

RESEARCH

A morpheme introducing degrees and its impact on argument structure: The Taiwanese Southern Min *u*-

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In the Taiwanese Southern Min *u*-V construction, the *u*-V sequence is an intransitive compound verb denoting a stative scalar property, and the V of the sequence can be a non-gradable lexical verb or an aspectual verb. The morpheme *u* ‘ u_{VD} ’ (A) morphosyntactically induces a change in the valency of the lexical V, (B) compositionally changes the denotation of V into a set of events (or time containment relations), and (C) semantically introduces degrees by contributing a structure-preserving map from events, states or time containment relations to their measures along various dimensions (Wellwood 2015). This study has two implications. First, contra Wellwood (2015), the TSM *u*-V construction provides empirical evidence in support of the degree-theoretic approach for degree structures. Second, Taiwanese Southern Min also adopts the possessive morphosyntactic strategy for predicating gradable properties, but the nominal involved is not necessary to be an abstract property concept nominal (Francez & Koontz-Garboden 2017).

Keywords: degree; implicature; measure function; possessive morphosyntactic strategy; Taiwanese Southern Min; valency change

1 Introduction

For decades, the Taiwanese Southern Min sentence like (1a), in contrast to its non-*u* counterpart (i.e., (1b)), has attracted many scholars’ attention by virtue of the following syntactic and semantic properties (Li 1950; Zhang 1983; Yang 1991; Lai 2007; Lien 2010) (For ease of exposition, I use the term TSM to represent ‘Taiwanese Southern Min’).¹

- (1) a. Tsit-khuan sann (*tsang) tsin u-tshing.
this-CL clothing yesterday very have-wear
‘For anyone to wear it, this kind of clothing is very durable/lasts quite long.’
- b. Yi (tsang) (*tsin) tshing tsit-khuan sann.
s/he yesterday very wear this-CL clothing
‘S/He wore this kind of clothing (yesterday).’

First, as Lien (2010: 1276) points out, “putting the morpheme *u* with the literal meaning *have* or its negative counterpart *bo* ‘not-have’ before a transitive activity verb” like *tshing* ‘wear’ in (1a) “brings about a change in the argument structure of the verb”. Namely, the external agent argument of the verb is syntactically deleted and the internal argument is syntactically externalized as subject bearing the role of theme.²

¹ Seven native speakers of TSM, with their ages ranging from thirty-eight to eighty-eight, are consulted about the grammaticality of the data discussed.

² As Lien (2010) points out, except the semantic distinction between affirmation and negation, the *u*-V ‘have-V’ expression and its negative counterpart (i.e., the *bo*-V ‘not-have-V’ expression) are parallel to each other in morphosyntax and semantics. Hence, I assume my proposal for the syntax and semantics of the

Second, “the *u/bo-V* predicate”, for example *u-tshing* ‘have-wear’ in (1a), “denotes a stative scalar predicate that can be modified by a degree adverb”; however, in (1b), the predicate *tshing tsit-khuan sann* ‘wear this-CL clothing’, being non-gradable, cannot be modified by a degree adverb (Lien 2010: 1278).

Third, “an implicit argument carrying the agent role is a necessary, but not sufficient, condition for a sentence” like (1a), but, in (1b), the agent role must overtly occur as subject (Lien 2010: 1279).

Fourth, “the implicit agent in sentences” like (1a) “is construed as ANY (i.e., an arbitrary or free choice item fed by pragmatic information)” (Lien 2010: 1278).

Fifth, a sentence like (1a), having stative but not punctual aspect, expresses a generic/characterizing rather than episodic/particular state, but (1b) can express an episodic event (Lien 2010: 1278).

Sixth, a sentence like (1a) conveys that the entity denoted by the subject NP (i.e., *tsit-khuan sann* ‘this-CL clothing’) has “the property of being washed many times over”, but (1b) does not (Lien 2010: 1277).

These properties lead Lien (2010: 1285) to analyze the TSM sentence like (1a), which denotes a pluractional event, as a type of middles and dub it the pluractional middle. According to his analysis, which consists of the following major points, (1a) has a syntactic structure like (2), in which the binding of the arguments is established through theta-identification.³ (The asterisk is used to indicate an argument that is closed.)

- (2) $[_S [_{NP} \text{tsit-khuan sann}]_i \dots [_{VP} \langle *1, *2 \rangle \text{pro} [_{V'} \langle 1, 2^* \rangle [_{Adv} \text{tsin}] [_{Adv} \text{u} \langle (1, 2, e), \text{tui } 1 \text{ lai-kong} \rangle]] \text{tshing} \langle 1, 2 \rangle \text{t}_i]]]$

First, the adverb of intensifier *u* ‘have’ with an internal structure like $\langle (1, 2, e), \text{tui } 1 \text{ lai-kong} \rangle$, as (2) shows, takes an event (i.e., *e*) as its argument, the experiencer 1 becomes an adjunct in conjunction with the circumfix *tui ... lai-kong* ‘as far as ... is concerned’, and, then, the experiencer 1 of the adverb *u* ‘have’ is theta-identified with the agent 1 of the verb *tshing* ‘wear’.

Second, the activity verb *tshing* ‘wear’ is changed by the converter *u* ‘have’ into a stative scalar predicate and loses the ability to assign the accusative case to the object NP.

Third, the strong feature of the obligatory adverb of intensifier *u* ‘have’ triggers the object-to-subject movement to fulfill the condition of EPP in the sentence (Lien 2010: 1283).

However, after closely scrutinizing, it is found that the syntactic and semantic properties shown by the TSM construction like (1a) are much more complex than what Lien (2010) and other previous studies have pointed out.

First, as Lien (2010) argues, in the pluractional middle, the transitive activity verb changed into a stative scalar predicate by the converter *u* ‘have’ loses the ability to assign the accusative case to the object NP. So, the internal argument is syntactically externalized as subject bearing the theme role. However, what occurs as subject in the pluractional middle, as Lien (2010: 1276) himself notices but does not provide any remark, actually can be an instrument or a location adjunct, as illustrated by (3b) and (4b), respectively (To note the valency change function and the degree introducing function associated with the morpheme *u* in expressions like *u-tshing* ‘have-wear’, in the following, I use ‘ u_{VD} ’ to gloss it).

morpheme *u* ‘have’ can be applied to that of its negative counterpart. So, examples with a *bo-V* ‘not-have-*V*’ expression will not be discussed in the rest of this paper.

³ Lien (2010: 1283), without providing any supporting evidence, simply claims that the marker *u* ‘have’ in examples like (2) is an adverb of intensifier.

- (3) a. Yi yonn tsit-khuan pi sia gi.
he use this-CL pen write word
'He writes words by this kind of pens.'
- b. Tsit-khuan pi kha u-sia.
this-CL pen more u_{VD} -write
'This kind of pens is more durable for writing.'
- (4) a. Yi ti tshan-lin tsing tshai.
he at field-inside plant vegetable
'He plants vegetables in the field.'
- b. Tsit-khu tshan kha u-tsing.
this-CL field more u_{VD} -plant
'The planting capacity of this field (or the harvest from this field) is larger.'

If the transitive activity verb's dysfunction in assigning the accusative case, as Lien (2010) argues, induces the externalization of the theme role of the verb in the pluractional middle, what occurs as subject in (3b) and (4b) should be the theme role rather than an adjunct of the verb. However, neither does (3b) have a theme subject, nor does (4b).

Second, in addition to the internal theme argument or the adjunct of a transitive verb, the external agent argument of a transitive verb can also occur as subject of a pluractional middle, as attested by (5), where the u -V expression u -lim ' u_{VD} -drink' is modified by the agent-oriented adverb *thiaukang* 'intentionally'.

- (5) Yi tsuekin thiaukang kha u-lim kapi.
he recently intentionally more u_{VD} -drink coffee
'Recently, he intentionally drinks coffee more frequently.'

Third, as (5) further indicates, in the pluractional middle, the agent role of the transitive verb (i.e., *yi* 'he') can be overtly realized. Thus, the agent role is not necessary to occur as an implicit one construed as an arbitrary individual fed by pragmatic information.

Fourth, a pluractional middle actually can express an episodic event or a temporary state, as (6a–b) illustrate.

- (6) a. Yi kinalit tsai kha u-lim kapi.
he today morning more u_{VD} -drink coffee
'This morning, he drank coffee more frequently.'
- b. Tshaikue tshang kai u-siau.
loofah yesterday very u_{VD} -sell/consume
'Yesterday, the loofah sold well/people consumed many loofahs.'

Given these, I will call the TSM sentence like (1a) the TSM u -V construction in the rest of this paper.

The purpose of this paper is to study the syntax and semantics of the TSM u -V construction. The main themes I am going to argue for are as follows. First, the TSM u -V construction, in which the V of the u -V compound verb can be a non-gradable lexical verb or an aspectual verb, is not a middle construction because (A) an aspectual verb does not bear any theta roles and (B) the u -V construction is not necessary to carry a generic reading. Second, the morpheme u ' u_{VD} ', which only induces a change in the valency of V in cases where the V is a lexical verb by introducing (a) generic operator(s) to bind the unsaturated argument(s), contributes a structure-preserving map from events, states or time containment relations to their measures along various

dimensions (Wellwood 2015). Third, the morpheme *u* ‘ u_{VD} ’ compositionally changes the denotation of *V* into a set of events (or time containment relations). This proposal has the following empirical and theoretical implications. First, the fact that the TSM morpheme *u* ‘ u_{VD} ’ cannot introduce degrees for gradable adjectives implies that the degree-theoretic approach for comparatives is still needed (Wellwood 2015). Second, TSM also adopts the possessive morphosyntactic strategy for predicating gradable properties, but, unlike languages like English and German, the nominal involved is not necessary to be an abstract property concept nominal (Francez & Koontz-Garboden 2015; 2017; Li to appear).

The organization of this paper is as follows. In Section 2, I discuss the syntactic and semantic properties of the TSM *u*-*V* construction in depth, and, then, end this section by pointing out the empirical and theoretical questions raised by this construction; among these questions, the discussion in Section 4 and 5 will center around the following five.

- (A) Is the TSM *u*-*V* construction a middle construction?
- (B) Is the TSM *u*-*V* expression a compound adjective as what Yang (1991) and Lien (2010: 1276) suggest?
- (C) Depending on whether the *V* of the *u*-*V* sequence involves a valency change, the TSM *u*-*V* constructions can be divided into the u - V_{vc} type, where the *V* involves a valency change, and the u - V_{nvc} type, where the *V* does not involve a valency change. Behind this empirical fact is the question of what makes the u - V_{vc} construction different from the u - V_{nvc} construction in that the former involves a valency change in the *V* while the latter does not.
- (D) How and where does the TSM *u*-*V* construction get its degree meaning?
- (E) The dimension of measurement shown by the TSM *u*-*V* construction might involve the property of the theme subject, the quantity of the event denoted by the *V* or an aspect of the event denoted by the *V*. So, what could be the exact measure function of the TSM *u*-*V* construction?

Section 3 includes the theoretical foundations of my proposal. In Section 4, a nutshell of my proposal is provided first; then, I demonstrate how my proposal accounts for the syntax and semantics of the TSM *u*-*V* construction. Then, I go back to the question of whether the TSM *u*-*V* construction is a middle construction in Section 5, where some remarks on Francez & Koontz-Garboden (2015; 2017) and Wellwood (2015) will be provided. Section 6 includes the concluding remarks.

2 The syntactic and semantic properties of the TSM *u*-*V* Construction

The TSM *u*-*V* constructions can be divided into two types in terms of whether the *V* of the *u*-*V* expression involves a valency change or not, as shown by (7a–b), respectively.

- (7) a. Tsit-khuan sann kha u-tshing.
 this-CL clothing more u_{VD} -wear
 ‘For anyone to wear it, this kind of clothing is more durable for wearing/lasts longer.’
- b. Yi tsuekin kha u-tshing tsit-khuan sann.
 s/he recently more u_{VD} -wear this-CL clothing
 ‘Recently, s/he wears this kind of clothing more frequently.’

In (7a), the external agent argument of the verb *tshing* ‘wear’ is syntactically deleted and semantically construed as an arbitrary individual; however, in (7b), the argument structure of the verb *tshing* ‘wear’ is intactly retained by having the external agent argument *yi*

‘s/he’ occur as subject and the internal theme argument *tsit-khuan sann* ‘this-CL clothing’ occur as object. So, in the following, I use ‘the $u-V_{vc}$ construction’ to represent a TSM construction like (7a), and ‘the $u-V_{nvc}$ construction’ to represent a TSM construction like (7b).

Thus, in Section 2.1, I will discuss the syntactic and semantic properties of the $u-V_{vc}$ construction and, then, the properties of the $u-V_{nvc}$ construction will be discussed in Section 2.2. Then, I end this section by highlighting the questions raised by the TSM $u-V$ construction.

2.1 The syntactic and semantic properties of the $u-V_{vc}$ construction

The TSM $u-V_{vc}$ construction has the following characteristics. First, the verb able to form an $u-V_{vc}$ ‘ $u_{VD}-V_{vc}$ ’ expression with the morpheme u ‘ u_{VD} ’ can be ditransitive, transitive or intransitive, as illustrated by (8a–b)–(10a–b), respectively (Marelj 2004; Fagan 2009; Xiong 2018).

- (8) a. Bikim kha u-tsio.
dollar more u_{VD} -lend
‘The amount of dollars lent by a lender to borrowers is larger.’
- b. Tionn sio khigiap kha u-tsio.
medium small enterprise more u_{VD} -lend
‘The number of small and medium enterprises to which a lender lends money is larger.’
- (9) Tsit-khuan sann kha u-tshing.
this-CL clothing more u_{VD} -wear
‘This kind of clothing is more durable for wearing.’
- (10) a. Bitpo long kangkhuan, amsi-a kha u-tshuthen.
bat all the-same night-PRT more u_{VD} -show-up
‘All kinds of bats are the same in that the night is more susceptible to their showing up.’
- b. Tsit-ting phonntshng kha u-thiau.
this-CL spring-mattress more u_{VD} -jump
‘This spring mattress is more durable for jumping on it.’

As (10a–b) further indicate, the intransitive verbs involved can be an unaccusative or unergative verb.

Second, as the grammaticality of (11a–b) shows, the V of the $u-V_{vc}$ ‘ $u_{VD}-V_{vc}$ ’ expression can be a non-volitional or mental verb, but, as (12a–b) show, cannot be modified by a degree adverb (Marelj 2004; Fagan 2009; Xiong 2018).⁴

- (11) a. Tsit-khuan hosuann kha u-phangken.
this-CL umbrella more u_{VD} -lose
‘This kind of umbrella is more susceptible to getting lost.’
- b. Tsit-khuan thiang kha u-kamkak.
this-CL pain more u_{VD} -feel
‘This kind of pain is more perceivable.’

⁴ Xiong (2018) claims that mental and stative verbs are not allowed in the Chinese *qilai* middle (Fagan 2009: 97).

(i) *Xiaohaizi ai qilai hen rongyi.
child love QILAI very easy
‘Intended: Children love easily.’

- (12) a. Yi (*kha) phangken tsit-ki hosuann.
s/he more lose one-CL umbrella
- b. Gua (*tsiok) kamkak kha le thiang.
I very perceive leg ASV painful

Third, depending on the inner aspects of verbs, verbs able to form an u - V_{vc} ' u_{VD} - V_{vc} ' expression with the morpheme u ' u_{VD} ' can be an activity, a stative, an achievement or a semelfactive verb, but cannot be an accomplishment verb, as the grammatical contrast between (13a–d) and (13e) illustrates (Smith 1997).⁵

- (13) a. Tsit-khuan sann kha u-tshing.
this-CL clothing more u_{VD} -wear
'This kind of clothing is more durable for wearing.'
- b. Yihak tsinpo, lang e singbiann kha u-potsiong.
medicine progress people E life more u_{VD} -guarantee
'Given the progress of medicine, the life of people is more guaranteed.'
- c. Bitpo long kangkhuan, amsi-a kha u-tshuthen.
bat all the-same night-PRT more u_{VD} -show-up
'All kinds of bats are the same in that the night is more susceptible to their showing up.'
- d. Tsit-ting phonntshng kha u-thiau.
this-CL spring-mattress more u_{VD} -jump
'This spring mattress is more durable for jumping on it.'
- e. *Tsit-khuan uann kha u-konnphua.
this-CL bowl more u_{VD} -hit-break

Fourth, in the TSM u - V_{vc} construction, the argument syntactically suppressed as an implicit one and construed as an arbitrary item fed by pragmatic information can be the agent, theme or experiencer role of V , as the interpretation of (14a–d) illustrates (Lien 2010: 1278).

- (14) a. Tsit-khuan sann kha u-tshing. (agent)
this-CL clothing more u_{VD} -wear
'For anyone to wear it, this kind of clothing is more durable for wearing.'
- b. Tsit-te satbun kha u-se. (agent and theme)
this-CL soap more u_{VD} -wash
'For anyone to wash anything by it, this piece of soap is more durable for washing.'
- c. Oobinlapue, tsit-khuan tsiau-a kha bo-khuanntioh. (experiencer)
Platalea-minor this-CL bird-PRT more not- u_{VD} -see
'As is generally recognized, the Platalea minor, this kind of birds is rarer.'
- d. Tshiu-a hioh long kangkhuan, kuannthinn kha u-lak. (theme)
tree-PRT leaf all the-same winter more u_{VD} -fall
'All kinds of leaves are the same in that the winter is more susceptible to having fallen leaves.'

⁵ As Fagan (2009) and Xiong (2018) argue, stative and achievement verbs are banned from middle formation. Besides, example (i) is a case where *potsiong* 'guarantee' is used as a stative verb.

(i) Hualut potsiong ginbin e singbiann ka tsaisan.
law guarantee people E life and property
'The law protects people's life and property.'

Moreover, the subject of the TSM $u-V_{vc}$ construction is not necessary to be the internal theme role of V. It can be an instrument or location adjunct of V or the goal role of a ditransitive V, as illustrated by (15a–c), respectively (Lai 2007; Lien 2010: 1276).⁶

- (15) a. Tsit-tai tsia kha u-tsai. (instrument)
 this-CL car more u_{VD} -load
 ‘For anyone to pick up anything by it, the loading capacity of this car is larger.’
- b. Tsit-king tshngkho kha u-khng. (location)
 this-CL storehouse more u_{VD} -store
 ‘For anyone to store anything in it, the storing capacity of this storehouse is larger.’
- c. Tionn sio khgiap kha u-tsio. (goal)
 medium small enterprise more u_{VD} -lend
 ‘The number of small and medium enterprises to which a lender lends money is larger.’

Fifth, based on the interpretation of (16a), Lien (2010: 1277) suggests that a TSM $u-V_{vc}$ construction always conveys the property of pluractionality accrued to the entity denoted by the subject NP.

- (16) a. Tsit-khuan sann kha u-se.
 this-CL clothing more u_{VD} -wash
 ‘This kind of clothing is more durable for washing.’
- b. Tsit-liap iu-a kha u-khng.
 this-CL pomelo-PRT more u_{VD} -preserve
 ‘This pomelo can be preserved longer.’
- c. *Tsit-liap iu-a, gua khng sann pai.
 this-CL pomelo-PRT I preserve three time

And, “pluractionality is taken here in the sense that the property (e.g., of durability) that accrues to something (e.g., clothing) is based on the observed result of a set of repeated actions (e.g., washing)” (Lien 2010: 1277).

However, Lien’s (2010) observation is not without exceptions. For example, as the ungrammaticality of (16c) shows, an $u-V_{vc}$ construction like (16b) can only convey the property of ‘monoactionality’ accrued to the entity denoted by the subject NP. And, from the property of monoactionality, the implicature that this pomelo can be preserved longer is implicated.

Sixth, the whole predicate of the TSM $u-V_{vc}$ construction, as Lien (2010) suggests, looks like a dispositional construed as attributing a stative scalar property to the derived subject in question, and the dimension of measurement is the property of the theme subject (e.g., the amount of money), as the interpretation of (17a) shows.

- (17) a. Bikim siunn u-tsio.
 dollar too u_{VD} -lend
 ‘The amount of dollars lent by a lender to borrowers is too large.’
- b. Tsit-liap iu-a tsin u-khng.
 this-CL pomelo-PRT very u_{VD} -preserve
 ‘This pomelo can be preserved very long.’

⁶ Marelj (2004) as well as Xiong (2018) claims that the source/goal role of ditransitive verbs cannot occur as subject in a middle construction.

However, as the interpretation of (17b) shows, the dimension of measurement can also be the quantity (i.e., the temporal duration) of the event denoted by the V. So, the dimension of measurement can be the property of the subject NP or the quantity of the event denoted by the V.

Seventh, a TSM $u-V_{vc}$ expression might allow one or more than one dimension of measurement to measure the relevant degrees, which makes the sentence ambiguous, as the interpretations of (18) illustrate.

- (18) Tsit-tiunn yi-a kha u-tse.
 this-CL chair-PRT more u_{VD} -sit
 a. ‘This chair is more durable than that chair for sitting.’
 b. ‘The seating capacity of this chair is larger than the seating capacity of that chair.’

As reading (18a) shows, the dimension of measurement is ‘the durability for sitting’; however, as reading (18b) shows, the dimension of measurement is ‘the seating capacity’.

Eighth, the TSM $u-V_{vc}$ construction can describe a temporary state or an episodic event, as the interpretation of (19a–b) shows.

- (19) a. Tshaikue tsang kai u-siau.
 loofah yesterday very u_{VD} -sell/consume
 ‘Yesterday, the loofah sold well/people consumed many loofahs.’
 b. Li kinalit tsai kha u-lim kapi.
 you today morning more u_{VD} -drink coffee
 ‘This morning, you drink coffee more frequently.’

Ninth, as Lien (2010: 1285) points out, the $u-V_{vc}$ construction “involves subjectivity, or subjective judgment or evaluation based on personal experience or direct evidence on the part of a sentient being”.

Tenth, Yang (1991: 234, 236) as well as Lien (2010: 1276) analyzes the TSM $u-V_{vc}$ expression as a compound adjective because, whenever occurring as predicate, it syntactically behaves the same as the TSM adjective.

- (20) a. Tsit-le gin-a kha laosit.
 this-CL child-PRT more honest
 ‘This child is more honest.’
 b. Tsit-le gin-a laosit o!
 this-CL child-PRT honest SFP
 ‘This child is honest!’
- (21) a. Tsit-khuan sann kha u-tshing.
 this-CL clothing more u_{VD} -wear
 ‘This kind of clothing is more durable.’
 b. Tsit-khuan sann u-tshing o!
 this-CL clothing u_{VD} -wear SFP
 ‘This kind of clothing is durable!’

However, the TSM $u-V_{vc}$ expression differs from the TSM adjective in that the former cannot undergo adjectival reduplication but the latter can.

- (22) a. Tsit-le gin-a laolaositsit.
this-CL child-PRT honest-honest
'This child is honest.'
- b. Tsit-le gin-a gongtitgongtit.
this-CL child-PRT honest-straightfoward-honest-straightfoward
'This child is honest and straightfoward.'
- c. *Tsit-khuan sann u-u-tshing-tshing.
this-CL clothing u_{VD} - u_{VD} -wear-wear
- d. *Tsit-khuan sann u-tshing-u-tshing.
this-CL clothing u_{VD} -wear- u_{VD} -wear

2.2 The syntactic and semantic properties of the u - V_{nvc} construction

The TSM u - V construction not involving a change in the valency of V (i.e., the u - V_{nvc} construction) has the following characteristics. First, the V of the u - V_{nvc} ' u_{VD} - V_{nvc} ' expression can be ditransitive, transitive or intransitive, as illustrated by (23)–(25a–b), respectively (Marelj 2004; Fagan 2009; Xiong 2018).

- (23) Taiuan ginhann kha u-tsio bikim hoo tionn sio khigiap.
Taiwan bank more u_{VD} -lend dollar to medium small enterprise
'Bank of Taiwan lends dollars to small and medium enterprises more frequently.'
- (24) Yi tsit kui kang sinthe kha hoo, kha u-tsia binnkiann.
he this several day body more good more u_{VD} -eat thing
'During these days, he feels better and eats things more frequently.'
- (25) a. Yi tsuekin thiaukang kha u-tshuthen. (unaccusative)
he recently intentionally more u_{VD} -show-up
'Recently, he intentionally shows up more frequently.'
- b. Yi tsuekin thiaukang kha u-tsau. (unergative)
he recently intentionally more u_{VD} -run
'Recently, he intentionally runs more frequently.'

And, the intransitive verbs, as (25a–b) show, can be an unaccusative or unergative verb.

Second, as the grammaticality of (26a–b) shows, the V of the u - V_{nvc} ' u_{VD} - V_{nvc} ' expression can be a non-volitional or mental verb, but, as (27a–b) show, cannot be modified by a degree adverb (Marelj 2004; Fagan 2009; Xiong 2018).

- (26) a. Yi tsuekin kha u-phangken hosuann.
he recently more u_{VD} -lose umbrella
'Recently, he lost umbrellas more frequently.'
- b. Gua tsuekin kha u-kamkak kha le thiang.
I recently more u_{VD} -feel leg ASV painful
'Recently, I feel my legs painful more frequently.'
- (27) a. Yi (*kha) phangken tsit-ki hosuann.
s/he more lose one-CL umbrella
- b. Gua (*kha) kamkak kha le thiang.
I more perceive leg ASV painful

Third, depending on the types of the inner aspects, the V of the u - V_{nvc} ' u_{VD} - V_{nvc} ' expression can be an activity, a stative, an achievement, an accomplishment or a semelfactive verb, as shown by (28a–e), respectively.

- (28) a. Yi kha u-tshing tsit-khuan sann.
 he more u_{VD} -wear this-CL clothing
 'He wears this kind of clothing more frequently than someone.'
- b. Gua tsuekin kha u-kamkak kha le thiang.
 I recently more u_{VD} -feel leg ASV painful
 'Recently, I feel my legs painful more frequently.'
- c. Yi tsuekin thiaukang kha bo-tshuthen.
 he recently intentionally more not- u_{VD} -show-up
 'Recently, he intentionally shows up less frequently.'
- d. Yi tsuekin kha u-konnphua uann.
 he recently more u_{VD} -hit-break bowl
 'Recently, he breaks bowls more frequently.'
- e. Penlang kinalit kha bo-sau.
 patient today more not- u_{VD} -cough
 'Today, the patient coughs less frequently.'

Fourth, the subject of the u - V_{nvc} construction can be the agent argument of V and the V can be a ditransitive verb, a transitive verb or an intransitive verb (e.g., an unergative or an unaccusative verb), as attested by (29a–d).

- (29) a. Taiuan ginhann tsuekin thiaukang kha u-tsio tsing hoo tionn
 Taiwan bank recently intentionally more u_{VD} -lend money to medium
 sio khigiap.
 small enterprise
 'Recently, Bank of Taiwan intentionally lends money to small and medium enterprises more frequently.'
- b. Yi tsuekin thiaukang kha u-lim kapi.
 he recently intentionally more u_{VD} -drink coffee
 'Recently, he intentionally drinks coffee more frequently.'
- c. Yi tsuekin thiaukang kha u-khau.
 he recently intentionally more u_{VD} -cry
 'Recently, he intentionally cries more frequently.'
- d. Yi tsuekin thiaukang kha bo-tshuthen.
 he recently intentionally more not- u_{VD} -show-up
 'Recently, he intentionally shows up less frequently.'

Fifth, the whole predicate of the TSM u - V_{nvc} construction might look like a dispositional construed as a stative scalar property about how frequently the event or state denoted by the predicate occurs.

- (30) a. Yi tsuekin nae tsia u-tshing tsit-khuan sann?
 He recently why so u_{VD} -wear this-CL clothing
 'Why does he recently wear this kind of clothing so frequently?'
- b. Li tsuekin nae tsia u-kamkak kha le thiang?
 you recently why so u_{VD} -perceive leg ASV painful
 'Why do you recently feel legs painful so frequently?'

- c. Yi tsuekin nae tsia u-phangken binnkiann?
 he recently why so u_{VD} -lose thing
 ‘Why does he recently lose things so frequently?’
- d. Yi tsuekin nae tsia u-konnphua uann?
 he recently why so u_{VD} -hit-break bowl
 ‘Why does he recently break bowls so frequently?’
- e. Penlang kinalit nae tsia u-sau?
 patient today why so u_{VD} -cough
 ‘Why does the patient cough so frequently today?’

Sixth, the TSM $u-V_{nvc}$ construction can describe temporary states or episodic events.

- (31) a. Gua kinalit tsai kha u-kamkak kha le thiang.
 I today morning more u_{VD} -feel leg ASV painful
 ‘This morning, I felt my legs painful more frequently.’
- b. Li kinalit tsai kha u-lim kapi.
 you today morning more u_{VD} -drink coffee
 ‘This morning, you drank coffee more frequently.’

Seventh, the TSM $u-V_{nvc}$ ‘ u_{VD} - V_{nvc} ’ expression differs from the TSM adjective in that the former can take an NP object while the latter cannot.

- (32) a. Yi tsuekin kha u-lim kapi.
 he recently more u_{VD} -drink coffee
 ‘Recently, he drinks coffee more frequently.’
- b. *Lausu tsin giam haksing.
 teacher very severe student

Thus far, the syntactic and semantic properties shown by the two types of the TSM $u-V$ construction bring us the following empirical and theoretical questions that any study on the TSM $u-V$ construction has to address.

First, is the TSM $u-V$ construction a middle construction? If it is, then the following sequential questions related to the first question need to be well addressed.

- (A) Why does the TSM $u-V_{nvc}$ construction not involve a valency change in the V?
- (B) How can the TSM $u-V$ construction get an episodic event or a temporary state reading?
- (C) How can the V of the $u-V_{vc}$ expression be an intransitive verb, either unaccusative or unergative?
- (D) How can the V of the $u-V_{vc}$ expression be a stative or mental verb?
- (E) How can the goal role of a ditransitive verb like *tsio* ‘lend’ occur as the subject of the $u-V_{vc}$ construction?

Second, is the TSM $u-V$ expression a compound adjective?

Third, what causes the $u-V_{vc}$ construction different from the $u-V_{nvc}$ construction in that the former involves a valency change in the V while the latter does not? Namely, what makes the external argument of V able to occur as subject in the $u-V_{nvc}$ construction but unable to occur as subject in the $u-V_{vc}$ construction?

Fourth, how and where does the TSM $u-V$ construction get its degree meaning?

Fifth, why can the V of the $u-V_{nvc}$ expression be an activity, a stative, an achievement, an accomplishment, or a semelfactive verb? And, why is the V of the $u-V_{vc}$ expression unable to be an accomplishment verb?

Sixth, what could be the exact measure function of the TSM *u-V* construction?

For ease of exposition, before going into the details of my proposal for the syntax and semantics of the TSM *u-V* construction, I will briefly introduce as the theoretical foundation Wellwood's (2015) unified account for comparative constructions.

3 The theoretical foundation

Among the properties shown by the TSM *u-V* construction, the following two provide us a good starting point to investigate the semantic nature of the morpheme *u* 'u_{VD}'.

First, the presence of the morpheme *u* 'u_{VD}' distinguishes a TSM *u-V* construction (e.g., (33a)) from its non-*u* 'non-u_{VD}' counterpart (i.e., (33b)) in that the former expresses a degree reading while the latter does not.

- (33) a. Tsit-nia sann kha u-se.
 this-CL clothing more u_{VD}-wash
 'This article of clothing is more durable for washing.'
- b. Yi (*kha) se tsit-nia sann.
 he more wash this-CL clothing
 'He (*more) washes this article of clothing.'

Second, neither can the morpheme *u* 'u_{VD}' independently determine the dimension of measurement, nor can the *V* of the *u-V* expression do so by itself. It is the interaction between the lexical meaning of *V* and the relevant contextual factor that determines the dimension of measurement. For example, in (34a), the interaction between the lexical meaning of the verb *tse* 'sit' and the relevant contextual factor leads the speaker to select 'the durability for sitting' as the dimension of measurement.

- (34) Tsit-tiunn yi-a pi hit-tiunn yi-a kha u-tse.
 this-CL chair-PRT than that-CL chair-PRT more u_{VD}-sit
- a. 'This chair is more durable than that chair for sitting.'
- b. 'The seating capacity of this chair is larger than the seating capacity of that chair.'

In contrast, in (34b), the collaboration of the same verb *tse* 'sit' with a different contextual factor leads the speaker to select 'the seating capacity' as the dimension of measurement. So, the morpheme *u* 'u_{VD}' should not lexically specify the dimension of measurement (See Section 5.2 for how the pragmatic effect is constrained).

These two semantic features of the TSM *u-V* construction, especially the degree introducing function of the morpheme *u* 'u_{VD}', remind us of the following three semantic properties of the English *much* pointed out by Cresswell (1977) and von Stechow (1984).

First, the presence of the semantically vacuous *much* distinguishes (35a) from (35b) in that the former expresses an entity reading while the latter expresses a degree reading.

- (35) a. John buys this coffee.
 b. John buys this much coffee.

Second, the English *much* may occur in a variety of contexts, at least including an adjectival, nominal and verbal domain.

- (36) a. much alike/different
 b. Much water is left in the bucket.
 c. I much prefer wine to beer.

Third, the dimension of measurement of the English *much* is not lexically specified.

In addition to these, Cresswell (1977) further suggests it is the interaction between the predicate and the context that determines the measure function introduced by the English *much* in a given case. And, the dimensions allowed, as Schwarzschild (2002; 2006) argue, have to respect strict part-whole relations, as (37a–c) illustrate (Wellwood et al. 2012; Wellwood 2015; Solt 2015; Dunbar & Wellwood 2016: 16).

- (37) a. Al drank as much coffee as Bill did. volume/*temperature
 b. Al ran as much as Bill did. time/distance/*speed
 c. We look so much alike. likeness/*volume

In (37a), larger portions of coffee have greater measures by volume than smaller portions; however, this is not generally the case with measures by temperature. In (37b), larger ‘quantity’ of running event has greater measures by time or distance than smaller ‘quantity’ of running event; however, the same does not obtain in cases with measures by speed. In (37c), larger ‘quantity’ of likeness state has greater measures by likeness than smaller ‘quantity’ of likeness state; however, this is not generally the case with measures by volume.

Further developing these ideas, Wellwood (2015: 68–69) proposes a unified account for comparative constructions, either adjectival, nominal or verbal, by claiming that “degrees are (i) introduced compositionally, (ii) introduced by *much*, which semantically contributes a structure-preserving map from entities, events or states to their measures along various dimensions, and (iii) introduced not by any other expression”.

In contrast with the degree-theoretic approaches which assume gradable adjectives lexically specify measure functions while nouns and verbs do not, Wellwood (2015: 69) suggests that “which dimensions are possible across domains is a consequence of what is measured, rather than which expressions measure”. So, the interpretations for *coffee* in (37a), *run* in (37b), and *alike* in (37c) can be represented as in (38a–c), where x, y range over elements of the domain of individuals D_e , and $e, e', \dots, s, s', \dots$ range over elements of the eventive and stative subsets of the domain of eventualities D_v .

- (38) a. $\llbracket \text{coffee} \rrbracket^A = \lambda x. \text{coffee}(x)$
 b. $\llbracket \text{run} \rrbracket^A = \lambda e. \text{run}(e)$
 c. $\llbracket \text{alike} \rrbracket^A = \lambda s. \text{alike}(s)$

Namely, a noun like *coffee* introduces individuals, a verb like *run* introduces events, and an adjective like *alike* introduces states for being measured.

Hence, the English *much*, as Wellwood (2015: 69) suggests, has a semantic interpretation as in (39), relative to any assignment of values to variables, A .

- (39) $\llbracket \text{much}_\mu \rrbracket^A = A(\mu)$

Here, the type of measure function over which the variable μ ranges can be $\langle e, d \rangle$ or $\langle v, d \rangle$, and d is the type of degrees. Assuming this, (38a–c) correspondingly have (40a–c) as their potential value for the variable μ (Wellwood 2015: 69).

- (40) a. $A(\mu) = \text{VOLUME}$
 b. $A'(\mu) = \text{TEMPORAL DURATION/DISTANCE}$
 c. $A''(\mu) = \text{ALIKENESS}$

Wellwood (2015: 74) further sets the following restriction on $A(\mu)$ to exclude a telic verb phrase from being a possible domain to which the measure function $A(\mu)$ applies

in any given context or on any assignment A : the domain to which $A(\mu)$ applies must be non-trivially structured ones. Namely, for any two entities properly ordered in a part-of relation, their measurements are similarly ordered in Schwarzschild's (2002; 2006) sense.

Accordingly, as (41b) shows, (41a) is true just in case A is the agent of a running event, the $A(\mu)$ -measure of which is greater than that of a running event by Bill. If $A(\mu)$ is 'temporal duration' or 'distance', the result will be interpretable. If it is 'speed', it will not be (Wellwood 2015: 78).

- (41) a. Al ran more than Bill did.
 b. $\llbracket \text{Al ran more than Bill did} \rrbracket^A = T$ iff
 $\exists e[\text{Agent}(e)(a) \ \& \ \text{run}(e) \ \& \ A(\mu)(e) > \max(\lambda d. \exists e'[\text{Agent}(e')(b) \ \& \ \text{run}(e') \ \& \ A(\mu)(e') \geq d])]$

4 The proposal

Taking Wellwood (2015) as the theoretical foundation, in this section, a nutshell of my proposal will be provided first; then, I demonstrate how my analysis accounts for the syntax and semantics of the TSM u -V construction, the u -V_{vc} and the u -V_{nvc} type.

4.1 A nutshell of the analysis

Following Li (1950: 158), Yang (1991: 236), Lai (2007) and Lien (2010), I assume that the TSM u -V expression is a compound word; however, instead of treating it as a compound adjective, I analyze the TSM u -V expression as an intransitive compound verb denoting a stative scalar property because of the following reasons. First, the TSM u -V expression cannot undergo adjectival reduplication, but the TSM adjective can, as shown by the contrast below.

- (42) a. *Tsit-khuan sann u-u-tshing-tshing.
 this-CL clothing u_{VD}-u_{VD}-wear-wear
 b. *Tsit-khuan sann u-tshing-u-tshing.
 this-CL clothing u_{VD}-wear-u_{VD}-wear
- (43) a. Tsit-le gin-a laolaositsit.
 this-CL child-PRT honest-honest
 'This child is honest.'
 b. Tsit-le gin-a gongtitgongtit.
 this-CL child-PRT honest-straightfoward-honest-straightfoward
 'This child is honest and straightfoward.'

Second, a TSM adjective cannot take a theme object NP unless it is introduced by a PP adjunct occurring before the adjective, as the grammatical contrast between (44a–b) and (44c–d) shows.

- (44) a. *Tsit-le lausu tsiok [_{AP} [[_A giam] [_{NP} haksing]]].
 this-CL teacher very severe student
 b. *Yi tsiok [_{AP} [[_A sennso] [_{NP} inngi]]].
 s/he very unfamiliar English
 c. Tsit-le lausu [[_{PP} [[_P tui] [_{NP} haksing]]] [_{DegP} tsiok giam]].
 this-CL teacher to student very severe
 'This teacher is very severe to students.'

- d. Yi [[_{pp} [[_p tui] [_{NP} inngi]]] [_{DegP} tsiok sennso]].
 s/he with English very unfamiliar
 ‘S/He is very unfamiliar with English.’

However, a TSM u -V_{nvc} ‘ u_{VD} -V_{nvc}’ expression can take an NP or a VP complement, as shown by (45a–b), respectively (henceforth, I use the term u -V compound verb to represent the u -V expression).^{7,8}

- (45) a. Yi tsuekin kha [_{VP} [_V u-lim] [_{NP} kapi]].
 he recently more u_{VD} -drink coffee
 ‘Recently, he drinks coffee more frequently.’
 b. Yi tsuekin kha [_{VP} [_V u-le] [_{VP} lim kapi]].
 he recently more u_{VD} -ASV drink coffee
 ‘Recently, he drinks coffee more frequently.’

After assuming that the TSM u -V expression is an intransitive compound verb denoting a stative scalar property, I will define the morphosyntactic function of the morpheme u ‘ u_{VD} ’ in 4.1.1 and the degree introducing function of the morpheme u ‘ u_{VD} ’ in 4.1.2. (For ease of exposition, I will use the term u_{ms} when discussing the morphosyntactic function of u ‘ u_{VD} ’, and u_s when discussing the degree introducing function of u ‘ u_{VD} ’.)

4.1.1 The morphosyntactic function of U_{ms}

In the TSM u -V construction, the morpheme u ‘ u_{VD} ’ and a verb (i.e., the V of u -V) form an intransitive compound verb denoting a stative scalar property at the level of lexicon. The V of the u -V compound can be a non-gradable lexical verb bearing theta roles or an aspectual verb which encodes aspectual information about events but never bears theta roles.

On one hand, if the V is a lexical verb bearing theta roles, the morpheme u ‘ u_{VD} ’ has the following morphosyntactic functions:

First, in order to stativize the V, the morpheme u_{ms} changes the valency of V by introducing a generic operator (or generic operators) to bind the unsaturated external argument (or the unsaturated external and the unsaturated internal argument) of V in Chierchia’s (1989) sense of argument saturation (Reinhart 1996).⁹

- (46) $(\lambda y P < x, y >) (a) \rightarrow (\lambda y OPx P < x, y >) (a)$ (Argument Saturation)

⁷ One of the features that distinguish the compound u -V from the phrasal u -V, as Yang (1991: 234, 236) argues, is that the former expresses a degree reading while the latter expresses the aspectual meaning of event realization.

⁸ In Section 4.2.2, I will argue that example (45a) actually has a syntactic structure like (i), in which one of the two consecutive u ’s (i.e., the morpheme u ‘ u_{VD} ’ and the aspectual verb u ‘the realization aspect’) is haploglogically eliminated at the phonetic level due to their phonetic identity.

- (i) Yi tsuekin kha [_{ASVP} [[_{ASV} u-[_{ASV} u]] [_{VP} [[_V lim] [_{NP} kapi]]]].
 he recently more u_{VD} -ASV drink coffee

So, in (45a), the u -V_{nvc} expression actually takes a VP complement rather than an NP complement.

⁹ According to Chierchia (1989) and Reinhart (1996), two operations on unbound semantic argument variables are available. That is, the unbound semantic argument variables can be bound by a semantic operator (i.e., OP) or completely removed from the semantic representation. The former operation is called argument saturation while the latter is called argument reduction, as shown by (i) and (ii), respectively.

- (i) $(\lambda y P < x, y >) (a) \rightarrow (\lambda y OPx P < x, y >) (a)$ (Saturation)
 (ii) $(\lambda y P < x, y >) (a) \rightarrow (\lambda y P < y >) (a)$ (Reduction)

As they further suggest, argument saturation yields the middle interpretation, whereas argument reduction is responsible for the anticausative and inherent reflexive interpretations.

Second, if the unsaturated external argument and internal argument(s) of V are all bound by a generic operator, the morpheme u_{ms} will lead a non-thematic argument (in the semantic term ‘a property of an event’ or in the syntactic term ‘an adjunct of the verb’) into the structure which, then, syntactically occurs as the subject of the sentence.

Third, according to the ambiguity approach proposed by Wilkinson (1991) and Gerstner-Link & Krifka (1993) for the interpretations of English bare plurals, the denotational ambiguity of a verb between a disposition (or a habit) (e.g., *bark* in (47a)) and an episodic event (e.g., *bark* in (48a)) results from how the eventuality argument s contained in the valency of the verb is quantified (Dayal 2011: 1091).

- (47) a. Dogs bark.
 b. GEN s, x [dogs(s, x)] [bark(s, x)]
- (48) a. Dogs are barking.
 b. $\exists s, x$ [dogs(s, x) \wedge are-barking(s, x)]

As (47b) shows, when the eventuality argument s is bound by a generic operator (i.e., GEN), the verb denotes a disposition (or a habit); however, as (48b) shows, when the eventuality argument s is bound by an existential operator, the verb denotes an episodic event. As Lien (2010: 1277) points out, the TSM u - V_{vc} construction always expresses the disposition of the subject based on the pluractionality of events. So, assuming that the valency of a verb contains an eventuality argument v , I suggest that the morpheme u_{ms} changes the denotation of the V of the u - V compound verb by having all the arguments and adjuncts bound by the generic operator, except one which is not the external argument or internal argument of an unaccusative verb, and, after this unbound variable takes the subject as its argument, it will return to a set of events (i.e., $\langle v, t \rangle$ with the symbol v as the type of event).¹⁰ And, the number of element events of the set of events, depending on the lexical meaning of V and the relevant contextual factor, might be one or more than one.

Depending on the types of lexical verbs that can occur as the V of the TSM u - V_{vc} compound verb, the interpretation of the morpheme u_{ms} can be represented as follows.

- (49) Ditransitive verbs (e.g., *tsio* ‘lend’)
- a. $\llbracket P_{\langle v, \langle e, \langle e, \langle e, t \rangle \rangle \rangle} \rrbracket^A = \lambda x \lambda y \lambda z \lambda v. P(z, y, x, v)$
- b. $\llbracket u_{ms} \rrbracket^A =$ (i) $\lambda P \lambda x \lambda y \text{OP} y \text{OP} z. P(v)(x)(y)(z)$
 (ii) $\lambda P \lambda y \lambda v \text{OP} x \text{OP} z. P(v)(x)(y)(z)$
 (iii) $\lambda P \lambda w \lambda v [\text{OP} x \text{OP} y \text{OP} z. P(v)(x)(y)(z) \wedge \text{Property}(v, w)]$ ¹¹
- P is a ditransitive verb, OP is a generic operator, z is the external argument, y and x are the internal arguments, w is a non-thematic argument, and v is the eventuality argument of P .

¹⁰ As one anonymous reviewer reminds me, in order not to create (ontological) confusion, it would be better to state things in terms of events here. So, I assume the valency of a verb contains an eventuality argument v with the type of event.

¹¹ I assume there is only one u_{ms} , which compositionally changes the denotation of V of the u - V compound verb into a set of events. So, (49bi–iii) are allomorphs of the morpheme u_{ms} , and they only differ from each other in which argument or adjunct is selected as the syntactic subject. Besides, I use the term ‘Property’, which means ‘a property of an event’ in the semantic term or ‘an adjunct’ in the syntactic term to represent the predicate modification relation between the eventuality argument v and the non-thematic argument variable w . This predicate modification relation is subject to Beck’s (2005: 34) Generalized Predicate Modification:

(i) If $\alpha = [\beta \gamma]$ and β' is of type $\langle e, \langle i, t \rangle \rangle$ and γ' is of type $\langle e, \langle i, t \rangle \rangle$, then $\alpha' = \lambda x \lambda e. \beta'(x) \ \& \ \gamma'(x)(e)$

(50) Transitive verbs (e.g., *se* ‘wash’)

a. $\llbracket P_{\langle v, \langle e, \langle e, t \rangle \rangle} \rrbracket^A = \lambda x \lambda y \lambda v. P(y, x, v)$

b. $\llbracket u_{ms} \rrbracket^A = (i) \lambda P \lambda x \lambda v [OPy.P(v)(x)(y)]$

(ii) $\lambda P \lambda w \lambda v [OPx.P(v)(x)(y) \wedge \text{Property}(v, w)]$

P is a transitive verb, *OP* is a generic operator, *y* is the external argument, *x* is the internal arguments, *w* is a non-thematic argument, and *v* is the eventuality argument of *P*.

(51) Unergative verbs (e.g., *thiau* ‘jump’)

a. $\llbracket P_{\langle v, \langle e, t \rangle} \rrbracket^A = \lambda y \lambda v. P(y, v)$

b. $\llbracket u_{ms} \rrbracket^A = \lambda P \lambda w \lambda v [OPy.P(v)(y) \wedge \text{Property}(v, w)]$

P is an intransitive verb, *OP* is a generic operator, *y* is the external argument, *w* is a non-thematic argument, and *v* is the eventuality argument of *P*.

(52) Unaccusative verbs (e.g., *tshuthen* ‘appear’)

a. $\llbracket P_{\langle v, \langle e, t \rangle} \rrbracket^A = \lambda x \lambda v. P(x, v)$

b. $\llbracket u_{ms} \rrbracket^A = \lambda P \lambda w \lambda v [OPx.P(v)(x) \wedge \text{Property}(v, w)]$

P is an intransitive verb, *OP* is a generic operator, *x* is the internal argument, *w* is a non-thematic argument, and *v* is the eventuality argument of *P*.

On the other hand, in TSM, there are two preverbal aspectual verbs (i.e., *u* ‘the realization aspect’ and *le* ‘the progression aspect’), as shown by (53a–b), respectively (Chappell 1989; Yang 1991: 235–236).¹²

(53) a. Yi u lim kapi.
he ASV drink coffee
‘He drank coffee.’

b. Yi le lim kapi.
he ASV drink coffee
‘He is drinking coffee.’

An aspectual verb simply functions to encode aspectual information about events but never bears theta roles, as attested by the data below (Fukuta 2012).

(54) a. Yi lim kapi.
he drink coffee
‘He drinks coffee.’

b. Yi u lim kapi.
he ASV drink coffee
‘He has drunk coffee.’

In (54a), the lexical verb *lim* ‘drink’ assigns one of its theta roles (i.e., the agent role) to the subject NP *yi* ‘he’ and the other (i.e., the theme role) to the object NP *kapi* ‘coffee’. In addition to the lexical verb *lim* ‘drink’, (54b) also contains the aspectual verb *u* ‘the realization aspect’. The grammaticality of (54b) implies that all theta roles of the predicate are assigned and all the NPs inside receive one and only one theta role. Since (54b) has as many NPs as (54a) has, it can be said that the aspectual verb *u* ‘the realization aspect’

¹² The TSM aspectual verb *u* ‘the realization aspect’ and the TSM morpheme *u* ‘ u_{vD} ’ of the *u*-V compound verb are two morphemes with different properties in syntax and semantics.

does not assign any theta role of its own. The aspectual verb *u* ‘the realization aspect’, therefore, does not bear any theta roles. The same also happens to the aspectual verb *le* ‘the progressive aspect’ in (55b).

- (55) a. Yi lim kapi.
 he drink coffee
 ‘He drinks coffee.’
 b. Yi le lim kapi.
 he ASV drink coffee
 ‘He is drinking coffee.’

Adopting Lin’s (2003: 271) definition of the realization aspect and the progressive aspect, I suggest that the aspectual verb *u* ‘the realization aspect’ and *le* ‘the progressive aspect’ have (56a–b) as their corresponding semantic representation (Bohnenmeyer & Swift 2001). (In (56a–b), $\tau(e')$, in which τ is the temporal trace function, can be equivalent to the event time and t is the topic time.)¹³

- (56) a. $\llbracket u_{ASV} \rrbracket = \lambda P_{\langle v, t \rangle} \lambda t \lambda e \exists e' [P(e) \wedge P(e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]$
 b. $\llbracket le_{ASV} \rrbracket = \lambda P_{\langle v, t \rangle} \lambda t \lambda e \exists e' [P(e) \wedge P(e') \wedge e' \leq_E e \wedge \tau(e') \supseteq t]$

Applying the meaning of the aspectual verb *u* ‘the realization aspect’ to the sentence *yi lim kapi* ‘he drink coffee’ (i.e., P in (56a–b)), the meaning of (57a) can be derived as follows: there is an event e of *yi lim kapi* ‘he drink coffee’, this event has a subpart (i.e., e') and $\tau(e')$ is contained within the topic time (i.e., t).

- (57) a. Yi u lim kapi.
 s/he ASV drink coffee
 ‘S/He drank coffee.’
 b. Yi le lim kapi.
 s/he ASV drink coffee
 ‘S/He is drinking coffee.’

Likewise, applying the meaning of the aspectual verb *le* ‘the progression aspect’ to the sentence *yi lim kapi* ‘he drink coffee’, we can get the meaning of (57b) (i.e., there is an event e of *yi lim kapi* ‘he drink coffee’, this event has a subpart (i.e., e'), and $\tau(e')$ (i.e., the event time) contains the topic time (i.e., t)).

So, the denotation of an aspectual verb can be regarded as a containment relation between the topic time (i.e., t) and the event time (i.e., $\tau(e')$). Since an aspectual verb does not bear any theta roles, the valency change function of the morpheme u_{ms} ‘ u_{VD} ’ is nullified. However, u_{ms} ‘ u_{VD} ’ still retains the ability of compositionally changing the denotation of an aspectual verb into a set of containment relations between the topic time and the event time. (In the following, I will use the term V_{ASVms} to represent the aspectual verb derived from applying the morphosyntactic function of u ‘ u_{VD} ’ to the aspectual verb V_{ASV} .)

Assuming these, I suggest that, after applying the morphosyntactic function of the morpheme u ‘ u_{VD} ’ to the TSM aspectual verb, the derived aspectual verb u_{ASVms} has an interpretation like (58a) and the derived aspectual verb le_{ASVms} has an interpretation like (58b).¹⁴

¹³ Here, I use the notion of event time rather than situation time to avoid ontological confusion.

¹⁴ In (58a–b), the capital E represents a set of events, the subscript v is the type of event and the subscript k is the type of topic time (i.e., t).

- (58) a. $\llbracket u_{ASVms} \rrbracket^A = \lambda P_{\langle v, t \rangle} \lambda t_k \exists E_{\langle v, t \rangle} \forall e_v [(P(e) \wedge e \in E) \rightarrow \exists e'_v [P(e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]]$
 ‘After the combination with an argument P , which denotes a set of events, and a topic time t , u_{ASVms} derives a set of events (i.e., $E_{\langle v, t \rangle}$) such that for its every element event e which describes P , e has a subpart e' which describes the same P and whose running time is contained within the topic time.’
- b. $\llbracket le_{ASVms} \rrbracket^A = \lambda P_{\langle v, t \rangle} \lambda t_k \exists E_{\langle v, t \rangle} \forall e_v [(P(e) \wedge e \in E) \rightarrow \exists e'_v [P(e') \wedge e' \leq_E e \wedge \tau(e') \supseteq t]]$
 ‘After the combination with an argument P , which denotes a set of events, and a topic time t , le_{ASVms} derives a set of events (i.e., $E_{\langle v, t \rangle}$) such that for its every element event e which describes P , e has a subpart e' which describes the same P and whose running time contains the topic time.’

4.1.2 The degree semantics of u_s

Partially along the line of Wellwood (2015), I suggest that the morpheme u_s , being a component of a compound verb, functions to introduce degrees for the V of the u -V intransitive compound verb and, depending on whether the V is a non-gradable lexical verb or an aspectual verb, has a semantic interpretation as in (59a–b), with μ a variable over measure function-types, whose value is determined by the assignment function A . (In the following, I will use the term u_s of type μ when discussing the degree introducing function of the morpheme u ‘ u_{VD} ’.)

- (59) a. If α is a non-gradable lexical verb, the morpheme u_s has a semantic interpretation like:
 $\llbracket u_{s\mu} \rrbracket^A = \lambda x \lambda \alpha. A(\mu)(\alpha(x))$
 $\alpha(x)$ denotes a set of events related to the lexical verb and x is not an eventuality argument. The dimension of measurement selected by $A(\mu)$ is the number of element events of the set of events or the temporal duration of the event denoted by α .
- b. If α is an aspectual verb, the morpheme u_s has a semantic interpretation like:
 $\llbracket u_{s\mu} \rrbracket^A = \lambda \alpha \lambda Q \lambda y. A(\mu)(\alpha(Q(y)))$
 $\alpha(Q(y))$ denotes a set of containment relations between the event time and the topic time. The dimension of measurement selected by $A(\mu)$ is the number of element containment relations of the set of time containment relations.

Whether a measure function is permissible or not is determined by the sort of thing that $\alpha(x)$ or $\alpha(Q(y))$ is. For the TSM u -V construction, the type of measure function over which the variable μ ranges is $\langle \langle v, t \rangle, d \rangle$ or $\langle \langle \langle v, t \rangle, \langle k, t \rangle \rangle, d \rangle$, depending on whether the sort of thing measured is $\alpha(x)$ or $\alpha(Q(y))$, and d is the type of degrees. So, for the TSM u -V construction, degrees are (i) introduced compositionally, and (ii) introduced by the morpheme u ‘ u_{VD} ’, which semantically contributes a structure-preserving map from events, states or time containment relations to their measures along various dimensions in Wellwood’s (2015) sense. The domain to which $A(\mu)$ applies, as Wellwood (2015) suggests, is subject to the condition: for any two entities properly ordered in a part-of relation, their measurements are similarly ordered (Schwarzschild 2002; 2006).

As I have argued, the TSM u -V constructions can be divided into two types (i.e., the u -V_{vc} and the u -V_{nvc} type) in terms of whether the V of the u -V compound verb has undergone a valency change.

Given this, the discussion below will proceed in a way as follows. I first show how my proposal accounts for the syntax and semantics of the $u\text{-}V_{vc}$ construction, and, then, I deal with the syntax and semantics of the $u\text{-}V_{nvc}$ construction.

4.2 The application of the analysis

4.2.1 The $u\text{-}V_{vc}$ construction

As I have suggested, the TSM $u\text{-}V$ intransitive compound verb formed by the morpheme u ‘ u_{vd} ’ and a non-gradable verb (i.e., V) denotes a stative scalar property.

If the V is a lexical verb, the morpheme u_{ms} , depending on the types of lexical verbs (i.e., the ditransitive, the transitive, the unergative or the unaccusative verb), has seven different application ways, as shown by (60a–d), respectively.

- (60) a. Ditransitive verbs: $\lambda P\lambda x\lambda y\lambda z\lambda v.P(z, y, x, v)$ (e.g., *tsio* ‘lend’)
 $\llbracket u_{ms} \rrbracket^A =$ (i) $\lambda P\lambda x\lambda v\text{OP}y\text{OP}z.P(v)(x)(y)(z)$
 (ii) $\lambda P\lambda y\lambda v\text{OP}x\text{OP}z.P(v)(x)(y)(z)$
 (iii) $\lambda P\lambda w\lambda v[\text{OP}x\text{OP}y\text{OP}z.P(v)(x)(y)(z) \wedge \text{Property}(v, w)]$
- b. Transitive verbs: $\lambda P\lambda x\lambda y\lambda v.P(y, x, v)$ (e.g., *se* ‘wash’)
 $\llbracket u_{ms} \rrbracket^A =$ (i) $\lambda P\lambda x\lambda v\text{OP}y.P(v)(x)(y)$
 (ii) $\lambda P\lambda w\lambda v[\text{OP}x\text{OP}y.P(v)(x)(y) \wedge \text{Property}(v, w)]$
- c. Unergative verbs: $\lambda P\lambda y\lambda v.P(y, v)$ (e.g., *tsau* ‘run’)
 $\llbracket u_{ms} \rrbracket^A = \lambda P\lambda w\lambda v[\text{OP}y.P(v)(y) \wedge \text{Property}(v, w)]$
- d. Unaccusative verbs: $\lambda P\lambda x\lambda v.P(x, v)$ (e.g., *lak* ‘fall’)
 $\llbracket u_{ms} \rrbracket^A = \lambda P\lambda w\lambda v[\text{OP}x.P(v)(x) \wedge \text{Property}(v, w)]$

These seven different application ways can be exemplified by (61a–c), (62), (63), (64) and (65), respectively.

- (61) a. Tionn sio khigiap kha u-tsio.
 medium small enterprise more u_{vd} -lend
 ‘The number of small and medium enterprises to which a lender lends money is larger.’
- b. Bikim pi auguan kha u-tsio.
 dollar than euro more u_{vd} -lend
 ‘The amount of dollars lent by a lender to borrowers is larger than the amount of euros is.’
- c. Tsuekin kha u-tsio.
 recently more u_{vd} -lend
 ‘The recent days are with more cases of a lender’s lending money to a borrower.’
- (62) Tsit-nia sann pi hit-nia sann kha u-se.
 this-CL clothing than that-CL clothing more u_{vd} -wash
 ‘For anyone to wash it, this article of clothing is more durable than that article of clothing.’
- (63) Tsit-te satbun pi hit-te satbun kha u-se.
 this-CL soap than that-CL soap more u_{vd} -wash
 ‘For anyone to wash anything by it, this piece of soap is more durable for washing than that piece of soap.’

- (64) Tsit-khuan e pi hit-khuan e kha u-tsau.
 this-CL shoe than that-CL shoe more u_{VD} -run
 ‘For anyone to run by wearing it, this kind of shoes is more durable than that kind of shoes.’
- (65) Tshiu-a hioh long kangkhuan, kuanthinn pi zuanthinn kha u-lak.
 tree-PRT leaf all the-same winter than summer more u_{VD} -fall
 ‘All kinds of leaves are the same in that the winter is more susceptible to having fallen leaves than the summer.’

However, due to space limit, I will only demonstrate how my proposal accounts for the syntax and semantics of (61b), (62), (63), (64) and (65), respectively.

First, in (61b), the ditransitive verb *tsio* ‘lend’ forms the intransitive compound verb *u-tsio* ‘ u_{VD} -lend’ with the morpheme *u* ‘ u_{VD} ’ and the unsaturated agent argument and the unsaturated goal argument of it, as (67c) shows, are bound by a generic operator at the level of lexicon. So, at the syntactic level, (61b) has a structure like (66), where the theme argument *bikim* ‘dollar’ of intransitive compound verb *u-tsio* ‘ u_{VD} -lend’, which can be understood as the theme argument of the verb *tsio* ‘lend’, occurs in the specifier position of VP projected by the compound verb *u-tsio* ‘ u_{VD} -lend’ and, then, moves to the subject position.

- (66) $[_{IP} [_{bikim}]_i [_{DegP} [_{PP} pi \text{ auguan}] [_{Deg'} [_{Deg} kha] [_{VP} t_i [_{V'} [_{V} u\text{-}tsio]]]]]]]]]$
 dollar than euro more u_{VD} -lend
 ‘The amount of dollars lent by a lender to borrowers is larger than the amount of euros is.’

Based on this syntactic structure, the semantic composition of (61b) can be demonstrated by (67a–j). For readership, the English gloss is added behind the slash, $[[u_{ms}]^A]$ represents the morphosyntactic function of *u* ‘ u_{VD} ’, $[[tsio_{ms}/lend_{ms}]^A]$, for example, represents the set of lending events denoted by the verb *tsio* ‘lend’ after it undergoes the morphosyntactic process induced by *u* ‘ u_{VD} ’, $[[u_s]^A]$ represents the semantic function of *u* ‘ u_{VD} ’, and $[[u_s\text{-}tsio_{ms}/u_s\text{-}lend_{ms}]^A]$ is the denotation of the intransitive compound verb *u-tsio* ‘ u_{VD} -lend’.¹⁵

- (67) a. $[[tsio/lend]^A] = \lambda x \lambda y \lambda z \lambda v. tsio(z, y, x, v)$
 b. $[[u_{ms}]^A] = \lambda P \lambda y \lambda v OP x OP z. P(v)(x)(y)(z)$
 c. $[[tsio_{ms}/lend_{ms}]^A] = \lambda y \lambda v OP x OP z. tsio(z, y, x, v)$

¹⁵ I treat the morpheme *kha* ‘more’ as the TSM counterpart of the English comparative morpheme *-er* because the obligatory element *kha* ‘more’ provides the ‘explicit comparison’ meaning for a TSM comparative construction, as (i) shows.

- (i) Yi (pi li) *(kha) kuan.
 s/he than you more tall
 ‘S/He is taller (than you).’

Following Bartsch & Vennemann (1972) and Kennedy (1999), I further suggest *kha* ‘more’ has an interpretation like (ii), where *g* ranges over measure functions, *d* is provided by the standard of comparison and α may be an individual of type *e*.

- (ii) $\lambda \alpha \lambda d \lambda g. g(\alpha) > d$

However, as (67e) shows, the denotation of $[_v u_s\text{-}tsio_{ms}]$ already contains a measure function (i.e., $A(\mu)$). So, *kha* ‘more’ that occurs in the TSM *u*-V construction has a denotation like (iii).

- (iii) $\lambda \alpha \lambda d. \alpha > d$

- d. $\llbracket u_s \rrbracket^A = \lambda\alpha\lambda y.A(\mu)(\alpha(y))$
- e. $\llbracket [_{\text{V}} u_s\text{-tsio}_{ms}/u_s\text{-lend}_{ms}] \rrbracket^A = \lambda y.A(\mu)(\lambda\nu\text{OPxOPz.tsio}(z, y, x, \nu))$
- f. $\llbracket [_{\text{Deg}} kha/more] \rrbracket^A = \lambda\alpha\lambda d\lambda g.g(\alpha) > d$
- g. $\llbracket [_{\text{DegP}} kha u_s\text{-tsio}_{ms}/more u_s\text{-lend}_{ms}] \rrbracket^A = \lambda d\lambda y.A(\mu)(\lambda\nu\text{OPxOPz.tsio}(z, y, x, \nu)) > d$
- h. $\llbracket [_{\text{PP}} pi\ auguan/than\ euro] \rrbracket^A = d_{auguan}$
- i. $\llbracket [_{\text{DegP}} pi\ auguan\ kha\ u_s\text{-tsio}_{ms}/than\ euro\ more\ u_s\text{-lend}_{ms}] \rrbracket^A = \lambda y.A(\mu)(\lambda\nu\text{OPxOPz.tsio}(z, y, x, \nu)) > d_{auguan}$
- j. $\llbracket [_{\text{IP}} bikim\ pi\ auguan\ kha\ u_s\text{-tsio}_{ms}/dollar\ than\ euro\ more\ u_s\text{-lend}_{ms}] \rrbracket^A = A(\mu)(\lambda\nu\text{OPxOPz.tsio}(z, bikim, x, \nu)) > d_{auguan}$
 $= \text{T iff } \exists E_{\langle v, t \rangle} [E_{\langle v, t \rangle} = \lambda\nu\text{OPxOPz.tsio}(z, bikim, x, \nu) \wedge A(\mu)(E_{\langle v, t \rangle}) > d_{auguan}]$
 $A(\mu)$ is the number of element events of the set of lending events.

Thus, (61b) is true just in case there is a set of lending events in which *bikim* ‘dollar’ is lent in each lending event, and the number of element events of this set of lending events is larger than the number of element events of the set of lending events in which *auguan* ‘euro’ is lent in each lending event.

From this ‘core’ meaning, a native speaker can obtain the implicature that the amount of dollars lent by a lender to borrowers is more than the amount of euros is.¹⁶ So, the dimension of measurement ‘the amount of money lent’, perceived from (61b) by the native speaker and related to the property of the theme subject (i.e., *bikim* ‘dollar’), can be regarded as an implicature implicated from the exact measure function (i.e., the number of element events of the set of lending events).

Second, in (62), the transitive verb *se* ‘wash’ of the intransitive compound verb *u-se* ‘ u_{VD} -wash’, as (69c) shows, has its unsaturated external argument bound by a generic operator at the level of lexicon. So, at the syntactic level, (62) has a structure like (68), where the theme argument of the intransitive compound verb *u-se* ‘ u_{VD} -wash’ (i.e., *tsit-nia sann* ‘this-CL clothing’) occurs in the specifier position of VP projected by the compound verb *u-se* ‘ u_{VD} -wash’ and, then, moves to the subject position.

- (68) $[_{\text{IP}} [tsit-nia\ sann]_i [_{\text{DegP}} [_{\text{PP}} pi\ hit-nia\ sann] [_{\text{Deg}'} [_{\text{Deg}} kha] [_{\text{VP}} t_i [_{\text{V}'} [_{\text{V}} u-se]]]]]]]$
 this-CL clothing than that-CL clothing more
 u_{VD} -wash
 ‘This article of clothing has the property of being washed more times than that article of clothing.’

Based on (68), the semantic composition of (62) can be represented by (69a–j).

¹⁶ Thanks to one anonymous reviewer for reminding me that the ‘amount of money lent’ reading is at best an implicature. The ‘implicature’ status of the ‘amount of money lent’ reading can be verified by its cancellability, as shown below.

- (i) Bo m-tio, bikim pi auguan kha u-tσιο, m-ko sanntsap pi bikim e sohbok
 not incorrect dollar than euro more u_{VD} -lend but thirty sum dollar E amount
 pi be kue gitsap pi auguan e sohbok.
 compare not cross twenty sum euro E amount
 ‘Yes, the number of the events of lending dollars to someone is larger than the number of the events of lending euros to someone; however, the amount of the thirty sums of dollars lent is less than the amount of the twenty sums of euros lent.’

And, the ‘derivation’ of the implicature must be subject to Grice’s (1975) conversational maxims.

- (69) a. $\llbracket se/wash \rrbracket^A = \lambda x \lambda y \lambda v. se(y, x, v)$
 b. $\llbracket u_{ms} \rrbracket^A = \lambda P \lambda x \lambda v OPy. P(v)(x)(y)$
 c. $\llbracket se_{ms}/wash_{ms} \rrbracket^A = \lambda x \lambda v OPy. se(y, x, v)$
 d. $\llbracket u_s \rrbracket^A = \lambda \alpha \lambda x. A(\mu)(\alpha(x))$
 e. $\llbracket [{}_V u_s-se_{ms}/u_s-wash_{ms}] \rrbracket^A = \lambda x. A(\mu)(\lambda v OPy. se(y, x, v))$
 f. $\llbracket [{}_{Deg} kha/more] \rrbracket^A = \lambda \alpha \lambda d \lambda g. g(\alpha) > d$
 g. $\llbracket [{}_{DegP} kha u_s-se_{ms}/more u_s-wash_{ms}] \rrbracket^A = \lambda d \lambda x. A(\mu)(\lambda v OPy. se(y, x, v)) > d$
 h. $\llbracket [{}_{PP} pi hit-nia sann/than that-CL clothing] \rrbracket^A = d_{hns}$
 i. $\llbracket [{}_{DegP} pi hit-nia sann kha u_s-se_{ms}/than that-CL clothing more u_s-wash_{ms}] \rrbracket^A = \lambda x. A(\mu)(\lambda v OPy. se(y, x, v)) > d_{hns}$
 j. $\llbracket [{}_{IP} tsit-nia sann pi hit-nia sann kha u_s-se_{ms}/this-CL clothing than that-CL clothing more u_s-wash_{ms}] \rrbracket^A = A(\mu)(\lambda v OPy. se(y, tsit-nia sann, v)) > d_{hns}$
 $= T$ iff $\exists E_{\langle v, t \rangle} [E_{\langle v, t \rangle} = \lambda v OPy. se(y, tsit-nia sann, v) \wedge A(\mu)(E_{\langle v, t \rangle}) > d_{hns}]$
 $A(\mu)$ is the number of element events of the set of washing events.

As (69j) shows, (62) is true just in case there is a set of washing events in which *tsit-nia sann* ‘this-CL clothing’ is washed in each washing event, and the number of element events of this set of washing events is larger than the number of element events of the set of washing events in which *hit-nia sann* ‘that-CL clothing’ is washed in each washing event.

From this ‘core’ meaning, a native speaker can obtain the implicature that this article of clothing is more durable for washing than that article of clothing is. So, the dimension of measurement ‘the durableness for washing’ related to the property of the theme subject *tsit-nia sann* ‘this-CL clothing’ can be regarded as an implicature implicated from the exact measure function of (i.e., the number of element events of the set of washing events).

Third, in (63), the morpheme u_{ms} , at the level of lexicon, (A) introduces generic operators to bind the unsaturated external argument and the unsaturated internal argument of the transitive verb *se* ‘wash’ of the intransitive compound verb *u-se* ‘ u_{VD} -wash’, (B) leads a non-thematic argument w (i.e., the instrument adjunct *tsit-te satbun* ‘this-CL soap’) into the structure, and (C) compositionally changes the denotation of the verb *se* ‘wash’ into a set of washing events. So, the verb derived (i.e., se_{ms} ‘wash’) has a semantic representation as in (70).

$$(70) \quad \llbracket se_{ms}/wash_{ms} \rrbracket^A = \lambda w \lambda v [\text{OP}x \text{OP}y. se(y, x, v) \wedge \text{Instrument}(v, w)]$$

Assuming this, I suggest that, at the syntactic level, (63) has a structure like (71), where the theme argument of the intransitive compound verb *u-se* ‘ u_{VD} -wash’ (i.e., *tsit-te satbun* ‘this-CL soap’), which can be understood as the instrument adjunct of the verb *se* ‘wash’, occurs in the specifier position of VP projected by the compound verb *u-se* ‘ u_{VD} -wash’ and, then, moves to the subject position.

$$(71) \quad [{}_{IP} [{}_{tsit-te \ satbun}]_i [{}_{DegP} [{}_{PP} [{}_{pi \ hit-te \ satbun}] [{}_{Deg'} [{}_{Deg} [{}_{kha}] [{}_{VP} [{}_{t_i} [{}_{V'} [{}_{u-se}]]]]]]]]] \\ \text{this-CL \ soap} \quad \text{than \ that-CL \ soap} \quad \text{more} \\ [{}_{V'} [{}_{u-se}]] \\ u_{VD}\text{-wash} \\ \text{‘This piece of soap has the property of being washed more times than that piece} \\ \text{of soap.’}$$

Based on (71), the semantic composition of (63) can be demonstrated by (72a–j).

- (72) a. $\llbracket se/wash \rrbracket^A = \lambda x \lambda y \lambda v . se(y, x, v)$
 b. $\llbracket u_{ms} \rrbracket^A = \lambda P \lambda w \lambda v [OPxOPY.P(v)(x)(y) \wedge Property(v, w)]$
 c. $\llbracket se_{ms}/wash_{ms} \rrbracket^A = \lambda w \lambda v [OPxOPY.se(y, x, v) \wedge Instrument(v, w)]$
 d. $\llbracket u_s \rrbracket^A = \lambda w \lambda \alpha . A(\mu)(\alpha(w))$
 e. $\llbracket [v u_s-se_{ms}/u_s-wash_{ms}] \rrbracket^A = \lambda w . A(\mu)(\lambda v [OPxOPY.se(y, x, v) \wedge Instrument(v, w)])$
 f. $\llbracket [Deg kha/more] \rrbracket^A = \lambda \alpha \lambda d \lambda g . g(\alpha) > d$
 g. $\llbracket [DegP kha u_s-se_{ms}/more u_s-wash_{ms}] \rrbracket^A = \lambda d \lambda w . A(\mu)(\lambda v [OPxOPY.se(y, x, v) \wedge Instrument(v, w)]) > d$
 h. $\llbracket [pp pi hit-te satbun/than that-CL soap] \rrbracket^A = d_{hts}$
 i. $\llbracket [DegP pi hit-te satbun kha u_s-se_{ms}/than that-CL soap more u_s-wash_{ms}] \rrbracket^A = \lambda w . A(\mu)(\lambda v [OPxOPY.se(y, x, v) \wedge Instrument(v, w)]) > d_{hts}$
 j. $\llbracket [ip tsit-te satbun pi hit-te satbun kha u_s-se_{ms}/this-CL soap than that-CL soap more u_s-wash_{ms}] \rrbracket^A = A(\mu)(\lambda v [OPxOPY.se(y, x, v) \wedge Instrument(v, tsit-te satbun)]) > d_{hts}$
 $= T \text{ iff } \exists E_{\langle v, t \rangle} [E_{\langle v, t \rangle} = \lambda v [OPxOPY.se(y, x, v) \wedge Instrument(v, tsit-te satbun)] \wedge A(\mu)(E_{\langle v, t \rangle}) > d_{hts}]$
 $A(\mu)$ is the number of element events of the set of washing events.

Thus, (63) is true just in case there is a set of washing events in which *tsit-te satbun* ‘this-CL soap’ is washed in each washing event, and the number of element events of this set of washing events is larger than the number of element events of the set of washing events in which *hit-te satbun* ‘that-CL soap’ is washed in each washing event. From this ‘core’ meaning, the implicature that this piece of soap is more durable for washing than that piece of soap comes out naturally.

Fourth, according to my proposal, the grammaticality of (64) repeated as (73), is also under expectation.

- (73) Tsit-khuan e pi hit-khuan e kha u-tsau.
 this-CL shoe than that-CL shoe more u_{VD} -run
 ‘For anyone to run by wearing it, this kind of shoes is more durable than that kind of shoes.’

In (73), the morpheme u_{ms} ‘ u_{VD} ’ first stativizes the event denoted by the verb *tsau* ‘run’ by introducing a generic operator to bind the unsaturated external argument at the level of lexicon, then compositionally changes the denotation of it into a set of running events by having the eventuality argument v bound by a lambda operator, and finally leads a non-thematic argument w (i.e., the instrument adjunct *tsit-khuan e* ‘this-CL shoe’) into the structure. So, the derived verb $tsau_{ms}$ ‘wash’ has an interpretation as in (74).

- (74) $\llbracket tsau_{ms}/run_{ms} \rrbracket^A = \lambda w \lambda v [OPY.tsau(y, v) \wedge Instrument(v, w)]$

Thus, (73) has a syntactic structure like (75), based on which the semantic composition of (73) can be demonstrated by (76a–j).

- (75) $[[_{IP} [tsit-khuan\ e]_i [_{DegP} [[_{PP} pi\ hit-khuan\ e] [_{Deg'} [_{Deg} kha] [_{VP} t_i [_{V'} [_{V} u-tsau]]]]]]]]]$
 this-CL shoe than that-CL shoe more
 u_{VD} -run
 ‘This kind of shoes is more durable for one to run by wearing it than that kind of shoes is.’

- (76) a. $[[tsau/run]]^A = \lambda y \lambda v. tsau(y, v)$
 b. $[[u_{ms}]]^A = \lambda P \lambda w \lambda v [OPy.P(v)(y) \wedge Property(v, w)]$
 c. $[[tsau_{ms}/run_{ms}]]^A = \lambda w \lambda v [OPy.tsau(y, v) \wedge Instrument(v, w)]$
 d. $[[u_s]]^A = \lambda w \lambda \alpha. A(\mu)(\alpha(w))$
 e. $[[[_{V} u_s-tsau_{ms}/u_s-run_{ms}]]]^A = \lambda w. A(\mu)(\lambda v [OPy.tsau(y, v) \wedge Instrument(v, w)])$
 f. $[[[_{Deg} kha/more]]]^A = \lambda \alpha \lambda g \lambda d. g(\alpha) > d$
 g. $[[[_{DegP} kha\ u_s-tsau_{ms}/more\ u_s-run_{ms}]]]^A = \lambda d \lambda w. A(\mu)(\lambda v [OPy.tsau(y, v) \wedge Instrument(v, w)]) > d$
 h. $[[[_{PP} pi\ hit-khuan\ e/than\ that-CL\ shoe]]]^A = d_{hke}$
 i. $[[[_{DegP} pi\ hit-khuan\ e\ kha\ u_s-tsau_{ms}/than\ that-CL\ shoe\ more\ u_s-run_{ms}]]]^A = \lambda w. A(\mu)(\lambda v [OPy.tsau(y, v) \wedge Instrument(v, w)]) > d_{hke}$
 j. $[[[_{IP} tsit-khuan\ e\ pi\ hit-khuan\ e\ kha\ u_s-tsau_{ms}/this-CL\ shoe\ than\ that-CL\ shoe\ more\ u_s-run_{ms}]]]^A = A(\mu)(\lambda v [OPy.tsau(y, v) \wedge Instrument(v, tsit-khuan\ e)]) > d_{hke}$
 $= T$ iff $\exists E_{\langle v, t \rangle} [E_{\langle v, t \rangle} = \lambda v [OPy.tsau(y, v) \wedge Instrument(v, tsit-khuan\ e)] \wedge A(\mu)(E_{\langle v, t \rangle}) > d_{hke}]$
 $A(\mu)$ is the number of element events of the set of running events.

From the ‘core’ meaning of (73), a native speaker can obtain the implicature that this kind of shoes is more durable for one to run by wearing it, and this implicature has ‘the durability for running’ as the dimension of measurement.

Fifth, in (65) (repeated as (77a)), the V of the intransitive compound verb *u-lak* ‘ u_{VD} -fall’ is an unaccusative verb (i.e., *lak* ‘fall’) and the TSM *u-V* construction involved has the NP *kuanthinn* ‘winter’, which can be thematically understood as the temporal adjunct of the verb *lak* ‘fall’, as subject. This *u-V* construction has a syntactic structure like (77b), based on which the semantic composition of (77b) can be demonstrated by (78a–j).

- (77) a. Tshiu-a hioh long kangkhuan, kuanthinn pi zuathinn kha u-lak.
 tree-PRT leaf all the-same winter than summer more u_{VD} -fall
 ‘All kinds of leaves are the same in that the winter is more susceptible to having fallen leaves than the summer.’
 b. $[[_{IP} [kuanthinn]_i [_{DegP} [[_{PP} pi\ zuathinn] [_{Deg'} [_{Deg} kha] [_{VP} t_i [_{V'} [_{V} u-lak]]]]]]]]]$
 winter than summer more
 u_{VD} -fall
 ‘The winter is more susceptible to having fallen leaves than the summer.’
- (78) a. $[[lak/fall]]^A = \lambda x \lambda v. lak(x, v)$
 b. $[[u_{ms}]]^A = \lambda P \lambda w \lambda v [OPx.P(v)(x) \wedge Property(v, w)]$

- c. $\llbracket lak_{ms}/fall_{ms} \rrbracket^A = \lambda w \lambda v [\text{OP}x.lak(x, v) \wedge \text{Time}(v, w)]$
- d. $\llbracket u_s \rrbracket^A = \lambda w \lambda \alpha . A(\mu)(\alpha(w))$
- e. $\llbracket [_V u_s-lak_{ms}/u_s-fall_{ms}] \rrbracket^A = \lambda w . A(\mu)(\lambda v [\text{OP}x.lak(x, v) \wedge \text{Time}(v, w)])$
- f. $\llbracket [_{Deg} kha/more] \rrbracket^A = \lambda \alpha \lambda g \lambda d . g(\alpha) > d$
- g. $\llbracket [_{DegP} kha u_s-lak_{ms}/more u_s-fall_{ms}] \rrbracket^A = \lambda d \lambda w . A(\mu)(\lambda v [\text{OP}x.lak(x, v) \wedge \text{Time}(v, w)]) > d$
- h. $\llbracket [_{PP} pi zuathinn/than summer] \rrbracket^A = d_{zuathinn}$
- i. $\llbracket [_{DegP} pi zuathinn kha u_s-lak_{ms}/than summer more u_s-fall_{ms}] \rrbracket^A = \lambda w . A(\mu)(\lambda v [\text{OP}x.lak(x, v) \wedge \text{Time}(v, w)]) > d_{zuathinn}$
- j. $\llbracket [_{IP} kuannthin pi zuathinn kha u_s-lak_{ms}/winter than summer more u_s-fall_{ms}] \rrbracket^A = A(\mu)(\lambda v [\text{OP}x.lak(x, v) \wedge \text{Time}(v, kuannthin)]) > d_{zuathinn}$
 $= \text{T iff } \exists E_{\langle v, t \rangle} [E_{\langle v, t \rangle} = \lambda v [\text{OP}x.lak(x, v) \wedge \text{Time}(v, kuannthin)] \wedge A(\mu)(E_{\langle v, t \rangle}) > d_{zuathinn}]$
 $A(\mu)$ is the number of element events of the set of leaf-falling events.

So, (77b) is true just in case there is a set of leaf-falling events in each of which the leaf falls in winter, and the number of element events of this set of leaf-falling events is larger than the number of element events of the set of leaf-falling events in each of which the leaf falls in summer.

From this ‘core’ meaning, the native speaker obtains the implicature that winter is more susceptible to having fallen leaves.

4.2.2 The u - V_{nvc} construction

My proposal for the syntax and semantics of the TSM u - V_{nvc} construction can be exemplified as follows. On one hand, an u - V_{nvc} construction like (79a), which involves no change in the valency of V and conveys a meaning about the occurrence frequency of the event denoted by the predicate (i.e., *lim kapi* ‘drink coffee’), has a syntactic structure like (79b).

- (79) a. Yi pi li kha u-lim kapi.
 he than you more u_{VD} -drink coffee
 ‘He drinks coffee more frequently than you.’
- b. $[Yi_i [_{DegP} [_{PP} pi li] [kha [_{ASVP} t'_i [_{ASV} [u-[_{ASV} u]] [_{VP} t_i lim kapi]]]]]]]$.
 he than you more u_{VD} ASV drink coffee
 ‘He drinks coffee more frequently than you.’

Namely, what forms the u - V compound verb with the morpheme u ‘ u_{VD} ’ in (79a) is the aspectual verb u ‘the realization aspect’ rather than the lexical verb *lim* ‘drink’. Then, at the phonetic level, one of the two consecutive u ’s (i.e., the morpheme u ‘ u_{VD} ’ and the aspectual verb u ‘the realization aspect’) is haplogogically eliminated due to their phonetic identity, as attested by the fact that (79a) is almost identical to (80) in semantic interpretation.

- (80) Yi pi li kha u-le lim kapi.
 he than you more u_{VD} -ASV drink coffee
 ‘He drinks coffee more frequently than you.’

That is, in (80), it is the aspectual verb *le* ‘the progressive aspect’ that forms the u - V compound verb with the morpheme u ‘ u_{VD} ’. So, the argument structure of the lexical verb *lim*

‘drink’ is not affected by the morpheme u_{ms} . This explains why the valency change does not happen in (80).

As the same reasoning, I suggest that what forms the u - V_{nvc} compound verb with the morpheme u_{ms} in (79a) is the aspectual verb u ‘the realization aspect’ and, given this, the lexical verb *lim* ‘drink’ does not undergo the valency change induced by u_{ms} .

On the other hand, adopting Lin’s (2003: 271) definition of the realization aspect and the progressive aspect, I suggest that the TSM aspectual verb u ‘the realization aspect’ and le ‘the progressive aspect’ have (81a–b) as their corresponding semantic representation (Bohnenmeyer & Swift 2001).

- (81) a. $\llbracket u_{ASV} \rrbracket = \lambda P_{\langle v, t \rangle} \lambda t \lambda e \exists e' [P(e) \wedge P(e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]$
 b. $\llbracket le_{ASV} \rrbracket = \lambda P_{\langle v, t \rangle} \lambda t \lambda e \exists e' [P(e) \wedge P(e') \wedge e' \leq_E e \wedge \tau(e') \supseteq t]$

So, the denotation of an aspectual verb can be regarded as a containment relation between the topic time (i.e., t) and the event time (i.e., $\tau(e')$). Since an aspectual verb does not bear any theta roles, the valency change function of the morpheme u_{ms} is nullified. However, u_{ms} still retains the ability of compositionally changing the denotation of an aspectual verb into a set of time containment relations.

Assuming these, the aspectual verb derived by having the aspectual verb u ‘the realization aspect’ undergone the morphosyntactic process induced by the morpheme u_{ms} (i.e., u_{ASVms}) has an interpretation as in (58a), repeated as (82).

- (82) $\llbracket u_{ASVms} \rrbracket^A = \lambda P_{\langle v, t \rangle} \lambda t_k \exists E_{\langle v, t \rangle} \forall e_v [(P(e) \wedge e \in E) \rightarrow \exists e'_v [P(e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]]$

Namely, after the combination with an argument P , which denotes a set of events, and a topic time t , u_{ASVms} derives a set of events (i.e., $E_{\langle v, t \rangle}$) such that for its every element event e which describes P , e has a subpart e' which describes the same P and whose running time is contained within the topic time.

Thus, assuming that (79a) has a syntactic structure like (79b), the semantic composition of (79a) can be demonstrated by (83a–l).

- (83) a. $\llbracket [{}_V \text{ lim/drink}] \rrbracket^A = \lambda x \lambda y \lambda e_v. \text{lim}(y, x, e)$
 b. $\llbracket [{}_{VP} \text{ lim kapi/drink coffee}] \rrbracket^A = \lambda y \lambda e_v. \text{lim}(y, \text{kapi}, e)$
 c. $\llbracket [{}_{ASV} u_{ASV}] \rrbracket^A = \lambda P_{\langle v, t \rangle} \lambda t_k \lambda e_v \exists e'_v [P(e) \wedge P(e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]$
 d. $\llbracket u_{ASVms} \rrbracket^A = \lambda P_{\langle v, t \rangle} \lambda t_k \exists E_{\langle v, t \rangle} \forall e_v [(P(e) \wedge e \in E) \rightarrow \exists e'_v (P(e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t)]$
 e. $\llbracket u_s \rrbracket^A = \lambda \alpha \lambda Q \lambda y. A(\mu)(\alpha(Q(y)))$
 f. $\llbracket [{}_{ASV} u_s - u_{ASVms}] \rrbracket^A = \lambda Q \lambda y. A(\mu)(\lambda P_{\langle v, t \rangle} \lambda t_k \exists E_{\langle v, t \rangle} \forall e_v [(P(e) \wedge e \in E) \rightarrow \exists e'_v [P(e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]](Q(y)))$
 $= \lambda Q \lambda y. A(\mu)(\lambda t_k \exists E_{\langle v, t \rangle} \forall e_v [(Q(y)(e) \wedge e \in E) \rightarrow \exists e'_v [Q(y)(e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]])$
 g. $\llbracket [{}_{ASVP} u_s - u_{ASVms} \text{ lim kapi} / u_s - u_{ASVms} \text{ drink coffee}] \rrbracket^A = \lambda y. A(\mu)(\lambda t_k \exists E_{\langle v, t \rangle} \forall e_v [(\text{lim}(y, \text{kapi}, e) \wedge e \in E) \rightarrow \exists e'_v [\text{lim}(y, \text{kapi}, e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]])$
 h. $\llbracket [{}_{Deg} \text{ kha/more}] \rrbracket^A = \lambda \alpha \lambda d \lambda g. g(\alpha) > d$
 i. $\llbracket [{}_{DegP} \text{ kha } u_s - u_{ASVms} \text{ lim kapi/more } u_s - u_{ASVms} \text{ drink coffee}] \rrbracket^A =$
 $\lambda d \lambda y. A(\mu)(\lambda t_k \exists E_{\langle v, t \rangle} \forall e_v [(\text{lim}(y, \text{kapi}, e) \wedge e \in E) \rightarrow \exists e'_v [\text{lim}(y, \text{kapi}, e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]]) > d$

- j. $\llbracket [_{PP} \text{pi li/than you}] \rrbracket^A = d_{li}$
- k. $\llbracket [_{DegP} \text{pi li kha } u_s\text{-}u_{ASVms} \text{ lim kapi/than you more } u_s\text{-}u_{ASVms} \text{ drink coffee}] \rrbracket^A = \lambda y. A(\mu)(\lambda t_k \exists E_{<v, t>} \forall e_v [(lim(y, kapi, e) \wedge e \in E) \rightarrow \exists e'_v [lim(y, kapi, e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]]) > d_{li}$
- l. $\llbracket [_{IP} \text{yi pi li kha } u_s\text{-}u_{ASVms} \text{ lim kapi/he than you more } u_s\text{-}u_{ASVms} \text{ drink coffee}] \rrbracket^A = A(\mu)(\lambda t_k \exists E_{<v, t>} \forall e_v [(lim(yi, kapi, e) \wedge e \in E) \rightarrow \exists e'_v [lim(yi, kapi, e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]]) > d_{li}$
 $= T \text{ iff } \exists E_{<k, t>} [E_{<k, t>} = \lambda t_k \exists E_{<v, t>} \forall e_v [(lim(yi, kapi, e) \wedge e \in E) \rightarrow \exists e'_v [lim(yi, kapi, e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]]) \wedge A(\mu)(E_{<k, t>}) > d_{li}]$

$A(\mu)$ is the number of element containment relations of the set of containment relations between the topic time and the event time.

As (83l) shows, (79a) is true just in case there is a set of containment relations in each of which the event time (i.e., $\tau(e')$) of s/he drank coffee is contained within the topic time (i.e., t). Since the measure function selected by $A(\mu)$ is the number of element containment relations of the set of containment relations between the topic time and the event time in each of which the event time (i.e., $\tau(e')$) of s/he drank coffee is contained within the topic time (i.e., t). So, the interpretation of (79a) is derived as follows: the number of element containment relations of the set of time containment relations between the topic time and the event time in each of which the event time (i.e., $\tau(e')$) of s/he drank coffee is contained within the topic time (i.e., t) is larger than the number of element containment relations of the set of time containment relations between the topic time and the event time in each of which the event time (i.e., $\tau(e')$) of you drank coffee is contained within the topic time (i.e., t). From this ‘core’ meaning, a native speaker can obtain the implicature that s/he drinks coffee more frequently than you because ‘frequency’ is essentially an aspectual notion related to the number of containment relations between the topic time and the event time.¹⁷ In other words, the dimension of measurement shown by this implicature is related to the aspect of the event denoted by the predicate.

As the same reasoning, example (84a) has a syntactic structure like (84b) and its semantic interpretation can be represented by (85).

- (84) a. Yi pi li kha u-le lim kapi.
 he than you more u_{VD} -ASV drink coffee
 ‘He drinks coffee more frequently than you.’
- b. $[Yi_i [_{DegP} \llbracket [_{PP} \text{pi li}] \rrbracket [kha [_{ASVP} t'_i [_{ASV'} [u\text{-}[_{ASV} \text{le}]]] [_{VP} t_i \text{lim kapi}]]]]]]]$.
 he than you more u_{VD} ASV drink coffee
 ‘He drinks coffee more frequently than you.’

- (85) $\llbracket [_{IP} \text{yi pi li kha } u_s\text{-}le_{ASVms} \text{ lim kapi/he than you more } u_s\text{-}le_{ASVms} \text{ drink coffee}] \rrbracket^A = T \text{ iff } \exists E_{<k, t>} [E_{<k, t>} = \lambda t_k \exists E_{<v, t>} \forall e_v [(lim(yi, kapi, e) \wedge e \in E) \rightarrow \exists e'_v [lim(yi, kapi, e') \wedge e' \leq_E e \wedge \tau(e') \subseteq t]]) \wedge A(\mu)(E_{<k, t>}) > d_{li}]$

$A(\mu)$ is the number of element containment relations of the set of containment relations between the event time and the topic time.

Namely, (84a) has a semantic interpretation as follows: the number of element containment relations of the set of time containment relations in each of which the topic time (i.e., t) is contained within the event time of s/he is drinking coffee is larger than the

¹⁷ Thanks to one of the anonymous reviewers for reminding me of this.

number of element containment relations of the set of time containment relations in each of which the topic time is contained within the event time of you are drinking coffee. From this ‘core’ meaning, a native speaker can obtain the implicature that s/he drinks coffee more frequently than you.

After exemplifying how my proposal accounts for the syntax and semantics of the TSM *u-V* construction, I will discuss some consequences and implications of my proposal before going into the concluding remarks.

5 Consequences and implications

In this section, I first highlight the consequences of my proposal by showing how the questions raised by the TSM *u-V* construction are dealt with, and, then, some implications concerning the possessive morphosyntactic strategy for predicating gradable properties and Wellwood (2015) will be addressed.

5.1 Middles or not middles

As for the questions raised by the TSM *u-V* construction, first things first, is the TSM *u-V* construction a kind of middle constructions? To answer this question, I will use Ackema & Schoorlemmer’s (2006: 132–138) widely-accepted definition of the middle construction as in (86) and a much less strict definition proposed by Yoshimura & Taylor (2004: 303) (i.e., (87)) as criterion to judge whether the TSM *u-V* construction is a middle construction.

- (86) a. The external argument of the non-middle counterpart of the middle verb cannot be expressed as a regular DP-argument in the middle.
 b. If the non-middle counterpart of the middle verb has a direct internal argument role, the subject of the middle sentence carries this role.
 c. The middle verb is stative, non-episodic. The middle sentence is a generic statement.
 d. In a middle, the logical subject argument of the underlying verb is semantically present.
- (87) A middle expression presents a non-Agent participant as possessing certain inherent properties which significantly facilitate, enable (or, as the case may be, impede) the unfolding of the kind of process designated by the verb phrase; at the same time, the contribution of the Agent to the process, though not erased, is backgrounded.

The answer we get is quite clear. The TSM *u-V* construction is not a middle construction because of the following reasons. (A) The subject of the TSM *u-V* construction (i.e., the TSM *u-V_{nvc}* construction) can be an NP bearing an agent role, (B) in the TSM *u-V_{nvc}* construction, the V of the *u-V* compound verb can be one without an argument structure, and (C) the TSM *u-V* construction might describe an episodic event or a temporary state, as illustrated by (88a), (88b) and (89a–b), respectively.

- (88) a. Yi tsuekin thiaukang kha u lim kapi.
 he recently intentionally more *u_{VD}*-ASV drink coffee
 ‘Recently, he intentionally drinks coffee more frequently.’
 b. Yi tsuekin thiaukang kha u-le lim kapi.
 he recently intentionally more *u_{VD}*-ASV drink coffee
 ‘Recently, he intentionally drinks coffee more frequently.’
- (89) a. Li kinalit tsai kha u lim kapi.
 you today morning more *u_{VD}*-ASV drink coffee
 ‘This morning, you drank coffee more frequently.’

- b. Tshaikue tsang kai u-siau.
 loofah yesterday very u_{VD} -sell/consume
 ‘Yesterday, the loofah sold well/people consumed many loofahs.’

On one hand, the fact that the NP subject of the TSM *u-V* construction can be an entity bearing the agent role (e.g., *yi* ‘s/he’ in (88a)) makes the TSM *u-V* construction unable to fit into the definition of the middle construction provided by Ackema & Schoorlemmer (2006) or Yoshimura & Taylor (2004).

On another hand, the subject of a middle sentence, as Ackema & Schoorlemmer (2006) and Yoshimura & Taylor (2004) suggest, must be a non-agent participant of the middle verb. However, in a TSM *u-V_{nvc}* construction, the V, being an aspectual verb, does not bear any theta roles. Hence, it is impossible to get a non-agent participant from this V. So, it is hard to assign the TSM *u-V* construction to the category of middle constructions under Ackema & Schoorlemmer’s (2006) or Yoshimura & Taylor’s (2004) definition.

On the other hand, neither Ackema & Schoorlemmer’s (2006) nor Yoshimura & Taylor’s (2004) definition can accommodate the fact that the TSM *u-V* construction might describe an episodic event or a temporary state.

Since the TSM *u-V* construction is not a middle construction, there is no reason to exclude (A) an intransitive verb (e.g., an unaccusative verb like *tshuthen* ‘appear’ in (25a) or an unergative verb like *tsau* ‘run’ in (25b)) or (B) a mental or stative verb like *kamkak* ‘feel’ in (26b) from being the V of the *u-V* compound verb. Of course, the possibility of having the goal role of a ditransitive verb as the subject of a TSM *u-V* construction like (15c) cannot be excluded, either.

Besides, contra Lien (2010: 1283), which assumes that, in the pluractional middle, the internal argument has to be externalized as subject bearing the theme role, the type of the *u-V* constructions with a non-theme NP subject, for example (90), should not be a problem to my analysis.

- (90) Tsit-khuan pi kha u-sia.
 this-CL pen more u_{VD} -write
 ‘This kind of pens is more durable for writing.’

Namely, no object-to-subject movement is assumed under my proposal.

5.2 Consequences

My proposal for the syntax and semantics of the TSM *u-V* construction has the following empirical and theoretical consequences. First, the analysis proposed well explains the question of why the TSM *u-V* constructions can be divided into two types in terms of whether the V of the *u-V* compound verb involves a valency change or not. On one hand, if the V of the *u-V* compound verb is an aspectual verb, the valency change does not occur because an aspectual verb does not bear any theta roles. So, the external argument of the lexical verb following the aspectual verb, regardless of its inner aspect, can occur as subject of the sentence, as shown by (91a–e), respectively.¹⁸

- (91) a. Yi kha u tshing tsit-khuan sann.
 he more u_{VD} -ASV wear this-CL clothing
 ‘He wears this kind of clothing more frequently.’

¹⁸ Example (91a), (91b), (91d) and (91e) all involve haplology at the phonetic level because the morpheme *u/bo* ‘ u_{VD} /neg- u_{VD} ’ and the aspectual verb are phonetically identical.

- b. Gua tsuekin kha u kamkak kha le thiang.
I recently more u_{VD} -ASV feel leg ASV painful
'Recently, I feel my legs painful more frequently.'
- c. Yi tsuekin thiaukang kha bo-le tshuthen.
he recently intentionally more not- u_{VD} -ASV show-up
'Recently, he intentionally shows up less frequently.'
- d. Yi tsuekin kha u konnphua uann.
he recently more u_{VD} -ASV hit-break bowl
'Recently, he breaks bowls more frequently.'
- e. Pennglang kinalit kha bo sau.
patient today more not- u_{VD} -not-ASV cough
'Today, the patient coughs less frequently.'

On the other hand, if the V of the u -V compound verb is a lexical verb, the morpheme u_{ms} will cause the lexical verb to undergo a valency change by introducing a generic operator (or generic operators) to bind the unsaturated external argument (or the unsaturated external argument and the unsaturated internal argument) at the level of lexicon. If the external argument and internal argument(s) of V are all bound by a generic operator at the lexical level, the morpheme u_{ms} will lead a non-thematic argument of V into the structure, and this non-thematic argument, then, occurs as the subject of the sentence at the syntactic level. So, the external argument of the lexical verb is impossible to occur as the subject of the sentence at the syntactic level.

Second, assuming that, in the TSM u -V construction, degrees are (i) introduced compositionally and (ii) introduced by the morpheme u ' u_{VD} ', which semantically contributes a structure-preserving map from events, states or time containment relations to their measures along various dimensions, measure functions allowed must be those that can only be applied to non-trivially structured domains in Schwarzschild's (2002; 2006) sense. This well explains why an accomplishment verb, which is not homogeneous, cannot form an u -V compound verb with the morpheme u ' u_{VD} ', as attested by the ungrammaticality of (13e), repeated as (92).

- (92) *Tsit-khuan uann kha u-konnphua.
this-CL bowl more u_{VD} -hit-break

Third, the ambiguity of (93) can be well explained by having the core dimension of measurement (i.e., the number of element events of the set of sitting events) associated with the implicature 'the durableness for sitting' in a context like (93a) or 'the seating capacity' in a context like (93b).

- (93) Tsit-tiunn yi-a pi hit-tiunn yi-a kha u-tse.
this-CL chair-PRT than that-CL chair-PRT more u_{VD} -sit
- a. 'Assuming other things being equal, this chair has been used for sitting for ten years until it is broken, and that chair has been used for sitting for nine years until it is broken. So, it can be said that this chair is more durable than that chair for sitting.'
- b. 'Assuming other things being equal, this chair allows ten persons, one by one, to sit on it adjacently until its space is fully occupied, and that chair allows nine persons, one by one, to sit on it adjacently until its space is fully occupied. So, it can be said that the seating capacity of this chair is larger than the seating capacity of that chair.'

And, the ‘derivation’ of these two implicatures must be subject to Grice’s (1975) conversational maxims.

Fourth, as I have argued, in the TSM u - V_{vc} construction, the morpheme u_{ms} compositionally changes the denotation of V into a set of events. The element number of a significant set can be one or more than one. So, we might expect there to be a TSM u - V_{vc} construction where the set of events generated by the morpheme u_{ms} contains only one element. The fact bears out this expectation. Example (94a) is such a case because it does not make sense for one to preserve a pomelo more than one time, as the ungrammaticality of (94b) attests.

- (94) a. Tsit-liap iu-a kha u-khng.
 this-CL pomelo-PRT more u_{VD} -preserve
 ‘This pomelo is more durable for preserving.’
 b. *Tsit-liap iu-a, gua khng san pai.
 this-CL pomelo-PRT I preserve three time

Given this, $A(\mu)$ selects ‘the temporal duration of this single preserving event’ as the dimension of measurement; (94a), therefore, has its core meaning as follows: this pomelo has the property of undergoing a preserving event with a temporal duration longer than that pomelo has. Implicated from this core meaning is the implicature that this pomelo is more durable for preserving than that pomelo.

Fifth, the many different dimensions of measurement intuitively perceived by native speakers from the TSM u - V construction, for example, the property of the entity denoted by the subject NP (e.g., the durability for washing or the seating capacity) and the occurrence frequency of an event (i.e., the aspect of the event denoted by the predicate), actually are all implicatures derived from the core dimension of measurement selected by $A(\mu)$. So, the exact measure function of the TSM u - V construction is the number of element events or element containment relations of a set of events or time containment relations.

5.3 Implications

After answering the questions raised by the TSM u - V construction, I want to have the attention shifted to the following two implications of my proposal. One is related to the possessive morphosyntactic strategy for predicating gradable properties, and the other is concerning Wellwood’s (2015) unified theory for comparative constructions.

5.3.1 The possessive morphosyntactic strategy

According to Francez & Koontz-Garboden (2015; 2017), many languages (e.g., English and German) have two types of Property Concept (PC) lexemes: PC adjectives, and PC nominals. The former is used in canonical PC constructions that, in most cases, involve the copula verb, and the latter often triggers ‘the possessive strategies of predication’, in which PC nominals form a PC predicate with a possessive or an existential morpheme, as illustrated by (95a–b), respectively.

- (95) Property Concept Adjectives
 a. John is knowledgeable. (English)
 b. Ich bin hungrig. (German)
 I am hungry
 ‘I am hungry.’
- (96) Property Concept Nominals
 a. John has (a lot of) knowledge. (English)
 b. Er hatte mehr Hunger als ich. (German)
 he had more hunger than I
 ‘He was hungrier than me.’

As Francez & Koontz-Garboden (2017: 548) further notice, only abstract-substance-denoting nominals are allowed in the PC predicate. So, they argue that PC nominals (e.g., *knowledge*) are semantically distinct from other mass nouns (e.g., *water*). That is, PC nominals denote a set of ‘portions’ of substances; for instance, *knowledge* denotes a set of portions of knowledge, as (97) shows.

$$(97) \quad \llbracket \textit{knowledge} \rrbracket = \lambda p_p. \textit{knowledge}(p)$$

As they argue, portions, being a primitive entity (of type p), are subject to a total preorder \leq (smaller than or equal to). Hence, the denotation of *knowledge* differs from that of a concrete substance noun like *water* in that *water* denotes a set of water substance partially ordered by a mereological part-whole relation (Link 2002).

$$(98) \quad \llbracket \textit{water} \rrbracket = \lambda x_e. \textit{water}(x)$$

Given this semantic distinction, the PC nominal *knowledge* of type $\langle p, t \rangle$ alone cannot serve as a predicate of an individual. So, it has to combine with the possessive verb *have* with an interpretation as in (99) to form a Possessive PC predicate by having the possessive verb *have* function to relate individuals to portions.

$$(99) \quad \llbracket \textit{have} \rrbracket = \lambda P_{\langle p, t \rangle} \lambda x \lambda D. \exists^D z [P(z) \wedge \pi(x, z)]$$

Namely, P is a variable over (abstract) substances, and π is a possessive relation. D , being a variable over sets of portions, provides a domain restriction for the existential quantifier such that the value of z is restricted to portions that count as ‘big enough’ in the context. Thus, combining *have* with the quality NP *knowledge* and the subject *John* yields the truth-conditions for (100a), as shown below.

$$(100) \quad \begin{array}{l} \text{a. John has knowledge.} \\ \text{b. } \llbracket \textit{John has knowledge} \rrbracket = \exists^D z [\textit{knowledge}(z) \wedge \pi(\textit{John}, z)] \end{array}$$

Namely, (100a) is true in case there is a portion of knowledge that counts as ‘big enough’ in the context and John possesses it.

According to Zhang (2019) and Li (to appear), such a morphosyntactic strategy for predicating gradable properties is also found in Chinese, and the nominal involved is also limited to property concept nominals. For instance, (101a), which contains a property concept noun (i.e., *zhihui* ‘wisdom’), is grammatical with a gradable property reading but the gradable property reading is not allowed for (101b), which contains a concrete substance noun (i.e., *shui* ‘water’).

$$(101) \quad \begin{array}{l} \text{a. Zhangsan hen you zhihui.} \\ \quad \text{Zhangsan very have wisdom} \\ \quad \text{‘Zhangsan has a lot of wisdom.’} \\ \text{b. *Zhangsan hen you shui.} \\ \quad \text{Zhangsan very have water} \\ \quad \text{‘Intended: Zhangsan has a lot of water.’} \end{array}$$

Relevantly here, according to the previous studies on the TSM u -V construction (e.g., Yang 1991; Lai 2007; Lien 2010), the morpheme u has the literal meaning *have* or *possess*. So, the grammaticality of (102a–b) implies that TSM also adopts the possessive morphosyntactic strategy for predicating gradable properties (henceforth, I use the term ‘the TSM u -N construction’ to represent a TSM construction like (102a–b)).

- (102) a. Tsit-le lang kha u-siuiong.
 this-CL person more have-self-cultivation
 ‘This person has more self-cultivation.’
 b. Yi kha u-gankong.
 he more have-vision
 ‘He has more vision.’

However, contra Francez & Koontz-Garboden (2015; 2017), Zhang (2019) and Li (to appear), it is found that the nominal allowed in the TSM *u*-N construction is not necessary to be an abstract property concept noun, as attested by (103a–d), where I still use the term u_{VD} to gloss the morpheme *u* of the TSM *u*-N expression.

- (103) a. Kin ni kha u-hootshui.
 this year more u_{VD} -rainwater
 ‘This year is more rainy than last year was.’
 b. Kin ni yi be kha u-tshia.
 this year s/he sell more u_{VD} -car
 ‘This year, s/he sells more cars.’
 c. Tsit-le gin-a kinalit sia kha u-gi.
 this-CL child-PRT today read more u_{VD} -word
 ‘Today, this child writes more words than he did yesterday.’
 d. Ti Autsiu e kosokkonlo khuann kha bo-TOYOTA.
 on Europe E freeway see more not- u_{VD} -TOYOTA
 ‘People see fewer Toyota’s on the freeway in Europe.’

Thus, the relevant TSM data empirically challenges Francez & Koontz-Garboden’s (2017) proposal for the construction adopting the possessive morphosyntactic strategy for predicating gradable properties in the following aspects.

First, how does Francez & Koontz-Garboden (2017) account for the syntax and semantics of the TSM *u*-V construction, in which what follows the morpheme *u* with the literal meaning *have* is a verb rather than a PC nominal?

Second, can the semantic distinction between the PC nominals and other mass nouns be maintained?

My proposal for the TSM *u*-V construction can be further applied to the TSM *u*-N construction by making the following adjustments which clearly distinguish my proposal from Francez & Koontz-Garboden’s (2017) analysis.

First, in the TSM constructions adopting the possessive morphosyntactic strategy for predicating gradable properties (i.e., the TSM *u*-V construction and the TSM *u*-N construction), what occurs after the morpheme *u* with the literal meaning *have* is not limited to a nominal.

Second, assuming Chierchia’s (1998) claim that all nouns in Chinese and Chinese dialects are all mass nouns, elements measured by the measure function in the TSM constructions adopting the possessive morphosyntactic strategy for predicating gradable properties, including verbs and nouns, must be contained within a non-trivially structure domain.

Third, the *u*-N sequence in the TSM *u*-N construction is a compound noun.

Fourth, in the TSM *u*-N construction, the morpheme u_s ‘ u_{VD} ’ has a semantic interpretation as in (104), in which $\alpha(x)$ is a set of entities denoted by the nominal, μ is a variable over the measure function of type $\langle\langle e, t \rangle, d \rangle$ and $A(\mu)$ is the amount/quantity of the entities.

$$(104) \llbracket u_{s\mu} \rrbracket^A = \lambda\alpha\lambda x.A(\mu)(\alpha(x))$$

Assuming these, a TSM *u*-N construction like (105a) has a syntactic structure like (105b), and its semantic composition can be demonstrated by (106a–j).

- (105) a. Tsit-le gin-a pi hit-le gin-a sia kha u-gi.
 this-CL child-PRT than that-CL child-PRT write more u_{VD} -word
 ‘This child writes more words than that child.’
- b. $[[[_S [_{NP} \text{Tsit-le gin-a}]] [_{PP} \text{pi hit-le gin-a}]] [_{VP} [_V \text{sia}]] [_{NP} [[[_{Deg} \text{kha}]]]]]]]$
 this-CL child-PRT than that-CL child-PRT write more
 $[[[_N u-[_N \text{gi}]]]]]$
 u_{VD} -word
 ‘This child writes more words than that child.’
- (106) a. $[[[_N \text{gi/word}]]]^A = \lambda x. \text{gi}(x)$
 b. $[[u_s]]^A = \lambda \alpha \lambda x. A(\mu)(\alpha(x))$
 c. $[[[_N u_s \text{-gi/u}_{VD}\text{-word}]]]^A = \lambda x. A(\mu)(\text{gi}(x))$
 d. $[[[_{Deg} \text{kha/more}]]]^A = \lambda \alpha \lambda d \lambda g. g(\alpha) > d$
 e. $[[[_{NP} \text{kha } u_s \text{-gi/more } u_{VD}\text{-word}]]]^A = \lambda d \lambda x. A(\mu)(\text{gi}(x)) > d$
 f. $[[[_V \text{sia/write}]]]^A = \lambda x \lambda y. \text{sia}(y, x)$
 g. $[[[_{VP} \text{sia kha } u_s \text{-gi/write more } u_{VD}\text{-word}]]]^A = \lambda d \lambda y. \text{sia}(y, (\epsilon x[\text{gi}(x) \ \& \ A(\mu)(\text{gi}(x)) > d]))^{19}$
 h. $[[[_{PP} \text{pi hit-le gin-a/than that-CL child}]]]^A = d_{hlg}$
 i. $[[[[[_{PP} \text{pi hit-le gin-a}]] [_{VP} \text{sia kha } u_s \text{-gi}]] / [[[_{PP} \text{than that-CL child}]] [_{VP} \text{write more } u_{VD}\text{-word}]]]]]^A = \lambda y. \text{sia}(y, (\epsilon x[\text{gi}(x) \ \& \ A(\mu)(\text{gi}(x)) > d_{hlg}]))$
 j. $[[[_S \text{tsit-le gin-a pi hit-le gin-a sia kha } u_s \text{-gi/this-CL child than that-CL child write more } u_{VD}\text{-word}]]]^A = \text{sia}(\text{tsit-le gin-a}, (\epsilon x[\text{gi}(x) \ \& \ A(\mu)(\text{gi}(x)) > d_{hlg}]))$
 $A(\mu)$ is the quantity of *gi* ‘word’.

Simply put, the semantic distinction between the PC nominals and other mass nouns is not necessary for the TSM *u*-N construction. Why does this difference exist? Perhaps, what matters is the cross-linguistic parameter.

5.3.2 Remarks on Wellwood (2015)

One important feature of Wellwood’s (2015) theory for comparative constructions is that “degrees are introduced by *much*, which semantically contributes a structure-preserving map from entities, events or states to their measures along various dimensions”. Assuming this, *coffee* in (107a), *run* in (107b) and *hot* in (107c) have (108a–c) as their corresponding interpretation.

- (107) a. Al bought more coffee than Bill did.
 b. Al ran more than Bill did.
 c. Al’s soup is hotter than Bill’s is.
- (108) a. $[[\text{coffee}]]^A = \lambda x. \text{coffee}(x)$
 b. $[[\text{run}]]^A = \lambda e. \text{run}(e)$
 c. $[[\text{hot}]]^A = \lambda s. \text{hot}(s)$

¹⁹ Along the line of Wellwood (2015: 75), here I suggest there exists a Hilbert’s ϵ operator to bind the variable x in (106g).

Namely, in (108a), x ranges over elements of the domain of individuals; in (108b), e ranges over elements of the domain of events; in (108c), s ranges over elements of the domains of states.

Partially along the line of Wellwood (2015), I suggest that, in the TSM u -V construction, “degrees are (i) introduced compositionally, (ii) introduced by u ‘ u_{VD} ’, which semantically contributes a structure-preserving map from events, states or time containment relations to their measures along various dimensions, and (iii) introduced not by any other expression”. This, then, makes my proposal for the syntax and semantics of the TSM u -V construction imply that the TSM morpheme u_s ‘ u_{VD} ’ cannot introduce degrees for individuals (i.e., the denotation of nouns). However, as I have argued in Section 5.3.1, after making some adjustments, the analysis proposed for the TSM u -V construction can also be applied to the TSM u -N construction, in which the morpheme u_s ‘ u_{VD} ’ introduces degrees for individuals. Nevertheless, the following empirical fact from TSM clearly indicates that the morpheme u_s ‘ u_{VD} ’ cannot introduce degrees for some specific type of state (i.e., the state denoted by a gradable adjective), as the ungrammaticality of examples in (109) shows.

- (109) a. Hit-tsang tshiu-a kha (*u) kuan.
that-CL tree-PRT more u_{VD} tall
- b. Hit-le tsabogin-a kha (*u) sui.
that-CL girl-PRT more u_{VD} beautiful
- c. Tsang kha (*u) kuann.
yesterday more u_{VD} cold

This distinction between the TSM morpheme u_s ‘ u_{VD} ’ and the English *much* provides a good point to distinguish my proposal for the syntax and semantics of the TSM morpheme u_s ‘ u_{VD} ’ from Wellwood’s (2015) proposal for the syntax and semantics of *much*.

First, Wellwood (2015) proposes the interpretation of *much* as in (110a), but the interpretation I propose for u_s ‘ u_{VD} ’ is as in (110bi–ii), depending on whether the V of the u -V ‘ u_{VD} -V’ compound verb is a lexical or an aspectual verb.

- (110) a. $\llbracket much_m \rrbracket^A = A(\mu)$
b. $\llbracket u_{sm} \rrbracket^A =$ i. $\lambda x \lambda \alpha. A(\mu)(\alpha(x))$
ii. $\lambda \alpha \lambda Q \lambda y. A(\mu)(\alpha(Q(y)))$

Namely, the denotation of the morpheme u_s ‘ u_{VD} ’ I propose differs from the denotation of *much* suggested by Wellwood (2015) in the additional argument $\alpha(x)$ or $\alpha(Q(y))$. This difference might result from the fact that the morpheme u ‘ u_{VD} ’ occurs as a component of a compound verb.

Second, since TSM gradable adjectives do not need the morpheme u_s ‘ u_{VD} ’ to introduce degrees for them, it is not implausible to say that (A) a TSM gradable adjective intrinsically carries a degree argument, and (B) the morpheme u_s ‘ u_{VD} ’ cannot co-occur with a gradable adjective or verb.²⁰ Thus, TSM, in some sense, provides empirical evidence in

²⁰ Example (109a–c) seem to provide evidence for the assumption that u ‘ u_{VD} ’ is the TSM counterpart of English *much* in that they both cannot directly precede an adjective (Bresnan 1973).

(i) *John is so much intelligent.

However, it would be too hasty to claim that the morpheme u ‘ u_{VD} ’ is the TSM counterpart of the English *much* simply based on the ungrammaticality of (i) and (109a–c). As (ii) shows, *much*, when directly preceding a *so*-pronominal, can be modified by a degree adverb like *too* (Corver 1997).

support of the degree-theoretic approach according to which gradable adjectives lexically specify measure functions while nouns and verbs do not.

Third, the ‘composition’ between the English *much* and a noun/verb/adjective is done at the level of syntax, but the ‘composition’ between the TSM morpheme *u* ‘ u_{VD} ’ and a noun/verb is done at the level of lexicon.

Fourth, the TSM morpheme *u* ‘ u_{VD} ’ differs from the English *much* in that the former triggers a valency change for the lexical verb with which it forms a stativized intransitive compound verb but the latter does not.

6 Concluding remarks

This paper investigates the syntax and semantics of the TSM *u*-V construction in depth. The main themes I have reached are as follows. First, the V of the *u*-V compound verb can be an aspectual verb or a non-gradable lexical verb. An aspectual verb does not bear any theta roles; therefore, there might not be a valency change for the V of the TSM *u*-V compound verb. Thus, the TSM *u*-V construction should not belong to the category of middles.

Second, in TSM, the morpheme *u* ‘ u_{VD} ’ introduces degrees for concrete substance and property concept nouns and non-gradable verbs by contributing a structure-preserving map from entities, events, states or time containment relations to their measures along various dimensions; however, it does not introduce degrees for gradable adjectives. So, contra Wellwood (2015), I suggest that the degree-theoretic approach for comparatives is still needed.

Third, TSM also adopts the possessive morphosyntactic strategy for predicating gradable properties; however, the nominals involved can be a property concept nominal or other mass nouns. This makes TSM different from other languages in how to apply the possessive morphosyntactic strategy for predicating gradable properties (Francez & Koontz-Garboden 2017).

Abbreviations

ASP = aspect marker, ASV = aspectual verb, CL = classifier, E = marker for modifying phrases, PRT = particle, QILAI = directional complement, SFP = sentence final particle. Besides, nasalization of vowels is signaled by *-nn*, and will be left unspecified if it is predicted by nasal initials.

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(ii) John is fond of Mary. Maybe he is too much so.

However, the same does not happen to the TSM *u* ‘ u_{VD} ’, as (iii) illustrates.

(iii) Thaoke tui guankang tsiok tangsng e, tampekong thaoke siu (*u) hit-le.
 boss to employee very stingy SFP frankly-speaking boss too u_{VD} that-CL
 ‘Intended: The boss is very stingy with his employees. Frankly speaking, the boss is too much so.’

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Competing Interests

The author has no competing interests to declare.

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