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Referentiality, individuation and incompletive readings

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Abstract
As an exception to Krifka's (in: Bartsch, Benthem, Emde Boas,Semantics and contextual expression, CSLI Publications, Stanford, 1989) famous generalization that a quantized incremental theme always induces an event-homomorphic completive reading, Singh (Annual Meeting of the Berkeley Linguistics Society 17(1): 469–479, 1991, Journal of East Asian Linguistics 3(2): 107–146, 1998) observes that in Hindi only quantized mass noun phrases entail a completive reading, but unexpectedly quantized count noun phrases can give rise to an incompletive reading. She proposes that count nouns can introduce a partial-affectedness thematic relation, whereas mass nouns introduce a total-affectedness thematic relation. With new data in Mandarin, instead of the count/mass distinction, I argue that referentiality of the direct object is a crucial factor, because incompletive readings are only felicitous with direct objects interpreted referentially for consumption verbs in Mandarin.

Keywords Referentiality · Individuation · Atomicity · Incompletive readings · Incremental-theme

1 Introduction

As is well known, the telicity of a verbal predicate often depends on the properties of its direct object (Verkuyl 1972; Dowty 1979; Tenny 1992; Bach 1986; Krifka 1989a, 1998, among others). When the direct object is a bare plural or mass noun, the predicate becomes an activity, as diagnosed by standard tests with *for*-phrases and *in*-phrases as in (1a). In contrast, when the direct object is a count noun with a numeral as in (1b), the predicate behaves like an accomplishment with respect to the same tests.

(1) a. I ate apples/bread for two hours/*in two hours.
b. I ate three apples *for two hours/in two hours.

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In his classic mereological account, Krifka (1989a; 1998) analyzes this variable telicity pattern in terms of an event-object homomorphism. For gradual predicates, such as verbs of creation and consumption, all the parts of an event are homomorphically mapped to the parts of an entity denoted by the direct object, consequently inheriting the boundedness of the NP. Krifka (1989a) models boundedness as a property called quantization, and the opposite cumulativity. Basically, an NP predicate is quantized if it cannot be applied to the sum of two individuals that it is true of as in (2a), whereas an NP predicate is cumulative if it can apply to the sum of two entities that it is true of as in (2b).

(2) a. $\forall P[QUA_S(P) \leftrightarrow \forall x \forall y[P(x) \wedge P(y) \rightarrow \neg y \subset_s x]]$
b. $\forall P[CUM_S(P) \leftrightarrow \forall x \forall y[P(x) \wedge P(y) \rightarrow P(x \cup_s y)]]$

Krifka (1989a, 89)

Under these definitions, quantized NPs include NPs with a numeral and definites, whereas cumulative NPs include bare mass nouns and bare plurals. For example, 'eat three apples' is a quantized predicate denoting a telic event, which progresses at the same time as parts of three apples are consumed and ends when three apples are completely consumed. In contrast, 'eat apples' is a cumulative predicate denoting an atelic event, because the meaning of the direct object 'apples' is not quantized, marking no inherent endpoint for the event.

Given Krifka's (1989a; 1998) account, it follows that consumption verbs with a quantized direct object entail event completion in the standard perfective (cf. Comrie 1976; Smith 1994, 1997). However, as various authors have observed (e.g. Piñón 2008; Rothstein 2004), this event completion entailment can sometimes be canceled, if the direct object is definite as in (3), which is analyzed as quantized.

(3) Rebecca ate the apple for five minutes (before dropping it on the floor).

Piñón (2008, 184)

Moreover, in some languages, even predicates with an indefinite quantized NP, the canonical cases of Krifka's (1989a; 1995) analysis, do not necessarily entail event completion, directly contradicting his homomorphism-based account (cf. Singh 1991, 1998; Koenig and Muansuwan 2000; Bar-El et al. 2004; Soh and Kuo 2005; Koenig and Chief 2008; Tatevosov and Ivanov 2009). For example in Hindi, according to Singh (1991; 1998), although verbs of consumptions with a quantized mass NP, such as *do gilaas biiyar* 'two glasses of beer', entail event completion as in (4), those with a quantized count NP, such as *do kek* 'two cakes', only implicate event completion in their bare forms, and need to compound with *liye* 'take' to entail event completion as in (5).

(4) us ne do gilaas biiyar pii (*par puurii nahĩĩ pii)
he ERG two glasses beer drink-PERF (but entire NEG drink-PERF)
'He drank two glasses of beer (* but did not drink all of it).'

Singh (1998, 174)

(5) laRke ne do kek khaaye/ khaa liye
boy ERG two cake eat-PERF/ eat take-PERF
'The boy ate two cakes (partly)/entirely. Singh (1998, 186)

Singh (1991, 1998) attributes incompletive readings to the partially-affected thematic relationship between the verb and count nouns instead. Since mass and count nouns relate to the verb through a total-affectedness and a partial-affectedness relation respectively, Singh's analysis correctly predicts that these two types of nouns give rise to two different patterns of event completion entailments. Nevertheless, positing two thematic relationships seems stipulative, and does not explain why definiteness seems to improve the acceptability of incompletive readings in English.

Singh's account, however, is not sufficient for Mandarin, because the crucial property is not the count/mass distinction of the noun, but rather the referentiality of the direct object. Contra Singh (1991, 1998), even a mass NP can have an incompletive reading in (6), when it is made definite.

(6) a. # wo he-le san-sheng shui, mei he-wan.
I drink-PERF three-liter water, not drink-finish
Intended 'I drank three liters of water, but I didn't finish.'

b. wo he-le na san-sheng shui, mei he-wan.
I drink-PERF that three-liter water, not drink-finish
'I drank those three liters of water, but I didn't finish.'

These incompletive readings for consumption verbs can be subsumed under the discussion of the broader phenomena of non-culminating accomplishments (Ikegami 1981; Koenig and Muansuwan 2000; Bar-el 2005; Tatevosov and Ivanov 2009; Altshuler 2014; Martin 2015, 2019; Beavers and Lee 2020, among others). Most studies in non-culminating accomplishments have a wider scope than my current study, aiming to explain the unexpected lack of culmination for all types of non-culminating accomplishments within a language. There are mainly three approaches: modal or partitive (Koenig and Muansuwan 2000; Bar-El et al. 2004; Tatevosov and Ivanov 2009; Altshuler 2014), scalar (Chief 2008; Koenig and Chief 2008), and agentive (Martin and Schäfer 2015; Martin 2015; Lee 2015; Beavers and Lee 2020). In the modal or partitive approach (Koenig and Muansuwan 2000; Bar-El et al. 2004; Tatevosov and Ivanov 2009; Altshuler 2014), the culmination point is removed to some kind of inertia world by an operator. In the scalar approach (Chief 2008; Koenig and Chief 2008), predicates are analyzed similarly to degree achievements as in Kennedy and Levin (2008) with a degree of change not necessarily equal to the maximum. In the agentive approach, it is observed that the non-culminated reading is much more acceptable if the sentence is agent-controlled (Martin and Schäfer 2015; Martin 2015; Lee 2015; Beavers and Lee 2020). All three approaches explain well the phenomena discussed within their own range of data with convincing arguments, and it may be the case that all three approaches can co-exist for explaining different subtypes of these phenomena.

Earlier studies often assume that there is one single source for the lack of culmination within the same language (Bar-El et al. 2004; Koenig and Chief 2008). This leaves the question open as to whether different factors may co-exist within the

same language. More recent studies explore this possibility (Martin 2019; Beavers and Lee 2020). There is evidence that non-culminating accomplishments might not be a homogeneous phenomenon as previously assumed, suggesting that different subtypes need to be examined thoroughly. In particular, incompletive readings for derived accomplishment predicates, i.e. incremental theme verbs such as verbs of creation and consumptions, have received much less attention than the inherent accomplishment predicates, except for Singh (1991, 1998) well-cited papers.

Within Mandarin, it has long been observed that accomplishments in the perfective allow non-completive readings (Tai 1984; Smith 1997; Sybesma 1997; Soh and Kuo 2005; Chief 2008). Different from the approaches mentioned above, the cause of non-culmination is attributed to the lack of bare accomplishment verbs (Tai 1984) in Mandarin, or the terminative semantics of the perfective marker *le* (Smith 1994). Sybesma (1997) agrees that Mandarin lacks bare accomplishment verbs, but he crucially points out that the perfective can be either terminative or completive depending on the predicate type. Similar to Singh (1991, 1998), Soh and Kuo (2005) demonstrate that the referential properties of the direct object matter for whether an incompletive reading can arise. Notably, Chief (2008) introduces scalarity as the source of non-culmination based on the works on degree semantics by Kennedy and Levin (2008), providing a unified analysis from a new perspective on this matter.

The approach I take in this paper is essentially a scalar one for gradient predicates (Krifka 1989a) similar to Chief (2008) and Koenig and Chief (2008), but I contend that the source of scalarity does not need to originate from the verb alone, and that the scalar approach needs to be constrained by the referential properties of its direct object. A priori, because inherent accomplishment predicates and derived accomplishment predicates are qualified as accomplishments for different reasons, it seems natural to assume that the source of non-culmination for derived accomplishments may also differ. Kennedy (2012) keenly points out that degree achievements, path verbs, and incremental theme verbs can indeed be analyzed with a unified approach with degree semantics, and yet the measure function is encoded in the noun for incremental theme verbs, and in the adjectival core of the verb for degree achievements respectively. Moreover, in light of Soh and Kuo (2005), I argue that the scalar semantics needs to be constrained by the referential properties of its nominal argument.

In this paper, I propose that for Mandarin consumption verbs, a sentence's completion entailment ultimately depends on the two different ways to interpret the direct object: as referential entities or as event measurements. In the former reading, the direct object refers to some pre-existing entity or entities affected in an event; whereas in the latter, the direct object specifies the amount of change in an event. Only the latter measurement interpretation entails event completion. Unlike Singh (1991, 1998), I maintain that there is one single partially-affected thematic relation that only referential entities can enter into, which I model through a partitive operator $part_{\Delta}$, following Kennedy (2012).

Crucially, I spell out the exact input conditions for the $part_{\Delta}$ operator (cf. Kennedy 2012), which creates a partitive event measurement scale based on the parts of the denotation of the direct object. Although underspecified in Kennedy's account, this partitive operator does require the denotation of the direct object to be referential: either each atomic part of the denotation is individuated, or the denotation as a whole

is pragmatically individuated. This requirement stems from the necessity to create an identifiable part-whole relationship between the parts consumed and each of the affected entities.

Another important ingredient of my analysis is modeling differences in referentiality of the direct object, which are not covered by Krifka's cumulative/quantized nominal semantics. To bridge this gap, I bring in research in definiteness and referentiality (Strawson 1950; Donnellan 1966; Fodor and Sag 1982; Longobardi 2005; Vangsnes 2001; Von Heusinger 2002; Chen 2003, 2005, 2009; among others). Adapting the lattice structures of Link (1983) and the syntax-semantic account of Li (2013) for Mandarin NPs, I propose that referential entities can be modeled by atomic lattices, and measure readings by non-atomic lattices. Entities, which are modeled as individuals on an atomic lattice structure, can enter into a patient-thematic relation with consumption verbs, whereas non-referential abstract measures only serve as event measurements. Simply put, just like the function of *three miles* in *run three miles*, if a direct object does not refer to entities, it merely denotes the extent of change rather than how certain event participants are affected.

Furthermore, I argue that depending on the definiteness, specificity, and the individuating function of its classifier or measure word, the direct object can have either only a measurement reading or both readings. As a result, some direct objects only allow a completive reading, whereas others seem to optionally permit incompletive readings.

This paper is organized as follows: in §2, I first provide some background on the notions of referentiality, definiteness, and individuation, and then discuss a few previous studies of incompletive readings in consumption verbs in Hindi and Mandarin. Then in §3, I present the main data of completion entailment patterns for different combinations of indefinite and definite numeral-classifier phrases, and show that only direct objects with possible referential readings allow incompletive readings in the right contexts. In §4, I analyze the data by first presenting a simplified version of Li (2013), and then present my semantic composition of consumption verbs with a referential direct object and a non-referential direct object. In addition, I offer some brief tentative remarks on the difference between English and Mandarin consumption verbs. To conclude, in §5 I summarize my analysis and point out some issues for future research.

2 Background and previous analyses

As previous studies mainly focus on indefinites, definites are seldom examined in full, and consequently the role of the referentiality of the direct object remains understudied in event semantics (Singh 1991, 1998; Soh and Kuo 2005; Koenig and Chief 2008; among others). Luckily, referentiality is well discussed in the literature for definiteness and specificity in nominal semantics (Donnellan 1966; Fodor and Sag 1982; Vangsnes 2001; Von Heusinger 2002; Chen 2003, 2005, 2009; among others). It is generally agreed that definite noun phrases and indefinite individuated noun phrases can be interpreted referentially, whereas indefinite non-individuated noun phrases are usually interpreted non-referentially by default (Chen 2003, 2005, 2009). For the rest of this

section, I first explain briefly how referentiality relates to definiteness, specificity and individuation, and then continue to discuss some previous analyses of consumption verbs in Hindi and Mandarin.

2.1 Referentiality

Although often mentioned in the literature for definiteness and specificity, referentiality is notoriously hard to define exactly, as various researchers seem to understand it slightly differently (Chen 2003, 2005, 2009), and referentiality is related to both semantics and pragmatics (Givón 1978; Gundel et al. 1993; Kuo 2008). Roughly speaking, referentiality can be defined as 'the speaker's intent to "refer to" or "mean" a nominal expression to have non-empty inferences- i.e. to "exist"- within a particular universe of discourse (Givón 1978, 293)'. Similarly, the term 'non-referential' has also been used loosely to refer to various concepts with different terms such as generic, attributive, quantifying (Donnellan 1966; Fodor and Sag 1982; Chen 2009). In this paper, I use the term 'non-referential' for NPs that do not refer to pre-existing entities in the discourse (Givón 1978). In particular, since this paper is mostly concerned with various types of numeral-classifier constructions, the opposition between an individuated reading (referential) and a measure reading (non-referential) is of particular interest (Rothstein 2009a, b; Li 2013).

Different types of noun phrases tend to be associated with different referential or non-referential readings by default. Whereas definites highly correlate with referential uses, indefinites usually correlate with non-referential uses (Chen 2003, 2005, 2009). Definite descriptions, proper names, and demonstrative phrases are often interpreted referentially, referring to uniquely identifiable entities in the world (Strawson 1950; Von Heusinger 2002; Longobardi 2005; among others). In contrast, indefinites tend to be interpreted non-referentially, not referring to any particular entity that pre-exists in the world, but describing some potential entities that fit the NP description or serve as quantifiers (Fodor and Sag 1982; Landman 1989a, b; Ter Meulen 1981; Landman 2008; among others).

In some cases, indefinite NPs can also be interpreted referentially with a specific reading (Fodor and Sag 1982; Von Heusinger 2002). In a classic example from Fodor and Sag (1982, 355), 'a student cheated in Syntax I', there might be a specific student in the speaker's mind, in which case the noun phrase is indeed referring to an entity; or else 'a student' may simply describe anyone that fits the description without a specific referent. However, indefinite mass NPs seem to lack a similar specific reading, if the measure word is non-individuating (Von Heusinger 2002; Chen 2009). For example, *three liters of water* usually does not refer to three specific liters of water, because its denotation does not have inherent atomic parts (cf. Link 1983). The standard unit measure word *sheng* 'liter' is non-individuating in the sense that each liter of water does not have a boundary that distinguishes it from another liter, so that each liter is not separately identifiable and referable. Therefore, unlike count noun phrases, indefinite mass noun phrases seem to be not easily interpretable referentially.

Rather than the count/mass distinction of the noun, Landman (2008) and Rothstein (2009a, b, 2010b) argue that it is ultimately the measure word in a noun phrase that

determines whether a referential interpretation is available, as even mass noun phrases can be interpreted referentially with an individuating measure word. For example, container measure words, such as *glass* or *bowl*, are ambiguous between a referential individuating reading and a non-referential measure reading. According to Rothstein (2009a, b, 2010b), 'three glasses of water' gives rise to two possible readings: 'an individuating reading, in which the DP denotes plural objects consisting of three individual glasses of water, and a measure reading, in which the DP denotes quantities of water which equal the quantity contained in three glasses (Rothstein 2009a).' Between these two readings, the individuating reading is the necessary condition for a referential reading, because the NP *three glasses of water* can now potentially refer to a specific plural entity consisting of three individual glasses of water.

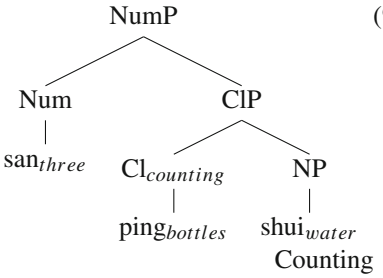
In a language like English with morphological count/mass distinctions, both the count/mass distinction of the noun and the measure word influence whether a referential reading can arise for indefinites. On the other hand, in a language like Mandarin without such a distinction, it is entirely up to the classifier or the measure word to decide (Cheng et al. 1998; Chierchia 1998; Sybesma 1999; Li et al. 2008; Li and Rothstein 2012; among others). In Mandarin, a count noun syntactically patterns like a mass noun by requiring a classifier between a numeral and the count noun itself. As in (7a), even a count noun, such as *pingguo* 'apple', cannot be counted directly by adding a numeral in front like in English, but needs an individuating classifier, such as *ge*, in-between at the same position for measure words as in (7b). Although Mandarin has no morphological count/mass distinction, for easy cross-linguistic comparisons, I continue to use the terms 'count' and 'mass' to differentiate nouns that are compatible with individuating classifiers for natural atoms and nouns that are not for the rest of the paper (cf. Cheng et al. 1998).

(7) a. san *(ge) pingguo
three CL apple
'three apples'
Count Nouns

b. san bang rou
three pound meat
'three pounds of meat'
Mass Nouns

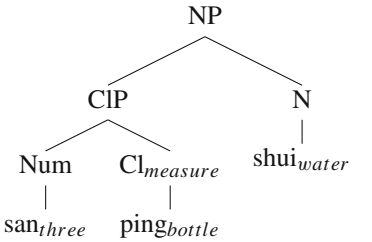
Because of this obligatory presence of a classifier or a measure word after a numeral, Chierchia (1998) proposes that all Mandarin nouns behave semantically like mass nouns, which need to compose with individuating classifiers to introduce an atomic part structure. Following Chierchia (1998) and Rothstein (2009b, 2010a, b), Li (2013, 140) proposes two different structures for Mandarin numeral-classifier phrases under an individuating (counting) reading in (8) and a measure reading in (9). Li (2013) shows with ample syntactic evidence that a classifier or a measure word composes with a head noun and a numeral in different orders in these two structures and that semantically classifiers or measure words only introduce an atomic part structure under an individuating reading.

(8)



Counting

(9)



Measure

Notice that not all types of classifiers or measure words can introduce an atomic structure. Whereas individuating classifiers and container measure words may have an individuating reading, standard unit measure words, such as *sheng* 'liter' and *bang* 'pound', only have a measure reading available (cf. Li 2013), because the units of the standard unit measure words have no inherent boundaries like the container measure words, nor do they have natural atomic boundaries as individuating classifiers do.

Therefore, for indefinite numeral-classifier phrases in Mandarin, a referential reading is potentially available for a) count nouns with individuating classifiers, and b) count or mass nouns with container measure words.

In terms of pragmatics, the choice of a particular nominal form signals a certain cognitive status of its denotation (Gundel et al. 1993; Kuo 2008). According to Gundel et al. (1993), there are six cognitives statuses that can be ranked in a Givenness Hierarchy. As can be seen in (10), referential occupies the second lowest position only above type identifiable. Type identifiable means that 'the addressee is able to access a representation of the type of object described by the expression', while referential means that '[t]he speaker intends to refer to a particular object or objects' (Gundel et al. 1993, 226). In other words, referential NPs presuppose the existence of their referents, while non-referential NPs are type identifiable without the need of the pre-existence of their denotations.

(10) Givenness Hierarchy
in focus > activated > familiar > uniquely identifiable > referential > type identifiable

Gundel *et al.* (1993, 275)

Under Gundel *et al.*'s (1993) theory, definite descriptions are uniquely identifiable and hence referential. By virtue of being uniquely identifiable, i.e. there is only one entity that satisfies the description, the referent of the definite description is pragmatically individuated from the rest of its kind. Unlike English, Chinese lacks articles so that demonstratives are used for the uniquely identifiable category instead (Gundel et al. 1993; Kuo 2008).

Indefinites, on the other hand, are canonically type identifiable (non-referential), but can alternatively be interpreted referentially with a specific reading (Gundel et al. 1993; Kuo 2008). In a study of the interpretations of bare nouns in Mandarin, Kuo (2008) shows how the context and the individual/stage-level distinction influence whether a referential or non-referential reading is to be adopted. Similarly, Mandarin indefinite

numeral-classifier constructions are also subject to the same ambiguity that may be resolved in certain contexts, with the exception that those with non-individuating classifiers actually have no referential interpretation (Li 2013; Chen 2009).

From the discussions above, we can conclude that an NP can potentially be interpreted referentially, if what it denotes can be individuated either semantically through the classifier or measure word, or pragmatically through definiteness. I informally define the necessary conditions for referentiality as follows:

(11) A nominal predicate can be referential if and only if its denotation can be semantically or pragmatically individuated.

By including definites which are pragmatically individuated, my definition of referentiality is therefore a broader concept than semantically individuating readings in Rothstein (2008, 2009a, b, 2010b). Semantic individuation provides the potential for an indefinite NP to be referential, because semantically non-individuated indefinite NPs, such as *san-sheng shui* 'three liters of water', only have a measure reading, lacking a referential reading. In contrast, not all NPs that can be semantically individuated, such as *san-ge pingguo*, need to be interpreted referentially, because they may be interpreted with a non-referential measurement reading.

Although the literature on non-culminating accomplishments covers numerous languages, as far as I am aware of, only a few have focused specifically on verbs of consumption and creation (Singh 1991, 1998; Soh and Kuo 2005). In some previous works both in Hindi (Singh 1991, 1998) and in Mandarin (Sybesma 1999; Soh and Kuo 2005; Koenig and Chief 2008), there have been discussions of the relevance of the count/mass or the definiteness distinctions for incompletive readings. But none of these previous studies has generalized both cases to referentiality, and consequently they have failed to cover the full range of data.

2.2 Singh's analysis of Hindi incompletive reading

Singh's (1991, 1998) seminal works of incompletive readings of Hindi verbs of consumption are particularly relevant, because she offers one of the first semantic accounts with modifications on Krifka's (1989a) canonical theory for the Hindi data, which pattern very much like the Mandarin data. Crucially, she points out the relevance of the count/mass distinction in the head noun of the direct object. She observes that incompletive readings are felicitous, only when the head is count, but never when it is mass. Compare the following examples in (4′) and (12). With a mass noun *biiyar* 'beer', the sentence entails event completion, as the continuation 'but did not drink all of it' is judged infelicitous. On the other hand, with a count noun *kek* 'cake' in (12), an incompletive reading is allowed.

(4′) us ne do gilaas biiyar pii (*par puurii nahĩĩ pii)
he ERG two glasses beer drink-PERF (but entire NEG drink-PERF)
'He drank two glasses of beer (* but did not drink all of it).'

Singh (1991, 174)

(12) mãẽ ne aaj apnaa kek khaayaa aur baakii kal
I ERG today mine cake eat-PERF tomorrow remaining tomorrow
khaaũũgaa
eat-FUT
'I ate my cake today and I will eat the remaining part tomorrow.'

Singh (1991, 172)

Singh explains this contrast by positing two separate thematic relations: a total-affectedness relationship in the material domain for mass nouns, and a partial-affectedness relationship in the individual domain for count nouns. As shown in (13a), the thematic relation for the material domain denotes a total-affected relation in the sense that every subpart of the denotation of the direct object participates in a subevent, and that each subevent has a subpart of the denotation of the direct object involved. In contrast, the thematic relation for the individual domain, as in (13b), only requires that for each of the atomic parts of the denotation of the direct object, there be a material subpart of that atomic part participating in the event, and that each subevent have a material subpart involved.

(13) a. $\theta_m(e,x) \leftrightarrow \forall x'[x' \sqsubseteq x \rightarrow \exists e'[e' \sqsubseteq e \wedge \theta_m(e',x')]] \wedge \forall e'[e' \sqsubseteq e \rightarrow \exists x'[x' \subseteq x \wedge \theta_m(e',x')]]$

b. $\theta_i(e,x) \leftrightarrow \forall x'[x' \sqsubseteq_A x \rightarrow \exists x'', e'[x'' \sqsubseteq h(x') \wedge e' \sqsubseteq e \wedge \theta_m(e',x'')]] \wedge \forall e'[e' \sqsubseteq e \rightarrow \exists x'[x' \sqsubseteq h(x) \wedge \theta_m(e',x')]]$ Singh (1998, 188-189)

Therefore, unlike Krifka's analysis, where each part of an individual must be mapped to some part of an event, for Singh (1991) within each atomic part of an individual, some parts do not need to participate in the event in the individual domain. In other words, given the partial-affected thematic relation, for 'I ate three apples' in Hindi, some part of each apple can be uneaten so that an incompletive reading may arise.

Given these different thematic relations for these two domains, only count nouns can have incompletive readings in Hindi, whereas mass nouns force an obligatory event completion reading as Krifka's (1989a) analysis predicts. Although Singh (1991, 1998) seems to have successfully accounted for the Hindi data, there are reasons to believe that this analysis based on the count/mass distinction is still insufficient, in light of new data from Mandarin that even mass nouns are compatible with incompletive readings, when they are definite. Since Singh's (1991, 1998) papers have only touched upon some definite noun phrases, it is not entirely clear what the completion entailment patterns are for different types of definite NPs. Furthermore, assuming that the count/mass domains are determined by the nominal head, rather than the measure word, definiteness or specificity, her analysis would then wrongly predict that mass nouns with demonstratives are incompatible with incompletive readings, given that the head noun belongs to the mass domain. Therefore, it is necessary to formulate a new analysis that can explain not only why incompletive readings are more likely to occur with count nouns, but also why incompletive readings may also occur with mass nouns with demonstratives.

2.3 Previous analyses in Mandarin

Just like in Hindi, Mandarin verbs of consumption and creation have also been observed to allow incompletive readings in some situations (Smith 1997; Sybesma 1997; Soh and Kuo 2005; Chief 2008; Koenig and Chief 2008; among others). Sybesma (1999) crucially points out that verbal predicate types influence whether sentences with *le* are interpreted as terminative or completive. In addition, he demonstrates the influence of different referential properties of the direct object, which matches the description in Krifka (1989a) for English that, as the object of a consumption verb, a bare mass noun gives rise to an atelic predicate, whereas a definite or a specific NP gives rise to a telic predicate.

(14) chi-le cai jue-zhe you diar xiangwer.
eat-PERF only feel have little flavor
'Only when I ate, I felt there was some nice flavor to it.'

Liu (1988, 326)

(15) chi-le yi-zhi ji cai jue-zhe you diar xiangwer.
eat-PERF one-CL chicken only feel have little flavor
'Only after I had eaten a chicken, did I feel there was some nice flavor (to the meal).' (only available reading) Sybesma (1999, 239)

I agree with the main point of Sybesma (1999) about the influence of the VP type by virtue of the referential properties of the direct object, but I have a slightly different analysis of the data, especially regarding (15). While there is no doubt about (14), an example by Liu (1988) cited in Sybesma (1999, 238), that a bare mass noun with an indefinite reading gives rise to atelicity, I believe that for a count noun, it may have a measure reading or a referential reading depending on the context, which complicates the situation. The obligatory completive reading for (15) is not only related to the completive semantics of *le*, but also related to the preference for a measure reading over a referential reading for *yi-zhi ji* 'one chicken' in this particular example due to the use of *cai* 'only'. The use of *cai* is pragmatically odd unless *yi-zhi ji* 'one chicken' has a measure reading that forces a total consumption reading. Without *cai*, the sentence seems to also allow an incompletive partitive reading with appropriate contexts.

Because of this potential ambiguity between a measure reading and a referential reading, there is some disagreement surrounding whether indefinite count NPs can give rise to incompletive readings, though most agree that demonstrative NPs allow for incompletive readings. For example, on the one hand, according to Soh and Kuo (2005), it is felicitous to cancel the default event completion reading, when the direct object has a demonstrative as in *na-ge dangao* 'that cake', but not a numeral as in *liang-ge dangao* 'two cakes', as in (16) similar to Sysbesma's (1999) example (15). Koenig and Chief (2008), on the other hand, show with an attested example from Google that an incompletive reading can be present even for count NPs with a numeral, *liang-chuan dakao* 'two kabobs', as in (17). The second half of (17) cancels the culmination implicature, giving rise to an incompletive reading that two kabobs are not completely eaten.

(16) Ta chi-le #liang-ge dangao/ na-ge dangao, keshi mei chi-wan.
He eat-PERF two-CL cake/ that-CL cake but not eat-finish
'He ate two cakes/that cake, but he did not finish eating them/it.'

adapted from Soh and Kuo (2005, 204)

(17) Wo (...) chi-le liang-chuan dakao, dan mei chi-wan[Google]
I eat-PERF two-CL kabob, but not eat-finish
'I ate two kabobs, but didn't finish eating them. (lit.)'

Koenig and Chief (2008, 247)

It is probably not so surprising that different speakers vary in their acceptance of such incompletive readings, given that most of these sentences are interpreted as completed by default through pragmatic reasoning. More specifically, there are potentially two pragmatic reasons. For one, the Gricean Maxim of Quantity would ask for the sentence to be as informative as possible (Grice 1989), and in (16) the most informative reading is the one where the denotation of the direct object is completely consumed. For another, the use of numeral-classifier phrases at the canonical direct object position strongly prefers a non-referential reading (Gundel et al. 1993; Kuo 2008). Consequently, some of these incompletive readings are admittedly quite difficult to get without the suitable contexts and some efforts on the hearer's part. Nevertheless, these previous studies in Mandarin do agree that it is much easier to get an incompletive reading for an NP with a demonstrative than one with a numeral alone. This suggests that referentiality of the direct object plays a very important role in determining whether an incompletive reading is felicitous.

Both studies offer many valuable insights. Soh and Kuo (2005) correctly point out the relevance of the boundedness feature of the NP, and yet their study primarily relies on syntactic tree features, and offers no detailed formal semantic derivations. Koenig and Chief (2008) propose a degree-achievement-like semantics for the verb, but consider referential properties of the direct object to be irrelevant because of the judgment variations surrounding part of the data. Though these two studies contain different judgments about indefinite count nouns as the objects for consumption verbs, referentiality is still a factor that deserves full consideration. The reason is that most native speakers tend to reject an incompletive reading in favor of a completive reading, which actually suggests that the partitive analysis (Altshuler 2014) or the scalar analysis (Chief 2008; Koenig and Chief 2008) cannot be unconstrained, otherwise an incompletive partitive reading should be freely available in all situations. Moreover, even though not all judgments are shared by every native speaker, the striking similarity between Hindi and Mandarin is unlikely to be pure chance, vouching for a careful investigation into this matter.

In the next section, I introduce the relevant data based on these previous analyses and also on my own judgments, supplementing substantial data on definites.

3 Data for consumption verbs in Mandarin

In this section, I argue that referentiality of the direct object, rather than the count/mass distinction of the head noun, determines whether an incompletive reading can arise. Crucially, I show that regardless of the count/mass distinction, whenever the direct object can be interpreted referentially, an incompletive reading may arise. The direct object can potentially be referential, either when its classifier or measure word is individuating, or when its denotation is pragmatically individuated.

3.1 Indefinite NPs

First, let us consider the case of indefinite NPs in the canonical postverbal object position. Regardless of the count/mass distinction, an incompletive reading can potentially arise whenever the classifier or the measure word is individuating (Rothstein 2008, 2010b; Li and Rothstein 2012; Li 2013). When the direct object is introduced in its canonical postverbal position, it usually has an indefinite reading (cf. Li and Thompson 1989; Paul 2002; Chen 2003, 2005, 2009). As discussed in §2, an indefinite NP tends to be interpreted non-referentially by default (Chen 2003, 2005, 2009), except for when it has a specific reading, which is possible if the classifier or the measure word is individuating. Consider the two sentences in (18).

(18) a. wo chi le san-ge pingguo, mei chi-wan.
I eat PERF three-CL apple, not eat-finish
'I ate (some part of) three apples, but didn't finish.'

b. wo he le san-wan shui, mei he-wan.
I drink PERF three-bowl water, not drink-finish
'I drank (some part of) three bowls of water, but didn't finish.'

The count/mass distinction of the head noun does not matter, because an incompletive reading can arise as long as the classifier or the measure word is individuating, such as with an individuating classifier *ge* in (18a) or a container measure word *wan* 'bowl' in (18b). Notice that, as discussed in the previous section, the completive reading is the default due to pragmatic reasoning, and this completion implicature needs to be canceled by a follow-up clause *mei chi/he wan* 'not finished eating/drinking'. And yet, incompletive readings are still attested and possible in the proper contexts. The two sentences in (18) can be true in scenarios where each apple is partly eaten or each bowl of water is partly drunk. In other words, indefinite NPs as the direct object of consumption verbs can give rise to distributive incompletive readings, with an individuating classifier or a container measure word. Crucially, these sentences cannot be true if only two out of three are eaten or drunk with a collective incompletive reading, which would be predicted if a partitive predicate approach is adopted.

Like the Hindi data in Singh's (1991, 1998) papers, in Mandarin each of the atomic parts in the denotation of the NP must be at least partly consumed. It would be infelicitous to utter sentences in (18), if only two out of the three apples or the three bowls of water were partly consumed. However, unlike the Hindi data, even mass nouns,

such as *shui* 'water', can be compatible with an incompletive reading, as long as the measure word is a container measure word like 'bowl' with an individuating function.

In contrast, with a standard unit measure word, such as *bang* 'pound' or *sheng* 'liter', the direct object cannot be interpreted referentially. Consequently, the sentences must entail that the entire amount has been consumed, disallowing incompletive readings as in (19). The first halves of the sentences in (19) can only be true when all three pounds of apples and all three liters of water are completely consumed.

(19) a. # wo chi le san-bang pingguo, mei chi-wan.
I eat PERF three-pound apple, not eat-finish.
Intended 'I ate (some part of) three pounds of apples, but didn't finish.'

b. # wo he le san-sheng shui, mei he wan.
I drink PERF three-liter water, not drink finish.
Intended 'I drank (some part of) three liters of water, but didn't finish.'

To summarize, for indefinites, it depends on the individuating functions of the classifier or the measure word whether an incompletive reading may arise. At the canonical post-verbal position, usually an NP is introduced as new information (cf. Ernst and Wang 1995; Paul 2002), so that the NP cannot be interpreted as referring to a specific entity already mentioned or assumed in the common ground. Since its denotation is not pragmatically individuated (cf. Link 1983; Landman 1989a, b), an indefinite NP can be referential only by having individuated atomic parts, which are semantically introduced by the classifier or the measure word (cf. Chierchia 1998; Li et al. 2008; Li 2013). Therefore, in Mandarin an indefinite NP can only be referential when it has an individuating classifier or a container measure word.

3.2 Definite NPs

As mentioned above in the introduction, compared to indefinite NPs, surprisingly little has been said about definite NPs in event semantics. Particularly, it is unclear what the event completion entailment patterns would be for definite NPs with different combinations of count/mass nouns and classifiers or measure words. To fill in this gap, I present the relevant data below in this subsection. Crucially, I show that regardless of the count/mass or individuating/non-individuating classifier distinctions, all definite NPs can give rise to an incompletive reading, because when an NP is definite, it refers to an entity that is individuated from the rest of its kind by context.

As Mandarin has no definite articles, let us consider the cases of demonstrative NPs. If *na* 'that' is added in front of the numeral-classifier phrases in examples (18) and (19) to produce (20) and (21) below, then regardless of the count/mass distinction of the noun or the type of the classifier or measure word, all examples below are now felicitous with an incompletive reading under the right contexts, even for NPs with non-individuating standard unit measure words as in (21)[1].

[1] Some native speakers may find these sentences somewhat odd, because they may prefer to put a definite direct object in the pre-verbal position.

(20) Individuating

a. wo chi-le na san-ge pingguo, mei chi-wan.
I eat-PERF that three-CL apple, not eat-finish
'I ate (some part of) those three apples, but didn't finish.'

b. wo he-le na san-wan shui, mei he-wan.
I drink-PERF that three-bowl water, not drink-finish
'I drank (some part of) those three bowls of water, but didn't finish.'

(21) Non-Individuating

a. wo chi-le na san-bang pingguo, mei chi-wan.
I eat-PERF that three-pound apple, not eat-finish
'I ate (some part of) those three pounds of apples, but didn't finish.'

b. wo he-le na san-sheng shui, mei he-wan.
I drink-PERF that three-liter water, not drink-finish
'I drank (some part of) those three liters of water, but didn't finish.'

Unlike their indefinite counterparts, definites with an individuating classifier or measure word no longer require a distributive reading. As the objects of consumption verbs, indefinites have an obligatory distributive reading, because readings where not all the atomic individuals are affected are judged to be false. In contrast, for definites, atomic individuals within the denotation of a definite NP can be uniquely linked to that plural individual such that not all atomic individuals need to be affected. Here I am only making an observation of the empirical data, rather than offering a general claim about the distributivity of indefinites, which is beyond the scope of this paper. In (20), the sentences can be true with a collective reading that some part out of those entities is consumed, because definite plurals actually form a group atom (Link 1983; Landman 1989a, b) that can be considered a single unanalyzable entity.

For example, even if the speaker only consumed some part of one of those three apples or a small portion of one of the three bowls of water, the sentences in (20) are considered true. The distributive reading may also be true by coincidence, as it entails the collective reading. Therefore, definites with atomic parts may give rise to either a collective or optionally a distributive incompletive reading.

Even for definites with a standard unit measure word like in (21), a collective incompletive reading is available. Imagine a scenario where some family members are talking about some amount of apples or water that a relative brought as a gift earlier. If the speaker asks 'did you eat those three pounds of apples/drink those three liters of water', then the hearer can felicitously utter the sentences in (21) to express that the hearer consumed part of the referred amount. Unlike the individuating classifiers or container measure words, standard unit measure words have no individuating function so that no distributive reading is available.

Besides the demonstratives, Mandarin can also use word order to communicate a definite meaning. When the direct object is preposed to the front of the verb, the internal topic position, the direct object is understood to be definite or specific (cf. Ernst and Wang 1995; Paul 2002). In terms of the information structure, this internal topic position can signal common ground information known to the speaker and the

hearer, hence rendering the noun phrase interpretively more or less like an English definite phrase.

Similar to the demonstrative NPs, the preposed direct objects also allow incompletive readings, regardless of the count/mass distinction of the head noun or the individuating function of the classifier or the measure word. In (22a), it is understood that *san bang pingguo* 'three pounds of apples' is referring to three specific pounds of apples already mentioned or assumed in the background. In this reading, it is felicitous to assert that the three pounds of apples are partially eaten. Likewise, replacing the head noun with a mass noun 'water' yields the same result in (22b).

(22) a. wo san-bang pingguo dique chi-le, dan mei chi-wan.
I three-pound apple indeed eat-PERF, but not eat-finish
'I ate (the) three pounds of apples indeed, but did not finish.'

b. wo san-sheng shui dique he-le, dan mei he-wan.
I three-liter water indeed drink-PERF, but not drink-finish
'I drank (the) three liters of water indeed, but did not finish.'

Just like the semantic individuation function of the classifier or the measure word, definiteness can also pragmatically individuate the denotation of an NP through context by a group atom formation process. According to Link (1983) and Landman (1989a, b, 2008), definite plurals can form a group atom consisting of a set of plural entities contextually singled out as a whole, distinguishable from the rest of their kind. By analogy, I argue that this process can be extended to definite NPs with standard unit measure words, because a specific amount of stuff can also be made contextually salient and uniquely identifiable. As individuation is the basis for referentiality, all the pragmatically individuating definites in this subsection and the semantically individuating indefinites in the previous subsection can be interpreted referentially, leading to a potential incompletive reading, because consumption verbs in Mandarin have a partially-affected patient thematic relation with a referential direct object, whereas a non-referential direct object is interpreted as the extent of change instead.

3.3 Summary of the data

Summarizing the patterns from both indefinites and definites, one clear pattern emerges: whenever the direct object can have a referential interpretation, either through inherent or derived atomic references, an incompletive reading can arise for consumption verbs in Mandarin. As summarized in Table 1, event completion is entailed only when a consumption verb takes an indefinite NP with a standard unit measure word, which has no referential reading. For all the other cases, when the direct object is definite or when it is indefinite with individuating classifiers or container measure words, the direct object can be referential, giving rise to various incompletive readings: indefinites obligatorily induce distributive readings, and definites can give rise to non-distributive collective readings or optionally distributive readings.

Unlike Singh's (1991, 1998) analysis of Hindi, for Mandarin, the count/mass distinction of the noun is only indirectly relevant by the classifier or measure word that the noun takes. Ultimately, it is referentiality that explains why both definites and indef-

Table 1 Summary of the data for consumption verbs with different DOs

Incompletive readings	Indefinites	Definites
Individuating classifiers	Incompl. distr.	Incompl. distr. or non-distr.
Container measure ords	Incompl. distr.	Incompl. distr. or non-distr.
Standard unit measure words	Completive	Incompl. non-distributive

inites with an individuating classifier or measure word can give rise to incompletive readings.

4 Analysis

From the previous section, it is clear that an incompletive reading is possible, whenever the direct object can be interpreted referentially. Based on this new insight, instead of stipulating two thematic relationships as in Singh (1991, 1998), I maintain that there is only one partially-affected thematic relationship for referential NPs in Mandarin (cf. Beavers 2011), and that non-referential direct objects are interpreted as event measurements instead. My analysis intuitively explains why direct objects interpreted referentially do not entail event completion, as they serve to describe how certain event participants are affected, rather than how much substance has been changed during an event.

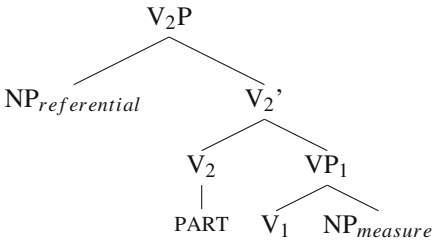
4.1 Analysis overview

For referential readings, 'ate X' in Mandarin semantically resembles 'ate of X' in English in that at least some part of the referent is eaten. With this partially-affected thematic relationship, Mandarin consumption verbs can be modeled similarly to degree achievements, which have variable telicity based on whether the degree of change is maximal (Kennedy and Levin 2008), with $part_{\Delta}$ from Kennedy (2012) .

However, when the NP lacks a referential reading, it is interpreted as an event measurement function instead, which always entails event completion more or less in line with Krifka (1989a, 1998). Because a non-referential reading measures the units of the direct object consumed during the event, it entails that the measurement is fully reached. To model this homomorphic mapping relationship, I propose that classifiers under a non-referential reading have a shifted semantics as event measurement functions in the spirit of Kennedy (2012).

Direct objects with referential and non-referential readings compose differently with verbs both syntactically and semantically (cf. Sun and Pan 2012; Zhang 2009, 2017, 2018; among others). I assume that in Mandarin specific and non-specific direct objects occupy two different syntactic positions (cf. Travis 2010): a non-specific NP with a measure reading is generated as the complement of V_1 and a referential NP is introduced by a partitive head at a higher syntactic position, the specifier of V_2P.

(23)



Crucially different from Krifka (1989a) and Singh (1991, 1998), my new proposal distinguishes referential and non-referential readings of the direct object (cf. Rothstein 2008, 2009a, 2010b), beyond the classic dichotomy between cumulativity and quantization. I propose that an NP can be referential, as long as it can be individuated from the rest of its kind: when the denotation of the NP has semantically individuated atomic parts or a pragmatically differentiated group atom. Since I propose individuation as the basis for referentiality, I model the referentiality difference by distinguishing atomic lattices and bottomless non-atomic lattices following Link (1983). I map both semantically derived atoms and pragmatically derived group atoms to the atomic lattices, and reserve non-atomic lattices for non-referential readings. Compositionally, I mainly adopt the syntactic-semantic account of Li (2013) to differentiate the referential reading and the measure reading.

The rest of this section is organized as follows: in §4.2, I present a simplified version of Li's (2013) analysis of Mandarin NPs and my own analysis of the group atom formation process for definites, and then I present my semantic analysis of consumption verbs composing with referential direct objects in §4.3 and the non-referential direct objects in §4.4. In §4.5, I discuss how the individuating classifiers can be ambiguous between a referential and a measure reading, and consequently how the predicate is ambiguous between a degree achievement reading and an accomplishment reading. In §4.6, I briefly compare Mandarin and English consumption verbs.

4.2 Semantics of noun phrases in Mandarin

Following Link (1983), I assume that the extension of a noun phrase forms a complete join semi-lattice structure in Mandarin. NPs interpreted referentially have an atomic lattice structure, whereas NPs interpreted non-referentially have a non-atomic bottomless lattice structure. Because all Mandarin noun roots denote kind (Chierchia 1998), count lattices are introduced not by the noun itself, but rather by individuating classifiers or container measure words with an individuating reading. For example, as shown in Fig. 1, the classifier phrase *ge pingguo* has a lattice structure with individual atomic apples as the bottom elements, picked out by the classifier *ge* CL.

Similar to *ge pingguo* 'CL apple', the extension of *wan pingguo* 'bowl of apples (or apple stuff)' with a referential reading also forms an atomic lattice structure with a bowl of apples or apple stuff as an atom as in Fig. 2. The atomic unit for *wan pingguo* is a bowl rather than an actual atomic apple, without specifying the shape of apples within the container. It could be whole apples or apple pieces, but the relevant atomic unit is a bowl.

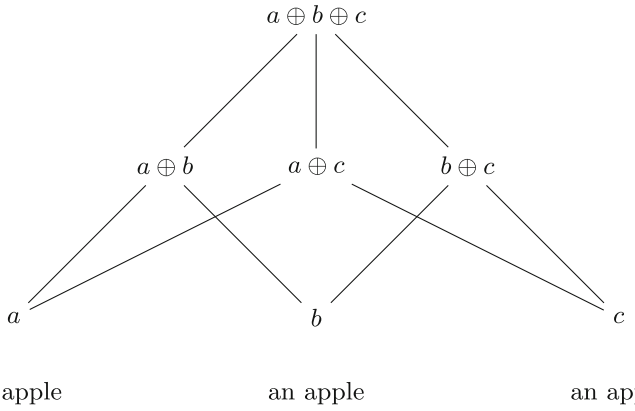


Fig. 1 The lattice of *Ge Pingguo* 'CL Apple'

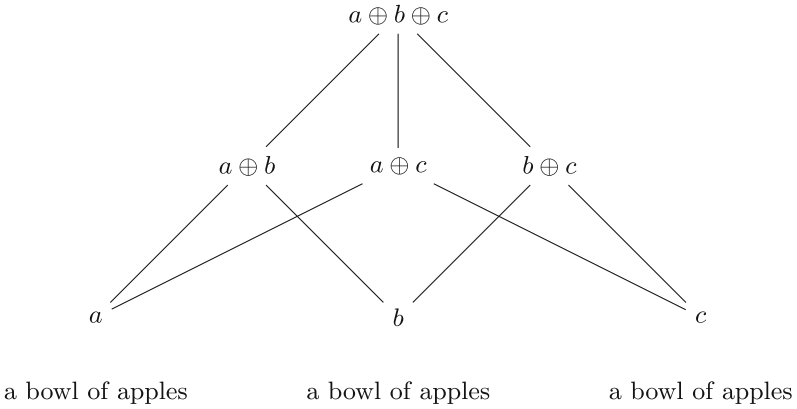
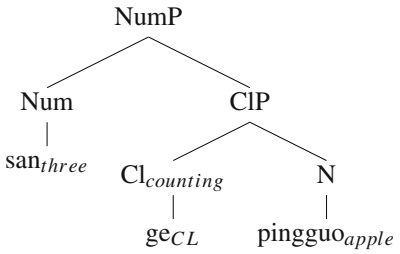


Fig. 2 The lattice of *Wan Pingguo* 'Bowl (of) Apples or Apple Stuff'

For the semantic composition, I basically assume the two syntactic structures proposed in Li (2013) for the referential reading and the measure reading.[2] I adopt this particular line of analysis for Mandarin numeral-classifier phrases because it has the merit of offering a detailed syntactic–semantic interface for distinguishing individuating readings from measure readings, which are critical for my event semantic analysis. In a nutshell, along the lines of Rothstein (2009b, 2010b), Li (2013) proposes that the classifier forms a constituent with the noun in an individuating reading, but not in a measure reading. The semantics for atomization only works when the classifier forms a ClP with the noun. As shown in (24), when the classifier has an individuating reading, the classifier first combines with the noun to form a ClP, and then combines with the numeral to form a NumP.

[2] Refer to Li (2013) for the actual syntactic tests in support of the two different syntactic structures.

(24)



Counting, adapted from Li (2013)

For ease of exposition, I simplify Li's (2013) notations along the lines of Krifka (1995), as illustrated in (25). First following Chierchia (1998) and Li (2013), I assume Mandarin bare nouns denote kinds. As in (25a), I use the subscript k as in $apple_k$ to indicate the apple kind. As in (25b), the individuating classifier *ge* maps a kind to its atomic individuals on a lattice with natural atomic units for that kind. So when the classifier *ge* composes with *pingguo* 'apple', the ClP phrase characterizes a set of natural atomic individuals for the apple kind, i.e. a set of individual atomic apples as in (25c). By default, *ge pingguo* has a singular meaning as in (25c), but because Mandarin has no singular/plural distinction, (25c) can shift to a plural meaning in (25d) to denote plural individuals by the '$*$' operation in Link (1983), when composing with numerals larger than one.

(25) a. $[\![pingguo]\!] = \text{apple}_k$

b. $[\![ge]\!] = \lambda k \lambda x[Atom_{natural}(k, x)]$

c. $[\![ge\ pingguo]\!] = \lambda x[Atom_{natural}(apple_k, x)]$

d. $[\![ge\ pingguo]\!] = \lambda x[^*Atom_{natural}(apple_k, x)]$

When numerals compose with ClPs, they have a counting semantics that counts the atoms in a given individual x for a given noun predicate P. The composition of the numeral one is slightly different from other numerals. As in (26), the numeral *yi* 'one' composes with a singular predicate P, while other numerals larger than one compose with a plural predicate $^*P$. In (26a), *yi* 'one' takes a singular nominal predicate P and returns a set of singular individuals with the count as one. Likewise, as in (26b), *san* 'three' has a plural predicate $^*P$ as an input and returns a set of plural individuals with a count of three, i.e. consisting of three atomic individuals.

(26) a. $[\![yi]\!] = \lambda P \lambda x[P(x) \wedge \text{COUNT}(x) = \mathbf{1}]$

b. $[\![san]\!] = \lambda^* P \lambda x[^*P(x) \wedge \text{COUNT}(x) = \mathbf{3}]$

For example, composing (26a) with (25c), we get the semantics of 'one apple' in Mandarin as in (27a). (27a) characterizes a set of singular atomic apple individuals. And similarly composing (26b) with (25d), we get the semantics for *san ge pingguo* 'three apples', which characterizes a set of plural individuals, where each individual is a sum of three atomic apples.

(27) a. $[\![yi\ ge\ pingguo]\!] = \lambda x[Atom_{natural}(apple_k, x) \wedge \text{COUNT}(x) = \mathbf{1}]$

b. $[\![san\ ge\ pingguo]\!] = \lambda x[^*Atom_{natural}(apple_k, x) \wedge \text{COUNT}(x) = \mathbf{3}]$

In the semantics of the numeral, the COUNT function counts the atomic individual(s) within the ClP's specific lattice structure. In the case of *ge apple* 'CL apple', *ge* semantically picks out natural atomic units. But the counting unit does not need to be the natural atomic unit for the kind, and is actually specified by the classifier rather than the noun. For example, as shown in (28), if we change *ge* 'CL' into *wan* 'BOWL' to form a ClP *wan pingguo* 'bowl of apples', the atomic unit will be a bowl of apples (or apple stuff). Therefore, when the COUNT function is applied to a plural individual on the lattice structure of 'bowls of apples', the COUNT function will return a value based on how many bowls of apples there are. Analogous to (25), *wan* 'bowl' in (28a) maps a kind to a set of atomic individuals with a bowl as the unit; *wan pingguo* 'bowl of apples' in (28b) denotes a set of individual bowls of apples, and (28c) denotes a set of plural individuals of bowls of apples that have a count of three.

(28) a. $[\![wan]\!]=\lambda k\lambda x[Atom_{bowl}(k, x)]$

b. $[\![wan\ pingguo]\!]=\lambda x[Atom_{bowl}(apple_k, x)]$

c. $[\![san\ wan\ pingguo]\!]=\lambda x[^*Atom_{bowl}(apple_k, x) \wedge \text{COUNT}(x) = \mathbf{3}]$

Similarly, when a container measure classifier with a referential reading combines with a mass noun *shui* 'water', the same kind of atomic lattice structure is formed with atoms consisting of individual bowls of water. Because both *wan pingguo* 'bowl(s) of apples' and *wan shui* 'bowl(s) of water' have an atomic lattice structure, it is the classifier, rather than the count/mass distinction of the noun, that determines whether an NP can introduce indefinite atomic referents in Mandarin. In (29a), *wan shui* 'bowl of water' characterizes a set of bowls of water, i.e. the water kind atomized into bowls of water; in (29b), *san wan shui* 'three bowls of water' characterizes a set of plural individuals with bowl atoms for the water kind with a count of three.

(29) a. $[\![wan\ shui]\!]=\lambda x[Atom_{bowl}(water_k, x)]$

b. $[\![san\ wan\ shui]\!]=\lambda x[^*Atom_{bowl}(water_k, x) \wedge \text{COUNT}(x) = \mathbf{3}]$

Unlike NPs with an individuating classifier or measure word, an NP with a standard unit measure word or a container measure word with a measure reading has a bottomless non-atomic lattice structure like that of a bare noun head. As shown in Fig. 3, like the noun *water* in English, the bare noun *shui* 'water' in Mandarin also has a bottomless non-atomic lattice structure, in which there are no bottom atomic elements, and each individual on the lattice is some arbitrary measure of water.

Actually bare count nouns, such as *pingguo* 'apple' without the classifier, would have the same bottomless structure as well in Mandarin. However, the lattice for *pingguo* 'apple' nevertheless has some individuals on the lattice that happen to be naturally existing atomic apples (in the actual sense, not in the sense of the atomic bottom elements on the lattice), which can be accessed by individuating classifiers, such as *ge* 'CL'. Mass nouns like *shui* 'water', on the other hand, are not compatible with individuating classifiers.

Given the lattice structure for bare nouns, the composition of an NP with a standard unit measure word works as follows: Syntactically, unlike classifiers with an individuation function, a standard unit measure word, such as *bang* 'pound', first composes

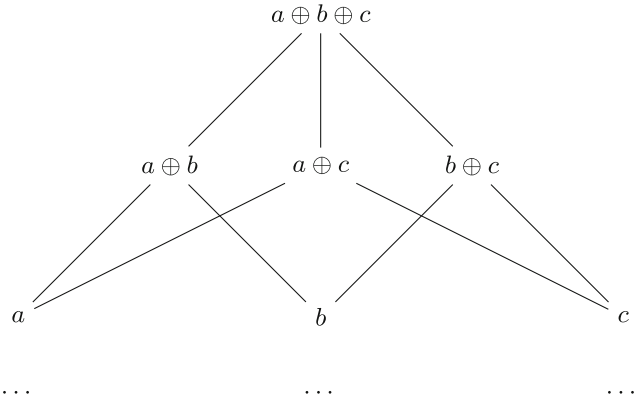
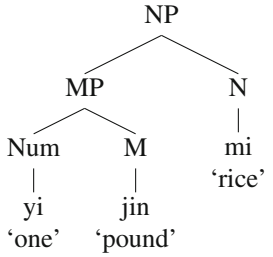


Fig. 3 A bottomless lattice for *Shui* 'Water'

with the numeral to form a measure phrase (MP)[3], and then the noun to form an NP. Because the measure word does not form a constituent with the noun syntactically, the measure word does not have the same atomization function as in the individuating reading.

(30)



Measure, adapted from Li (2013)

Semantically, as shown in (31a), a standard unit measure word like *jin* '(Chinese) pound' does not map a kind to an atomic lattice structure, but serves more or less as a measure function that measures some individual in the kind by the unit of the measure word. (31a) takes a degree argument as its first argument, a kind argument as its second argument, and an individual x as its third argument. The $^{\cup}$ operator from Chierchia (1998) lowers the kind meaning to the set of non-atomic individuals reading. Simply put, (31) measures by the unit of *jin* 'Chinese pound' a non-atomic individual x to the degree of d. Notice that the numerals here do not have the same counting semantics as in the individuating reading, but instead merely function as a degree argument for the measure function of the measure word as in (31b). So *yi jin mi* 'one (Chinese) pound of rice' denotes a set of non-atomic individuals of the rice kind, each weighing one pound.

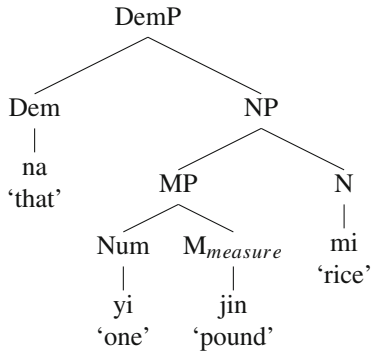
[3] To avoid confusion about the two different types of ClPs, I have slightly modified the labeling in Li's (2013) proposal by using M and MP instead here.

(31) $[\![jin]\!]=\lambda d\lambda k\lambda x[^{\cup}k(x) \wedge \text{POUND}(x) = d]$
$[\![\text{yi jin}]\!]=\lambda k\lambda x[^{\cup}k(x) \wedge \text{POUND}(x) = \mathbf{1}]$
$[\![\text{yi jin mi}]\!]=\lambda x[^{\cup}rice_k(x) \wedge \text{POUND}(x) = \mathbf{1}]$ adapted from Li (2013)

So far, I have shown, through a simplified version of Li's (2013) analysis, how individuating and measure readings for indefinites are derived. Notice that only when the classifier or measure word has an individuation function, can an indefinite NP have a referential reading. These include individuating classifiers like *ge* and container measure words like *wan* 'bowl'. Standard unit measure words, on the other hand, only have non-referential measure readings.

Besides these semantically derived atoms, definiteness can pragmatically individuate an NP denotation from the rest of its kind, through the group atom formation process (cf. Link 1983). To implement this idea, I assume the syntactic structure in (32).

(32)



As in (33a), *na* 'that' semantically creates a definite group atom by taking a nominal predicate P and returning a unique x such that x is a group atom, and that there is a y which fits the description P such that all the material parts that are in x are also in y and vice versa. For example, *na yi-jin mi* 'that one (Chinese) pound of rice' in (33b) denotes a group atom x, whose material parts equal the material parts of a non-atomic individual y of rice that weighs one pound. Note that the $\leq_m$ symbol stands for the material part relation (Link 1983).

(33) a. $[\![na]\!]= \lambda P\iota x[Atom_{group}(x) \wedge \exists y[P(y) \wedge \forall z[z \leq_m x \longrightarrow z \leq_m y] \wedge \forall z[z \leq_m y \longrightarrow z \leq_m x]]]$

b. $[\![\text{na yi jin mi}]\!]= \iota x[Atom_{group}(x) \wedge \exists y[^{\cup}rice_k(y) \wedge \text{POUND}(y) = \mathbf{1} \wedge \forall z[z \leq_m x \longrightarrow z \leq_m y] \wedge \forall z[z \leq_m y \longrightarrow z \leq_m x]]]$

In the next subsections, I discuss how these different types of NPs with different referential properties compose with consumption verbs in Mandarin.

4.3 Semantic composition with a referential NP

When the direct object has a referential reading, the atomic parts of the referent are each in a partially-affected thematic relationship (Beavers 2011) with the consumption

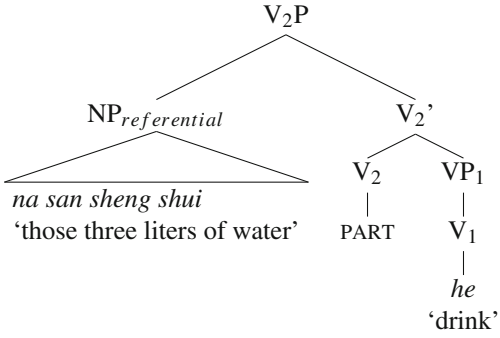
verb. To model this partially-affected thematic relationship, I modify the partitive operator from Kennedy (2012) as in (34). This new partitive operator composes with a verbal predicate $P_{<v,t>}$ to give it a partial meaning with respect to a referential NP x. After the verbal and the nominal arguments are satisfied, the new predicate is of type $< d, < v, t >>$, measuring the degree d changed of a referential individual x during an event e. The $part_{\Delta}$ measures an event e by the degree of change d based on the event scale created on the parts of x.

(34) $[\![\text{PART}]\!]=\lambda P_{<v,t>}\lambda x\lambda d\lambda e[P(e) \wedge part_{\Delta}(x)(e) = d]$

adapted from Kennedy (2012)

Compositionally, I propose that a referential direct object is introduced by a null partitive head at the V_2 position following Travis (2010). Cross-linguistically, it is well attested that there are two syntactic positions for internal objects, i.e. complement of the verb or of a higher argument head, the latter of which is often associated with definiteness and specificity (Kratzer 1996; Travis 2010). Because Mandarin also uses the higher internal topic position for old information and reserves the post-verbal position for new information (Paul 2002), it is appropriate to posit a separate syntactic position for referential direct objects.

(35)



This partitive head selects a referential NP at the specifier of the V_2P, semantically requiring the NP denotation to be on an atomic lattice. That is, I specify that Kennedy's (2012) partitive operator is restricted to referential NPs, because the parts changed should be uniquely identifiable to the entities affected.

Kennedy's partitive operator measures the degree of change on an event scale derived from the part-whole relation of the denotation of the direct object. A predecessor of this operator can probably be traced back to the partitive in Krifka's (1989b) German dissertation. Kennedy's object-based partitive operator, which I adopt in my paper, is crucially different from a predicate-based partitive operator, such as in Altshuler (2014), in that this selection restriction is encoded on the partitive operator rather than on the verb, so that the effect of partial completion is not ubiquitous, allowing for completive readings when the direct object is introduced elsewhere. Although in Kennedy (2012), the input selectional restrictions for the partitive operator are not discussed, in Krifka (1989b), it is briefly mentioned that the input must be either definite or quantized.

In order to establish a partitive event-measurement scale, I argue that it is insufficient for the direct object to be just quantized, but it has to be also referential. This is because

affecting a part can stand for affecting an individual, only when the part can be uniquely linked to an identifiable individual. An NP denotation that is merely quantized but not referential lacks this unique part-whole relation. My argument is corroborated by analogous data in the nominative partitive constructions such as 'a part of the cake'. It has been well observed in English that the noun after *of* must be definite or specific (Jackendoff 1977; de Hoop 1997). In other words, the second noun must be entity denoting, unless the first noun is proportional such as 'half' (de Hoop 1997).

(36) Partitive Constraint
In an of-N''' construction interpreted as a partitive, the N''' must have a demonstrative or a genitive specifier

Jackendoff (1977, 113)

Kennedy's partitive operator, therefore, is similar to an entity partitive (de Hoop 1997) in requiring the input NP to be referential, because ultimately to identify the event participants by their parts, there needs to be a unique part-individual relationship. For referential readings, the parts within an individual can be uniquely mapped to that individual, whereas for measure readings, a part (or rather a portion) (cf. Koontz-Garboden and Francez 2010) may simultaneously belong to various non-atomic individuals. It follows that only partitive relations built on referential objects can successfully identify the unique event participants in an event, for a partitive event measure scale to make sense.

To see how a consumption verb composes with a referential object, let us first consider the derivations for a collective reading for a group atom for (35) in (37).

(37) a. $[\![na\ san\ sheng\ shui]\!]$
$= \iota x[Atom_{group}(x) \wedge \exists y[^{\cup}water_k(y) \wedge \text{LITER}(y) = \mathbf{3} \wedge \forall z[z \leq_m x \longrightarrow z \leq_m y] \wedge \forall z[z \leq_m y \longrightarrow z \leq_m x]]]$

b. $[\![\text{PART}\ he]\!] = [\![\text{PART}]\!]([\![he]\!])$
$= \lambda x \lambda d \lambda e[drink'(e) \wedge part_{\Delta}(x)(e) = d]$

c. $[\![he\ na\ san\ sheng\ shui]\!] = [\![\text{PART}\ he]\!]([\![na\ san\ sheng\ shui]\!])$
$= \lambda d \lambda e \iota x[Atom_{group}(x) \wedge \exists y[^{\cup}water_k(y) \wedge \text{LITER}(y) = \mathbf{3} \wedge \forall z[z \leq_m x \longrightarrow z \leq_m y] \wedge \forall z[z \leq_m y \longrightarrow z \leq_m x]] \wedge drink'(e) \wedge part_{\Delta}(x)(e) = d]$
$= \lambda e \exists d \iota x[Atom_{group}(x) \wedge \exists y[^{\cup}water_k(y) \wedge \text{LITER}(y) = \mathbf{3} \wedge \forall z[z \leq_m x \longrightarrow z \leq_m y] \wedge \forall z[z \leq_m y \longrightarrow z \leq_m x]] \wedge drink'(e) \wedge part_{\Delta}(x)(e) = d]$ (existential closure)

As shown in (37a), *na san sheng shui* 'those three liters of water' denotes a pragmatically derived group atom of water, measuring to three liters. This referential entity can enter into a partially-affected relation with the verb. As in (37b), the verb composes with the partitive operator to create a degree-achievement-like predicate that measures the degree d of a referential object x that is changed in an event. The composition of the NP with the partitive predicate gives the meaning in (37c), which denotes an event in which the group atom of three liters of water is drunk to the degree d. As this degree does not need to be maximized to three liters, the predicate can denote

an incompletive event, where less than three liters is consumed. This derivation also gives rise to a collective reading, because the quantity of three liters of water is treated as a single whole.

Besides definites that give rise to collective readings, I have argued that indefinites with atomic referents can also be interpreted referentially, allowing for distributive incompletive readings. These include count NPs with an individuating classifier, and count or mass NPs with a container measure word. However, because indefinites are of type $< e, t >$, rather than type e like definites (Partee 1973), Kennedy's partitive operator needs to be further modified. Moreover, in the case of indefinite plurals, the sentence has an obligatory distributive reading over all the atomic parts. The relevant examples are repeated below, in which each apple or each bowl of water must be at least partly consumed.

(18′) a. wo chi le san-ge pingguo, mei chi-wan.
I eat PERF three-CL apple, not eat-finish
'I ate (some part of) three apples, but didn't finish.'

b. wo he le san-wan shui, mei he-wan.
I drink PERF three-bowl water, not drink-finish
'I drank (some part of) three bowls of water, but didn't finish.'

Since Kennedy's $part_{\Delta}$ originally only deals with a singular definite NP, it lacks the necessary distributive semantic component. I adapt the distributive operator in (38) by Link (1983) as cited in Champollion (2016) into a specialized version for partitive verbs as in (39). Link's D operator takes in a verbal predicate P and a plural individual x such that for all y that is a part of x, if y is an atom then P applies to y. I modify this formula mainly to change the input types into the appropriate types for my composition.

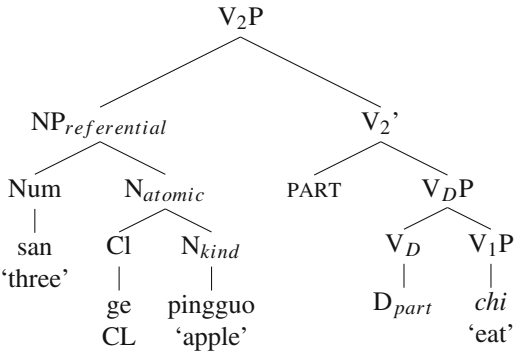
(38) Link's D operator
$[\![D]\!] = \lambda P \lambda x \forall y[y \leq x \wedge Atom(y) \rightarrow P(y)]$ (Champollion 2016, 11)

(39) Modified D operator for partitive verbs:
$[\![D_{part}]\!] = \lambda P_{<v,t>} \lambda Q_{<<v,t>,<e,<d,<v,t>>>>} \lambda R_{<e,t>} \lambda x \lambda e \forall y[R(x) \wedge y \leq x \wedge Atom(y) \rightarrow \exists e' \exists d[e' \leq e \wedge Q(P)(y)(d)(e')]]$

This D_{part} operator takes in a verbal predicate P of type $< e, t >$ and the partitive head Q of type $<< v, t >, < e, < d, < v, t >>>>$, giving back a predicate that can be applied to the denotation R of an indefinite NP of type $< e, t >$, so that for each atomic part y within an individual x, there is a degree d to which the atomic part is partly affected[4]. Syntactically, as in (40), I position D_{part} between the partitive head and the verb according to the usual position of the overt distributive operator *dou* 'even'.

[4] A reviewer comments that the semantics of D_{part} is somewhat unnecessarily complex. Indeed, this could be rectified if the syntax were to be changed in favor of a simpler semantic composition but would result in very unnatural and unattested syntax, which would also be an unwelcome result. Because complicated semantic types are not unheard of for abstract linguistic elements, I consider it a better solution than changing the well-established structures.

(40)



The semantic composition for (40) works as follows: As shown in (41a), *san ge pingguo* understood referentially denotes a plural individual with natural atomic parts counting to three. In (41b, c), the verb first composes with the distributive operator and then the partitive operator, producing a predicate that can be applied to the denotation of an indefinite NP of type $< e, t >$. In (41d), composing the nominal predicate *san ge pingguo* with the distributive partitive predicate as in (41c) produces a predicate of type $< e, < v, t >>$, that describes a relation between an individual x and an event description of type $< v, t >$, where x is a plural individual consisting of three natural apple atoms, and for each atom there is some degree d eaten during an event e. By existentially closing the argument x (cf. Partee 1987), i.e. instantiating the argument, we get an event description that some specific three apples are each eaten partially. This correctly derives the distributive reading for indefinites.

(41) a. $[\![san\ ge\ pingguo]\!] = \lambda x[^*Atom_{natural}(apple_k, x) \wedge \text{COUNT}(x) = \mathbf{3}]$

b. $[\![D_{part}\ chi]\!] = \lambda Q_{<<v,t>,<e,<d,<v,t>>>>} \lambda R_{<e,t>} \lambda x \lambda e \forall y[R(x) \wedge y \leq x \wedge Atom(y) \rightarrow \exists e' \exists d[e' \leq e \wedge Q(eat')(y)(d)(e')]$

c. $[\![\text{PART D}_{part}\ chi]\!] = \lambda R_{<e,t>} \lambda x \lambda e \forall y[R(x) \wedge Atom(y) \wedge y \leq x \rightarrow \exists e' \exists d[e' \leq e \wedge eat'(e') \wedge part_{\Delta}(y)(e') = d]]$

d. $[\![san\ ge\ pingguo\ \text{PART D}_{part}\ chi]\!]$
$= \lambda x \lambda e \forall y[^*Atom_{natural}(apple_k, x) \wedge \text{COUNT}(x) = \mathbf{3} \wedge [Atom(y) \wedge y \leq x \rightarrow \exists e' \exists d[e' \leq e \wedge eat'(e') \wedge part_{\Delta}(y)(e') = d]]]$
$= \lambda e \exists x \forall y[^*Atom_{natural}(apple_k, x) \wedge \text{COUNT}(x) = \mathbf{3} \wedge [Atom(y) \wedge y \leq x \rightarrow \exists e' \exists d[e' \leq e \wedge eat'(e') \wedge part_{\Delta}(y)(e') = d]]]$ (existential closure)

However, this distributive reading is actually not necessary for definites. For example, 'I ate those three apples' in Mandarin can be true, if I only ate one out of those three apples with a collective reading. This is because those three apples are pragmatically treated as a singular whole, forming a group atom, just like in the case of 'those three liters of water'. As in (42), the unique group atom x is an atom on its own such that the original atomic structure of the plural individual 'three apples' within the group atom is rendered inaccessible after the mapping from the plural individual to the group atom, and consequently a collective reading is sufficient.

(42) $[\![na\ san\ ge\ pingguo]\!]$
$= \iota x[Atom_{group}(x) \wedge \exists y[^*Atom_{natural}(apple_k, y) \wedge \text{COUNT}(y) = \mathbf{3} \wedge \forall z[z \leq_m x \longrightarrow z \leq_m y] \wedge \forall z[z \leq_m y \longrightarrow z \leq_m x]]]$

Notice that the relevant atomic parts are not necessarily natural atoms, because group atoms can contain natural atoms within, but the substructure is made invisible underneath. As long as the group atom is partially consumed, it does not matter whether each of the natural atoms is consumed.

In summary, I have proposed that when the direct object has a referential reading, the predicate can have a partial reading by virtue of the partitive operator. In the case of indefinite plurals, the consumption verb has an obligatory distributive reading, which can be modeled by a distributive operator D_{part}. However, in the case of definites, a distributive reading is not required, as definites can be treated as singular objects because of the group atom formation.

4.4 Semantic composition with the Non-referential NP

When the direct object is interpreted non-referentially, however, I propose that it serves as an event measurement instead à la Krifka (1989a). That is, the direct object denotes an amount of substance involved in an event, rather than referential entities that pre-exist. Indefinite NPs with standard unit measure words can only be interpreted non-referentially, because indefinites cannot form pragmatic group atoms and standard unit measure words cannot individuate semantic atoms. Without atomic referents, the partitive operator is consequently absent, so that incompletive readings cannot arise.

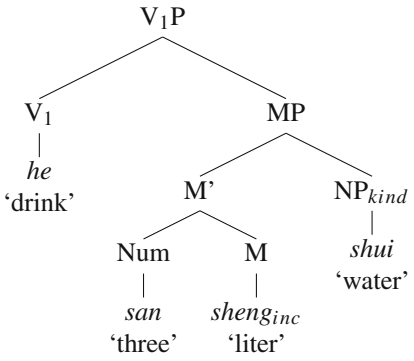
I adopt the analysis for incremental-themes in Kennedy (2012), because his account offers a unified analysis for event measurements based on parts of the denotation of the incremental theme and also other types of event measurements. In the spirit of Kennedy (2012), I argue that when a classifier has a measure reading, the classifier is shifted to an event measurement function as illustrated by *sheng* 'liter' in (43), which measures how many liters of substance denoted by a noun phrase are incrementally changed in an event. The formula in (43) reads that given a degree d, a nominal predicate P, an individual x and an event e, the predicate P is true of x and that the amount of change of this non-referential individual x in e is equal to d. My analysis differs from Kennedy's in that the measure function is encoded in the classifier rather than the noun in Mandarin, because it is the classifier that determines whether an indefinite NP has a referential or measure reading as discussed in the previous sections.

(43) $[\![sheng_{inc}]\!] = \lambda d \lambda P \lambda x \lambda e[P(x) \wedge \text{LITER}_{\Delta}(x)(e) = d]$

adapted from Kennedy (2012)

Syntactically, I propose that the direct object is introduced as the complement of V_1 as an event measurement phrase as in (44), following Aydemir (2004) and Travis (2010) for the structure of the object position, and Li (2013) for the structure for a measure reading. Unlike the referential cases, the direct object with a measure reading is not introduced by the partitive operator, hence lacking an incompletive reading.

(44)



As in (45a), the measure word *sheng* 'liter' has a shifted event measurement function semantics. Unlike the regular nominal measure semantics, this shifted measure function measures how much substance denoted by a noun is incrementally changed in an event. My new shifted semantics for non-individuating measure words meshes well with Li's (2013), as the rest of the composition follows the exact same compositional order. The measure function first takes in the degree argument *san* 'three' in (45a), and then the noun *shui* 'water' in (45b), producing a predicate of type $< e, < v, t >>$ from individuals to events to truth values, which is a relation between a non-referential entity x and an event e such that x belongs to the water kind and that in the event e the liters of water involved equal to three. Given that the '$\text{LITER}_{\Delta}(x)(e) = 3$' function specifies that the total amount changed is three liters, the sentence is otherwise false unless the total amount is completely consumed, giving rise to a completive reading.

(45) a. $[\![san\ sheng]\!]$
$= [\![sheng_{inc}]\!]\ ([\![san]\!])$
$= \lambda d \lambda P \lambda x \lambda e[P(x) \wedge \text{LITER}_{\Delta}(x)(e) = d](\mathbf{3})$
$= \lambda P \lambda x \lambda e[P(x) \wedge \text{LITER}_{\Delta}(x)(e) = \mathbf{3}]$

b. $[\![san\ sheng\ shui]\!] = [\![san\ sheng]\!]\ ([\![shui]\!])$
$= \lambda x \lambda e[^{\cup} water_k(x) \wedge \text{LITER}_{\Delta}(x)(e) = \mathbf{3}]$

c. $[\![he]\!] = \lambda e[drink'(e)]$

d. $[\![he\ san\ sheng\ shui]\!]$
$= \lambda x \lambda e[drink'(e) \wedge {}^{\cup} water_k(x) \wedge \text{LITER}_{\Delta}(x)(e) = \mathbf{3}]$
(event identification)
$= \lambda e \exists x[drink'(e) \wedge {}^{\cup} water_k(x) \wedge \text{LITER}_{\Delta}(x)(e) = \mathbf{3}]$
(existential closure)

To compose the event measurement reading in (45b) with the verbal predicate 'drink' in (45c), we need a special conjunction composition rule called 'event identification' (cf. Kratzer 1996, 122), which conjoins a function of type $< v, t >$ and a function of type $< e, < v, t >>$ into a new function of type $< e, < v, t >>$. This process 'makes it possible to chain together various conditions for the event described by the sentence (cf. Kratzer 1996, 122).' And as a last step, by existentially closing the x argument, we get an individual x of water, whose quantity of three liters is changed in the event in total, and thus deriving the right completive reading.

4.5 Ambiguity of the individuating classifiers

So far, I have mainly treated indefinite NPs with individuating classifiers or container measure words as denoting referential entities. In fact, these NPs are ambiguous between a referential reading and a measure reading (cf. Li 2013). Therefore, consumption verbs with these NPs can be ambiguous between a degree-achievement reading that there is a degree of consumption based on the denotation of direct object, and an accomplishment reading that the direct object denotes the amount of total change. In other words, 'I ate three apples' in Mandarin can be interpreted as: a) 'there are three specific apples which are eaten by me' for the referential reading, and b) 'I ate an amount of three atomic units of apples' for the measure reading.

Because of this ambiguity and the general tendency of interpreting indefinites non-referentially and non-thematically, i.e. taking a canonical thematic role such as patient (cf. Chen 2009), the default reading of an indefinite quantized direct object will be a measure reading rather than a referential reading. Therefore, when interpreting 'I ate three apples' in Mandarin, the hearer usually treats 'three apples' as event measurements. This explains why some native speakers consider the default readings to be completive, and find incompletive readings hard to accept.

4.6 Comparison with English consumption verbs

My analysis can be extended to English consumption verbs as well. This would explain why definite direct objects seem to make incompletive readings more felicitous in English. The reason why we are under the impression that English does not allow incompletive readings for consumption verbs is that the Krifka-style analysis predominates and over-applies to the referential cases. In other words, English NPs are mostly analyzed as measure readings with consumption verbs in previous studies.

However, there seems to be a legitimate difference between Mandarin and English, in that indefinite plurals in English seem to strongly disfavor incompletive partial readings. I suggest the reason to be that it is much harder for English indefinites to be interpreted referentially, probably because the association between different NP categories with the Givenness Hierarchy are slightly different in English than in Mandarin (Gundel et al. 1993; Kuo 2008; Chen 2003, 2005, 2009). In English the referential category is occupied by a colloquial *this NP* indefinite, whereas it is empty in Mandarin (Gundel et al. 1993). This would mean that the use of indefinites in English, which is associated with the type identifiable status, often implicates that the higher referential status is not true. In contrast, in Mandarin, because the referential category has no conventional association, indefinites can perhaps be more easily interpreted referentially. Another possibility is that English has a somewhat archaic or literary partitive verbal construction *V of* as an alternative. If the English speaker wants to emphasize the partial reading, *ate of* could have been used instead of *ate*. I leave it as an open question for future research, as to why exactly English does not seem to allow incompletive readings for indefinite plurals, which theoretically can also have referential readings.

5 Conclusion

In this paper, I have argued that referentiality plays a key role in determining a sentence's event completion entailment for Mandarin consumption verbs. Through investigating different combinations of indefinite and definite numeral-classifier phrases, I find that incompletive readings are felicitous for referential direct objects, but not for non-referential direct objects. Crucially, it is referentiality rather than the count/mass distinction of the noun that ultimately determines whether an incompletive reading can arise for Mandarin consumption verbs.

This event completion entailment dichotomy ultimately boils down to two ways that the NP is interpreted: referential or measure. Incompletive readings arise for the referential reading, because affecting some subpart of an atomic entity means that the atomic entity as a whole is also affected. In contrast, for the measure reading, there is no similar part-whole relationship, such that affecting the subpart can stand for affecting the whole individual, and consequently only a completive reading can arise.

This paper contributes to event semantics by discussing extensively how the referential interpretations of the direct object affect the event completion entailments of perfective sentences with Mandarin consumption verbs. It opens up a new direction for cross-linguistic investigations on how languages with different noun phrase structures may have different patterns of event completion entailments for their incremental-theme verbs.

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