

Measure Phrases and the *-ka/-lul* Alternation in Korean

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1 Introduction

Every language uses certain devices to express amount in the noun phrases. For instance, languages like Korean use classifier phrases (e.g., *two-classifier* in (1a)) and amount phrases (e.g., *three-kilograms* in (1b)) for this purpose.¹

- (1) a. Yoda-ka sakwa-lul ecey **twu kay** mek-ess-ta.
Yoda-nom apple-acc yesterday 2 Cl_{unit} eat-past-decl
'Yoda ate two apples yesterday.'
- b. Yoda-ka sakwa-lul ecey **sam kiro** mek-ess-ta.
Yoda-nom apple-acc yesterday 3 kilogram eat-past-decl
'Yoda ate three kilograms of apples yesterday.'

These Measure Phrases (Classifier Phrases and Amount Phrases) can be separated from the nouns that they modify, forming Floating/Split MP Constructions. It has been argued that Split MPs must be c-commanded by their host nouns (Sportiche 1988, Bobaljik 1995, Junker 1995, Downing 1996, Doetjes 1997, Nakanishi 2004, among others). It also has been claimed that there is no derivational relation between the Float/Split pattern and other possible patterns such as the Genitive pattern.²

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¹The markers *-i* and *-ka*, *-ul* and *-lul* alternate depending on their phonological environments: *-i* and *-ul* are used after a consonant and *-ka*, and *-lul* after a vowel. Abbreviations: nom = nominative; acc = accusative; gen = genitive; top = topic marker; past = past tense; decl = declarative marker; pass = passive; NMZ = nominalizer; rel = relativizer; mod = modifier marker

²One of the tests is modification. If the Split MP construction in (ib) has a derivational relation with the Genitive pattern (ia), the two sentences are expected to have the same meaning, which is not correct. Thus, the semantic difference denies the derivational relation between them.

- (i) a. Kyengchal-i tocuha-n-un twu tay-euy cha-lul cap-ass-ta.
police-nom run.away-pres-mod 2 Cl_{unit}-gen car-acc catch-past-decl
'The police caught two cars that were running away.'
The number of cars that were running away = 2

Based on these facts, Nakanishi (2003, 2004) proposes that Measure Phrases (hence MPs) indirectly measure the host noun by measuring out the event denoted by the verb, using homomorphism in (2).

- (2) The indirect measure function μ' is monotonic relative to the domain E iff: For events e_a, e_b in E: If $h(e_a)$ is a proper subpart of $h(e_b)$, then $\mu'(h(e_a)) < \mu'(h(e_b))$, where h is a homomorphism from E to I such that $h(e_1 \cup_E e_2) = h(e_1) \cup_I h(e_2)$ (Nakanishi 2003)

By introducing an event argument (Davison 1967) and by defining lattice structures of events (Link 1983, Krifka 1989, Landman 2000), the homomorphism connects the semantic parallelism between the nominal and verbal domains. Both the mass/count distinction in the nominal domain and the telic/atelic distinction in the verbal domain use a lattice of individuals and events, respectively. The sentence (1a), thus, is interpreted such that there is a plural event e of Yoda's eating x such that x is an apple/apples and μ : cardinality-of-individuals applied to $h(e)$ yields an interval on the cardinality-of-individuals scale that has the property [*two-individuals*], where h is the [*eat*].

This parallelism also captures the fact that Split MPs in each nominal and verbal domain are subject to the same monotonicity constraint in (3).

- (3) μ is monotonic relative to domain I iff: For individuals x, y in I:
If x is a proper subpart of y , then $\mu(x) < \mu(y)$ (Schwarzschild 2002)

A measure function is monotonic relative to the denotation of some element if and only if it tracks part-whole structures of the element. That is, that element provides a part-whole relation consisting of proper subparts and proper superparts, and a measure obtained for that element is larger than a measure obtained for proper subparts of it, and is smaller than a measure obtained for proper superparts of it. Therefore, *sip do* '10 degree' can be used to measure out the temperature (4b), because of the measure function μ : Degree is monotonic to [*temperature*], but it cannot be used to measure out water (4a), because of the measure function μ : Degree is not monotonic to [*water*].

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- b. Kyengchal-i tocuha-n-un cha-lul twu tay(-lul) cap-ass-ta.
 police-nom run.away-pres-mod car-acc 2 CL_{unit}-acc catch-past-decl
 'The police caught two of the cars that were running away.
 The number of cars that were running away \geq 2

- (4) a. *Mwul-I cinan pam-ey **sipdo** nemchi-ess-ta.
 water-nom last night-at 10 degree overflow-past-decl
 'The water overflowed by 10 degrees last night.'
- b. Kion-i cinan pam-ey **sip do** ol-ass-ta.
 temperature-nom last night-at 10 degree increase-past-decl
 'The temperature increased by 10 degrees last night.'

Split Classifier Phrases (CIPs) and Amount Phrases (AmPs) form a natural class in semantics, and behave like VP adverbials in syntax. Nakaniishi's analysis, therefore, makes no prediction as to whether they show different behavior in syntax. The relation between a classifier and its host DP, however, is different from the relation between an amount expression and its host DP such that a classifier and its host DP have a closer relation than an amount word and its host DP do. In this paper, I will show that this difference has a syntactic impact.

This paper is organized as follows. Section 2 will demonstrate that classifiers are different from amount expressions. The difference results in the different syntactic behavior between CIPs and AmPs in constructions that involve DP-movement such as passives and unaccusatives. In section 3, I propose that a CIP must agree with its host DP in syntax, while an AmP does not. I will show that the case morphology on MPs is related to the position where they occur under the structure of the Split MP constructions proposed in this paper. The positional difference, under the phase based syntactic theory, accounts for the difference in the case morphology on MPs. Section 5 will conclude the paper.

2 CIPs are different from AmPs

Amount expressions and classifiers are used to quantize a certain domain of entities. In this respect, amount words are similar to classifiers. However, it has been argued that classifiers and amount expressions are different.

Classifiers form a closed set and each classifier refers to an atomic discrete entity with specific properties such as a particular shape, human, non-human, etc. (Lonning 1987, Krifka 1986, Krifka 1989, Cheng and Sybesma 1992, Downing 1996, Chierchia 1998a, Chierchia 1998b, among others). For instance, *myeng* is used to count the number of humans, *mari* for the number of animals, *kay* for the quantity of inanimate objects and so on. Therefore, the relationship between a classifier and its host noun is arbitrary and the choice of a classifier is dependent upon the host noun (Krifka 1986, 1989). Classifiers always combine with numerals forming a classifier phrase (CIP).

Amount expressions, in contrast, measure out a certain domain of entities, based on some properties, such as length, weight, volume, degree etc. (Schwarzschild 2002). Since the measure function of AmPs is independent from the host noun (Krifka 1986, 1989), AmPs apply to an entity that is compatible with them. For instance, an AmP, *kilogram*, can be used in reference to any entity that has weight measurable by kilograms. Since the choice of an amount phrase is independent from its host noun, the relationship between them is not closer than that of a classifier and its host noun.

This difference between a CIP and an AMP has an effect in syntax in terms of case morphology. In Korean, classifier phrases and measure phrases can bear case morphology, *-ka* or *-lul*.³ Internal argument-oriented CIPs bear the accusative case morphology, and external argument-oriented CIPs bear the nominative case morphology, as shown in (5).

- (5) Haksayng-tul-i **twu myeng-i** chinkwu-tul-ul **ney myeng-ul**
 student-PL-nom 2 Cl_{person}-nom friend-PL-acc 4 Cl_{person}-acc
 man-ass-ta.
 meet-past-decl
 '2 students met 4 friends.'

Amount phrases, just like CIPs, can bear case morphology. Internal argument-oriented AmPs can bear accusative case morphology, and external argument-oriented AmPs can bear nominative case morphology, as in (6).

- (6) Kangmwul-i **sam thon-i** kangtuk-ul **sip mithe-lul**
 river.water-nom 3 ton-nom river.bank-acc 10 meter-acc
 mwunettuli-ess-ta.
 break.down-past-decl
 '3 tons of water broke down 10 meters of the bank.'

Since both CIPs and AmPs can bear case morphology, it seems that Floating CIPs and AmPs behave similarly in syntax. There are, however, constructions in which they differ. In sentences involving DP-movement such as unaccusatives and passives, CIPs must bear the same case morphology as the host noun, as shown in (7), while AmPs can bear either *-ka* or *-lul*, as in (8).⁴

³Dative arguments do not allow floating CIPs, unless either the host noun or the floating CIP carries some additional marker such as *-man* 'only', *-to* 'also', *-cohca* 'even' etc. See (Hong Ki-Sun 1990) for details.

⁴There are speakers who do not like the *-lul* marked measure phrases in passives and unaccusatives.

- (7) a. elum-i **twu cokak-i** / ***twu cokak-ul** el-ess-ta.
 ice-nom 2 Cl_{piece}-nom / 2 Cl_{piece}-acc freeze-past-decl
 'Two pieces of ice were frozen.'
- b. Kaykwuri-ka **twu mari-ka** / ***twu mari-lul** cap-hi-ess-ta.
 frog-nom 2 Cl_{animal}-nom / 2 Cl_{animal}-acc catch-pass-past-decl
 'Two of the frogs were caught.'
- (8) a. Elum-i **sip inchi-ka** / **sip inchi-lul** el-ess-ta.
 ice-nom 10 inch-nom / 10 inch-acc freeze-past-decl
 'The water froze 10 inches thick.'
- b. Ttang-i **sam mithe-ka** / **sam mithe-lul** pha-i-ess-ta.
 ground-nom 3 meter-nom / 3 meter-acc dig-pass-decl
 '3 meters of the ground were dug.'

In (7) and (8), when the internal argument moves to the subject position, CIPs must bear nominative case morphology, while the AmPs can bear either nominative or accusative case morphology. This contrast shows that CIPs are different from AmPs.

To summarize, classifier phrases behave differently from amount phrases. The relationship between a CIP and its host noun is much closer than that of an AmP and its host noun. This difference can be overtly realized as case morphology. CIPs, if they bear case morphology, must bear the same case morphology as their host DP, while AmPs can bear mismatching case morphology in passives and unaccusatives. To account for this differing behavior with respect to case morphology, I argue that case morphology on MPs is an position indicator where they occur in a sentence and that CIPs are in an agreement relation with their host noun, while AmPs are not. The next section will be focused on the structure of Split MP constructions and case morphology on MPs.

3 The Structure of Split MP Constructions

3.1 Two Distinct Positions for Split MPs

It has been reported in the literature that a Split MP associated with an external argument and a Split MP associated with an internal argument are at different locations (Sohn Keun-Won 1993, Miyagawa 1989, Fujita 1994, Kim Sun-Woong 1996, Nakanishi 2003).

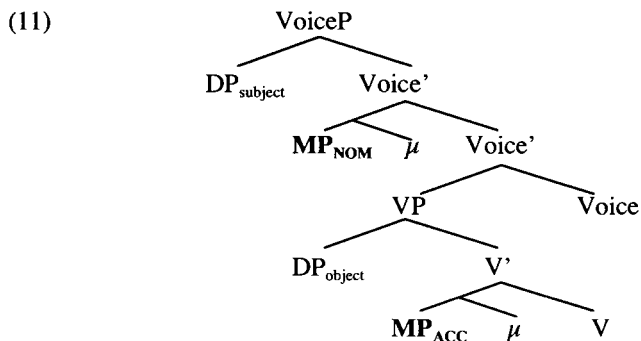
For instance, external argument oriented CIPs cannot occur below the VP adverbs such as *caymisskey* 'interestingly', assuming that VP adverbs have a fixed position (cf. Kim Sun-Woong 1996).

- (9) a. *Haksayng-tul-I *caymisskey* twu myeng-i chayk-ul
 student-Pl-nom with.interest 2 Cl_{person}-nom book-acc
 ilk-ess-ta.
 read-past-decl
 '2 Students read the book with interest.'
- b. Haksayng-tul-i twu myeng-i *caymisskey* chayk-ul
 student-Pl-nom 2 Cl_{person}-nom with.interest book-acc
 ilk-ess-ta.
 read-past-decl
 '2 Students read the book with interest.'

The ungrammatical sentence in (9a) shows that external argument-oriented CIPs cannot occur in a position below the position that VP adverbs occupy. The internal argument oriented CIP in (10), in contrast, occurs in a position lower than the VP adverb.

- (10) Haksayng-tul-i *caymisskey* chayk-ul twu kwen-ul ilk-ess-ta.
 student-Pl-nom with.interest book-acc 2 Cl_{book}-acc read-past-decl
 'Students read 2 books with interest.'

Therefore, the external argument-oriented CIPs occur at a location distinct from the position that the internal argument-oriented CIPs occupy. Suppose that there are two positions such as inside VP and outside VP. Moreover, suppose that the external argument-oriented CIPs are generated outside of VP and the internal argument-oriented CIPs are generated inside of VP. Then, the contrast in (9) receives a natural account. Therefore, I propose the structure in (11) for Split MPs in Korean: here a Split MP associated with an external argument is adjoined to VoiceP and a Split MP associated with an internal argument is adjoined to VP.



In (11), the Agent role is not the argument of a lexical verb but is introduced by the functional head, Voice (Kratzer 1996). External argument related MPs are generated within the projection of Voice. The internal argument is generated in the specifier position of VP and internal argument related MPs are generated within the domain of VP. In this structure, both Split MPs are c-commanded by their host DPs in the local domain.

The measure function μ in (11) is a measurement scheme obtained from the relation between an MP and a measured element (Nakanishi 2004). The presence of the accusative case morphology on AmPs in passives and unaccusatives, as in (10), denies the possibility that the accusative case morphology serves as a structural case marker. In unaccusatives and passives, the verb lacks the ability to assign case. The internal argument, therefore, moves to the subject position in the course of derivation, as shown in (12), and is nominative marked. If it is accusative, the sentence is ungrammatical.

- (12) Elum-i / *elum-lul nok-ass-ta.
 ice-nom / ice-acc melt-past-decl
 'The ice was melt.'

Unlike the argument, an AmP can bear accusative case morphology as well as nominative case morphology, as shown in (8). This indicates that the case morphology on AmPs is not related to structural case. Rather, the case morphology on AmPs is related to the position where they occur. As shown in (13), the AmP, *sam inchi* '3 inches', can bear either the nominative or the accusative case morphology.

- (13) a. Elum-i **tantanhakey** sam inchi-lul el-ass-ta.
 ice-nom solid 3 inch-acc freeze-past-decl
 '3 inches of ice was frozen solid.'
- b. *Elum-i sam inchi-lul **tantanhakey** el-ass-ta.
 ice-nom 3 inch-acc solid freeze-past-decl
- c. ??/*Elum-i **tantanhakey** sam inchi-ka el-ass-ta.
 ice-nom solid 3 inch-nom freeze-past-decl
- d. Elum-i sam inchi-ka **tantanhakey** el-ass-ta.
 ice-nom 3 inch-nom solid freeze-past-decl

Crucially, the relative ordering of the AmP and the VP adverb, *tantanhakey* 'solid', has a grammatical impact, resulting in the contrasts between (13a) and (13b), and (13c) and (13d). The AmP with accusative case morphology must occur below the VP adverb, while the one with nominative case morphology must occur above the VP adverb. The contrasts in (13),

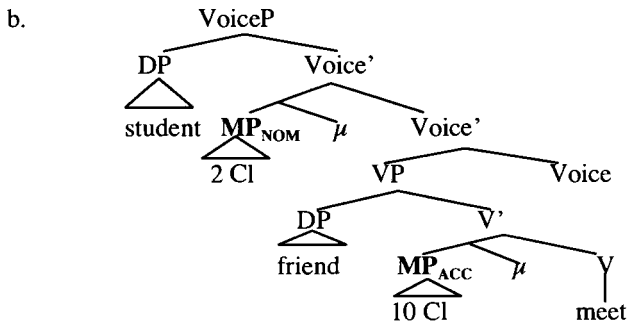
therefore, show that the nominative/accusative case morphology on AmPs indicates the position where they occur in a sentence rather than the case marker.

One might consider the possibility that the *-ka* and *-lul* markers on AmPs are situational delimiters. Delimiting an event, however, is distinguished from measuring an event. Delimitedness refers to the property of an event's having a distinct, definite and inherent end point in time (Tenny 1994). For instance, if *-ka* in (13d) is a situational delimiter, it is expected that the ice-freezing-event was over when the event resulted in 3 inch deep frozen ice. This is, however, incorrect, since 3 inches only refers to the ice that was frozen solid.

Therefore, I argue that the case morphology on MPs is a position indicator and that case morphology is domain specific. An MP within the domain of VP receives accusative case morphology and an MP outside the domain of VP receives nominative case morphology. This analysis provides an account for the *-ka/-lul* alternation on AmPs and the absence of such alternation on ClPs, which will be discussed in the next section.

The sentence in (5), repeated here as (14a), thus has the structure in (14b). The external argument oriented ClP, *twu myeng-i*, occupies the VP external position and the internal argument oriented ClP, *yel myeng-ul*, occupies the VP internal position.

- (14) a. Haksayng-tul-i **twu myeng-I** chinkwu-tul-ul **yel myeng-ul**
 student-PL-nom 2 Cl_{person}-nom friend-PL-acc 10 Cl_{person}-acc
 man-ass-ta.
 meet-past-decl
 '2 students met 10 friends.'



To summarize, there are two distinct positions in which MPs may occur. The external argument oriented MPs occupy the position outside the domain

of VP, and the internal argument oriented MPs occupy the position within the domain of VP. The case morphology on MPs indicates where the MPs occur in a sentence. The nominative case morphology indicates that the MP is outside the domain of VP, and the accusative case morphology indicates that it is within the domain of VP. The structure for the Split MP construction proposed in this section provides a basis to account for the fact that CIPs are different from AmPs in Section 2.

3.2 The Agreement Relation

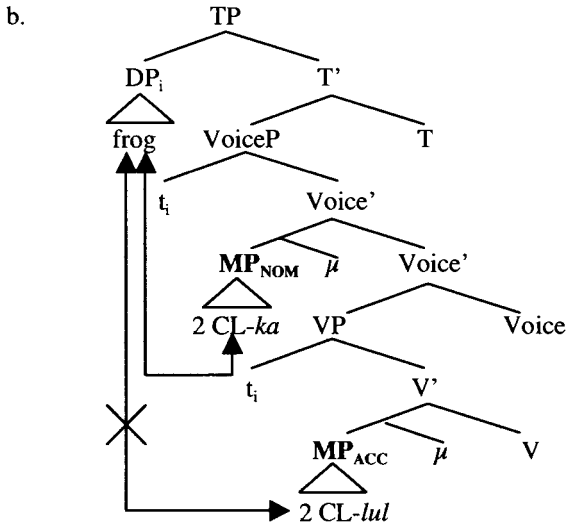
An AmP exhibits a *-ka/-lul* alternation in passives and unaccusatives, while a CIP does not. I argue that that a CIP is in an agreement relation with its host noun, while an AmP is not. The presence or absence of the agreement relation results in the absence or presence of the alternation of case morphology. Matching case morphology does not indicate that there is an agreement relation, since case morphology on MPs marks the position of MPs. The mismatching of case morphology, in contrast, is significant. As shown in (15), CIPs and AmPs show a contrast when they bear accusative case morphology. A CIP cannot have mismatching case morphology with its host noun, while an AmP can.

(15)

Host DP in passives/ unaccusatives	case morphology on MP	
Host-nom	√CIP-nom	*CIP-acc
	√AmP-nom	√AmP-acc

Intolerance for mismatching case morphology in CIPs is related to the fact that a classifier has a more intimate relation with its host noun than an AmP does. Suppose that a classifier has a formal feature [F] which agrees with the host DP, similar to the morphological agreement between host DP and a floating quantifier observed in languages like French, German, or Hebrew. The feature that a classifier has can be a partial phi-feature set. Among the features [person], [number] and [gender], it is plausible to posit the [number] feature on a classifier that agrees with its host noun, since a CIP always contains a numeral and has quantified the host DP indirectly. If a classifier agrees with its host noun in [number], then a mismatch in case morphology shows that there is a failure with respect to agreement. Consider the sentence in (7a), repeated as (16a).

- (16) a. Kaykwuri-ka **twu mari-ka** /***twu mari-lul** cap-hi-ess-ta.
 frog-nom 2 Cl_{animal}-nom/ 2 Cl_{animal}-acc catch-pass-past-decl
 'Two of the frogs were caught.'



In (16), the internal argument moves to the subject position and agrees with its associated CIP. The ungrammaticality of the sentence in which the CIP bears accusative case morphology indicates that the agreement relation must be established in the local domain where identical case morphology is available. This goes along with Legate's (2003) claim that unaccusative and passive VPs are phases, as are vP and CP. Based on the parallelism between ordinary transitive sentences and passive/unaccusative sentences with respect to diagnostic tests such as reconstruction effects, quantifier raising in Antecedent Contained Deletion, parasitic gap licensing, and stress assignment, Legate shows convincingly that unaccusative and passive VPs are phases. The presence of case morphology on a CIP in passives and unaccusatives in Korean follows her claim.

A phase is a self-contained subsection of the derivation, beginning with a numeration and ending with Spell-Out (Chomsky 1998, 2001). At the point of Spell-Out, the complement of the phase-defining head is sent to each of the PF and LF components for interpretation. Thus, after the construction of the vP phase (VoiceP in this paper), VP undergoes Spell-Out. This results in the *Phase Impenetrability Condition* in (17).

(17) *Phase Impenetrability Condition (PIC)*

The complement of a strong phase α is not accessible to operations at the level of the next highest strong phase β , but only the head and the edge of α are, where the edge includes any specifiers of α and any adjuncts to α .

This condition has the effect that any element in the complement of v that has to undergo movement to a position outside the phase (e.g. an object wh-phrase or internal argument of passive and unaccusative predicates) must move to the phase edge before Spell-Out.

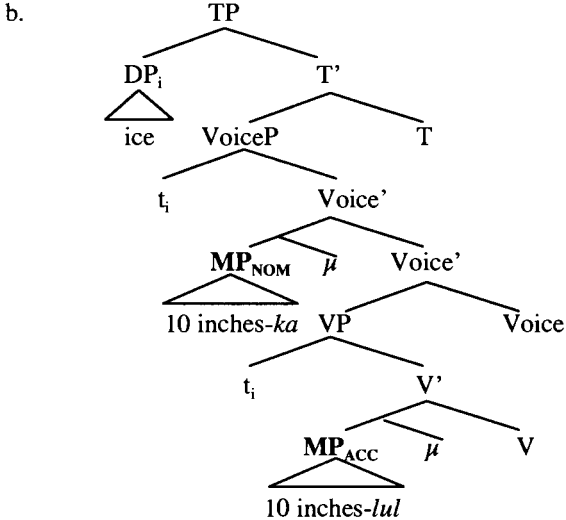
PIC provides a natural account for the contrast observed in (16). Since passive and unaccusative VPs are subject to PIC, VP is spelled out after the internal argument, *kaykwuri* 'frog', moves to the phase edge. In (16), the accusative CIP, *twu mari-lul* '2 Cl_{animal}-acc', is in the domain of VP and its host DP is outside of the phase. Consequently, the CIP cannot agree with its host DP, *kaykwuri* 'frog' due to PIC. In contrast, the nominative CIP, *twu mari-ka* '2 Cl_{animal}-nom' is in the edge of a phase, and successfully agrees with its host DP, *kaykwuri* 'frog'. Therefore, the requirement of identical case morphology on CIPs is accounted for. A CIP agrees with its host DP with respect to the [number] feature in syntax. Since passive and unaccusative VPs are subject to PIC, the CIP must be in the phase edge. Consequently, the CIP must bear nominative case morphology.

If a CIP does not agree with its host DP in syntax, the identical case morphology requirement cannot be accounted for. Suppose that the agreement relation is purely semantic. Then, the accusative CIP and its host noun should be able to agree, since nothing prevents them from agreeing semantically. However, the accusative CIP is ungrammatical in (16), indicating that a CIP and its host DP are in the agreement relation in syntax.

An AmP, unlike a CIP, does not agree with its host noun in syntax. An AmP allows mismatching case morphology, as in (8a), repeated as in (18). If an AmP agrees with its host DP in syntax, it is predicted incorrectly that the AmP with the accusative case morphology is not allowed. The AmP, *sip inchi* '10 inches' in (18), shows the *-kal-lul* alternation. The nominative AmP is in the phase edge, and thus it does not cause any problem. In contrast, the accusative AmP is in the domain of VP. After VoiceP is constructed, the VP undergoes Spell-Out, blocking any syntactic operation from accessing the AmP within it due to PIC. Thus, if an AmP agrees with its host DP, the AmP must be in the phase edge, allowing the nominative AmP only. However, this is not the case. Therefore, an AmP does not agree with its host DP in syntax, and it is not subject to PIC. Since it combines with the compatible DP in semantics, it can occur outside/within the domain of VP, ex-

hibiting the *-ka/-lul* alternation, as illustrated in (18).

- (18) a. Elum-i **sip inchi-ka** / **sip inchi-lul** el-ess-ta.
 ice-nom 10 inch-nom / 10 inch-acc freeze-past-decl
 ‘The water froze 10 inches thick last night.’



3.3 Summary

The fact that MPs have case morphology indicates that they are generated in a certain position where the proper case morphology is available, i.e., inside VP and outside VP. In passive and unaccusative constructions, a CIP and its host DP must have identical case morphology, while an AmP can bear either nominative or accusative case morphology. Since unaccusative and passive VPs are phases, the host DP, which is the surface subject of passive and unaccusative predicates, cannot agree with a CIP within the domain of VP. Unlike a CIP, an AmP allows the *-ka/-lul* alternation, since it does not agree with its host DP.

4 Conclusion

Classifiers and amount expressions share certain properties. They are, however, different, and that difference has an impact in syntax. Since an agreement relation must be established between a CIP and its host DP in syntax, the CIP must have the same case morphology as its host DP. In contrast, no

such agreement relationship is required for an AmP and its host DP. This agreement relation accounts for facts concerning the *-ka/-lul* alternation.

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