

# Two Universal Quantifiers in Taiwanese: Collectivity, Distributivity, and Scopes

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## Abstract

This paper deals with two universal quantifiers in Taiwanese, *tak* and *moiN*, and their extensions, *takkei* and *moiN chit e lang*. While both *tak* and *moiN* are assumed to mean every, both *takkei* and *moiN chit e lang* are both assumed to mean everyone. This paper will argue that *takkei* is different from *moiN chit e lang* while *tak* and *moiN* have exactly the same distributions, with respect to distributivity, collectivity, scopal interaction with *wh* phrases, and scopal interaction with negation. In addition, due to the fact that the distributive operator *long* and the collective operator *taotin* are closely related to universal quantifiers, the syntactic and semantic behavior of these operators will also be discussed. This paper will propose semantic translations for *takkei* 'everyone', *moiN chit e lang* 'everyone', *long* 'all' and *taotin* 'together', and a new tree structure with functional projections for universal quantifiers, for the distributive operator and the collective operator, and demonstrate how correct scopal readings can be derived and unwanted readings are blocked.

## 1. Introduction

### 1.1 An Overview

This paper deals with universal quantifiers in Taiwanese, *tak* 'every', *moiN* 'every' and *takkei* 'everyone'. Four issues are addressed in this paper, including whether they allow for a distributive interpretation, whether they allow for a collective reading, their scopal interaction with negation, and with *wh* phrases. *Tak* and *moiN* allows for a distributive reading, but are not compatible with a collective reading. When they interact with negation, they obey the Isomorphism Principle, which basically says that the surface word order determines the scopal relation [Huang, 1981]). When they syntactically precede a *wh* phrase, they can scope over or under the *wh* phrase, which result in a Pair-List (PL) reading and a single answer (SA) reading respectively.

*Takkei* 'everyone' was derived from *tak e lang* 'every CL person' and presumably it should behave exactly the same as *tak* 'every'. Examined carefully and compared to *moiN chit e lang* 'every one CL person', which preserves all the properties of *moiN*, *takkei* has its own properties that *tak* does not have. The first difference is that *takkei* allows for a collective interpretation, but *tak* and *moiN* do not. The second difference is that *takkei* always scopes over negation, but *tak* and *moiN* obey the Isomorphism Principle when interacting with negation. The third difference is that *takkei* allows for a collective reading when the *wh* phrase scopes over it and the sentence has the distributive operator *long* 'all'. Lastly, one sentence can have one *takkei* only, but *tak* and *moiN* do not have this constraint.

To fully understand and explain the syntactic and semantic properties of the universal quantifiers, the distributive operator *long* 'all' and the collective operator *taotin* 'together' must be examined first. It will be argued that these two operators project two functional projections, DistP (distributive phrase) and ColP (collective phrase) separately. In addition, based on the fact that plurals always take wide scope, a new tree will be proposed where *long* and *taotin* project their functional projections and a PlurP (plural phrase) exists above the DistP and the ColP to encode the wide scope property of plurals. Universal quantifiers in Taiwanese will be argued to move either in overt syntax or in covert syntax to <Spec, DistP>. When they move in overt syntax to <Spec, DistP>, the distributive operator is realized as *long* in overt syntax. When they move in covert syntax, the distributive operator is not realized in overt syntax. This is why in Taiwanese universal quantifiers can stay in situ but still receive a distributive reading. And, because a collective reading cannot be derived unless the collective operator *taotin* surfaces in overt syntax and universal quantifiers can receive a distributive reading with or without the distributive operator *long*, it will be argued that the DistP is the default in Taiwanese.

In addition to their syntactic status, other properties of these two operators will also be discussed. The distributive operator obeys the Leftness Condition, the Locality Condition and the Multiplicity Condition. The Leftness Condition requires that the NP distributed over must be to the left of the operator. This is encoded by the movement of the NP distributed over to <Spec, DistP> in overt syntax. The Locality Condition restricts the distributive ability of the operator in the local clause where the operator is. The Multiplicity Condition requires the NP distributed over must have multiple parts, e.g., plurals, or things like a book which has multiple pages. Besides, the distributive operator obeys a semantic constraint, the exhaustivity of domains condition. This condition requires that the distributive operator *long* be used as long as all members of a domain are commented, that is, the domain is exhausted. This is why universal quantifiers must co-occur with *long* as long as they are to its left in overt syntax.

The collective operator *taotin* shares some of the conditions obeyed by the distributive operator *long* and has some of its own conditions. *Taotin* requires that the NP collectivized be plural. This is different the Multiplicity Condition in that entities that have multiple parts such as books cannot be collectivized. It also obeys the Leftness Condition and the Locality Condition. And, unlike *long*, *taotin* must surface in overt syntax to derive a collective reading. This is because the DistP is the default and the ColP is not projected unless *taotin* is realized overtly.

To account the PL reading, Agüero-Bautista (2000) proposes that reconstruction reconstructs the NP argument in the *wh* phrase back to a position lower than the universal quantifier so that the following reading can be derived:

$$\forall > wh \text{ (PL)}$$

Since Taiwanese is a *wh*-in-situ language and hence *wh* phrases do not move in overt syntax, it will be argued that in Taiwanese it is either the whole *wh* phrase moves or only the *wh* determiner moves in LF. When only the *wh* determiner moves and the NP argument is left behind, the reading above can be derived.

The difference between *takkei* on the one hand and *tak* and *moiN* on the other will be argued to lie in the fact that *takkei* is a plural universal quantifier and *tak* and *moiN* are singular universal quantifiers. Since *tak* and *moiN* is just every in English, they can be represented as:

$$\lambda P \lambda Q \forall x [P(x) \rightarrow Q(x)]$$

Two semantic representations are proposed for *takkei*. One is just like the singular one except that the universal quantifier ranges over plural entities:

$$\lambda P \forall X [*plurality(X) \rightarrow P(X)]$$

The other is based on Barwise and Cooper (1981). In that paper, Barwise and Cooper argue that universal quantifier denote the set of all members of a domain, that is, the unique sum individual in lattice-theoretic terms, which is exactly the denotation of definite plurals. Based on the fact that *takkei* behaves just like definite plurals, which is exactly why one sentence can have only one *takkei* but *tak* and *moiN* do not have this constraint, it will be argued that Barwise and Cooper's denotation of universal quantifiers is a better semantic representation for *takkei*. But the singular universal quantifiers still remain their traditional denotation because they are different from *takkei* in that they are not compatible with a collective reading.

### 1.2 Organization of the Paper

This paper is organized as follows. Section 2 is a description of the syntax of *long*, the collective operator *taotin*, and the universal quantifiers. Section 2.1 deals with the syntax of *long* and *taotin*. Section 2.2 gives a complete description of the distributivity and collectivity of *moiN*, *tak* and *takkei*. Section 2.3 is devoted to the other properties of *long* and *taotin*. Section 3 is about the semantics of distributivity and collectivity. Section 3.1 deals with the semantic representations of the universal quantifiers, where two semantic representations for *takkei* are proposed. To choose between these two proposals, the syntactic precedence between *takkei* and *moiN chit e lang* must be examined, which is done in Section 3.2. Partially based on the discussions in Section 3.2, Section 3.3 deals with the two representations for *takkei* and picks one that is supported by other evidence. And, then, Section 3.4 deals with the denotations of *long* and *taotin*. Section 3.5 is devoted to the interaction between *wh* phrase and universal quantifiers. The semantic derivations of the possible readings are discussed in this section. And, finally, Section 4 concludes this paper. This paper has two appendices. Appendix A is the detailed semantic derivations discussed in Section 3.3. Appendix B reviews three related previous works.

## 2. *Long*, *Taotin*, and Universal Quantifiers in Taiwanese

This section first discuss the syntax of *long* 'all' and *taotin* 'together'. A new tree structure is proposed for this purpose and to explain the scopal interaction between negation and universal quantifiers and plurals. Then, we will discuss the syntactic and semantic properties of *tak* 'every' and *moiN* 'every', and those of *takkei* 'everyone' and *moiN chit e lang* 'everyone'. And, then we will examine other features of *long* 'all' and *taotin* 'together'.

### 2.1 Syntax of *Long* and *Taotin*

Lin (1998) argues that universal quantifiers must move because they carry a strong quantificational feature to be checked and *dou* must be present to project DistP, whose specifier position is for universal quantifiers to move to, and hence induces a distributive reading. However, this is not the case in Taiwanese.

- 1 a. *wo kan le mei yi ben shu*  
I read Pfv every one CL book  
'I read every book.'
  - b. *\*wo dou kan le mei yi ben shu*  
I all read Pfv every one CL book  
'I read every book.'
  - c. *mei yi ben shu wo dou kan le*  
every one CL book I all read Pfv  
'I read every book.'
- 2 a. *chia e moiN chit pun chu goa long*  
*khoaN ke?*  
here POSS every one CL book I all  
read EXP  
'I have read every book here.'
  - b. *goa khoaN ke chia e moiN chit pun*  
*chu*  
I read EXP here POSS every one CL  
book  
'I have read every book here.'

The examples in (1) are Mandarin. Lin points out that a universal quantifier object cannot stay in situ, as in (1a), and must move to the left of the distributive operator *dou*, as (1c). As the examples in (2) show, in Taiwanese a universal quantifier object can stay in the object position, that is, in situ, as (2b) shows. And, they can also move to the sentence-initial position, just like the case in Mandarin. And, *long* 'all', just like *dou* 'all' in Mandarin, distributes over this universal quantifier object. This suggests that with or without *long* 'all', universal quantifiers receive a distributive interpretation in Taiwanese. This generalization can be further supported by the following example about plurals.

- 3a. *in boe chhia a*  
they buy car Prc  
'They bought a car  
(individually).'
- b. *goa kayi in*  
I like they  
'I like them.'

The plural subject in (3a), *in* 'they', has a distributive reading even though *long* 'all' does not occur to provide a distributive interpretation. (3b) also expresses distributivity. (3b) does not mean that I like them as a group. Instead, it means I like every single member of them, which is exactly a distributive denotation.

The examples in (2) and (3) suggest that with or without explicit indication of distributivity, which is done by *long* 'all', universal quantifiers and plurals tend to have a distributive interpretation in Taiwanese. This obligatory distributive interpretation suggests that in Taiwanese DistP is obligatory with or without its head, *long* 'all', being overtly realized. In addition, (2b) also suggests that universal quantifiers in Taiwanese do not have a strong semantic feature with them since they do not have to move to check any feature in overt syntax. Therefore, they do not have to move in overt syntax, as in (2b). Of course, they can also move in overt syntax, as in (2a).

There is also a collective adverbial, *taotin* 'together', in Taiwanese. It collectivizes a plural NP and gives the sentence containing it a collective reading, which describes a situation where every member of the plural NP participates in an event denoted by the VP, everyone's participation is part of the whole event and all participations together comprise the event.

- 4 *in taotin boe chit tai*  
*chhia*  
they together buy one  
CL car  
'They bought a car  
together.'

(4) describes a situation where every member of them participated in the car-buying event, i.e., everyone paid for this car. But, a sentence needs *taotin* 'together' to have a collective denotation. A sentence without either *long* 'all' or *taotin* 'together', like (3b), denotes distributivity.

Even though (3a) has a seemingly collective reading, it does not have a collective interpretation in the sense we discussed above. Let us look at the following examples.

- 5 a. [Ng ka chueikun kha u chiN a ] [in boe chit tai chhia a ]  
[Ng family recently more have money Prc] [they buy one  
CL car Prc]  
'The Ng's became richer recently. They bought a car.'
- b. [In boe chia choe chentouki ] [chmma khongkun ko kha  
lihai a ]  
[we buy so many fighter plane] [now air force even more  
good Prc]  
'We bought so many fighter planes. Now the Air Force is  
even better.'

(5a) describes the financial situation of the Ng family. This family has more extra money now and this is concluded from the fact that they bought a car. It does not have a collective reading because obviously the young children in this family have no money to pay. (5a), in fact, means that the Ng family bought a car.

(5b) describes a similar situation. If a country bought a lot of fighter planes, its citizens can say something like (5b). Not every citizen participates in the plane buying event. In fact, only a very small portion of the population participates. But, the citizens of this country can still claim 'we bought fighter planes' even though in fact it is this country that bought fighter planes.

these two sentences do not really participate in the event denoted by the verb is the group, not every member of this group.

Therefore, it can be claimed that a collective reading can surface only when *taotin* 'together' is overtly realized while a distributive reading is the default with or without *long* 'all' being overtly realized. That is, the collective operator projects a ColP, Collective Phrase, just like the distributive operator *long* 'all' projects a DistP only when *taotin* 'together' is overtly realized.

The following examples show that DistP must precede ColP since *long* 'all' must precedes *taotin* 'together'.

- 6 a. in ting lepai long taotin khi chia png  
 they last week all together go eat rice  
 'They went to eat together every day  
 last week.'  
 b. \*in tin lepai taotin long khi chi png  
 they last week together all go eat rice  
 'They went to eat together every day  
 last week.'

Though plurals are similar to universal quantifiers with respect to distributivity in that both of them allow for a distributive interpretation, they are different with respect to the interaction with negation.

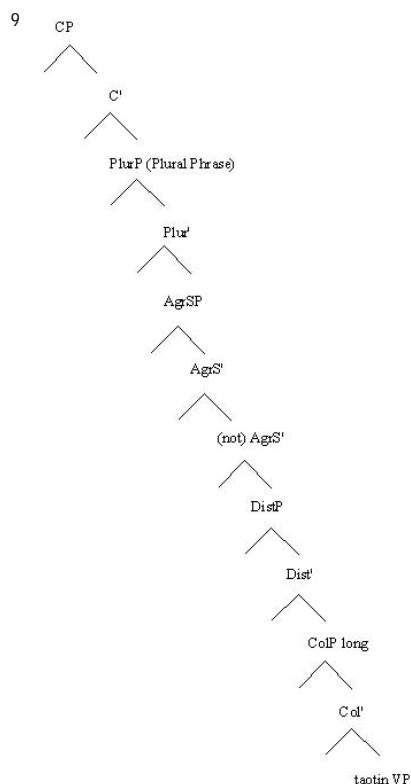
- 7 a. goa bo kayi moiN chit e lang  
 I no like every one CL person  
 'I don't like everyone.'  
 NEG precedes  $\forall_e$   
 NEG >  $\forall$   
 b. moiN chit e lang long boai lai  
 every one CL person all no come  
 'Nobody will come.'  
 $\forall$  precedes NEG  
 $\forall$  > NEG  
 c. moiN chit e lang goa long bo kayi  
 every one CL person I all no like  
 'I like nobody.'  
 $\forall$  precedes NEG  
 $\forall$  > NEG  
 8 a. goa bo kayi in  
 I no like they  
 'I don't like them.'  
 NEG precedes PL  
 PL > NEG  
 b. in bo kayi goa  
 they no like I  
 'They don't like me.'  
 PL precedes NEG  
 PL > NEG

Universal quantifiers obey the Isomorphism Principle (Huang 1981) when interacting with negation, i.e., the syntactic precedence determines the scopal relation. In (7a), negation syntactically precedes the universal quantifier and scopes over it. In (7b), the universal quantifier syntactically precedes negation, and has scope over negation. (7c) is interesting. Syntactically, the preposed universal quantifier precedes negation. Though it originates from a position lower than negation, the object position, it still scopes over negation since it moves to the topic position, which is higher than negation.

On the other hand, regardless of its syntactic precedence, a plural always scopes over negation, which suggests that plurals should occupy a position higher than universal quantifiers.

We have made the following observations. First, universal quantifiers in Taiwanese do not have to move in overt syntax. Secondly, a distributive reading is the default with or without *long* 'all' being overtly realized, while a collective reading surfaces only when the collective operator *taotin* 'together' is overtly realized. Thirdly, DistP is higher than ColP. Fourthly, plurals should occupy a position higher than the position of universal quantifiers and negation.

Based on these observations, and following the idea that each occupies a position higher than every (Aguero-Bautista 2000), and the idea of a functional projection for distributivity and collectivity (Lin 1996, 1998; Beghelli and Stowell 1997; Hsieh 1994; and Li 1992), a new tree structure is proposed:



Our observations can be encoded as follows. DistP is always there except when the collective operator *taotin* 'together' is realized overtly and projects a ColP, which follows from the fact that a sentence with a universal quantifier or a plural always expresses a distributive reading unless the collective operator *taotin* appears to force a collective interpretation. For (2a), every book moves in overt syntax. It, first, moves to <Spec, DistP> to check a semantic feature and then to <Spec, CP>. This movement is in overt syntax, and the distributive operator is overtly realized as *long* 'all'. For (2b), every book moves to <Spec, DistP> in LF. Since this movement is in covert syntax, the distributive operator is not realized in overt syntax. For (4), *taotin* 'together' is realized in overt syntax and projects ColP. The plural NP's move to <Spec, ColP>, and then to <Spec, AgrS>. For (7a), everyone moves to <Spec, AgrS> via <Spec, DistP>. Since the subject position is higher than negation, everyone scopes over negation. For (7c), everyone, though as an object, moves to <Spec, CP>, is higher than negation, and scopes over negation. For (8a) and (8b), plurals must move to <Spec, PlurP> via <Spec, DistP>, and because <Spec, PlurP> is higher than negation, plurals always scope over negation. The discussions above clearly show that (9) successfully encodes the phenomena we observed.

## 2.2. *Tak*, *MoiN*, Distributivity and Collectivity

In Taiwanese, there are two *every*'s. One is *tak*, and the other *moiN*. In this section, we examine the semantics of *tak* and *moiN*, and then we discuss closely related *takkei* 'everyone' and *moiN chit e lang* 'everyone', which manifest interesting differences from other *tak + N* or *moiN + N* phrases.

### 2.2.1 *Tak* vs. *MoiN*

The first difference we observe is that *moiN* 'every' can quantify over plural nouns, but *tak* 'every' cannot. This has a side effect, that is, the nouns quantified by *moiN* 'every' can be modified by numbers, but those quantified over by *tak* 'every' cannot.

- 10 a. i e chu moiN go pun goa khoan ke neng  
 pun<sub>Z</sub>  
 he POSS book every five CL I read Exp  
 two CL  
 'As for his books, I read two out of five.'  
 b. \*i e chu tak go pun goa khoan ke neng  
 pun  
 he POSS book every five CL I read Exp  
 two CL  
 c. \*tak koa chu  
 every CL<sub>PL</sub> book
- 11 a. moiN (chit) pun chu  
 every (one) CL book  
 'every book'  
 b. tak (\*chit) pun chu  
 every (\*one) CL book  
 'every book'

(10a) shows that *moiN* 'every' can quantify over plural nouns. (10b) and (10c) demonstrate that not only can *tak* 'every' not quantify over a noun modified by a number but also that it must quantify over a singular noun, since it does not allow for a plural classifier. The contrast between (11a) and (11b) suggests that *tak* is not only semantically incompatible with plurality but syntactically incompatible with the specification of number, including singular.

The second observation is that both *tak* 'every' and *moiN* 'every' are compatible with distributivity. This is not surprising since every is generally assumed to be inherently distributive.

- 12 a. moiN/tak pun ni khoan ke e chu \*(long) hon  
 thau-the-khi a  
 every CL you read Exp REL book all Passive  
 steal Prc  
 'Every book you had read was stolen.'

Just as *dou* 'all' in Mandarin, *long* 'all' here is obligatory. The sentence is bad if *long* 'all' is not there<sub>g</sub>. The quantifiers with *tak* 'every' and *moiN* 'every' can be distributed over by *long* 'all'.

The third observation is that neither *tak* nor *moiN* allows for collectivity<sub>g</sub>.

- 13 a. \*tak/moiN chia niao taotin lia niaochu  
 every CL cat together catch mouse  
 b. \*goa siuNbe ka tak/moiN pun chu taotin  
 boeboe e  
 I want DISP every CL book together sell  
 Prc  
 c. gun tao hit koa niao changam taotin lia  
 niaochu  
 our house that PL cat last night together  
 catch mouse  
 'Those cats at our house caught mice together last night.'  
 d. goa siuNbe ka ni so-u e chu taotin boeboe  
 e  
 I want DISP you all POSS book together  
 sell Prc  
 'I want to sell all of your books together.'

(13c) and (13d) show that a plural NP can be treated as a collective entity that can be dealt with as a whole. However, though *tak + N* and *moiN + N* can comment on all members of a certain group, they cannot be regarded as a plural entity that can be disposed of as a whole.

The fourth observation is about the scope between negation and *tak* 'every' and *moiN* 'every'.

- 14 a. goa bo chhuhoat tak e haksing  
 I no punish every CL student  
 'I didn't punish every student.'  
 NEG precedes tak  
 NEG > tak  
 b. tak e haksing long bo lai  
 every CL student all no come  
 'None of the students came.'  
tak precedes NEG  
 tak > NEG  
 c. goa bo chhuhoat moiN chit e haksing  
 I no punish every one CL student  
 'I didn't punish every student.'  
 NEG precedes  
moiN  
 NEG > moiN  
 d. goa ka e moiN chit e haksing long bohoatto hoeitap  
 chit e buntoei  
 I teach REL every one CL student all cannot answer  
 this CL question  
moiN precedes  
 NEG

(14a) and (14b) suggest that the syntactic precedence between negation and *tak* determines their semantic scope. (14c) and (14d) show that *moiN* has the same behavior, too. Both *tak* and *moiN* obey the Isomorphism Principle, which is assumed to be the general principle for scope taking in the Chinese languages.

The fifth observation is about the scope between *wh* phrases and *tak* and *moiN*.

- 15 a. li chhi e tak chia kao long lip ke siaN lang  
 you feed REL every CL dog all chase Exp what person  
 'Who did every dog you kept chase?'  
 b. A-bin ∀ precedes wh; wh > ∀  
 'Abin'  
 c. chit chia lip ke a-bin, hit chia lip ke a-hoa, ∀ precedes wh; ∀ > wh (distributive)  
 hit chia lip ke a-tai  
 this CL chase Exp Abin, that CL chase Exp Ahoa,  
 that CL chase Exp Atai  
 'This one chased Abin, that one Ahoa, and that one Atai.'  
 d. !!chia kao pat taotin lip ke abin collective: bad answer  
 this PL ever together chase Exp Abin  
 'These dogs chased Abin together.'
- 16 a. li chhi e moiN chia kao long lip ke siaN lang  
 you feed REL every CL dog all chase Exp what person  
 'Who did every dog you kept chase?'  
 b. A-bin ∀ >> wh; wh > ∀  
 'Abin'  
 c. chit chia lip ke a-bin, hit chia lip ke a-hoa, ∀ >> wh; ∀ > wh (distributive)  
 hit chia lip ke a-tai  
 this CL chase Exp Abin, that CL chase Exp Ahoa,  
 that CL chase Exp Atai  
 'This one chased Abin, that one Ahoa, and that one Atai.'  
 d. !!chia kao pat taotin lip ke abin collective: bad answer  
 this CL every together chase Exp Abin  
 'These dogs chased Abin together.'

The second and third observations show that *tak* and *moiN* are distributive but not collective. This also applies to *wh* questions. A collective reading answer is not good for a question like (15a) and (16a). For the other two good answers, the Isomorphism Principle does not work here, i.e., the word order does not correspond to the scopal relations. Though syntactically *tak* and *moiN* precede the *wh* phrase, the *wh* phrase can either scope under or over these two universal quantifiers. The following chart summarizes what we discussed above.

	tak + N	moiN + N
every + number (every two days)	-	+
distributed over by long	+	+
collectivized by taotin	-	-
negation	Isomorphism Principle	Isomorphism Principle
∀ precedes wh	wh > ∀ DIST/PL reading *collective reading	wh > ∀ DIST/PL reading *collective reading

Among the five properties introduced in this section, the fourth and the fifth are syntax-related. The mechanism proposed in Section 2.1 (the tree structure and the movement) can successfully encode the scopal interaction between the universal quantifiers and negation since the examples in (14) are similar to those in (7), and the scopal interaction between negation and the universal quantifiers in (7) are demonstrated in Section 2.1.

However, the mechanism cannot explain the scopal interaction between *wh* phrase and the universal quantifiers. Even though the universal quantifiers syntactically precede *wh* phrases, the sentences can have either of the following two readings.

wh > ∀      ∀ > wh

Obviously, we need more than the syntactic mechanism introduced in Section 2.1 to successfully explain this interaction. We will propose other mechanisms to account for this interaction in Section 3.

### 2.2.2 Narrowing down: *Takkei* and *MoiN chit e lang*

*Takkei* 'everyone' originated from *tak e lang* 'every CL person'. Two pieces of evidence can support this assumption. The first one is a phonological one. *Takkei* 'everyone' has a free variant *tak-e*, which obviously is short for *tak e lang* 'every CL person' since it is quite normal in Taiwanese to omit some generic, context-derivable head nouns (11, 12). No matter how it is pronounced, it has exactly the same syntactic and semantic properties. The second is that native speakers of Taiwanese tend to use *takkei* 'everyone', and seldom, if ever, use *tak e lang* 'every one CL person' when they want to comment on everyone, that is, *takkei* 'everyone' replaces *tak e lang* 'every one CL person' almost everywhere. Since *takkei* 'everyone' originated from *tak e lang* 'every one CL person', it is reasonable to assume that *takkei* 'everyone' keeps all of properties of *tak*. However, this assumption is proved to be not entirely correct.

*Takkei* 'everyone' and *moiN chit e lang* 'everyone' are both compatible with distributivity and hence both can be distributed over by *long* 'all'. This is a property *tak* and *moiN* share. Again, *long* 'all' here is obligatory.

- 17 a. takkei/moiN chit e lang \*(long)  
 li wi to  
 everyone all PRG draw picture  
 'Everyone is drawing a picture individually.'

But, to our surprise, *takkei* 'everyone' allows for collectivity, which *tak* 'every' does not. As for *moiN chit e lang* 'everyone', it does not allow for collectivity, just like *moiN* 'every'.

- 18 a. takkei taotin li wi hai po  
 everyone together PRG draw  
 poster  
 'Everyone is drawing the poster together.'

- b. \*moiN chit e lang taotin li wi  
 haipo  
 everyone together PRG draw  
 poster  
 'Everyone is drawing the poster  
 together.'

The contrast between (18a) and (18b) suggests that though *takkei* 'everyone' originated from *tak e lang* 'every CL person', it has undergone some semantic change so that it is compatible with the collective reading while *moiN chit e lang* 'everyone' does not undergo the same change.

Next, let us look at the scopal interaction between negation and *takkei* 'everyone' and *moiN chit e lang* 'everyone'.

- 19 a. goa boe chhuhoat takkei  
 I no punish everyone      NEG precedes takkei  
 'I will punish nobody.'      *takkei* > NEG
- b. takkei long bo lai  
 everyone all no come      takkei precedes NEG  
 'Nobody came.'      *takkei* > NEG
- 20 a. goa bo chhuhoat moiN chit e  
 lang  
 I no punish everyone      NEG precedes moiN chit e  
    lang  
 'I will not punish  
 everyone.'  
 NEG > *moiN chit e lang*
- b. moiN chit e lang long bo  
 lai  
 everyone all no come      moiN chit e lang precedes  
    NEG  
 'Nobody came.'      *moiN chit e lang* > NEG

*Takkei* 'everyone' always scopes over clausemate negation regardless of its syntactic position relative to negation, as shown in (19a) and (19b). On the contrary, *moiN chit e lang* 'everyone' obeys the Isomorphism Principle, that is, the syntactic position determines the semantic scope. However, *takkei* 'everyone' has some positive-polarity like property in the sense that it takes wide scope over negation only but it does not always scope over other non-negative scope-taking elements, such as frequency adverbials.

- 21 a. I invite everyone to dinner often.
- b. possible       $\forall > \text{often}$       (all are invited at the same time and this happens  
 reading (i):      often)
- c. possible       $\text{often} > \forall$       (not all are invited at the same time, but all are  
 reading (ii):      invited over a period of time, and this happens  
    often)
- 22 a. goa tiaNtiaN chhiaN takkei lai chia ampng  
 I often invite everyone come eat dinner  
 'I often invite everyone to dinner.'
- b. takkei tiaNtiaN khi hit king chhantiaN chia png  
 everyone often go that CL restaurant eat rice  
 'Everyone often goes to that restaurant to eat.'

Suppose that (21a) has two different readings. When *everyone* scopes over *often*, (21a) means that everyone is included when the speaker makes an invitation and the speaker often makes an invitation like this. If *often* scopes over *everyone*, the sentence means that the speaker can invite one or two or more per invitation and over a period of time everyone is invited, and the speaker does this quite often. But, (22a) does not have two readings. The only reading it has is:

often >  $\forall$

(22b) is not ambiguous, either. But, the reading it has is:

$\forall > \text{often}$

That is, in (22a) everyone is invited per invitation, but in (22b) it is not the case that everyone has to go to the restaurant together. It is clear that the Isomorphism Principle is at work here. When *tiaNtiaN* 'often' syntactically precedes *takkei* 'everyone', the former takes scope over the latter; if *tiaNtiaN* 'often' follows *takkei* 'everyone', it scopes under *takkei* 'everyone'. Therefore, *takkei* 'everyone' does not always take wide scope, and its wide scope taking property is positive-polarity like, which is something *tak* 'every' does not have.

The next observation is about the interaction between *wh* phrases and *takkei* 'everyone' and *moiN chit e lang* 'everyone'.

- 23 a. takkei long boe siaN be ho abin  
 every all buy what want give Abin  
 'What did everyone buy for Abin?'
- b. goa boe chu, i boe wei, ahoa boe saN      PL: Distributive  
 I buy book, he buy shoes, Ahoa buy clothes  
 'I bought a book, he a pair of shoes, and Ahoa  
 clothes.'
- c. takkei long boe chu      SA: Distributive  
 everyone all buy book  
 'everyone bought books individually.'
- d. !!abin ahoa boe chu, achhin atai boe wei      PL: Collective  
 Abin Ahoa buy book Achhin Atai buy shoe  
 'Abin and Ahoa bought books together, and Achhin and  
 Atai shoes.'      [bad answer]
- e. takkei taotin boe chit tai chhia be ho i      SA: Collective  
 everyone together buy one CL car want give he  
 'Everyone bought a car together for him.'
- 24 a. lan chit cho moiN chit e lang long boe siaN be ho  
 abin?  
 we this group everyone all buy what want give Abin  
 'What did everyone in our group buy for Abin?'
- b. goa boe chu, i boe wei, ahoa boe saN      PL: Distributive  
 I buy book, he buy shoes, Ahoa buy clothes  
 'I bought a book, he a pair of shoes, and Ahoa  
 clothes.'
- c. moiN chit e lang long boe chu      SA: Distributive  
 every one CL person all buy book  
 'Everyone bought books individually.'

- d. !!abin ahoa boe chu, achhin atai boe wei PL: Collective  
 Abin Ahoa buy book Achhin Atai buy shoe  
 'Abin and Ahoa bought books together, and Achhin and Atai shoes.'  
 [bad answer]
- e. \*moiN chit e lang taotin boe chit tai chhia be ho i SA: Collective  
 everyone together buy one CL car want give he  
 'Everyone bought a car together for him.'  
 [bad answer]

When *takkei* 'everyone' precedes *wh* phrases, as (23a), it allows for both kinds of distributive readings, SA distributive (23c) and PL distributive (23b), and one kind of collective readings, SA collective (23e). If it is *moiN chit e lang* 'everyone' that precedes *wh* phrases, it also allows for both kinds of distributive readings, (24b) and (24c), but does not allow for any kind of collective reading, (24d) and (24e).

Though semantically *takkei* always takes wide scope, syntactically it does not have to always precede *moiN chit e lang*. In addition, one sentence cannot have two *takkei*'s but it is acceptable to have two *moiN chit e lang*'s.

- 25 a. *takkei* long chin koansim lan simbiN e moiN chit e lang  
 everyone all very care we body side DE everyone  
 'Everyone (here) care very much about everyone around us.'
- b. lin chhu e moiN chit e lang long e pangcho *takkei* kiampoi e  
 you house DE everyone all will help everyone lose weight Prc  
 'Everyone in your family will help everyone (here) lose weight.'
- c. ???*takkei* ai pangcho *takkei*  
 everyone must help everyone  
 'Everyone must help everyone.'
- d. chia-e moiN chit e lang long bat hia-e moiN chit e lang  
 here every one CL person all know there every one CL person  
 'Everyone here knows everyone there.'

What we should bear in mind is that, though *takkei* and *moiN chit e lang* can precede each other in syntax, it is not clear whether they have any scopal interaction since both of them are universal quantifiers and which one precedes which one does not influence truth conditions of the sentences at all.

In this section, we have discussed six properties of *takkei* and *moiN chit e lang*, including whether they can be distributed, whether they can be collectivized, their scope relation with negation, *wh* phrases and other scope-taking elements, e.g., *tianTian* 'often', and the syntactic precedence between *takkei* and *moiN chit e lang*, which does not cause any scope ambiguity because the phenomenon that one universal quantifier scopes over another does not cause any semantic difference.

The following chart summarizes all of the phenomena we discussed in this section.

	<i>takkei</i>	<i>moiN chit e lang</i>
distributed over by <i>long</i>	+	+
collectivized by <i>taotin</i>	+	-
negation	<i>takkei</i> > neg	Isomorphism Principle
$\forall$ precedes <i>wh</i>	$\forall$ > <i>wh</i> SA distributive <i>wh</i> > $\forall$ : PL distributive SA collective	$\forall$ > <i>wh</i> SA distributive <i>wh</i> > $\forall$ : PL distributive *SA collective
other scope-taking elements	*PL collective Isomorphism Principle	*PL collective Isomorphism Principle
precedence	$t \gg m, m \gg t$ * $t \gg t$ $m \gg m$	

From the discussions above, it can be found that *takkei* 'everyone' behaves in parallel to plurals. They share the following properties.

First, both of them allow for collectivity.

- 26 a. in toatin khi khoaN tienyaN  
 they together go see movie  
 'They went to a movie together.'
- b. *takkei* toatin khi khoaN tienyaN  
 everyone together go see movie  
 'All of the persons (everyone) went to a movie together.'

Secondly, both of them scope over negation regardless of their syntactic positions relative to negation.

- 27 a. goa boe chhuoat in  
 I no punish they NEG precedes PL  
 'I will punish none of them.' PL > NEG
- b. in boe lai  
 they no come PL precedes NEG  
 'They will not come.' PL > NEG
- 28 a. goa boe chhuoat  
*takkei*  
 I no punish everyone NEG precedes  $\forall$   
 'I will punish nobody.'  $\forall$  > NEG
- b. *takkei* long boe lai  
 everyone all no come  $\forall$  precedes NEG  
 'Nobody will come.'  $\forall$  > NEG

Based on these two similarities, *takkei* 'everyone' can be claimed to be a plural quantifier. Since *takkei* is a plural quantifier, its interaction with negation can be easily explained by the mechanism proposed in Section 2.1.

However, again, the mechanism alone cannot explain the scopal interaction between *takkei* and *wh* phrases, just like it cannot explain the interaction between *tak* 'every', *moiN* 'every' and *wh* phrases. We will deal with this issue in Section 3.

In this section, we briefly discuss the distributive operator *long* 'all' and the collective operator *taotin* 'together'. Since distributivity and collectivity play an important role in the semantics of *tak* 'every', *moiN* 'every', *takkei* 'everyone' and *moiN chit e lang* 'everyone', which we discussed separately in the last two sections above, it is definitely helpful to devote some space to these two operators.

### 2.3.1 The Distributive Operator *Long*

Several works (Lin 1996, 1998; Hsieh 1994; Li 1992; Gao 1994; and Huang 1994 among others) are devoted to the Mandarin distributive operator, *dou* 'all'. It is generally accepted that *dou* has four properties: it is a distributive operator, it obeys the Leftness Condition, the Locality Condition, and the Multiplicity Condition. The Taiwanese distributive operator *long* shares these four properties.

The Leftness Condition requires that the NP distributed over by *long* must be to its left. Sentences are ungrammatical if the NP distributed over is not to the left of *long* as *long* appears.

- 29 a. *gun long boe chhia a*  
we all buy car Prc (distributing over *gun* 'we')  
'We all bought a car.'
- b. *chit koa chu goa long khoaN*  
ke a  
this PL book I all read Exp (distributing over *chit koa chu* 'these  
Prc books)  
'I've read all of these  
books.'
- c. *\*goa long khoaN ke chit koa*  
*chu*  
I all read Exp this PL book (distributing over *chit koa chu* 'these  
books')  
'I've read all of these  
books.'

(29c) is bad because the NP, *chit koa chu* 'these books', that is distributed over by *long* does not move to the left of *long*.

The Locality Condition requires that *long* can only distribute over elements in the local clause where *long* exists, as shown in (30).

- 30 *goa ka i khokheng in mai long*  
*chhuhi*  
I and he urge they no all go out  
'He and I urged them not to go  
out both.'  
\*He and I both urged them not to  
go out.'

The Multiplicity Condition<sup>25</sup> requires that only things with multiple parts<sup>26</sup> can be distributed over by *long*, and only predicates that have a proper subset entailment on the group argument can occur with *long*, as shown in (31a), (31b), (31c), (31d) and (31e).

- 31 a. *\*goa long boe chhia*  
I all buy car (distributed over *goa*  
'I')
- b. *chit pun chu goa long khoaN ke a*  
this CL book I all read Exp Prc (a book has many  
pages.)  
'I've read every page of this book.'
- c. *chiat tua kuan e chiu ni long lim khi a*  
so big bottle DE wine you all drink go Prc (potentially a big  
bottle of wine has  
parts.)  
'You finished such a big bottle of wine!'
- d. *\*taipohun e lang long paowi chongthonghu*  
most DE person all surround Presidential Office  
'Most people surrounded the Presidential Office.'
- e. *taipohun e lang long pat paowi ke chongthonghu*  
most DE person all ever surround Exp Presidential  
Office  
'Most people have the experience of surrounding the  
Presidential Office.'

Consider the contrast between (31d) and (31e). Suppose there are one hundred out of 120 people participated in the surrounding of the Presidential Office. For (31d) to be true, it should be true that these one hundred persons as a whole surrounded the Presidential Office. That is, it is a collective effort of the one hundred persons. No proper subset (part) of the one hundred persons can be said to surround the Presidential Office. In (31e), *paowi ke* 'surround Exp', different from *paowi* 'to surround', has a temporal interpretation. While *paowi* 'to surround' denotes groups of individuals located at the same time in the same event, *paowi ke* 'surround Exp' can denote groups of individuals located at different times and in different events. It allows that only *paowi ke* 'to surround Exp' can be true of some subset of the denotation of the subject noun phrase. Both things with multiple parts and predicates that need proper subsets mean some kind of multiplicity. This is what the Multiplicity Condition captures.

As explained in Section 2.1, *long* is the overt realization of the distributive operator. The overt realization of *long* is due to the overt movement of universal quantifiers or plural to <Spec, DistP>. However, (27b) and (28a) point out an interesting asymmetry between plurals and universal quantifiers, that is, universal quantifier subjects require *long* while plurals do not. While plurals also have to move to <Spec, DistP>, *long* is not obligatory. This suggests that overt movement is not the only trigger for *long* to be overtly realized.

To know what else is needed to explain the obligatoriness of *long*, let us examine the following examples.

- 32 a. *tiuN-e li-e ong-e (long) li chia png*  
TiuN Li Ong (all) PRG eat rice  
'Mr. TiuN, Mr. Li and Mr. Ong are (all)  
eating.'
- b. *tiuN-e li-e ong-e goa (long) u khoaN ke*  
TiuN Li Ong I (all) have see Exp  
'I have seen Mr. TiuN, Mr. Li and Mr. Ong  
(all).'
- c. *chit koa chu (long) li pangking*  
this PL book (all) at room  
'These books are (all) in the room.'
- d. *chit koa chu goa (long) khoaN ke a*  
this PL book I (all) see Exp Prc  
'I have read these books (all).'
- e. *in (long) khoaN ke chit chhu tienyiaN*  
they (all) see Exp this CL movie



'They (all) saw this movie.'

- f. in, goa (long) u khoaN ke  
they I (all) have see Exp  
'I have seen them (all).'

The six examples above seem to be suggesting that *long* is optional with respect to plural NP's. However, this is not true. In fact, whether *long* can or cannot appear in these examples is determined by a semantic condition, exhaustivity of domains. Let's look at (32a). If a manager calls his secretary and asks to see five persons, TiuN, Li, Ong, Ko, and Go. The secretary wants to tell him that the first three are eating their lunch now and the others are on leave. In this case, the secretary will use (32a) without *long* to report about the first three men. But, if the manager asks to see three persons only, TiuN, Li and Ong, the secretary will use (32a) with *long* to report about these three men. In these two situations, what the manager does is to set up a domain. In the first situation, the domain includes five persons. When the secretary reports part of the domain, *long* cannot be used. On the contrary, in the second situation, the domain includes three persons only. When the secretary reports the entire domain, *long* is obligatory. That is, when the domain is exhaustively commented on, as the second situation introduced above, *long* is obligatory; while the domain is not exhaustively commented on, as the first situation above, *long* cannot be used.

The same condition applies to the other examples in (32). Assume a situation below for (32b). A detective shows five pictures with names on them to a witness, and asks whether the witness saw any one of these five persons. The witness saw three of them, say TiuN, Li and Ong, but not the other two. In this case, the witness will use (32b) without *long* to report the fact. But, if the detective shows only three pictures to the witness and asks the same question, the witness recognizes all of them: TiuN, Li and Ong. Then, he will use (32b) with *long* to report his knowledge. What the detective in this situation does is just like what the manager in the previous situation does, i.e., to set up a domain. When the witness wants to make a comment on only part of the domain, he does not use *long*. While the witness wants to comment on all of the members in the domain, he must use *long*.

In sum, the exhaustivity of domains condition can help predict when *long* is obligatory. When the domain is exhaustively commented on, *long* is obligatory; while only part of the domain is commented on, *long* cannot be used.

This semantic condition can explain why overt movement of universal quantifiers requires *long* but overt movement of plural NP's does not. Universal quantifiers refer to every member of a domain. When a universal quantifier are used, it means that the domain is exhaustively commented on, which is exactly when the exhaustivity of domains condition requires *long* must be used.

Overt movement of NPs and the exhaustivity of domains condition cooperate with each other to explain the occurrence of *long*. Overt movement of NPs provides a syntactic reason and the exhaustivity of domains condition provides a semantic reason. Neither of them alone can explain the syntactic property of *long*.

### 2.3.2 The Collective Operator *Taotin*

Little attention, if any, has been paid to the collective operator. We find that some of the syntactic properties of *taotin* 'together' are parallel to those of *long*, and some are not. First, not surprisingly, *taotin* requires a plural NP that it can collectivize.

- 33 a. \*goa toatin khi khoaN tienyan  
I together go see movie
- b. goa ka i toatin khi khoaN tienyan  
I and he together go see movie  
'He and I went to a movie together.'
- c. \*goa be ka chit pun chu taotin boeboe e  
I want DISP one CL book together sell Prc
- d. goa be ka chit koa chu taotin boeboe e  
I want DISP this PL book together sell Prc  
'I want to see these books together.'

*Goa* 'I' in (33a) and *chit pun chu* 'this book' in (33b) are singular and hence cannot be collectivized by *taotin*. On the contrary, *goa ka i* 'I and he' in (33b) and *chit koa chu* 'these books' in (33d) are plural and can be collectivized. This explains the (un)grammaticality of the four examples in (33).

This point is a little different from the Multiplicity Condition in that plurality is only part of the Multiplicity Condition. Things with multiple parts, such as books, cannot be collectivized; only plurals can be collectivized.

- 34 a. \*chit pun chu goa taotin khoan  
wan a  
this CL book I together see  
finish Prc
- b. chit koa chu goa taotin khoan  
wan a  
this PL book I together read  
finish Prc  
'I finished reading these books  
together.'

Secondly, *taotin* also requires the Leftness Condition.

- 35 a. \*goa siuNbe taotin boe chit koa  
chu<sub>IZ</sub>  
I want together sell this CL book
- b. goa siuNbe ka chit koa chu taotin  
boeboe e  
I want DISP this PL book together  
sell Prc  
'I want to sell these books  
together.' (these books as a whole)
- c. chit koa chu goa taotin boekhi a  
this PL book I together sell Prc  
'I sold these books together.' (these books as a whole)
- d. goa ka i ka chit koa chu taotin  
boekhi a  
I and he DISP this PL book  
together sell Prc  
'He and I sold these books  
together.' (these books as a whole or do the  
selling together)

(35a) is bad because *chit koa chu* 'these books' does not precede *taotin*. (35b) and (35c) are both good since the Leftness Condition is obeyed. (35d) is ambiguous because two potential candidate, *goa ka i* 'I and he' and *chit koa chu* 'these books', are in the right positions to be collectivized.

Thirdly, *taotin* also obeys the Locality Condition.

- 36 a. goa ka i taotin khokheng [<sub>IP</sub> in mai chhukhi]  
I and he together urge they no go out  
'He and I together urged them not to go  
out.'
- b. goa ka i khokheng in [<sub>IP</sub> mai taotin chhukhi]  
I and he urge they no together go out

\*'He and I together urged them not to go out.'  
 'He and I urged them not to go out together.'

In (36a), *taotin* is in the matrix clause and it can only collectivize something in the same clause. This is why it cannot have the 'to go out together' reading. On the other hand, in (36b), *taotin* is in the lower clause and it can collectivize something in the lower clause, not the matrix clause. This is why it cannot have the 'to urge together' reading.

Fourthly, a collective interpretation surfaces only when the collective operator *taotin* is overtly realized. We have shown that sentences without the distributive operator or the collective operator receive a distributive interpretation in (3a) and (3b), which are repeated below.

- 3a. in boe chhia a  
 they buy car Prc  
 'They bought a car  
 (individually).'
- b. goa kayi in  
 I like they  
 'I like them.'

The observations above suggest that to get a collective reading, the collective operator *taotin* must be overtly realized to project a CoIP and NPs must move to <Spec, CoIP> to get a collective interpretation. If *taotin* is not overtly realized, no CoIP is projected and NPs have no place to move to get a collective denotation. Therefore, a collective reading is impossible when *taotin* is not overtly realized.

### 3. The Semantics of Distributivity, Collectivity and Universal Quantifiers

In this section, we want to discuss the semantic representations for the quantifiers, the distributive operator *long* 'all', and the collective operator *taotin* 'together'. And then we will demonstrate how these semantic representations work with the tree structure proposed in Section 2.1.1 to derive the readings we can get and block the readings we cannot get.

#### 3.1 The Semantic Representations for the Universal Quantifiers

We discussed the following universal quantifiers in the previous section: *tak* 'every', *moIN* 'every' and *takkei* 'everyone'. We have established that the first two are singular universal quantifiers and the last one a plural universal quantifier. For the singular ones, we make the default assumption that they are just like every in English and denote.

$$\lambda P \lambda Q \forall x [[P(x) \wedge \text{atom}(x)] \rightarrow Q(x)]$$

In this representation, the universal quantifier ranges over atomic individuals.

As for the plural one, we propose the following semantic representation along the same line of the singular ones:

$$37 \text{ [takkei]} = \lambda Q \forall X [[* \text{person}(X) \wedge \neg \text{atom}(X)] \rightarrow Q(X)]$$

\* is an operator that pluralizes predicates in the sense of Link (1983). \* takes a one-place predicate P as its argument to form all the possible sum individuals from the member of the extension of P, \*P. Suppose the model has three people, a, b, and c. [man] is {a, b, c}. Then [\*man] is

$$\{a \oplus b, b \oplus c, c \oplus a, a \oplus b \oplus c\}$$

the set of all sum individuals. The capital variables in the formula are variables over plural entities.

However, in the literature, another representation for universal quantifiers is argued. Barwise and Cooper (1981) argue that quantifiers correspond to NPs, not to determiners and quantifiers denote families of sets. In their definition, quantifiers such as

$$\exists x \varphi(x)$$

denote a set of entity that satisfies some property, which can be informally represented as

$$\{x \mid (x) \text{ or } x \uparrow \varphi(x)\}$$

in their formalism. So, they define ||the n|| (A) = ||every|| (A) if |A| = n, and undefined otherwise. that is, in their formalism a universal quantifier denotes the unique sum individual, which the NP the + plural N denotes.

Though this definition does not work for the singular universal quantifiers, *moIN* and *tak*, because their syntactic and semantic behaviors are very different from those of definite plurals, this definition works for the plural universal quantifier *takkei*, which does share the same behavior with (definite) plurals. Therefore, it is a likely assumption that instead of functioning like a traditional plural universal quantifier, *takkei* behaves like the quantifiers in Barwise and Cooper's (1981) sense. According to this idea, *takkei* denotes (38).

$$38 \text{ [takkei]}_D = \lambda Q \exists x \exists y [\text{sup}(* \text{person}(y) \mid D) = x \wedge Q(x)]$$

We have argued that *takkei* takes a presupposed domain with it, which is contextually determined. The D in the denotation captures this fact. \*person(y) is the plural object of person, which is represented as a lattice, with respect to D. (38) says that the denotation of *takkei* is the super of the lattice \*person(y), that is, the unique sum individual.

To choose between the two representation for *takkei*, we need to look at the syntactic precedence between *takkei* and *moIN chit e lang*, which show syntactic evidence for our choice. Therefore, in the next section, we discuss the syntactic precedence between these universal quantifiers.

#### 3.2 The Syntactic Precedence between *Takkei* and *MoIN chit e lang*

The fact that *tak-kei* cannot precede *tak-kei* but *moIN chit e lang* can precede another *moIN chit e lang* is related with the domains of the two universal quantifiers. We mentioned that *tak-kei* comes with a presupposed domain, but *moIN chit e lang* does not. (Footnote 1 and 14) That is why *moIN chit e lang* can be generic and it usually needs a modifier that sets up a domain for it. Since *moIN chit e lang* can have different domains and hence can peacefully coexist in a sentence. *Tak-kei* comes with a presupposed domain, which cannot be altered in the same sentence. That is, if two *tak-kei* appear in the same sentence, they will refer to the same group of persons. According to Principle A, a reflexive anaphor should be used in this case.

- 39 a. goa chhiaN takkei toto koansim lan simbiN e moi chit e lang  
 I ask everyone more care we body side De everyone  
 'I ask everyone (here) to care more about everyone around us.'
- b. goa e chhiaN lin chhu e moiN chit e lang pangcho takkei kiampo e  
 I will ask you house DE everyone help everyone lose weight Prc  
 'I will ask everyone at your home help everyone (here) lose weight.'
- c. ???takkei ai pangcho takkei  
 everyone must help everyone  
 'Everyone must help everyone.'
- d. gun chit cho e moiN chit e lang e ka lin hit cho e moiN chit e lang  
 we this group DE everyone will DISP you that group DE everyone  
 taosankang e help Prc

- 'Everyone in our group will help everyone in your group.'
- e. takkei ai pangcho kai (bo siaN e le)  
 everyone must help self (otherwise who will Prc)  
 'Everyone here must help themselves. Otherwise, who will?'

(39c) and (39e) illustrate the discussion about *tak-kei*. Since *tak-kei* refers to the same group of persons, a reflexive anaphor should be used as in (39e), instead of using *tak-kei* again, (39c). (39d) illustrates the discussion about *moiN chit e lang*. Since the two *moiN chit e lang*'s refer to two different groups of people, it is fine for *moiN chit e lang* to precede another *moiN chit e lang*.

That is, *takkei* is just like an *r*-expression, e.g. a proper name. Its referent does not change as long as the referent is not reset. In longer sentences as follows, this can be seen more clearly.

- 40 a. takkei long linwi abin kayi \*takkei/i  
 everyone all think Abin like \*everyone/he.  
 'Everyone thinks that Abin like him.'
- b. Ian chia moiN chit e lang long linwi abin kayi  
 in hia moiN chit e lang  
 we here everyone all think Abin like they their  
 everyone  
 'Everyone here thinks that Abin likes everyone  
 there.'
- c. inwi takkei tui goa ho, goa ma tui takkei ho  
 because everyone to I good, I also to everyone  
 good  
 'Because everyone is good to me, I am good to  
 everyone.'
- d. John thinks that Mary likes \*John/him.  
 e. Because John is good to Mary, Mary is good to  
 John.

As we can see, *takkei* in (40a) and (40b) behaves just like the proper name *John* in (40d) and (40e). These examples further support that argument that *takkei* is like an *r*-expression and hence no two *takkei* can occur in the same sentence.

### 3.3 Choosing Between the Two Representations of *Takkei*

Two representations for the plural universal quantifier *takkei* are proposed Section 3.1.

One is:  
 $\lambda P \forall X [*person(X) \rightarrow P(X)]$

which is just like a traditional regular universal quantifier except that the universal quantifier ranges over plural entities, the capitalized letter X. The other is Barwise and Cooper's (1981) definition of universal quantifier, represented as:

$\lambda Q \exists x \exists y [sup(*person(y))D] = x \wedge Q(x)$

where universal quantifiers are defined as the set of all of the individuals in a domain, that is, the unique sum individual in lattice-theoretic terms, which is exactly what definite plurals denote.

It can be argued that the Barwise and Cooper's definition is better for *takkei*, but not for *moiN* and *tak*, based on the following observations.

First, the singular universal quantifiers are not compatible with a collective reading, but the plural universal quantifier is. If both kinds of universal quantifiers denote a set of entities, then it is difficult to explain why one kind allows for a collective interpretation but the other does not. Especially, if both kinds denote a set, it is very difficult to argue against that a set of entities cannot work together and allows for a collective interpretation.

Secondly, the syntactic behavior of *takkei* and *moiN chit e lang* discussed in Section 3.2 also suggests that *takkei* denotes the set of all members in a domain, just like a definite plural, and hence it behaves like a definite plural, e.g., it obeys Condition C, but *moiN chit e lang* does not behave, in any way, like a definite plural. The traditional universal quantifier definition for *takkei* does not capture this similarity between it and a definite plural.

Given the argument that universal quantifiers have the same denotation as definite plurals (Barwise and Cooper 1981) and given the observation that syntactically and semantically *takkei* is exactly like definite plurals, as discussed in Section 3.2, then the better semantic representation for *takkei* should be

$\lambda Q \exists x \exists y [sup(*person(y))D] = x \wedge Q(x)$

the unique sum individual in lattice-theoretic terms, just like definite plurals. The singular universal quantifiers *moiN* and *tak* still remain the traditional universal quantifier definition, where universal quantifiers denote:

$\lambda P \lambda Q \forall x [P(x) \rightarrow Q(x)]$

Now the semantic representations for the singular universal quantifier and the plural one are determined. However, to show how these semantic representations work, we still need to know the denotation of the distributive operator *long* and the collective operator *taotin*, which we are going to discuss next.

### 3.4 The Denotation of *Long* and *Taotin*

We know that *long* distributes over NPs. Following Lin (1998), which is reviewed in [Appendix B3](#), we propose that the denotation of *long* should be as follows:

41 [long] =  $\lambda_1 \lambda P \in D_{\alpha} \lambda u \in D_{\alpha} \forall y [y <_1 u \rightarrow P(y)]$  where  $a <_1 b$  iff ( $b = a$  or  $b = \Phi X$  where  $a \in X$ ).

Syntactic condition: the subject of *long* cannot be a singular non-quantified NP.

There are two things to say about this definition. First, an atomic individual is defined as an *i*-part of itself. We will show how it works and why this is necessary. Second, we propose that Q must be instantiated as a variable bound by a universal quantifier. This is because we need to rule out type-raised proper names. Since in G0, proper names are type-raise to  $\langle\langle e, t \rangle, \langle e, t \rangle, t \rangle$ , e.g.

[John] =  $\lambda_1 \lambda P \in D_{\alpha} [P(J)]$

However, a singular proper name cannot be distributed over by *long*, as shown in (42).

- 42 a. \*John long li wi hai po  
 John all PRG draw poster

b. [wi hai po] =  $\lambda x$  [draw(poster)(x)]  
 [long wi hai po] =  $\lambda Q \forall y [y <_1 Q \rightarrow \text{draw}(\text{poster})(y)]$   
 [John long wi hai po]  
 =  $\lambda P (P(J)) (\lambda u \forall y [y <_1 u \rightarrow \text{draw}(\text{poster})(y)])$   
 =  $\lambda u \forall y [y <_1 u \rightarrow \text{draw}(\text{poster})(y)] (J)$   
 =  $\forall y [y <_1 J \rightarrow \text{draw}(\text{poster})(y)]$

Our denotation of *long* would yield this result if we did not make the constraint on Q. Since we define that an atomic individual is an *i*-part of itself, then (42) could have a

reading like for all such that John is drawing a picture, which is a reading that we do not get. To avoid this awkward situation and to block this false reading, we propose that Q must be instantiated to a variable bound by a universal quantifier.

The example above demonstrated how the denotation of *long* can block the reading we do not get. Below, we will show how the semantic representations for universal quantifiers and the denotation work together to derive the readings we can get.

43 a. moiN chit/ tak e haksing long li wi haipo  
every CL student all PRG draw poster  
'Every student is drawing a poster  
individually.'

b. [wi haipo] =  $\lambda x$  [draw(poster)(x)]  
[long wi haipo] =  $\lambda u \forall y$  [ $y <_i u \rightarrow$  draw(poster)(y)]  
[moiN chit/ tak e haksing long wi haipo]  
=  $\lambda P \lambda Q \forall x$  [P(x)  $\rightarrow$  Q(x)] ( $\lambda x$  [student(x)])  
( $\lambda u \forall y$  [ $y <_i u \wedge$  atomic(x)]  $\rightarrow$  draw(poster)(y))  
=  $\forall x$  [student(x)  $\rightarrow \lambda u \forall y$  [ $y <_i u \wedge$  atomic(x)]  $\rightarrow$  draw(poster)(y)] (x)  
=  $\forall x$  [student(x)  $\rightarrow \forall y$  [ $y <_i x \wedge$  atomic(x)]  $\rightarrow$  draw(poster)(y)]

In (43b), Q is instantiated to x, which is bound by a universal quantifier and hence the constraint on Q is met. As shown in the derivation, for singular universal quantifiers like *moiN chit e haksing* 'every student', the distributive operator does not really do anything. It simply passes the atomic individual variable bound by the universal quantifier to the predicate.

44 a. takkei long li wi haipo  
everyone all PRG draw poster  
'Everyone is drawing a poster individually.'

b. [wi haipo] =  $\lambda x$  [draw(poster)(x)]  
[long wi haipo] =  $\lambda u \forall y$  [ $y <_i u \rightarrow$  draw(poster)(y)]  
[takkei long wi haipo]  
=  $\lambda Q \exists x \exists y$  [sup(\*person)(y)D] = x  $\wedge$  Q(x)  
( $\lambda u \forall y$  [ $y <_i u \rightarrow$  draw(poster)(y)])  
=  $\exists x \exists y$  [sup(\*person)(y)D] = x  $\wedge \lambda u \forall y$  [ $y <_i u \rightarrow$  draw(poster)(y)](x)  
=  $\exists x \exists y$  [sup(\*person)(y)D] = x  $\wedge \forall y$  [ $y <_i x \rightarrow$  draw(poster)(y)](x)]

In Section 3.3, we have argued that the semantic representation for *takkei* should be the unique sum individual. Suppose the domain contains three persons, a, b, and c. The unique sum individual is:

$$a \oplus b \oplus c$$

Since y is atomic, which is represented by small letters, (44b) amounts to say that for all atomic individual y, which is an i-part of the unique sum above, y is drawing a poster, which is exactly the distributive reading we get.

Next, we discuss the denotation of *taotin*. We have shown that the collective operator *taotin* needs a plural entity to collectivize and all of the members of the entity it collectivizes participate in the event denoted by a verb. In this aspect, *taotin* is distributive in a sense, i.e., it distributes subevents over all of the members of a certain entity. This is exactly the difference between the following examples, which were discussed in Section 2.1.

45 a. in boe chit tai chhia  
they buy one CL car  
'They bought a car.'

b. in taotin boe chit tai chhia  
they together buy one CL car  
'They bought a car  
together.'

(45a) describes a situation where some people can be identified as a group, that group bought a car and it is not necessary that case that everyone in this group participated in the car-buying event. On the contrary, in (45b) everyone of 'them' participated in the car-buying event. Therefore, the semantic translation of *taotin* can be defined as:

46 [taotin] =  $\lambda P \lambda u \forall x$  [[x <<sub>i</sub> u  $\wedge$   $\neg$ atomic(u)  $\wedge$   $\neg$ atomic(x)]  $\rightarrow$  P(x)]

This translation says that for all non-atomic individual X, which is an i-part of a sum individual Q, P(X). This translation can capture the difference between (45a) and (45b). If they denote a+b+c, then all of its non-atomic i-parts are a+b, b+c, and c+a. Without *taotin*, (45a) just says that a+b+c bought a car. The internal structure of a+b+c is not mentioned. It is used to describe a situation like a family bought a car, but the young children in that family did not really participate in the car-buying event. With *taotin*, (45b) describes a situation where all non-atomic sum individual that are i-parts of another sum individual participated in the car-buying event. This is exactly our intuition about this sentence. If a, b and c bought a car together, then of course a and b bought a car together, b and c bought a car together and so on. The brief semantic derivation of (45b) is given below.

45 c. [boe chit tai chhia] =  $\lambda x$  [buy(car)(x)]  
[taotin boe chit tai chhia]  
=  $\lambda P \lambda u \forall x$  [[x <<sub>i</sub> u  $\wedge$   $\neg$ atomic(u)  $\wedge$   $\neg$ atomic(x)]  $\rightarrow$  P(x)] ( $\lambda x$  [buy(car)(x)])  
=  $\lambda u \forall x$  [[x <<sub>i</sub> u  $\wedge$   $\neg$ atomic(u)  $\wedge$   $\neg$ atomic(x)]  $\rightarrow$  buy(car)(x)]  
[takkei taotin boe chit tai chhia]  
=  $\lambda Q \exists x \exists y$  [sup(\*person)(y)D] = x  $\wedge$  Q(x)  
( $\lambda u \forall x$  [[x <<sub>i</sub> u  $\wedge$   $\neg$ atomic(u)  $\wedge$   $\neg$ atomic(x)]  $\rightarrow$  buy(car)(x)])  
=  $\exists x \exists y$  [sup(\*person)(y)D] = x  $\wedge$   
 $\forall x$  [[x <<sub>i</sub> u  $\wedge$   $\neg$ atomic(u)  $\wedge$   $\neg$ atomic(x)]  $\rightarrow$  buy(car)(x)]

This denotation of *taotin* can also prevent *moiN chit e lang* receiving a collective reading.

47 a. \*moiN chit e lang toatin li wi haipo  
everyone together PRG draw poster

b. [wi haipo] =  $\lambda y$  [draw(poster)(y)]  
[taotin wi haipo]  
=  $\lambda u \forall y$  [[ $y <_i u \wedge$   $\neg$ atomic(u)  $\wedge$   $\neg$ atomic(y)]  $\rightarrow$  [draw(poster)(y)]]  
[moiN chit e lang toatin li wi haipo]  
=  $\lambda Q \forall x$  [person(x)  $\rightarrow$  Q(x)]  
( $\lambda u \forall y$  [[ $y <_i u \wedge$   $\neg$ atomic(u)  $\wedge$   $\neg$ atomic(y)]  $\rightarrow$  [draw(poster)(y)]])  
=  $\forall x$  [person(x)  $\rightarrow$   
 $\forall y$  [[ $y <_i x \wedge$   $\neg$ atomic(x)  $\wedge$   $\neg$ atomic(y)]  $\rightarrow$  [draw(poster)(y)]]]

The underlined part will make the derivation false since the small x is an atomic individual, but the semantic representation of *taotin* requires a non-atomic sum individual, and this can stop singular universal quantifiers from receiving a collective interpretation.

### 3.5. Semantic Derivations: *Wh* Phrases and Universal Quantifiers

In Section 2.2.1 and 2.2.2, we have shown that a *wh* phrase can scope either over or under a universal quantifier. To solve this problem in English, Agügero-Bautista [11] proposes a reconstruction mechanism. In his paper, he argues that the PL readings of a *wh* question comes from the reconstruction of the NP argument of a *wh* determiner back to a position lower than that of a universal quantifier.

In English, *wh* phrases move in overt syntax. To get a

$$\forall > wh \text{ (PL)}$$

reading, reconstruction is needed to move *wh* phrases to a position lower than universal quantifiers in LF. Taiwanese is a *wh*-in-situ language. *Wh* phrases move in LF only. Since both *wh* movement and reconstruction occur in LF in Taiwanese, it seems redundant to propose that the whole *wh* phrase move in LF and then is constructed back in LF. So, instead of utilizing reconstruction, we propose that in Taiwanese it is either the *wh* determiner or the whole *wh* phrase that moves in LF.

This proposal can achieve the same goal as Agügero-Bautista's reconstruction, which reconstructs the NP argument of a *wh* determiner back in LF and leaves the *wh* determiner at <Spec, CP> and results in a PL reading. Our proposal suggests that either the *wh* determiner moves to <Spec, CP>, which can result in a PL reading, or the whole *wh* phrase moves, which results in a SA reading or a collective reading.

We keep the assumption that a PL reading is a functional reading. That is, the NP argument in a *wh* phrase such as *siaNmi lang* 'what person' is interpreted as

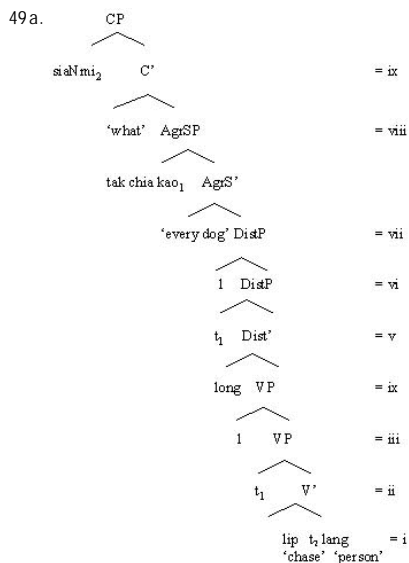
$$\lambda P [\text{PERSON}(f(x)) \wedge P(f(x))]$$

and the *wh* determiner binds the variable *f*. The following sections demonstrate how this proposal works together with the denotations of *moiN*, *tak*, *takkei*, *long*, *taotin* and the tree structure proposed in Section 3.1 to derive the readings we can get and block the readings we cannot get.

#### 3.5.1 *Wh* Phrases and *Tak/MoiN*

Let's look at the two examples below and try to derive their readings based on what we have proposed in the previous sections.

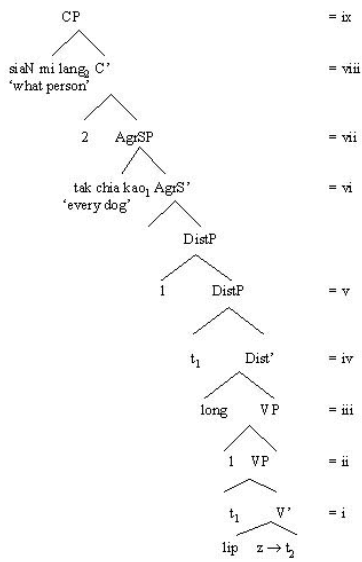
48 [REL ni chhi e] tak chia kao long lip ke siaNmi  
 lang<sub>2</sub>  
 you fed REL every CL dog all chase EXP what person  
 'Who did every dog [you had] chase?'



(48) has two possible readings. One is a PL reading and the other SA reading. (49a) is the tree structure for the PL reading. To get a PL reading, the *wh* determiner *siaNmi* 'what' moves to <Spec, CP>. The universal quantifier subject, first, moves to <Spec, DistP>, and then <Spec, AgrSP>. The NP argument of the *wh* determiner *lang* 'person' has a functional interpretation. It combines with *lip* 'to chase' and then all the way up. At (v), because the type of the subject is still unknown, the two parts of the denotation of *long* are both kept. At (viii), since *tak chia kao* denotes

$$\lambda P \forall x [\text{dog}(x) \rightarrow P(x)]$$

the second part of the denotation of *long* is chosen. At (ix), the *wh* determiner offers a question meaning and an existential quantifier that can bind the free variable *f* in the interpretation of its NP argument. And, the PL reading can be derived. The detailed semantic derivation is offered in [Appendix A](#).



(49b) is the tree structure for the SA reading. To get this reading, the whole *wh* phrase moves to <Spec, CP>. Other movements are the same as (49a) except that in this case both the subject and object move. This will cause a problem for *long* since there will be two free variables to bind in the VP. Here, Nissenbaum's [XIII], [XIV] idea about parasitic gap<sup>23</sup> can help.

The basic idea is as follows. In (49b), the subject moves to <Spec, DistP>, and then to <Spec, AgrSP>. At this time, the object is still at the object position, which we mark as *z*. The movement of the subject leaves traces and indexes as usual. After *long* binds the index left by the movement of the subject, now it is time for the object to move. The object moves to <Spec, CP>, and leaves an index adjoined to C'. At this stage, *z* is changed to *t2*. In this way, the only trace left in the scope of *long* before the object is *t1*. This approach can avoid the awkward situation where both the subject and the object move at the same time and two indexes are left in the VP for *long* to bind, and in this way, *long* can bind the correct argument. In addition, this approach can avoid the seemingly arbitrary claim that *long* carries as its lexical property an index that can freely bind free variables in the VP. The semantic derivation can also be found in [Appendix A](#).

### 3.5.2 *Wh* Phrases and *Takkei*

To discuss the readings of *wh* questions with *takkei*, two different types of sentences need to be considered - one with the collective operator *taotin* and the other with the distributive operator *long*.

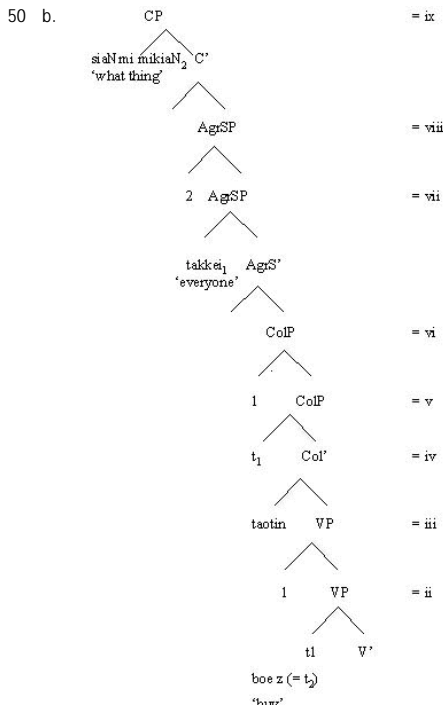
The one with *taotin* is less complicated. Sentences with *taotin* explicitly spelled out has the SA collective reading only. This fact is due to the denotation of *taotin*. The collective operator distributes all of subevents of an event over the members of a plural object. *Takkei* is a plural quantifier, as we have shown before. Hence, it is compatible with a collective reading.

- 50 a. takkei taotin boe sianmi mikiaN be ho abin  
everyone together buy what thing want give Abin  
'What did all of the persons(everyone) buy together for Abin?'

The derivation in (50b) is very similar to those in (48). *Takkei* moves to <Spec, AgrSP> via <Spec, ColP>, where it is collectivized. Then the *wh* phrase moves. Due to the overt realization of *taotin*, this sentence receives a collective interpretation, and (50b) in next page is how the collective reading is derived.

The one with the distributive operator *long* is more complicated. This kind can have both the PL distributive reading and the SA distributive reading and the SA collective reading.

Though in this kind of sentences a universal quantifier syntactically precedes a *wh* phrase, the universal quantifier can either scope over or under the *wh* phrase, just like the cases we discuss in Section 3.5.1. If the *wh* determiner moves to <Spec, CP>, the PL reading can be derived. If the whole *wh* phrase moves to <Spec, CP>, the SA reading can be derived. The distributive operator *long* offers the distributive reading. The derivation is just like the one in (49b), which will not be repeated here.



This kind of sentences does not allow for a PL collective reading because the distributive operator distributes over the elements of a plural entity, which is represented as a

set. The meaning of *takkei* is the set containing all of the persons in a specific domain, each member of which is an atomic individual. *Long* distributes over these atomic individuals and hence this kind of sentences does not allow for a PL collective reading.

In addition, this kind of sentences with *long* allow for the SA collective reading, and this is worthy of discussion. The example is repeated below.

- 32 Q: takkei long boe siaN be ho abin  
 every all buy what want give Abin  
 'What did everyone buy for Abin?'  
 A: takkei taotin boe chit tai chhia be ho SA:  
 i Collective  
 everyone together buy one CL car want  
 give he  
 'Everyone bought a car together for  
 him.'

A few factors are at work here so that (320) allows for the SA collective reading. The first, of course, is that *takkei* is compatible with collective readings. If we substitute *takkei* for *moiN chit e lang* in (320), the collective reading becomes impossible. Secondly, collective readings are a special case of

$wh > \forall$  readings

The mechanism that can derive these readings can give us collective readings. This mechanism has been introduced in Section 3.5. Basically, as long as a *wh* object is not reconstructed, such a reading can be derived. Thirdly, the predicate type also affects the readings sentences can get. If we substitute *boe* 'to buy' for a verb that cannot be performed collectively, then (320) cannot have collective readings. The fourth and the most interesting one is that in a sentence like (320) the semantics of the distributive operator *long* seems to be compromised somehow and as a result *long* loses its distributive ability. This compromise is due that the structural similarity between (320) and the Existential Polarity *Wh* Phrases (EPW for short) (Lin 1996). An EPW is a *wh* phrase in sentences as follows.

- 51 siaNmi chhia goa long kayi  
 what car I all like  
 'I like all cars.'

(51) is not a question. In an EPW sentences like this, the *wh* phrase, *siaNmi chhia* 'whatever car' here, has a universal quantifier-like interpretation. EPW sentences have a surprising characteristic, that is, the distributive and the collective operators can coexist in this kind of sentences without rendering the sentences ungrammatical [24](#).

- 52 a. siaNmi lang long esai taotin keng chit tai kngkhim  
 what person all can together lift this CL piano  
 'Lit. Whatever persons they are, they can lift this  
 piano together.'  
 = Any group of persons can lift this piano together.  
 b. siaNmi mikiaN i long tatoi thulokhi a  
 what thing he all together swallow Prc  
 'Lit. Whatever food they were, he swallowed them  
 together.'  
 = He swallowed any kind of food together!

Even though the examples in (51) and (52) are not questions, they share syntactic similarity with (320) in that all of them contain *wh* phrases and *long*. Apparently, *long* in (52) seems to lose its distributive ability. This seemingly loss of the distributive ability is analogized to (320), which is, in fact, not an EPW sentence, due to the syntactic similarity. In addition, the fact that *long* loses its distributive ability only in a *wh* question like (320) but not in a declarative sentence also suggests that *wh* phrases must have something to do with the loss of distributivity and the syntactic similarity discussed above captures this *wh* phrase-related property. This provides another ground for a collective reading to surface.

In sum, for a sentence like (320) to have a collective reading, the following factors must work together. First, *takkei* allows for the possibility for a collective reading. Secondly, the predicate allows for a collective interpretation too. Thirdly, in LF, the *wh* phrase moves to <Spec, CP> and is not reconstructed. In this case, a

$wh > \forall$  reading

is ready. And, fourthly, because of the analogy due to the syntactic similarity, *long* loses its distributive ability. Since *long* does not induce distributivity any more and the predicate *boe* 'to buy' allows for a collective reading, a

$wh > \forall$  structure

can induce a collective reading. This is how (320) can have the SA collective reading.

#### 4. Conclusion

In this paper, we examined the syntactic and semantic behaviors of *tak* 'every', *moiN* 'every', *tak-kei* 'everyone' and *moiN chit e lang* 'everyone'. We find that *tak* and *moiN* have the same behaviors except that *tak* quantifies over only singular nouns but *moiN* can quantify either singular nouns or plural ones, e.g., they are both incompatible with collectivity, they are both compatible with distributivity, they both obey the Isomorphism Principle with respect to negation, and they both allow for the A and the B reading in a *wh* question.

A  $wh > \forall$  B  $\forall > wh$

*MoiN chit e lang* preserves all of the properties that *moiN* has. But, *tak-kei* allows for the collective reading, which *tak* does not. Besides, *tak-kei* always takes wide scope over negation, which is another property *tak* does not have.

We propose that the semantic representation of *takkei* is

$\lambda Q \exists x \exists y [sup(*\text{person})(y)D] = x \wedge Q(x)$

the unique sum individual in lattice-theoretic terms, based on Barwise and Cooper's (1981) argument and on the fact that syntactically and semantically *takkei* and definite plurals behave exactly the same. We suggest that the denotation of *tak* and *moiN* is the regular one for universal quantifiers:

$\lambda P \lambda Q [[P(x) \wedge \text{atomic}(x)] \rightarrow Q(x)]$

Since plurals and singular universal quantifiers are different types of objects, we suggest that *long* should have two parts in its denotation to capture the fact that it can distribute over two different types of objects. *Taotin* distributes subevents over all of the members of a plural object and hence is not compatible with singular universal quantifiers.

Both *long* and *taotin* are heads of functional projections, DiSP and CoIP. NP's, including universal quantifiers, must move to <Spec, DistP/ColP> and then to somewhere else. We argue that sentences with plurals or universal quantifiers have a distributive interpretation as their default interpretation. Movement of NP's in overt syntax realizes the distributive operator in overt syntax and movement in covert syntax does not. These ideas can explain the Leftness Condition.

We also propose a new tree structure which includes a PlurP for plurals, DistP and ColP. The ambiguity of *wh* questions between [A and B](#) depends on whether to move *wh* determiners or whole *wh* phrases to <Spec, CP>.

The fact that *takkei* always scopes over negation follows from a more general phenomenon that plurals tend to take wide scope. And last, a *wh* question with *tak-kei* and *long* allows for a collective reading is due to the cooperation of several factors, including that *takkei* is compatible with collectivity, that the predicate allows for collectivity, that a collective reading is a special case of [A](#) readings, which can be derived as long as the whole *wh* phrase moves, and that *long* loses its distributive ability due to the syntactic similarity with EPW. And, not two *takkei* are allowed in the same sentence because it behaves like an *r*-expression.

## Footnotes

1 In these examples, *chia e 'here'* is used to modify *every book*. Without it, (2b), with a not-preposed universal quantifier, sounds weird. This can be due to pragmatics since it seems impossible to read every book in the world. However, in a time when books could not be easily reproduced and hence there were not too many books in the world, uttering (2b) without modifiers to mean that I have read every book in the world seems plausible.

2 The detailed syntactic and semantic properties of *long 'all'* will be discussed later.

3 This sentence can be ambiguous with a proper context. If *in 'they'* refers to people who can be conceptually identified as a single group, for example, a family, (3a) can mean this group bought a car. However, it does not have a collective reading, where every member participates in the event. If *in 'they'* refers to a family, (3a) means this family bought a car and of course the young children in this family did not pay for this car. We will come back to this point when we talk about collectivity. See (5) and the discussion following it. But, without a context, this sentence is distributive.

4 For some reason, this sentence does not have a group reading as (3a) does, where the plural refers to a group, say, a family. Why it is so is still unknown to us.

5 In these two sentences, *long 'all'* distributes over the time adverbial, *tin lepai 'last week'*. So, there is no semantic clash. We will leave distribution over time adverbials for future studies.

6 Italicized *precedes* is used to mean 'syntactically precedes' in this paper.

7 When *moiN 'every'* quantifies over a numeral modifier greater than two, the phrase *moiN NUM N* cannot stay in an argument position.

- i a. i e chu moiN go pun goa khoaN ke go pun  
he POSS book every five CL I read Exp  
five CL  
'As for his books, I read five out of five'
- b. ??? i e chu goa khoaN ke moiN go pun  
he POSS book I read Exp every five CL

(ia) can be uttered when one wants to exaggeratingly emphasize that he reads *every* book owned by some other guy. *MoiN go pun chu 'every five books'* must undergo QR for some reason. We leave open this question why a QP like that must undergo QR.

8 In fact, *long 'all'* behaves pretty similarly to *dou 'all'* in Mandarin. We will discuss *long 'all'* later.

9 Some may argue that *tak* and *moiN* can denote collectivity since both can appear in the following examples:

- i a. tak/moiN chia nieo-a-kian long siN-lo-  
kangkhoan  
every CL kitten all look alike  
'Every kitten looks alike'
- b. tak/moiN chia niao long li chia kiNbin  
every CL cat all at here meet  
'Every cat meets here'

*SIN-lo-kangkhoan 'to look alike'* and *kiNbin 'to meet'* are said to be collective predicates and therefore *moiN 'every'* and *tak 'every'* can express collectivity. However, (ia) and (ib) are significantly different from a real collective sentence, such as (ii):

- ii in taotin poaN kangkim  
they together lift  
piano  
'They lifted the piano together'

In (ii), every member of they is a part of the lifting event, and all the parts together make up the complete lifting event. It is not the case in (ia) and (ib) since a member alone can neither look alike nor meet. In this paper, only examples like (ii) are regarded as collective ones.

10 *!!* is used to mark those answers that are syntactically well-formed, but pragmatically bad.

11 The two examples below briefly illustrate the point about omitting generic, context-derivable head nouns.

- i li be chhiaN chi e chu png e, chhiaN u bo  
you want hire one CL cook rice REL, hire have no  
'You want to hire a cook. Have you found one?'
- ii chia u neng lui hoa ang e ho li hun e ho goa  
here have two CL flower red DE give you pink DE give I  
'There are two flowers here. The red one is for you, and the pink one for me'

In both cases, the head nouns after *e 'REL/DE'* are omitted. In (i), the head noun is generic. All is said is a person who can cook. Gender, age and other features are irrelevant. In (ii), the head noun is context-derivable. It is pretty clear that we are talking about a red flower and a pink flower, not anything else.

12 Some arbitrariness is involved in why *moiN chit e lang 'everyone'* does not undergo the same change. We leave this issue open in this paper.

13 *MoiN chit e lang 'everyone'* and *takkei 'everyone'* differ in that *takkei* comes with a presupposed domain, but *moiN chit e lang* does not. That is, only *moiN chit e lang* can have a generic meaning. This is why in our examples we usually need a modifier to set up a domain for *moiN chit e lang*.

14 *MoiN chit e lang* requires a modifier to restrict its domain so that it does not have to include everyone in the world. Without a modifier to restrict its domain, *moiN chit e lang* refers to everyone in the world and it seems practically impossible to care for all the people in the world. This may be why in Taiwanese *moiN chit e lang* usually, if not always, requires a modifier.

15 The Proper Subset Condition on the use of *dou* proposed by Lin (1998) is part of the Multiplicity Condition.

16 Plurality is not sufficient here since in (41b) and (41c) the NPs distributed over there are not plural, but they can still be distributed over by *long*. This is why this condition requires 'things with multiple parts', but not 'a plural NP'.

17 This sentence is ungrammatical only in the meaning that I want to sell these books together. But it is OK in the following context.

- i. goa tiaNkong ni miNachai be khi boe chu, goa siUNbe taotin beo chit koa chu, esai  
boe



I hear you tomorrow will go sell book I want together sell this PL book OK no  
'I heard that you're going to sell books tomorrow. I want to sell these books  
together (with you). Is that OK?'

This does not influence our analysis since *taotin* here does not collectivize these books. Here, *taotin* simply picks up another participant in the discourse and collectivizes the subject and the participant, that is, in this case, *taotin* does not collectivize *chit koa chu* 'these books'.

18 As for the cases like *moIN go pun chu* 'every five CL books' where *moIN* quantifies obviously plural nouns, as mentioned in footnote 8, a universal quantifier of this kind cannot stay in argument positions and behaves like an adjunct. Since they do not behave like regular universal quantifiers, which can stay in argument positions, we will not discuss them in this paper.

19 To simplify the derivation, we ignore the semantic contribution of the progressive marker since it does not influence our analysis.

20 We checked with a few native speakers of Taiwanese, and all of them agree with this intuition. We would like to thank Rajesh Bhatt for pointing this intuition out.

21 See Tsai [XII] for arguments for Wh movement in LF in Mandarin. Though few previous studies, if any, deal with wh movement in Taiwanese, we assume that in Taiwanese wh phrases move in LF too because Mandarin and Taiwanese are closely related.

22 To simplify matters, we ignore relative clauses in the trees and in the derivations since they do not really affect our analysis.

23 We would like to thank Rajesh Bhatt for bringing Nissenbaum's works to our attention.

24 Lin [V] suggests that EPW denotes a union of things and the distributive operator distributes over the members of the union. So, for (59), *siaNmi chhia* 'whatever car' denotes a union of cars and *long* distributes over the union. Extending Lin's idea a little bit, we can say that the wh phrases in (58a) and (58b) denotes a union of groups of things, *long* distributes over the members of the union, i. e., those groups, and *taotin* collectivizes the members of those groups.

## Appendix A

The detailed semantic derivations for (64a) and (64b).

46 a. [WU\\_46.JPG](#)

b. [WU\\_47.JPG](#)

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