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An Empirical Investigation of Typicality and Uniqueness Effects on Article Choice in Attributive-Possession NPs*

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Introduction

Previous analyses of the use of English definite descriptions have generally taken one of two approaches, loosely characterizable as familiarity and uniqueness. That is, felicitous use of the definite article has been argued to require that the referent of the NP be either known to the hearer within the current context of utterance (e.g. Heim 1983, Prince 1992) or uniquely identifiable to the hearer (e.g. Gundel *et al*. 1993, Birner & Ward 1994, *inter alia*). What is common to all previous analyses is that the explanatory principle is presented as categorical; i.e. a referent is familiar or not, unique or not. There is generally no provision for gradience within the theory. In what follows we will investigate how familiarity- and uniqueness-based accounts of definiteness fare in accounting for the class of EMBEDDED DEFINITES known as ATTRIBUTIVE-POSSESSION constructions (McKercher 2001) and how the gradient notion of typicality impacts article choice in these constructions.

Attributive-possession NPs (henceforth APNPs), which consist of embedded NPs headed by *with* (e.g. *the man with the cane)*, can be used to refer to one of the figures in (1):

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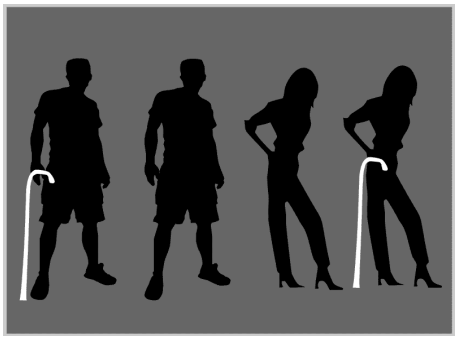


(1) a. The guy with the cane is my roommate.
b. The guy with a cane is my roommate.

The felicity of both the definite and indefinite suggests that the general felicity conditions for the use of definite descriptions do not apply to APNPs. First, under a uniqueness-based approach, the presence of two equally salient canes should render the definite in (1a) infelicitous. Second, under a familiarity-based account, if the man's cane, being clearly visible, is taken to be (weakly) familiar, then the indefinite in (1b) should be infelicitous. Moreover, if it is taken not to be (weakly) familiar, then the definite in (1a) should be infelicitous. However, neither is the case. Thus, neither uniqueness nor (weak) familiarity alone appears to be driving article choice for APNPs. In what follows we will explore the role that other factors play in accounting for the article we find used with this type of NP in an experimental setting.

1 Previous Studies

Attempts to provide a unified account of the felicity conditions for the English definite article have proven to be elusive. For example, proponents of 'familiarity' as the explanatory condition for the definite article encounter difficulties in explaining how some first-mention definites representing familiar entities are felicitous while others are not. Consider (2):

(2) I'm taking an Italian conversation class this semester. On the first day of class, the instructor told #the student that the textbook is available on-line.

Here, none of the underlined definites has a referent that has been explicitly evoked in the preceding discourse. However, as is well known, what licenses the use of the felicitous definites in (2) is the inferable bridging relation that holds between a class and things associated with a class, e.g. instructors, students, textbooks, etc. (Clark 1975, *inter alia*). However, the same bridging inference which licenses the felicitous use of *the instructor* in (1) would also presumably license the infelicitous use of *the student* in the same context. That is, the student

referenced in (2) is presumably as familiar as the instructor via a bridging relation, yet only the latter is felicitous with a first-mention definite, suggesting that familiarity is at most a necessary condition for the use of the definite article.

However, familiarity does not seem to constitute a sufficient condition either. Even in situations in which there is no plausible bridging relation, i.e. no plausible grounds for accommodation, definite descriptions can nonetheless be used to refer to completely unfamiliar entities, as in (3a):

(3) a. When I got in my car this morning, I was totally grossed out by the half-eaten burrito that I had left on the front seat from the night before.
b. #When I got in my car this morning, I was totally grossed out by the half-eaten burrito.

As noted by Birner & Ward (1994), Barker (2005), Abbott (2008), *inter alia*, such NPs are felicitous even if the speaker assumes that their referents are completely unfamiliar to the hearer. On the basis of such data, we can conclude that familiarity by itself is neither a necessary nor sufficient condition for the use of the definite article.

Accounts based entirely on uniqueness fare better with respect to the examples discussed above. The felicity of *the instructor* and *the textbook*, as well as the infelicity of *the student,* in (2) can be explained by the fact that classes typically contain a single instructor and textbook, but typically contain more than a single student. Similarly, the minimal description contained in the NP in (3b) is insufficient to identify the intended referent upon first mention; what is needed is a uniquely identifying description (Gundel *et al*. 1993, Ward & Birner 1995), such as is provided by the relative clause in (3a). That is not to say that uniqueness-based accounts are not without their problems as well. As is well known, so-called 'weak' definite NPs may be used to refer to contextually non-unique entities under certain specifiable conditions, as illustrated in (4):

(4) a. [Instructor to students in a classroom with three equally salient windows] Could somebody please open the window?
b. When I was six, I had to spend a night in the hospital and I was terrified.

In (4a), the context includes multiple salient windows, yet the definite is nonetheless felicitous. In (4b), the hospital in which the speaker spent a night need not be unique (much less familiar) in the context of utterance; the event in question could have occurred in New York City, where there are literally dozens of hospitals. Birner & Ward (1994) conclude that uniqueness is at most a sufficient condition on the use of the definite article.

More recently, it has been proposed that there exists a systematic class of exceptions to the uniqueness condition/presupposition for definite NPs, namely the class of WEAK DEFINITES, and that they constitute a semantically distinct type of expression (Poesio 1994, Barker 2005, Carlson & Sussman 2005, Carlson *et al.* 2006, Schwarz 2009, *inter alia*). As a class, weak definites (as compared to 'strong' definites) share the following properties: they allow the 'sloppy' reading in VP ellipsis (*John went to the hospital and Bill did, too* can involve different hospitals), take narrow scope (*Every passenger was taken to the hospital*), occur only with a restricted class of nouns (*John went to the doctor* vs. #*the surgeon*), resist modification (*John was taken to #the award-winning hospital*) , exhibit enriched meanings (*John went to the doctor* (for medical purposes and not, e.g., to subpoena her), and don't occur in subject position except with a generic reading (*The hospital overcharged its patients* disallows a weak reading). Instead, as Carlson *et al*. (2006) argue, such NPs are semantically related to bare singular NPs (e.g. *in class*, *at work, in prison*), as discussed by Stvan (1998), and are more akin to indefinite expressions than definite ones.

Finally, it has been observed that certain embedded definites (as in (1a, b) above), seem to lack a uniqueness presupposition (Haddock 1987, Meier 2003, Champollion & Sauerland 2009). Haddock (1987) proposes to account for the felicitous use of embedded definites to refer to seemingly non-unique entities by means of a computational model of incremental interpretation, whereby *the cane* in (1a) is interpreted locally (with respect to the unique man who has a cane) rather than globally (with respect to the larger discourse context in which an additional cane exists). That is, for Haddock, the interpretation of *the man with the cane* would begin with *the man* combining with *with* to produce the set of men who are 'with' something. After the preposition is encountered incrementally, then the interpretation of *the cane* is restricted to the (singleton) set of canes that have men with them, thus preserving a uniqueness-based analysis for the embedded definite.

In this paper, we investigate the use of APNPs in an experimental setting. We hypothesize that uniqueness is not the only factor that influences the use of the definite article with such NPs. Indeed, the results of our empirical study confirm that the typicality of the object NP is another significant factor in accounting for the use of the definite and indefinite articles in this construction.

2 Hypothesis

Following previous work on the felicity conditions for the definite article in English, we assume that, at least for NPs on the so-called 'strong' interpretation, uniqueness provides at most a sufficient condition for felicity. Of particular interest are cases in which the discourse context provides no uniquely identifiable referent, yet use of the definite for that referent is nonetheless possible. One such

case is the attributive-possession construction, illustrated in (1) and repeated below for convenience:

(5) [to companion] The man with the/a cane is my roommate. [=(1)]

The NPs of this construction are of theoretical interest because they appear to permit the use of the definite in the case of non-unique referents as well as the use of the indefinite for unique referents. From this it follows that factors other than uniqueness must play a role in accounting for the distribution of the definite and indefinite article in this construction. Specifically, we propose that the perceived typicality of the referent of APNPs plays a significant role in determining article use and that the typicality of that referent corresponds to the object/property-denoting distinction of Partee 1987. That is, we predict that typical instances of a referent will more likely be interpreted as property-denoting, favoring the indefinite and, correspondingly, atypical instances will be more likely taken as object-denoting, favoring the definite.

3 Experiment

3.1 Design

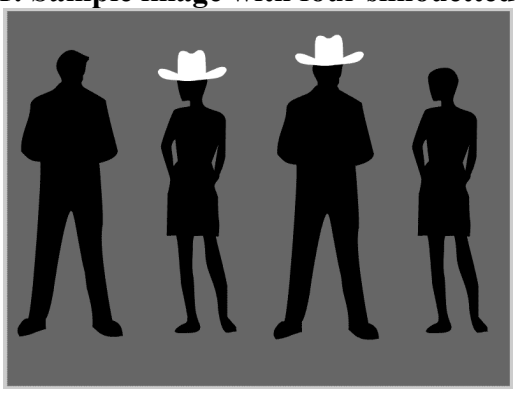
To test this hypothesis, we conducted an experiment with two phases. The first phase was designed to elicit spontaneous responses from participants containing APNPs. The second phase elicited individuals' typicality rankings for different objects used in the first phase of the experiment.

3.2 Phase 1

Participants were brought into a quiet laboratory setting and seated in either a sound booth or at a workstation containing a computer monitor, keyboard, and mouse. They were presented with a series of images on their computer screen, each containing four silhouetted human or animal figures in a row, spaced evenly apart. After a brief pause (2.5 seconds) one of the figures on the screen would begin to flash. Participants were asked to describe the flashing figure in such a way that another participant (their "teammate") would be able to identify the flashing figure from the same set of four figures on his/her computer screen at a later time. Participants had as much time as they needed to complete the experiment. Responses were recorded electronically and labeled for article use. An example of an image used in the experiment is shown above in (1), where the figure of the man with a cane would begin to flash. Since the objects in each image were assumed to be weakly familiar, the uniqueness and typicality of the objects were varied across images.

Participants had as much time as they needed to complete the experiment. Responses were recorded electronically and labeled for article use.[1] An example of an image used in the experiment is shown in Figure 1, where the figure of the woman with a hat would begin to flash:

Figure 1: Sample image with four silhouetted figures



As part of the instructions, participants were told that the figures appearing on their teammate's screen would not flash, thus preventing them from producing simpler, but non-target, responses of the form *Choose the flashing figure*. Participants were also told that the figures would appear in a different order than on their teammate's screen, which again ruled out simpler but irrelevant responses using directional cues, e.g. *Choose the guy on the left.*

In addition, a pilot study we conducted revealed that, without any further directions to guide them, participants tended to produce increasingly reduced non-target responses over the course of the experiment, e.g. *the man with the cane*, *the man with cane, man with cane, cane man, Caneman*, etc. This finding replicates the findings of others that repeated use of referring expressions in a task-based setting results in a reduction in the form of those referring expressions (Clark & Wilkes-Gibbs 1986; Horton & Gerrig 2002; *inter alia*). To circumvent this tendency, we instructed our participants in the experiment proper to use complete sentences in their responses, thus increasing their use of articles overall as well as the likelihood of their producing an APNP.

Another finding from the pilot study was that the structure of the task itself had a powerful influence on article choice. That is, some participants understood the task to be one of merely describing the flashing figure; i.e. upon seeing a unique flashing man with a unique hat, many participants in the pilot study simply responded with "a man with a cane". Such participants tended to use the indefinite article almost to the complete exclusion of the definite, even when the objects in question were uniquely identifiable. In order to emphasize the interactive nature

[1] Since participants were typically run two at a time, all participants were verbally informed that their teammate was not participating in the experiment concurrently with them and that their responses would be stored for later use.

of the task, i.e. that they were providing instructions for someone else to use to identify the figures and not merely labeling them, we required that each response begin with the verb *choose*. Responses that did not begin with the verb *choose* were automatically rejected by means of a computer-generated script and participants were then asked to re-enter their response. Furthermore, responses were automatically checked for the presence of articles upon submission. If no articles were present, participants were prompted to "use a complete sentence". Responses were recorded electronically and labeled for article use.

Since the focus of this study was on APNPs, we only considered responses that contained two NPs, one representing the attribute possessor and the other representing the possessed attribute. The first NP (the possessor NP) was associated with the silhouetted figure (of a man, woman, boy, or girl) while the second NP (the APNP) was associated with the accompanying object (umbrella, hat, cane, etc.). Both of these NPs could appear with either a definite or indefinite article, resulting in four possible combinations of articles given a possessor NP followed by an APNP. Only the articles corresponding to the figure and object were considered for responses such as *Choose the man wearing the shorts with the cane*.

3.3 Phase 2

Recall that our hypothesis is that the typicality of the accompanying object in an APNP plays a significant role in the use of the definite and indefinite article in English. To assess the affect of typicality on article choice, we asked the participants to rate the typicality of the accompanying objects used in Phase 1. Participants rated each of the objects on a scale from 1 to 4, where 4 was 'very typical' and 1 was 'not typical at all'.[2] Examples of two of the objects – one rated typical and one rated atypical – are provided in Figures 2a-b, respectively:

Figure 2a: A 'Typical' Object

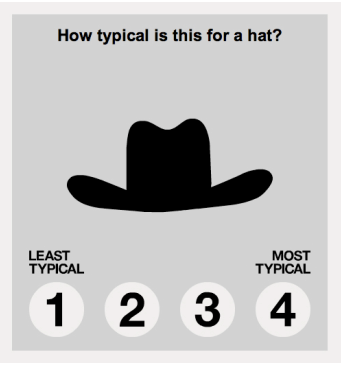
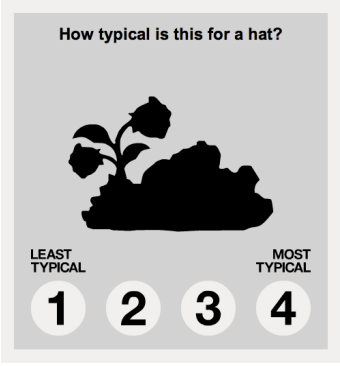


Figure 2b: An 'Atypical' Object



[2] An even number of values was used to prevent participants from (over-)using the median value.

We relied on the ratings of the participants themselves rather than on our own ratings to avoid possible experimenter bias when it came to assessing the (a)typicality of a given object. That is, if a participant gave a rating of 1 or 2 to an object, regardless of our intuitions, it would nonetheless be categorized as 'atypical' for that participant, in which case we would expect that participant to produce more definite articles in referring to that object (*ceteris paribus*). To balance the presentation of objects, an equal number of (what we judged to be) typical and atypical objects were used in the study (Figure 2b was designed to serve as the atypical counterpart to the object in Figure 2a).[3]

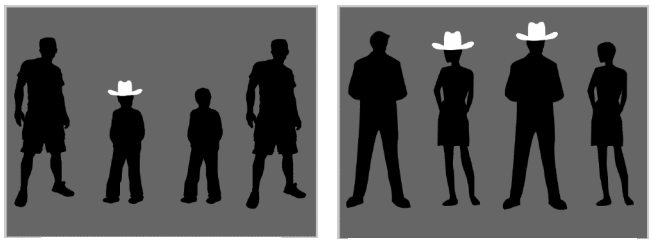
3.4 Participants

Native English speakers of the Northwestern University community, who received course credit for their participation. None of the participants found the task difficult to complete and most completed the experiment in about 30 minutes.

3.5 Results

In analyzing the results of our study, we were particularly interested in the role that two factors – uniqueness and typicality – play in article choice. The 180 images that were used in Phase 1 varied in composition, by number and kind of objects, for a total of 10,439 responses (58 participants x 180 images).[4] The crucial cross-factorial comparison of uniqueness and typicality is illustrated in Figure 3:

Figure 3



Typical, unique object Typical, non-unique object

[3] Participants' ratings of the objects used in the study largely correspond to our own: the mean ratings of only two (of 22) objects deviated from our own, and then only slightly.

[4] One response had to be discarded in the analysis of the data.

Atypical, unique object Atypical, non-unique object

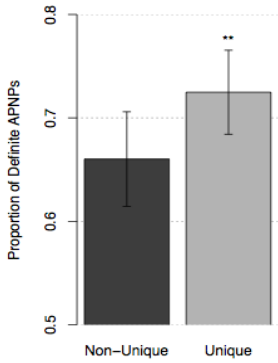
The two images in the left column display a unique object, while those in the right do not. The two images in the top row display typical objects (based on participant ratings) and those on the bottom display atypical objects.

If uniqueness is a motivating factor in article choice, then we predict that images like those in the left column would elicit more definites than those in the right. This would accord with previous accounts of definiteness based primarily or exclusively on uniqueness. However, if typicality is also a significant factor, as we have hypothesized, then we predict that for images with non-unique objects, typicality will also play a role in article choice. That is, we predict that images with non-unique, atypical objects, like the one in the bottom-right image, will elicit more definites than ones with non-unique, typical objects (as illustrated in the top-right image).

To test these predictions, we performed a 2x2 ANOVA based on two factors: uniqueness and typicality, as illustrated in Figure 3. There was a significant main effect of uniqueness ($F(1,57) = 17.21$, $^{**}p < .001$), i.e. there were significantly more definite APNPs used for images displaying unique objects than for those displaying non-unique ones, as shown in Figure 4.

Figure 4

Proportion of Definite APNPs for Unique vs. Non-Unique Objects (n=58)

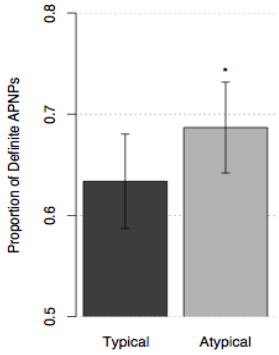


This finding supports uniqueness as an important factor underlying the felicitous use of the definite article.

In the absence of uniqueness, on the other hand, we find that typicality plays a significant role in accounting for the distribution of the definite and indefinite articles in APNPs. Our initial 2x2 ANOVA revealed an interaction between uniqueness and typicality that trended towards significance ($F(1,57) = 3.63$, $p = .062$). This, however, includes both the unique and non-unique conditions. When we separate out the two factors, a pairwise t-test reveals that this interaction is being driven by the non-unique cases ($t(57) = 2.22$, $*p < .04$), as illustrated in Figure 5.

Figure 5

Proportion of Definite APNPs for Typical vs. Atypical (Non-Unique) Objects (n=58)



As shown in Figure 5, we see that there are significantly more definites used in referring to (non-unique) atypical objects than to (non-unique) typical ones, thus supporting our hypothesis that typicality plays a role in determining article choice for non-unique referents. Note that this effect only holds in the non-unique condition; for unique objects, typicality was not found to be significant ($F(1,57) = 1.41$, $p = .24$).

4 Discussion

Previous analyses of the use of the English definite article have relied on the notions of familiarity or uniqueness (or both). The results of our empirical study suggest that, in the case of APNPs, speakers do not rely exclusively on either and that typicality plays a significant role. In this section, we propose an alternative explanation to account for the distribution of the (in)definite article in APNPs,

and compare it to the principles that govern article choice in other environments.

4.1 Object- vs. Property-Denoting

The results of our empirical study suggest that both uniqueness and typicality play a significant role in the use of the definite article in APNPs. When the referent of an APNP was unique within the discourse context, participants used the definite article 72% of the time to refer to it. On the other hand, when the referent was non-unique, participants used an indefinite only 34% of the time (contrary to what one would expect based on uniqueness alone). Instead, their use of the definite article for non-unique referents was dependent on the perceived typicality of those referents: the more typical the referent was judged to be, the greater the likelihood of an indefinite article being used to refer to it.[5]

The greater use of the indefinite article to refer to typical objects suggests that indefinite APNPs are being interpreted less as discourse entities in their own right than as properties associated with the possessor NP. One useful diagnostic for measuring the degree to which an NP is being interpreted as property-denoting vs. object-denoting is the extent to which subsequent anaphora is possible (Meier 2003). Compare the felicity of subsequent discourse anaphora when the entity in question is evoked by an APNP denoting a typical object versus one denoting an atypical object, as shown in (6a) and (b), respectively:

(6) a. The man with the tie over there is my boss. ?He wears it every day.
b. The man with the purple polka-dotted bowtie over there is my boss. He wears it every day.

There is a clear contrast in felicity between reference to the typical tie evoked by the APNP in (6a) and to the atypical one evoked in (6b).[6] When the referent of an APNP is atypical, that is, when it is noteworthy in its own right, then subsequent reference to it is relatively felicitous. To see that this difference is independent of definiteness, we find the same contrast with indefinite APNPs, as illustrated in (7):

(7) a. The man with a tie over there is my boss. ?He wears it every day.
b. The man with a purple polka-dotted bowtie over there is my boss. He wears it every day.

[5] The overall usage of the definite article for non-unique referents was 65%.

[6] While not impossible, the anaphora in (6a) is clearly marked; the point is that there exists a contrast between subsequent reference to typical and atypical objects. The fact that the APNP in (6b) is also longer, heavier, and more complex than the APNP in (6a) correlates with this difference in typicality.

From this, we can posit that APNPs denoting typical objects are associated with relatively low topicality. In this way, they are functionally akin to property-denoting prenominal modifiers, whose function is to restrict the extension of the noun to those members having the property in question. That is, a man wearing a prototypical tie can be described by means of a definite or indefinite APNP, as in (6a) or (7a), respectively, or by means of a prenominal modifer (*tie-wearing*), as in (8):

(8) The tie-wearing man over there is my boss. #He wears it every day.

In both the APNP and the prenominal case, the tie is being supplied primarily as a means to identify the man in question, and not as a full-fledged discourse entity that will, for example, be referenced in subsequent discourse. What renders (8) even less felicitous than the corresponding APNP (e.g. (7a)) is the fact that in (8), the noun *tie* occurs as part of a complex modifier in prenominal position.[7]

Of course, there are many ways in which an object can be seen as atypical. In addition to being seen as atypical in its own right (as, e.g., being a non-prototypical member of its class), an object can also be perceived as contextually atypical given the noun with which it is associated. For example, a completely ordinary-looking skirt would be perceived as extremely atypical if worn by a man as opposed to a woman. To illustrate the context-sensitive nature of typicality, we conducted an informal search on Google for *woman wearing a skirt* and *man wearing a skirt*, along with their prenominal counterparts.[8] The string *skirt-wearing woman* received only 144,000 hits compared to *woman wearing a/the skirt* received 791,000 (a ratio of 1:5.49), while *skirt-wearing man* received 34,200 hits compared to 537,004 hits for *man wearing a/the skirt* (a ratio of 1:15.7). This difference is highly significant: $x^2 = 30122.35$, df = 1, $p < 2.2e\text{-}16$,

[7] Contributing to the low topicality of the tie in (8) is the fact that it is being introduced within a so-called ANAPHORIC ISLAND (Ward, Sproat, and McKoon 1991), an even less preferred way of introducing an entity into the discourse than via an APNP. As Ward *et al.* note, when the referent is particularly salient, then subsequent anaphora to an object evoked within an 'island' is ameliorated; compare (i) with (ii)

(i) The tie-wearing man is my boss. #He bought it last week.
(ii) The purple-polka-dotted-bowtie-wearing man over there is my boss. ?He bought it last week.

Moreover, the fact that bowties are an atypical type of tie would lead us to predict that they would be referenced in prenominal modifier position less frequently than typical ties would be referenced in the same position. This prediction is borne out by an informal corpus search on Google: tie-wearing man (with no determiner specified) received 16,800 hits, while *man wearing a/the tie* received 1,766,000, a ratio of 1:105, whereas *bowtie-wearing man* received 5,917 hits compared to 725,240 hits for *man wearing a/the bowtie*, for a ratio of 1:122. Performing a chi-square test reveals that this difference is indeed highly significant: $x^2 = 102.3887$, df = 1, $p < 2.2e\text{-}16$.

[8] We thank Larry Horn (p.c.) for suggesting this pair to us.

which we take to be further evidence that atypical objects are disfavored in prenominal position.

To account for the observed difference between typical and atypical objects, we draw on the object-denoting vs. property-denoting distinction for NPs as discussed in Partee 1987 (see also Meier 2003). We suggest that APNPs used to refer to typical objects were interpreted by our participants as *relatively* property-denoting. These NPs provide a property or attribute whose primary function is to identify the referent of the possessor NP, similar to the property-denoting function of NPs in predicate position:

(9) a. Pat is a teacher.
b. Lee is a fool.
c. Sam is a marvel.

In this way, the APNPs denoting typical objects tended to be interpreted as property-denoting and were therefore realized by our participants more frequently with the indefinite article.

APNPs used to refer to atypical objects, on the other hand, tended to be interpreted as object-denoting and were therefore realized more frequently with the definite article. The atypicality of these objects rendered them more salient, and hence presumably more topical, rendering them as discourse entities available for subsequent reference. While the object-denoting vs. property-denoting distinction is a categorical one, our findings suggest that the criteria used to determine whether an NP is interpreted as one or the other may well be gradient.

4.2 Uniqueness vs. Typicality

The results of our empirical study suggest that typicality plays a significant role in the use of the definite article. However, this effect was found only in cases where uniqueness does not hold; that is, contextual uniqueness still plays a significant role in a speaker's decision to use a definite article in referring to an object with an APNP – regardless of the perceived typicality of that object. In this way, uniqueness can be seen of as a kind of 'primary' strategy and typicality as a 'secondary'. When the principle of contextual uniqueness is not satisfied, speakers rely on secondary strategies such as typicality to assist their hearer in identifying the intended referent as efficiently as possible.

Moreover, if we consider some very basic assumptions about the cognitive difficulty associated with determining uniqueness versus typicality, it may be the case that, at least for APNPs, these two strategies are ordered with respect to one another. On the assumption that it is easier to determine whether a referent is contextually unique or not than whether it is typical or not, then it might be expected that speakers would rely on the easier strategy to minimize their effort

and maximize the likelihood that a hearer will successfully identify the intended referent. In our experimental paradigm, participants needed only to ascertain whether the object was unique within the image presented. For example, to know whether a hat was unique, participants needed only scan the other figures in the image to determine uniqueness. In contrast, in the case of a non-unique referent, the speaker must resort to alternative strategies. Presumably, computing the perceived similarity between an object and its exemplar is relatively costly and undertaken only as a 'backup' strategy when uniqueness does not obtain.

5 Conclusion and Future Directions

In this paper, we have argued that the (in)definiteness of an attributive-possession NP is sensitive to whether it is being interpreted as property-denoting or object-denoting (Partee 1987). Typical instances of an object are interpreted more as property-denoting, thus favoring the indefinite, while atypical instances are interpreted more as object-denoting, thus favoring the definite. Moreover, we have shown that typicality is only relevant in the absence of uniqueness; in the case of unique objects, the perceived typicality of the object was irrelevant.

In addition, the results of our empirical study support the claim of Birner & Ward (1994) that uniqueness is at most a sufficient condition for the felicitous use of the definite article; fully two-thirds of the APNPs with non-unique objects were nonetheless produced with a definite article. This use of the definite article in conjunction with non-unique referents represents a challenge for any unified theory of definiteness based solely on the notion of uniqueness.

We do not, however, claim that typicality and uniqueness exhaust the possibilities; other factors may well play a role in guiding a speaker's choice of article for APNPs. Moreover, it is possible that typicality plays a role in guiding article choice for other types of NPs as well. Finally, it would be interesting to extend this paradigm to languages with article systems distinct from English, e.g. Polish, Arabic, Japanese. In the case of a language with only a definite article (and no indefinite one), for example, we would expect speakers of such a language to use anarthrous APNPs for typical objects and arthrous APNPs for atypical objects. In any event, what is clear is that uniqueness alone, while being a powerful explanatory principle, is only part of the story for this class of expressions.

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