just about marking information as accessible, but rather about indicating the specific degree of Accessibility. The expressions chosen reflect this degree. For instance, when introducing new entities in discourse, choice depends on Accessibility and context.

(1) a. ##? *That woman over there* is very intelligent.
b. ## *Rachel* is very intelligent.
(## = Discourse Initial) (Ariel 1988, 68)

As seen in example (1), initial introductions of known entities favor proper names (1b) over descriptions (1a) due to contextual richness required for

understanding and forming a clearer mental image of the referent in the hearer's mind. In contrast, for subsequent mentions, pronouns often become preferable, as in (2):

(2) Geraldine Ferraro has been an active Democrat for quite a few years. But she/??Geraldine Ferraro ran for Vice-Presidency only in 1984. (Ariel 1988, 69)

The degree of Accessibility for referring expressions during communication is influenced by various factors. Ariel (1988, 1990) proposed four primary factors, as provided in (3).

(3) **Factors Affecting Accessibility of Antecedents (Ariel 1990, 28-29):**

a. ***Distance:*** *The Distance between the antecedent and the anaphor* (*relevant to subsequent mentions only*)
b. ***Competition:*** *The number of competitors in the role of antecedent*
c. ***Saliency:*** *The antecedent being a salient referent, mainly whether it is a topic or a non-topic*
d. ***Unity:*** *The antecedent being within vs. without the same frame/ world/point of view/segment or paragraph as the anaphor*

To illustrate the principles of Accessibility, consider the following examples:

(4) Anna, a renowned linguist, recently published a groundbreaking paper on endangered languages. **She** presented her findings at an international symposium.

(5) Last week, I went to a museum where I met Alice. She introduced me to her friends, Jane and Meg, who were having a debate about a painting. Jane believed the painting was overrated, while Meg thought the painting was extraordinary. The museum's collections were fantastic. There was art from the middle ages, renaissance, modern and post-modern art. **She** was really content after the visit.

In example (4), the anaphor "she" directly refers back to "Anna." The **Distance** between them is minimal. Since Anna is the only female entity mentioned, there is no **Competition** for the role of the anaphor. Her central role in the discourse underscores her **Saliency**. Both sentences revolve around Anna's accomplishments, demonstrating the **Unity** of the discourse. Together,

these factors contribute to the high Accessibility of the antecedent. In contrast, example (5) offers a more complex Accessibility scenario. The **Distance** between the anaphor "she" and its potential antecedents (Alice, Jane or Meg) is notably longer. There is also evident **Competition** since three potential antecedents compete for the role of "she." The narrative's **Saliency** shifts from the initial protagonists to the museum's collections, making any of the initial antecedents less prominent. Finally, in terms of **Unity**, the mention of "she" appears in a segment that diverges thematically from the initial conversation. Collectively, these factors contribute to reduced Accessibility of the antecedent.

Accessibility ranges from low to high. Ariel (1988, 1990) proposed an Accessibility Marking Scale to rank referring expressions based on their Accessibility degree, provided in (6).

(6) Accessibility Marking Scale (Ariel 1988, 1990; highest to lowest)

High Accessibility

a. Extremely High Accessibility Markers (gaps, including pro, PRO and *wh* traces, reflexives and Agreement)
b. Cliticized pronoun
c. Unstressed pronoun
d. Stressed pronoun
e. Stressed pronoun + gesture
f. Proximal demonstrative (+NP)
g. Distal demonstrative (+ NP)
h. Proximal demonstrative + modifier
i. Distal demonstrative + modifier
j. First name
k. Last name
l. Short definite description
m. Long definite description
n. Full name
o. Full name + modifier

Low Accessibility

Ariel's (1988, 1990) Accessibility Marking Scale suggests referring forms correspond to varying Accessibility degrees, as influenced by their inherent

properties of Informativity, Rigidity, and Attenuation. **Informativity** relates to how much a linguistic form provides, where more informative forms serve as better "retrieval devices" (Ariel 1990, 80). Highly accessible forms, on the other hand, do not need to carry a lot of information. Informativity differentiates full names and forms with modifiers from forms without modifiers, such as zero pronouns and demonstratives. For example, the descriptive phrase "the woman wearing a striped scarf" is more informative than the mere pronoun "she," as it gives clearer retrieval cues. **Rigidity** measures the precision with which a noun identifies a unique referent. It aligns with Informativity in that, as Informativity increases, it enhances the unambiguity of a referent. For instance, full names, like "Mary Cooper," are both more rigid and informative than a vaguer definite description, like "that woman." Lastly, **Attenuation** refers to the reduction or weakening of a linguistic form. This correlates with the degree of emphasis a linguistic form receives. An attenuated or reduced form suggests higher Accessibility. For instance, a stressed "SHE went home!" emphasizes clarity in a potentially ambiguous setting, while an unstressed "she" in "She just went home" implies the referent is already clear and highly accessible to the listener. Collectively, these principles guide the choice of referring expressions based on their perceived Accessibility.

2.2 *Accessibility and Thai Referring Expressions*

Research into the relationship between Accessibility and referring expressions in Thai remains under-explored. While there has been some examination of how the factors of Distance, Competition and Unity influence lexical, pronominal and elliptical expressions, comprehensive studies are limited. Ratitamkul (2007) investigated these expressions in the Thai Pear Stories corpus among twenty Thai native speakers and found that grammatical positions—associated with information status, recency of mention and interference from other referents—influence referential choices. Rhetorical factors, including sentential connectivity and topic shifts, also play a role. Recency of mentions, interferences from other referents and topic shifts map to Distance, Competition and Unity, respectively, in the context of Accessibility Theory. For example, Ratitamkul (2007) found that recent mentions led to elliptical expressions, while distant ones favored lexical expressions. Absence of interference favored ellipsis, whereas its presence prompted lexical choices. When topics remained consistent, ellipsis was preferred over both pronouns and lexical nominals.

While lexical, pronominal and elliptical referring expressions have been investigated before, a more fine-grained categorization needs to be in place in order to study the overall Accessibility of Thai referring expressions as these

are highly varied. For example, nouns may be categorized into six groups: common nouns, proper nouns, pronouns, classifiers, nominalized nouns and numeral nouns (Prasithrathsint, Indrambarya and Chaicharoen 2011). Likewise, Thai referring expressions also include bare noun phrases, classifiers, lexical plurals, quantifiers, demonstratives, as well as modified noun phrases found in "generalized clausal modification" and "classifier-modifier construction" (Jenks 2011). Additionally, noun modification constructions also include possessive phrases (Huang and Jenks 2017). Apart from the referring expression variability, different referring expressions in Thai can have the same functions. For instance, proper names, kin terms and titles can function as pronominals like pronouns. That is, they can appear "in first and second person contexts or with first and second person meanings, just as many personal pronouns do" (Cooke 1968, 2).

Due to the differences between the categories of referring expressions in Thai and English, we propose a new Accessibility Marking Scale for Thai. Our proposed scale has removed stressed, unstressed, cliticized pronouns, as well as referring expressions with definite articles because definiteness in Thai is expressed through demonstratives, overt or null pronouns and bare noun phrases (Piriyawiboon 2010; Jenks 2011, 2015). We examine eight new types of anaphoric expressions that are not present on Ariel's (1988, 1990) scale, namely, bare noun phrases, noun phrases with modifiers, nominalization, kin terms/titles, kin terms/titles with proper names, possessive phrases, quantifier phrases and conjoined noun phrases. The 16 types of Thai anaphoric expressions examined in this study, along with examples, are presented in

TABLE 1 Types of Anaphoric Expressions and their Examples

Type of Anaphoric Expressions (Abbrev.)	**Word**	**Meaning**
Bare Noun Phrase (N)	kòp	'Frog'
Noun with Modifiers (N*)		
Relative Clause (N-RC)	kòp tʰîː kʰǎːw càp wáj	'The frog that he caught'
Others (N*)	kôːn-hǐn jàj	'Big rock'
Nominalization (NOM)	kaːn tʰɑm.bun	'Merit-making'

TABLE 1 Types of Anaphoric Expressions and their Examples (*cont.*)

Type of Anaphoric Expressions (Abbrev.)	Word	Meaning
Demonstrative Pronoun (DPRO)		
Proximal Demonstrative (DPRO-P)	nîː	'This'
Distal Demonstrative (DPRO-D)	nân	'That'
Demonstrative Phrase (DEMP)		
Proximal Demonstrative (DEMP-P)	krà.tʰɔ̂m (lăŋ) níː	'This hut'
Distal Demonstrative (DEMP-D)	pàː (hèŋ) nán	'That forest'
Proper Name (PN)	dík.kîː	'Diggy'
Kin Term/Title (KT)	pʰɔ̂ː	'Father'
Kin Term/Title with Proper Name (KT+PN)	nɔ́ːŋ.dɛːŋ	'Brother Daeng'
Possessive Phrase (POSSP)	sǎː.miː kʰɔ̌ːŋ nɑːŋ	'Her husband'
Quantifier Phrase (QP)	tʰáŋ sɔ̌ːŋ (kʰon)	'Both'
Pronoun (PRO)	man	'It'
Zero Pronoun (ZP)	Ø pɑj pʰóp kɔ̂ːn-hǐn	'He saw a rock'
Conjoined Noun Phrase (CNP)	tʰɔm.mîː kàp bɔ́p.bîː	'Tommy and Bobby'

Table 1. The predictions for Thai, based on Ariel's (1988, 1990) assumptions, are laid out in Section 3.3.

3 Methodology

3.1 *Data*

This study uses Thai narratives drawn from the Thai-Zlatev Corpus (Zlatev and Yangklang 2001), the Aakanee website (Aakanee, "Thai Recordings") and the Thai Folktale Database (Princess Maha Chakri Sirindhorn Anthropology Centre, "Folktales"). The Thai-Zlatev Corpus includes the Frog Story collection produced by Thai speakers from five different age groups–4, 6, 9,

11, and 20-years-old. The Aakanee website contains a collection of texts and recordings in Thai, Khmer and Northeastern Thai. The Thai narratives from the storytelling tasks were delivered by three native-Thai speakers (one male, two female). The Thai Folktale Database, compiled by the Princess Maha Chakri Sirindhorn Anthropology Center, contains a collection of 226 Thai folktales.

Narratives from these sources were selected for two reasons. First, the narratives came from storytelling tasks in which speakers had to adjust their referential choices according to the changing degree of Accessibility for hearers as the discourse unfolds. Secondly, the methodologies, purposes, and genres of the three narrative sources differ, providing variability in data. The Thai-Zlatev Corpus narratives were recorded in a controlled setting and were elicited from speakers using a picture book. The Aakanee website narratives involve speakers accounts of personal experiences and discussion of cultural aspects for language learning purposes. The Thai Folktale Database includes speaker narratives of different folktale stories.

Regarding data selection, the criteria used for each narrative source vary according to the number of narratives and the metadata of narratives provided.[2] For the Thai-Zlatev Corpus, only 10 narratives from the 20-year-old age group were selected because the referential choices of the younger groups might differ from those of the adult group. Unlike the Thai-Zlatev corpus in which narratives were given by a range of speakers, the 122 narratives on the Aakanee website were provided by three speakers. Three narratives were randomly selected for each speaker, for a total of nine narratives. Lastly, for the Thai Folktale Database, a random sample of 20 narratives in Standard Thai was selected. In summary, a total of 39 narratives were used in this study.

3.2 *Procedures*

The procedures used to prepare data for analysis involved four steps: narrative segmentation, identification of referring expression, annotation and Accessibility factor calculation. The details for each step are discussed below.

First, narratives were divided into narrative segments and assigned segment ID numbers. A narrative segment represented an event or state within the narrative. When multiple events were present, each event was considered a separate narrative segment unless it was a serial verb construction (SVC). The criteria for identifying SVCs was based on the work of Prasithrathsint

2 The Aakanee website does not provide the age for one speaker. The Thai Folktale database does not specify the name of speakers for some narratives and the age of speakers is not provided.

(2006), which states that there should be no connectors between verbs, that the construction should represent a single complex event and that verbs should share at least one argument and have the same tense, aspect, mood and polarity. It is important to note that while a narrative segment usually represents a single event, there may be narrative segments with multiple events when connected by conjunctions. Examples of narrative segments are provided in (7).

(7) Narrative Segments

a. Single Event

tʰáŋ.kʰûː	ʔɔ̀ːk	tɑːm.hǎː	kòp
both	out	look for	frog

'Both are out looking for the frog.'

b. Multiple Events

pʰɔː	rɑw	dâːj	tóʔ	púp	raw	kôː	rə̂ːm
when	3.PL	get	table	immediately	we	then	start
tɕàːk	kɑːn-sàŋ-ʔɑː.hǎːn		kɔ̀ːn				
from	NMZ-order-food		first				

'When we get the table, we start by ordering food first.

Additionally, referring expressions within each narrative segment were identified and assigned an identification number (nominal ID). As illustrated in (8), identification was done at two levels: larger referring expressions and their directly nested sub-spans, limiting analysis to one level within them. Table 2 summarizes the number for each type of anaphoric expression used in the current study.

(8) Level-of-Referring-Expression Identification

tʰɔm.mîː	kàp	bɔ́p.bîː
Tommy	and	Bobby

'Tommy and Bobby'

Largest Span: tʰɔm.mîː kàp bɔ́p.bîː 'Tommy and Bobby'

Sub-span: tʰɔm.mîː 'Tommy' and bɔ́p.bîː 'Bobby'

TABLE 2 The Number and Percentage for Each Type of Anaphoric Expression

Type of Anaphoric Expressions (Abbrev.)	Number	Percentage (%)
Bare Noun Phrase (N)	**566**	**15.98**
Noun with Modifiers (N*)	**245**	**6.92**
Relative Clause (N-RC)	34	0.96
Others (N*)	211	5.96
Nominalization (NOM)	**16**	**0.45**
Demonstrative Pronoun (DPRO)	**11**	**0.31**
Proximal Demonstrative (DPRO-P)	3	0.08
Distal Demonstrative (DPRO-D)	8	0.23
Demonstrative Phrase (DEMP)	**247**	**6.97**
Proximal Demonstrative (DEMP-P)	135	3.81
Distal Demonstrative (DEMP-D)	112	3.16
Proper Name (PN)	**273**	**7.71**
Kin Term/Title (KT)	**363**	**10.25**
Kin Term/Title with Proper Name (KT+PN)	**119**	**3.36**
Possessive Phrase (POSSP)	**96**	**2.71**
Quantifier Phrase (QP)	**96**	**2.71**
Pronoun (PRO)	**877**	**24.75**
Zero Pronoun (ZP)	**566**	**15.98**
Conjoined Noun Phrase (CNP)	**49**	**1.38**

Next, the referring expressions in the data were annotated with respect to type and subtype to prepare them for further analysis. If a referring expression was a subsequent mention, the identification number for its antecedent (antecedent ID) was specified. The antecedent of an anaphoric expression was determined by finding the closest referring expressions to which the anaphoric expression referred. Additionally, the topicality of a referring expression was also tagged. Referring expressions that were the topic of a narrative segment were tagged as 1; otherwise, they were tagged as 0. An annotation example is provided in Figure 1.

segment_id

12002 ก็มี เด็กชายคนหนึ่ง ชื่อ น้องต้น

12002001 12002002

12003 น้องต้นนี่ ก็มี หมาตัวหนึ่ง เป็นเพื่อนชื่อว่า เจ้าบ๊อบบี้

12003001 12003002 12003003 12003004

12004 วันหนึ่ง ต้นกับบ๊อบบี้นี่ ก็เดิน

12004001

ต้น *บ๊อบบี้*

12004002 12004003

12005 ระหว่างที่ {ต้นกับบ๊อบบี้นี่} กำลังเดินเล่นกันอยู่ {ต้นกับบ๊อบบี้นี่} ก็ไปเจอ ลูกกบตัวหนึ่ง

12005001 12005002 12005003

segment id	nominal id	nominal	main type	subtype	antecedent id	topic
12002	12002001	เด็กชายคนหนึ่ง	QP	QP	-	0
12002	12002002	น้องต้น	KT+PN	KT+PN	12002001	0
12003	12003001	น้องต้นนี่	DEMP	DEMP-P	12002002	1
12003	12003002	หมาตัวหนึ่ง	QP	QP	-	0
12003	12003003	เพื่อน	N	N	-	0
12003	12003004	เจ้าบ๊อบบี้	KT+PN	KT+PN	12003002	0
12004	12004001	ต้นกับบ๊อบบี้นี่	DEMP	DEMP-P	12003004	1
12004	12004002	ต้น	PN	PN	12003001	1
12004	12004003	บ๊อบบี้	PN	PN	12003004	1
12005	12005001	{ต้นกับบ๊อบบี้นี่}	ZP	ZP	12004001	1
12005	12005002	{ต้นกับบ๊อบบี้นี่}	ZP	ZP	12005001	1
12005	12005003	ลูกกบตัวหนึ่ง	QP	QP	-	0

FIGURE 1 Annotation Example

Lastly, the values of each Accessibility factor for each anaphoric expression, namely, Distance, Competition, Saliency and Unity were calculated for further analysis. Distance measures how far in terms of the number of narrative segments an anaphor is from its antecedent. For example, Distance is 0 if an anaphor is in the same narrative segment with its antecedent and *n* if an anaphor is *n* narrative segments away from its antecedent. Competition is the number of referring expressions between an anaphor and its antecedent. To illustrate, Competition is 0 if there are no other referring expressions between an anaphor and its antecedent and *n* if there are *n* referring expressions between an anaphor and its antecedent. Saliency is calculated based on the topicality of an antecedent. If the antecedent is a topic, Saliency is 1 and vice versa. Unity of an anaphor is measured by topic continuity. For instance, if an anaphor is a topic of the current and previous narrative segments, it is considered as having continued topics, and Unity is 3 because the anaphor stays in the same topic chain. On the other hand, if an anaphor is a topic of the current narrative segment but not of the previous narrative segment, it is regarded as having switched topics, and Unity is 2 because the anaphor diverges thematically from the previous narrative segments. For anaphors that

segment id	nominal id	nominal	Distance	Competition	Saliency	Unity
12002	12002001	เด็กชายคนหนึ่ง	-	-	-	-
12002	12002002	น้องต้น	0	0	0	1
12003	12003001	น้องต้นนี	1	0	0	1
12003	12003002	หมาตัวหนึ่ง	-	-	-	-
12003	12003003	เพื่อน	-	-	-	-
12003	12003004	เจ้าบ๊อบบี้	0	1	0	1
12004	12004001	ต้นกับบ๊อบบี้นี	1	0	0	1
12004	12004002	ต้น	1	4	1	3
12004	12004003	บ๊อบบี้	1	2	0	1
12005	12005001	(ต้นกับบ๊อบบี้นี)	1	0	1	3
12005	12005002	(ต้นกับบ๊อบบี้นี)	0	0	1	3
12005	12005003	ลูกกบตัวหนึ่ง	-	-	-	-

FIGURE 2 The Example of Accessibility Factor Values

TABLE 3 Predicted Accessibility Ranking for Thai Referring Expressions

Ariel (1988, 1990)	**Predicted Accessibility ranking**
Extremely High Accessibility Markers (gaps, including pro, PRO and *wh* traces, reflexives, and Agreement)	Zero Pronoun (ZP)
Cliticized pronoun Unstressed pronoun Stressed pronoun Stressed pronoun + gesture	Pronoun (PRO)
—	Proximal Demonstrative Pronoun (DPRO-P)
—	Distal Demonstrative Pronoun (DPRO-D)
Proximal demonstrative (+NP)	Proximal Demonstrative Phrase (DEMP-P)
Distal demonstrative (+ NP)	Distal Demonstrative Phrase (DEMP-D)
Proximal demonstrative + modifier	Not found in this study
Distal demonstrative + modifier	Not found in this study
First name	Kin Term/Title (KT) Proper Name (PN) Kin Term/Title with Proper Name (KT+PN)

TABLE 3 Predicted Accessibility Ranking for Thai Referring Expressions (*cont.*)

Ariel (1988, 1990)	**Predicted Accessibility ranking**
Last name	N/A[3]
Short definite description	Bare Noun Phrase (N) Nominalization (NOM) Quantifier Phrase (QP) Possessive Phrase (POSSP)
Long definite description	Noun with Modifiers (N*) Noun with Relative Clause (N-RC) Conjoined Noun Phrases (CNP)
Full name	Not found in the narratives in the scope of the study
Full name + modifier	Not found in the narratives in the scope of the study

are not a topic, Unity is 1. Figure 2 provides the example of the Accessibility factor calculation for Figure 1.

3.3 *Predictions*

Ariel (1990, 1992) stated that Accessibility is translated into a marking system based on Informativity, Rigidity and Attenuation of referring expressions. In Table 3, we predict the Accessibility Marking Scale for Thai anaphoric expressions and present a mapping between referring expressions in Ariel's (1988, 1990) works and the current study. To elaborate, the Accessibility Marking Scale starts with zero pronouns having the highest Accessibility because they are the least informative. Pronouns are ranked lower than zero pronouns and demonstratives lower than pronouns due to being more informative. This study distinguishes between demonstrative pronouns and demonstrative phrases. Demonstrative phrases are ranked after demonstrative pronouns because their linguistic forms contain more information. Likewise, based on Ariel's (1988, 1990) scale, proximal demonstratives should be ranked higher than distal demonstratives. Demonstratives with modifiers, on the other hand, are not found in this study. Moreover, based on Ariel's (1988,

3 Unlike English, last names are not used as personal reference terms in Thai.

1990) finding that, in English, first names have a lower degree of Accessibility than demonstratives, we predict that kin terms/titles, proper names, and kin terms/titles with proper names should be ranked lower than demonstratives. In addition, we predict that bare noun phrases, nominalization, quantifier phrases as well as possessive phrases have a lower Accessibility because they are more informative. While proper names and kin terms/titles with proper names can contain more information than bare noun phrases, they are ranked higher than bare noun phrases because they are more rigid. Lastly, noun phrases with modifiers, noun phrases with relative clauses and conjoined noun phrases are at the lower end of the Accessibility Marking Scale. It is also important to point out that full names and full names with modifiers are not present in the narratives used in this study.

3.4 *Analysis*

This study investigated the relationship between types of anaphoric expression and Accessibility. A total of 6,007 referring expressions, categorized into 16 types (including 13 main types), were annotated, but only 3,543 anaphoric expressions were used. To examine the distributional tendency for each type of anaphoric expression, the mean and standard error were calculated for Distance, Competition, Saliency and Unity. Finally, the overall Accessibility for each anaphoric expression was calculated.

This study modified the formula for overall Accessibility used by Izumi and Sato (2008) and Toole (1996). Toole's (1996) formula, shown in (9), combined Distance and Unity into a single measure ranging from 4 to 0. Competition Accessibility ranged from 0 to -2. Saliency Accessibility was based on the repetition of the referring expression in the last four propositions and ranged from 0 to 2. The current study's formula for overall Accessibility, provided in (10), differs from Toole's formula in several ways. Firstly, the current study uses continuous values for Distance and Competition for a more fine-grained analysis. Secondly, the current study uses the topicality of the antecedent to determine Saliency instead of the repetition of the referring expression. Thirdly, the current study differentiates between the calculations of Distance and Unity. Lastly, to mitigate the differences in the scale used to measure each Accessibility factor, the current study transformed the values for each Accessibility factor into *z* scores. According to Accessibility Theory, Accessibility decreases as Distance and Competition increase and increases as Saliency and Unity increase. The current study calculated Accessibility by adding Saliency and Unity *z* scores and subtracting Distance and Competition *z* scores. Figure 3 shows the correlations between the Accessibility factors in the

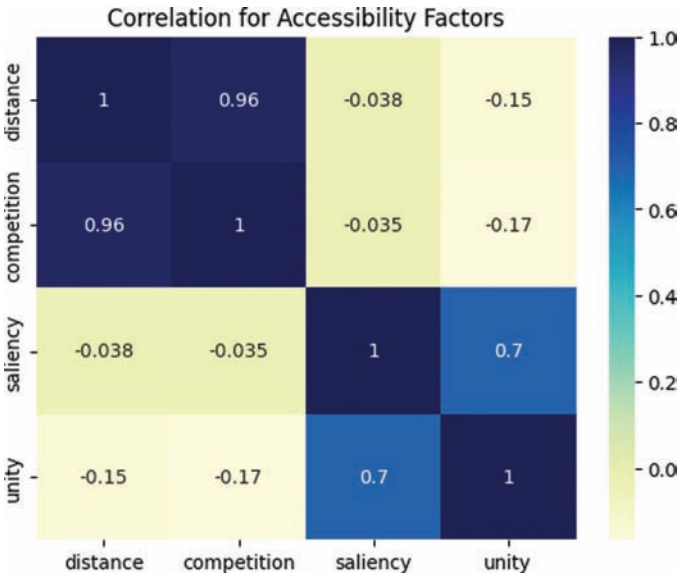

FIGURE 3 Pearson's Correlation Between Accessibility Factors

current study. The differences in correlation reflect the fact that the Saliency/Unity and Distance/Competition pairs contribute differently to Accessibility.

(9) Accessibility Calculation (Toole 1996)

$$\text{Accessibility} = \text{Accessibility}_{\text{Distance/Unity}} + \text{Accessibility}_{\text{Competition}} + \text{Accessibility}_{\text{Saliency}}$$

(10) Accessibility Calculation (Current Study)

$$\text{Accessibility} = (Z_{\text{Saliency}} + Z_{\text{Unity}}) - (Z_{\text{Distance}} + Z_{\text{Competition}})$$

Statistical analyses were performed using R Statistical Software (v4.2.2; R Core Team 2022). The readxl package (v1.4.1; Wickham and Bryan 2022), writexl package (v1.4.2; Ooms 2023), and dplyr package (v1.0.10; Wickham *et al.* 2022) were used for data manipulation. Mixed effects models using lmerTest package (v3.1.3; Kuznetsova *et al.* 2020) were used to investigate the effects of anaphoric expression types on Accessibility, taking into account the variation in narrative storytelling and narrative sources. Narrative instances and narrative sources were treated as random effects. The formula for the

mixed effects models is provided in (11). Sum coding was used to compare the Accessibility mean for each anaphoric expression type to the overall Accessibility mean, and the model estimates were used to rank the anaphoric expression types for the Accessibility Marking Scale. To test whether the anaphor expressions with adjacent ranks differed statistically, 16 mixed effects models were fitted with different anaphoric expression types as the reference group.

(11) Accessibility ~ anaphoric expression types + (1 | narrative sources) + (1 | narrative ID)

4 Results

4.1 *Accessibility Factors and Types of Anaphoric Expressions*

4.1.1 Distance

Distal demonstrative pronouns have the smallest mean Distance while nouns with relative clauses have the highest mean Distance. The Distance means and standard errors for anaphors are visualized in Figure 4 where they are ranked from lowest to highest. Distal demonstrative pronouns, quantifier phrases,

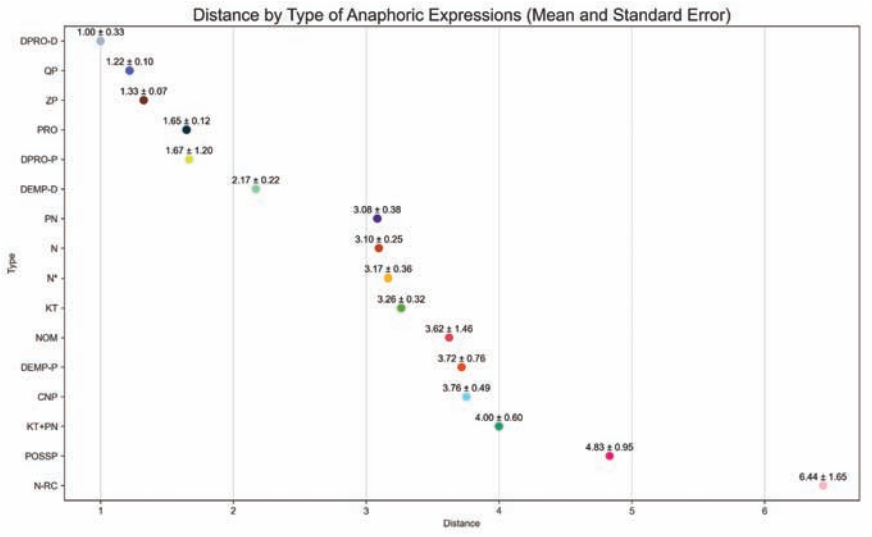

FIGURE 4 The Means and Standard Errors of Distance by Type of Anaphoric Expression

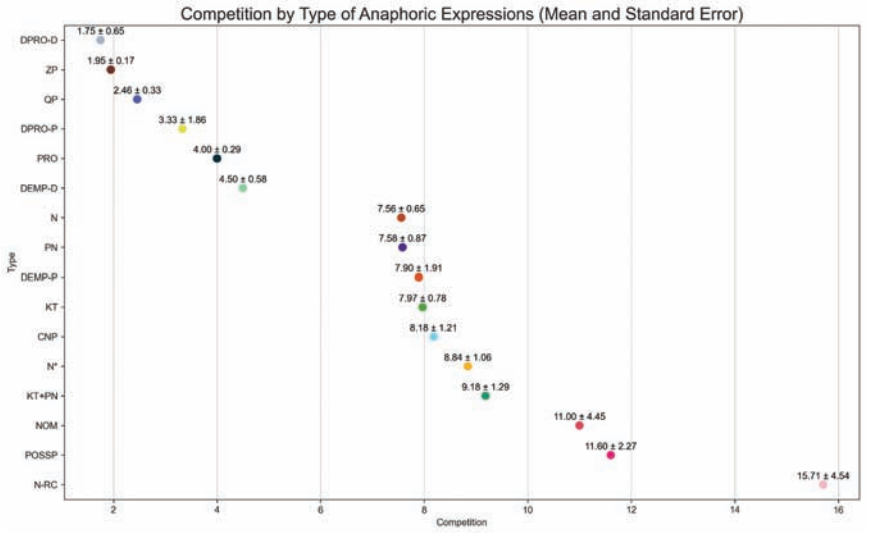

FIGURE 5 The Means and Standard Errors of Competition by Type of Anaphoric Expression

zero pronouns, pronouns, proximal demonstrative pronouns and distal demonstrative phrases tend to appear one to two narrative segments away from antecedents. Additionally, proper names, bare noun phrases, noun phrases with modifiers, kin terms/titles, nominalization, proximal demonstrative phrases, conjoined noun phrases, and kin terms/titles with proper names typically appear three to four narrative segments away from their antecedents. Finally, possessive phrases and nouns with relative clauses are used more than four narrative segments from their antecedents.

4.1.2 Competition

Distal demonstrative pronouns have the smallest number of competitors while noun phrases with relative clauses have the highest. Figure 5 shows the means and standard errors of Competition. The Competition means by type of anaphoric expression, ranked from lowest to highest, are as follows: distal demonstrative pronouns, zero pronouns, quantifier phrases, proximal demonstrative pronouns, pronouns, distal demonstrative phrases, bare noun phrases, proper names, proximal demonstrative phrases, kin terms/titles, conjoined noun phrases, noun phrases with modifiers, kin terms/titles with proper names, nominalization, possessive phrases and noun phrases with relative clauses.

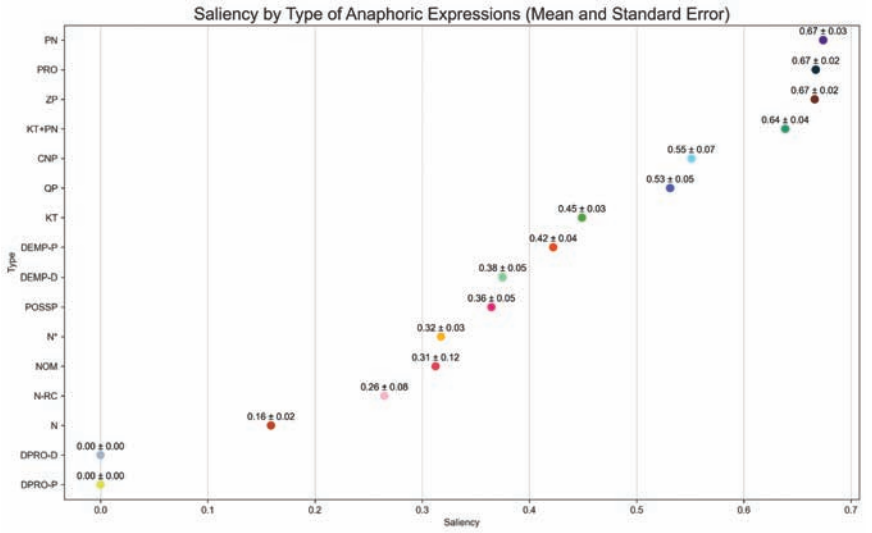

FIGURE 6 The Means and Standard Errors of Saliency by Type of Anaphoric Expression

4.1.3 Saliency

Proper names tend to be used when they are salient while distal and proximal demonstrative pronouns are typically not salient. The Saliency means and standard errors are illustrated in Figure 6. Proper names, pronouns, zero pronouns, kin terms/titles with proper names, conjoined noun phrases and quantifier phrases tended to be used in salient contexts, while kin terms/titles, proximal demonstrative phrases, distal demonstrative phrases, possessive phrases, noun phrases with modifiers, nominalization, noun phrases with relative clauses and bare noun phrases tended to be used in non-salient contexts. Finally, distal and proximal demonstrative pronouns were not found to be salient in any contexts.

4.1.4 Unity

Zero pronouns had the highest Unity mean while proximal and distal demonstrative pronouns had the lowest. The means and standard errors for Unity are depicted in Figure 7. Zero pronouns, pronouns, proper names, quantifier phrases and conjoined noun phrases tended to be used as continued or switched topics, while the rest were normal anaphors.

4.2 *Accessibility*

Compared to the overall Accessibility mean, pronouns had the highest mean difference, while nouns with relative clauses had the lowest. Figure 8 provides

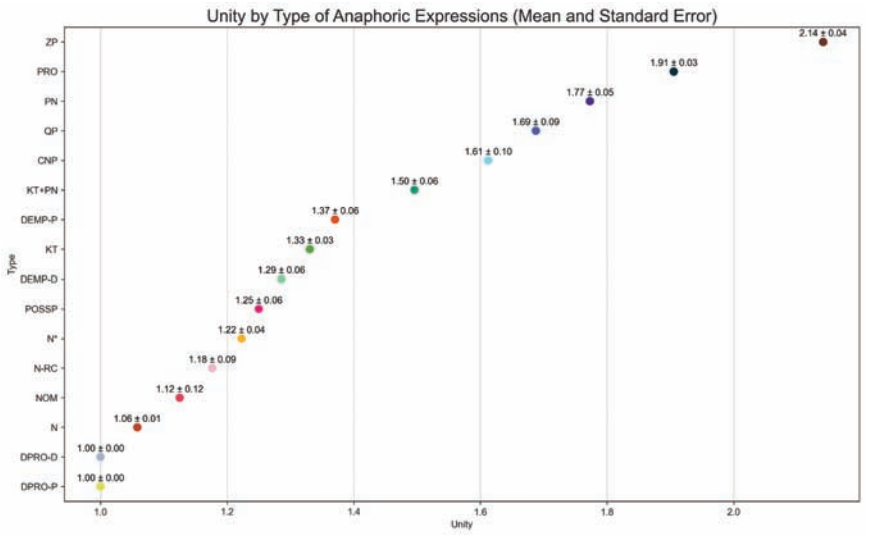

FIGURE 7 The Means and Standard Errors of Unity by Type of Anaphoric Expression

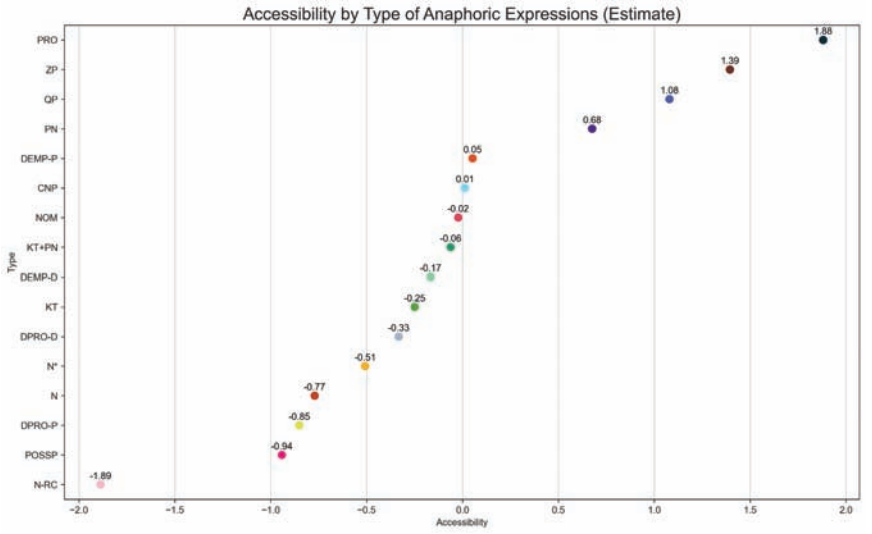

FIGURE 8 The Estimates for Accessibility by Type of Anaphoric Expression

the estimates, ranked from highest to lowest, for each anaphoric expression type from a mixed-effects model. Additionally, mixed-effects models treating each anaphoric expression type as a reference group were run (see Appendix I), whereby it was found that the difference between Accessibility means for some adjacent ranks were not statistically significant and were, therefore, grouped together in the Accessibility Marking Scale for Thai anaphoric expressions, presented in (12). It is also important to note that the Accessibility means for nominalization, distal demonstrative pronouns and proximal demonstrative pronouns did not differ significantly from the majority of anaphoric expression types; these non-significantly different types are italicized in (12).

(12) Thai Accessibility Marking Scale (highest to lowest, current study)

High Accessibility

a. Pronouns (ZP)
   Zero Pronouns (PRO)
b. Quantifier Phrases (QP)
   Proper Names (PN)
c. Proximal Demonstrative Phrases (DEMP-P)
   Conjoined Noun Phrases (CNP)
   Nominalization (*NOM*)
   Kin Terms/Titles with Proper Names (KT+PN)
   Distal Demonstrative Phrases (DEMP-D)
   Kin Terms/Titles (KT)
d. *Distal Demonstrative Pronouns* (*DPRO-D*)
e. Nouns with Modifiers (N*)
   Bare Noun Phrases (N)
f. *Proximal Demonstrative Pronouns* (*DPRO-P*)
g. Possessive Phrases (POSSP)
   Nouns with Relative Clauses (N-RC)

Low Accessibility

5 Discussion

5.1 *Thai Accessibility Marking Scale*

The Accessibility Marking Scale for Thai anaphoric expressions shows both similarities to and differences from the English Accessibility Marking Scale (Ariel 1988, 1990). A comparison between the two scales is presented in Table 4. Anaphoric expressions that are shared with Ariel's (1988, 1990) scale are italicized.

While zero pronouns and pronouns are still associated with high Accessibility markers and nouns with relative clauses with low Accessibility markers, the ranks for pronouns and proper names differ. The rank for pronouns changes from the second to the first. However, the Accessibility means for pronouns and zero pronouns are not statistically different and both are regarded as sharing the same rank. Whether this difference stems from the fact that Thai is a pro-drop language merits further investigation. Apart from pronouns, the rank of proper names changes from being lower than demonstratives to being higher. This could arise from several reasons. Firstly, proper names tend to refer to topical antecedents and tend to be used as topics to a higher degree than demonstratives, resulting in higher Saliency and Unity. This corresponds with the fact that many narratives in the data center around the experiences or events concerning certain protagonists. Secondly, proper names in Thai can function as pronominals (Cooke 1968). Being pronominal could allow proper names to appear in contexts similar to pronouns more often than demonstratives. However, whether being pronominal affects the Accessibility Marking Scale needs more study.

Apart from the differences in ranks above, demonstratives show two differences. To begin with, demonstrative phrases have higher Accessibility than demonstrative pronouns. This could be due to the small number of demonstrative pronouns found in this study. Demonstrative pronouns were not found to refer to topical antecedents or be topical, making their Unity and Saliency lowest. A similar observation was pointed out by Prasithrathsint (2000) who observed that the demonstrative pronoun ní: 'this' is hardly found in subject or object positions because given information tends to be omitted. Additionally, while proximal demonstrative phrases had higher Accessibility than distal demonstrative phrases, as was the case in English, distal demonstrative pronouns had higher Accessibility than proximal demonstrative pronouns. The pattern for demonstrative pronouns was similar to the association found in Dutch (Piwek, Buen, and Cremers 2008). That is, indexical distal demonstratives were used when the Accessibility was high, and indexical proximal demonstratives were associated with low Accessibility.

TABLE 4 The Comparison between English and Thai Accessibility Marking Scale

English Accessibility Marking Scale (Ariel 1988, 1990)	**Thai Accessibility Marking Scale**
Extremely High Accessibility Markers (gaps, including pro, PRO and *wh* traces, reflexives, and Agreement)	*Pronouns* (*PRO*) *Zero Pronouns* (*ZP*)
Cliticized pronoun Unstressed pronoun Stressed pronoun Stressed pronoun + gesture	(rank changed)
	Quantifier Phrases (QP) *Proper Names* (*PN*)
Proximal demonstrative (+NP)	*Proximal Demonstrative Phrases* (*DEMP-P*) Conjoined Noun Phrases (CNP) Nominalization (NOM) Kin Terms/Titles with Proper Names (KT+PN) *Distal Demonstrative Phrases* (*DEMP-D*) Kin Terms/Titles (KT)
Distal demonstrative (+ NP)	
	Distal Demonstrative Pronouns (*DPRO-D*)
Proximal demonstrative + modifier	—
Distal demonstrative + modifier	—
First name	(rank changed)
Last name	N/A
Short definite description	Nouns with Modifiers (N*) Bare Noun Phrases (N)
	Proximal Demonstrative Pronouns (*DPRO-P*)
Long definite description	Possessive Phrases (POSSP) *Nouns with Relative Clauses* (*N-RC*)
Full name	—
Full name + modifier	—

However, this awaits further analysis because the current study did not differentiate between indexical and non-indexical demonstratives. Finally, it is essential to point out that demonstratives in Thai share the same forms with grammaticalized related words that can function as emphatic markers, attention getters, mood markers and discourse markers (Suwanpanich 2017). While grammaticalized related words can contribute to the differences found in demonstratives, the current study did not separate between demonstratives and grammaticalized related words.

New anaphoric expression types were found to fit on the scale adjacent to anaphoric expressions with similar discourse functions and similar distributional patterns. To begin with, quantifier phrases share the same rank with proper names because most quantifier phrases are used to refer to discourse referents. Additionally, conjoined noun phrases, nominalization, kin terms/titles and kin terms/titles with proper names share the same rank with demonstrative phrases. Importantly, the Accessibility mean was not statistically different from other types of anaphoric expressions due to small sample size and may not actually be in this rank. Conjoined noun phrases precede kin terms/titles and kin terms/titles with proper names. The high proportion of conjoined noun phrases being proper names (34.69 %) could increase their Accessibility. Similarly, kin terms/titles with proper names precede kin terms/titles. Similar to proper names, kin terms/titles and kin terms/titles with proper names can function as pronominals. This can also contribute to its being adjacent to proper names and pronouns. Furthermore, nouns with modifiers, bare noun phrases, possessive phrases and noun phrases with relative clauses are at the lower part of the scale. The ranking for possessive phrases and noun phrases modified by relative clauses is in line with Huang's (2013) ranking for Chinese.

5.2 *Accessibility Degree and Thai Anaphoric Expressions*

The Accessibility degree marking of anaphoric expression is influenced by Informativity, Rigidity and Attenuation. While the current study did not explore the relationship between these three properties and anaphoric expressions quantitatively, the relationship between Accessibility degree and the three properties can still be observed in the Accessibility Marking Scale. Firstly, anaphoric expressions with more informative forms are typically selected when the Accessibility is low because they provide more information to better retrieve the antecedents. As can be observed from the scale, highly accessible forms, such as pronouns and zero pronouns, are less informative, while low Accessibility forms, such as possessive phrases and nouns with

relative clauses are more informative. Additionally, Rigidity corresponds to the extent an anaphoric expression can identify a unique referent. A more rigid form is selected to guide hearers to a unique antecedent when speakers deem the Accessibility is low. Lastly, less attenuated forms are used when the Accessibility is high. Only the case of zero pronouns and pronouns in Thai support this property because Attenuation in terms of pronunciation is not present in written texts.

Apart from the relationship between three properties and anaphoric expressions, the relationship between the forms of anaphoric expressions and overall Accessibility suggests a one-to-many mapping between form and Accessibility degree. That is, different forms of anaphoric expressions can have the same Accessibility degree if Distance, Competition, Saliency and Unity are the same. The Accessibility Marking Scale only reflects the distributional tendency of the types of anaphoric expression to occur at some Accessibility degrees but does not predict the categorical encoding of Accessibility, which corresponds with Accessibility theory that views it as a matter of degree. This is supported by the fact that the Accessibility means for some types of anaphoric expression are statistically significantly different.

5.3 *Limitations and Future Works*

There are limitations that need to be addressed regarding the Accessibility Marking Scale proposed in the current study. To begin with, the metric used for Unity is similar to Saliency because both metrics use topics in their measurements. The similarity between Saliency and Unity can influence the ranking of anaphoric expressions because it increases the Accessibility of the anaphoric expressions that tend to be topics. Additionally, this study used a simple formula to calculate Accessibility. The weights assigned to each Accessibility factor may not accurately reflect their relative contributions to Accessibility, and the Accessibility factors may interact with each other in complex ways. The formula may not accurately reflect how Accessibility is represented mentally. Further psychological studies are needed to investigate these limitations. Lastly, the current study is only a preliminary study based on a small sample of anaphoric expressions. A larger scale study is needed to provide more insight into each type of anaphoric expression. Likewise, a more fine-grained subcategorization for each anaphoric expression type is needed to examine whether different inherent properties or subtypes can result in different distributional patterns of Accessibility.

6 Conclusion

This study proposes the Accessibility Marking Scale for Thai anaphoric expressions and highlights the similarities and differences regarding the scale between Thai and English. The relationship between anaphoric expressions and Accessibility, whether in terms of Distance, Competition, Saliency, Unity and overall Accessibility, was presented. It was found that the relationship between anaphoric expressions and Accessibility is a matter of degree and that the types of anaphoric expression are associated with different Accessibility degrees. Furthermore, we observed that the rankings for some anaphoric expressions change, likely due to the influence of language-specific properties, which warrants further investigation. Lastly, it was also observed that new anaphoric expressions fit in the scale near anaphoric expressions with similar discourse functions and distributional patterns. The current study does not only provide insights about Accessibility tendency, but also referential choices in Thai.

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Appendix I

Mixed-Effects Models with Each Type of Anaphoric Expression as Reference Group

(green = statistically significant, red = not statistically significant)

Reference	Intercept	value	PRO	ZP	QP	PN	DEMP-P	CNP	NOM	KT+PN	DEMP-D	KT	DPRO-D	N*	N	DPRO-P	POSSP	N-RC
PRO	1.1876	estimate		0.2071	-0.8015	-1.2048	-1.8282	-1.8684	-1.9031	-1.9427	-2.0475	-2.1300	-2.2132	-2.3887	-2.6519	-2.7317	-2.8226	-3.7685
		p-value		0.1402	0.0043	0.0000	0.0000	0.0000	0.0035	0.0000	0.0000	0.0000	0.0145	0.0000	0.0000	0.0642	0.0000	0.0000
ZP	1.3948	estimate	-0.2071		-1.0086	-1.4120	-2.0353	-2.0755	-2.1102	-2.1498	-2.2546	-2.3371	-2.4203	-2.5958	-2.8590	-2.9389	-3.0297	-3.9756
		p-value	0.1402		0.0004	0.0000	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0077	0.0000	0.0000	0.0467	0.0000	0.0000
QP	0.3861	estimate	0.8015	1.0086		-0.4033	-1.0267	-1.0669	-1.1016	-1.1412	-1.2460	-1.3285	-1.4117	-1.5871	-1.8504	-1.9302	-2.0211	-2.9669
		p-value	0.0043	0.0004		0.1952	0.0030	0.0184	0.1157	0.0015	0.0005	0.0000	0.1331	0.0000	0.0000	0.1974	0.0000	0.0000
PN	-0.0172	estimate	1.2048	1.4120	0.4033		-0.6233	-0.6636	-0.6982	-0.7379	-0.8426	-0.9252	-1.0083	-1.1838	-1.4470	-1.5269	-1.6178	-2.5636
		p-value	0.0000	0.0000	0.1952		0.0229	0.0937	0.2972	0.0102	0.0035	0.0000	0.2698	0.0000	0.0000	0.3029	0.0000	0.0000
DEMP-P	-0.6405	estimate	1.8282	2.0353	1.0267	0.6233		-0.0402	-0.0749	-0.1145	-0.2193	-0.3018	-0.3850	-0.5605	-0.8237	-0.9035	-0.9944	-1.9403
		p-value	0.0000	0.0000	0.0030	0.0229		0.9250	0.9125	0.7260	0.5055	0.2486	0.6780	0.0479	0.0008	0.5441	0.0037	0.0001
CNP	-0.6808	estimate	1.8684	2.0755	1.0669	0.6636	0.0402		-0.0346	-0.0743	-0.1791	-0.2616	-0.3448	-0.5202	-0.7835	-0.8633	-0.9542	-1.9000
		p-value	0.0000	0.0000	0.0184	0.0937	0.9250		0.9630	0.8640	0.6820	0.5030	0.7227	0.2020	0.0405	0.5690	0.0341	0.0009
NOM	-0.7154	estimate	1.9031	2.1102	1.1016	0.6982	0.0749	0.0346		-0.0396	-0.1444	-0.2269	-0.3101	-0.4856	-0.7488	-0.8287	-0.9196	-1.8654
		p-value	0.0035	0.0013	0.1157	0.2972	0.9125	0.9630		0.9544	0.8351	0.7323	0.7794	0.4691	0.2525	0.6068	0.1882	0.0170
KT+PN	-0.7551	estimate	1.9427	2.1498	1.1412	0.7379	0.1145	0.0743	0.0396		-0.1048	-0.1873	-0.2705	-0.4459	-0.7092	-0.7890	-0.8799	-1.8257
		p-value	0.0000	0.0000	0.0015	0.0102	0.7260	0.8640	0.9544		0.7575	0.4972	0.7718	0.1381	0.0074	0.5962	0.0136	0.0003
DEMP-D	-0.8598	estimate	2.0475	2.2546	1.2460	0.8426	0.2193	0.1791	0.1444	0.1048		-0.0825	-0.1657	-0.3412	-0.6044	-0.6843	-0.7751	-1.7210
		p-value	0.0000	0.0000	0.0005	0.0035	0.5055	0.6820	0.8351	0.7575		0.7675	0.8590	0.2571	0.0234	0.6467	0.0300	0.0006
KT	-0.9424	estimate	2.1300	2.3371	1.3285	0.9252	0.3018	0.2616	0.2269	0.1873	0.0825		-0.0832	-0.2587	-0.5219	-0.6017	-0.6926	-1.6385
		p-value	0.0000	0.0000	0.0000	0.0000	0.2486	0.5030	0.7323	0.4972	0.7675		0.9273	0.2476	0.0027	0.6841	0.0182	0.0003
DPRO-D	-1.0256	estimate	2.2132	2.4203	1.4117	1.0083	0.3850	0.3448	0.3101	0.2705	0.1657	0.0832		-0.1755	-0.4387	-0.5185	-0.6094	-1.5553
		p-value	0.0145	0.0077	0.1331	0.2698	0.6780	0.7227	0.7794	0.7718	0.8590	0.9273		0.8485	0.6286	0.7640	0.5159	0.1203
N*	-1.2010	estimate	2.3887	2.5958	1.5871	1.1838	0.5605	0.5202	0.4856	0.4459	0.3412	0.2587	0.1755		-1.2010	-0.3431	-0.4340	-1.3798
		p-value	0.0000	0.0000	0.0000	0.0000	0.0479	0.2020	0.4691	0.1381	0.2571	0.2476	0.8485		0.0952	0.8172	0.1687	0.0034
N	-1.4642	estimate	2.6519	2.8590	1.8504	1.4470	0.8237	0.7835	0.7488	0.7092	0.6044	0.5219	0.4387	0.2632		-0.0798	-0.1707	-1.1166
		p-value	0.0000	0.0000	0.0000	0.0000	0.0008	0.0405	0.2525	0.0074	0.0234	0.0027	0.6286	0.2023		0.9569	0.5446	0.0131
DPRO-P	-1.5441	estimate	2.7317	2.9389	1.9302	1.5269	0.9035	0.8633	0.8287	0.7890	0.6843	0.6017	0.5185	0.3431	0.0798		-0.0909	-1.0367
		p-value	0.0642	0.0467	0.1974	0.3029	0.5441	0.5690	0.6068	0.5962	0.6467	0.6841	0.7640	0.8172	0.9569		0.9516	0.4999
POSSP	-1.6350	estimate	2.8226	3.0297	2.0211	1.6178	0.9944	0.9542	0.9196	0.8799	0.7751	0.6926	0.6094	0.4340	0.1707	0.0909		-0.9458
		p-value	0.0000	0.0000	0.0000	0.0000	0.0037	0.0341	0.1882	0.0136	0.0300	0.0182	0.5159	0.1687	0.5446	0.9516		0.0632
N-RC	-2.5808	estimate	3.7685	3.9756	2.9669	2.5636	1.9403	1.9000	1.8654	1.8257	1.7210	1.6385	1.5553	1.3798	1.1166	1.0367	0.9458	-2.5808
		p-value	0.0000	0.0000	0.0000	0.0000	0.0001	0.0009	0.0170	0.0003	0.0006	0.0003	0.1203	0.0034	0.0131	0.4999	0.0632	0.0032