

On counting and measuring events

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Abstract. This paper discusses the issue of the ontology of the verbal domain with respect to empirical phenomena related to countability. I will take up the issue by discussing in particular the case of Mandarin Chinese, a language that has a specific functional category for counting in the verbal domain, the category of Verbal Classifiers (VCIs, Paris (2011, 1981); Fassi Fehri and Vinet (2008), among others). I will show that verbal classifiers, as event counters, cannot be conflated with durative modifiers, which have the function of bounding the predicate by imposing a measure unit. Rather, VCIs are functional devices which act as classifiers of verbal predicates that single out and count the individuals in the denotation of the VP.

Keywords: verbal classifiers - countability - events and occasions - Mandarin Chinese

1. The issue

In the linguistic literature of the last thirty years, aspectual modifiers have been directly linked to the issue of the mereology and ontology of the domain of eventualities.¹ In the attempt at organizing verbal predicates into distinct aspectual classes, linguists and philosophers based the classification on different semantic properties, such as cumulativity, homogeneity, (a)telicity or dynamicity, or on clusters of them, whose definition often depend on tests of modification by aspectual PPs and their interpretation (see a.o. Smith (1991); Krifka (1998); Rothstein (2004, 2008)). More recently, it has also been argued that iterative modifiers like *n times*-phrases in English are not PPs nor NPs, but rather classifier phrases of events (Doetjies, 1997; Landman, 2006); on the basis of this evidence, the event domain has thus been endowed with individuals of different sorts, individuals and groups.

The Chinese counterpart of English aspectual modifiers such as durative *in-* and *for*-phrases and iterative *time*-expressions is, in either case, a ‘bare’, non prepositional phrase.² Given their constrained distribution in post-verbal position and their complementary distribution with respect to most nominal internal arguments, these non-prepositional phrases have been considered syntactic complements of the verb rather than adverbial adjuncts (Huang, 1982). As for their semantics, a distinction is generally drawn between durative phrases (1-a) and frequency phrases (1-b).³ The latter are called in some Chinese grammars ‘Verbal Classifiers’ (VCI).

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²See Paris (2006); Lin (2007), a.o., for a semantic and syntactic description of durative temporal modifiers.

³Cf. e.g. Li and Thompson (1981); Sybesma (1999).

- (1) a. Wo deng-le [liang ge xiaoshi/ ban tian].
 I wait-ASP two CL hour/ half day
 I waited for two hours/ for a long time.
- b. Wo qu-guo Xianggang [liang tang] .
 I go-ASP Hong-Kong two VCI
 I went to Hong Kong twice.

In a recent paper, Paris (2011) challenges this semantic distinction, showing that at least some VCIs are comparable to duratives not only for their distribution but also for their interpretive constraints. On this basis, she proposes to distinguish two groups of VCIs, that she dubs ‘strong’ and ‘weak’ VCIs, whose interpretation depends on their different aspectual properties as VP modifiers. My aim here is to show that a more fine-grained analysis is possible. I will claim that VCIs, as event counters, are a homogeneous functional category, and that their interpretive differences can be explained by appealing to two criteria:

- (i) the semantic content of the VCI head, that divides VCIs into two groups according to the type of individual unit they count;
- (ii) the structural properties of the domain of denotation of verbal predicates, that determines in some cases their interpretation as durative expressions.

In a more general perspective, the goal of the present inquiry is twofold.

On the one hand, my aim is to give an insight into the linguistic ontology of the event domain, by considering event modifiers that have the function of measuring and of counting atomic units. The possibility of counting is directly linked to the existence of sortals (see e.g. Grandy (2007)), and as such it is a key to the understanding of the linguistic ontology of the domain of denotation of natural language predicates. On the other hand, languages differ in the way countability is expressed, making use of specific lexical and functional devices to encode plurality and the mass-count distinction. Cross-linguistic variation has been studied extensively in the nominal domain, but recent works on pluractionality and adverbial quantification show that there may be variation also in the way plurality is expressed in the event domain (Cusic, 1981; Newman, 1990; Xrakovskij, 1997; Müller and Sanchez-Mendes, 2007; Cabredo-Hofherr and Laca, 2012). In this respect, then, this study is also intended as a survey into cross-linguistic variation; my aim will be to take a first step towards an empirical generalization by considering the expressions of countability of events across languages.

The paper is organized as follows. In section 2, I will first introduce the empirical data about Chinese Verbal Classifiers, and discuss their grammatical and semantic properties, drawing on the account given also in previous analyses. I will focus in particular on the issues raised by the recent analysis by Paris (2011). In section 3, I will introduce the theoretical framework in which I will develop my own analysis. I will then come back to Chinese classifiers, and show how the empirical problems find a solution in a framework that links the aspectual and structural distinctions in the denotation of verbal predicates to the ontological status of events.

2. Mandarin Verbal Classifiers

The category of Verbal Classifiers in Chinese grammars and linguistic studies does not coincide with the definition generally given in the typological literature (Aikhenvald, 2000; McGregor, 2002). In typological studies ‘verbal classifiers’ are intended as ‘noun categorization devices’, used to ‘signal the presence of a surface NP’ (Aikhenvald, 2000, p.162). Noun categorization devices are realized by paradigmatic suppletive verbal forms or expressed on the verb phrase through a variety of constructions, described sometimes as *noun incorporation* structures (see (2) from Mayali) or cases of *affixation* ((3), from Terêna).

- (2) *ga-rrulk-di* *an-dubang*
 3NP-CL:TREE-stand Cl3-ironwood.tree
 An ironwood tree is there (Lit.: there-is-tree an ironwood tree).

- (3) *oye-pu’i-co-ti*
 cook-Cl:round-THEME-ProgAsp
 He is cooking (round things).

Chinese VCl, as it will appear shortly, do not have the primary function of subcategorizing the verbal predicate with respect to its thematic argument; instead, they are used to express iterativity or to count the occurrences of the events denoted by the VP. More generally, in Sinitic and South-Asian Languages, VCl can be considered a grammatical class, distinct from bound morphemes and from nominal predicates.

To start with, while all NPs in Chinese can be counted only by means of nominal classifiers (NCI, see (4-a)) and may otherwise appear bare (4-b), VCl can and must be directly preceded by a numeral in all cases : they cannot appear bare (5-b) and do not need NCIs (5-a).

- (4) a. *Wo chi-le yi *(wan/cai) fan.*
 I eat-ASP one (NCI/NCI) food
 I ate a *(bowl/serving of) food.
 b. *Wo chi-le fan.*
 I eat-ASP food
 I ate (food)/ I had a meal.

- (5) a. *Wo chi-le yi kou*
 I eat-ASP one VCL
 I ate a mouthful (of food)
 b. ??*Wo chi le kou*
 I eat ASP VCl

VCl can also cooccur with bare NPs in post-verbal position, as in (7-a); despite their apparent similarity with nominal classifiers when occurring in this position, they do not form a constituent with the NP, as shown by the impossibility of extraction or extraposition of the Numeral-VCl-NP string (Paris, 1981).

- (6) a. Wo chi-le [yi kou/ji kou] (fan).
I eat-ASP one VCl/few VCl (food)
I ate a/few mouthful(s) (of food).
b. Wo xiang mai [yi ben] shu.
I want buy a NCl book
I want to buy a book.
- (7) a. Wo chi-le fan [yi kou/ji kou].
I eat-ASP food one VCl/few VCl
I ate a/few mouthful(s) (of food).
b. */??Wo xiang mai shu [yi ben].
I want buy book one NCl

A final point concerns the lexical subcategorization properties of VCl. Even if, as I will show, VCl should be analysed as functional devices that count events, their label as ‘classifiers’ is in some sense justified by the fact that they show a certain degree of lexical specialization for the verbal phrase with which they occur. In other words, VCl seem at first sight to establish lexical classes of event types. The same degree of lexical specialization is found also in the nominal domain, and indeed VCl present some analogies with nominal classifiers in this respect. The parallel between NCl and VCl in term of selectional properties is evidenced in (8) and (9). Both NCl in (8) and VCl in (9) are restricted, in distribution, to lexical classes of predicates, which have been tentatively defined on the basis of shared physical properties, in the case of nominal predicates denoting non-abstract individuals, or, for verbal predicates, of types of actions or activities (e.g. motion verbs vs. psychological verbs).

- (8) a. Waimain you yi *tiao/zhi mao.
outside have one NCl/NCl cat
There is a cat outside.
b. Waimain you yi tiao/*zhi she.
outside have one NCl/NCl snake
There is a snake outside.
- (9) a. Zhangsan kan-le Luotuo Xiangzi san bian/*tang.
Zhangsan read-ASP Camel Xiangzi three VCl
Zhangsan read Camel Xiangzi three times.

- b. Zhangsan qu-guo Xianggang san *bian/ tang.
Zhangsan go-ASP Hong-Kong three VCI
Zhangsan went to Hong Kong three times.

Accordingly, as in the case of nominal classifiers, both the lexical and the functional properties of VCIs have been subject to inquiry in previous studies.⁴ In this paper, I will be interested only in the functional properties of VCIs as event counters; it will probably turn out that the lexical classification they seem to imply can be derived from their aspectual use.

2.1. Paris (2011): ‘weak’ and ‘strong’ classifiers

Paris (2011) offers a minute examination of the interpretive and distributional properties of verbal classifiers based on a wide empirical coverage. The study establish two distinct classes of VCIs by making use of two closely related semantic criteria, which can be summarized as follows.

[1] *Enumeration* The first criterion that sets apart ‘strong’ VCIs from ‘weak’ ones is the possibility of enumerating multiple occurrences of events. ‘Strong’ VCIs can be preceded by numerals referring to any natural number and even by quantifiers (10),(11); ‘weak’ ones can refer only to a minimal instance, and accept only the numeral *yi*, ‘one’ (12).⁵

- (10) Zhangsan kan-le ni [yi yan/ san yan/ ji yan.] (65)
Zhangsan watch-ASP you one VCI/ three VCL/ few VCI
Zhangsan casted a glance at you (once/three/several times).

- (11) Zhangsan kan-le ni [yi ci/ san ci/ ji ci.]
Zhangsan watch-ASP you one VCI/ three VCL/ few VCI
Zhangsan looked at you once/three times/several times.

- (12) Zhangsan ma-le ni [yi dun/ *san dun/ *ji dun.] (72)
Zhangsan scold-ASP you one VCI/ three VCI/ some VCII
(Zhangsan scolded you once).

[2] *Interpretation* The durative vs. iterative interpretation is the second criterion that distinguishes

⁴See, among others, (Shao, 1996; Bisang, 2010) for the ‘classificatory’ properties, and (Chao, 1968; Paris, 1981; Fassi Fehri and Vinet, 2008; Paris, 2011) for syntactic and semantic analyses.

⁵Examples with bracketed numbers on the right are adapted from Paris (2011), to which the numbering refers. In addition to VCIs, Paris (2011) also discusses verbal reduplication patterns in Chinese, an issue that we do not address here.

the two groups of VCl. While ‘strong’ classifiers count the (multiple) number of occurrences of an event and thus yield an iterative reading, as shown by (10) and (11), the interpretation of ‘weak’ classifiers, which may single out only a single occurrence, ends up being in most cases a durative one. When applied to a verbal predicate, ‘weak’ VCl signify that it holds for a time span of arbitrary duration, which is usually understood to be quite short.

As pointed out by Paris, this difference is nicely illustrated by the ambiguity of the VCl *xia*, which can be used both as a ‘strong’ (13-a) and as a ‘weak’ VCl (13-b).

- (13) a. Zhangsan qiao-le yi xia/ liang xia men.
Zhangsan knock-ASP one VC/ two VCl I door
a. Zhangsan knocked one/two strike(s) at the door.
b. ??Zhangsan knocked for a while at the door.
- b. Zhangsan deng-le yi xia/ *liang xia.
Zhangsan wait-ASP one VCl/ two VCl
a. #Zhangsan waited once.
b. Zhangsan waited for a while.
- c. Zhangsan tui-le wo yi xia.(34/81)
Zhangsan push-ASP me one VCl
a. Zhangsan pushed me once.
b. ??Zhangsan pushed me for a while.⁶

Paris (2011)’s conclusions is that the denotation of VCl should be linked to ‘the aspectual properties of the predicate they are in construction with’: they may denote either count VCl (‘strong’ classifiers: *xia* in (13-c), *ci* in (11)) or measures on the temporal interval of the event (‘weak’ classifiers: *xia* in (13-b), *dun* in (12)). The two groups of VCl thus have distinct semantic and functional content: according to Paris (2011), ‘strong’ VCl have the function of bounding the predicate by introducing an endpoint, thus creating a telic event; ‘weak’ ones only bound the predicate by delimiting a sub-interval, being in this sense similar to durative modifiers.

While I acknowledge the important insights in Paris’ work, and I do share with it the intuition that VCl are aspectual in nature, I will defend here a unified analysis for VCl as functional items. In my view, VCl are different from durative phrases. Durative phrases are better analysed as measure functions on the temporal trace of the eventuality, whereas VCl are in all cases *classifiers* of the verbal predicate, which are used to single out and count individuals in its domain of denotation. My proposal will thus be different: VCl do not bound the predicate, but rather make accessible to counting bounded units that count as individuals in the domain of denotation of the predicate. The interpretive differences between ‘weak’ and ‘strong’ VCl, I will claim, are due to the type of individual they count, and, to a certain extent, to the structural properties of the VP.

⁶This interpretation is OK for Paris (2011), but is judged wierd or almost impossible by some of my informants, who say that ‘*tui yi xia* is a momentaneous action’.

3. Ways of counting events

One piece of empirical evidence for positing the existence of different units for counting in the event domain can be seen in the distinct interpretations of sentences like (14) below.

(14) John knocked at the door twice.

The sentence in (14) can denote in principle two distinct propositions. It can be true that John knocked twice either if John gave exactly two knocks at the door, or if John stroke an indefinite number of knocks at the door two times. The first situation can be a subcase of the second one, but the sentence should not be interpreted only as vague, since its interpretation in fact depends on the interpretation of the verbal predicate.

The verb ‘to knock’ in (14) is a semelfactive predicate (Smith, 1991; Rothstein, 2004). Semelfactives are ambiguous with respect to the predicate type to which they belong, since they can be interpreted either as unbounded activities or as telic events. The ambiguity of (14) is then inherent to the semelfactive predicate, and does not depend on the adverbial expression. The sentence in (15) presents the same ambiguity with respect to a single occurrence of a telic event (John stroke one knock at the door) or of a single instance of the activity of knocking.⁷

(15) John just knocked at the door.

In its activity reading, the predicate of (15) is bounded aspectually, without being inherently telic. If the predicate is shifted to an imperfective form, under the the telic interpretation it does not resist the inference from (16-a) to (16-b) (John did not strike one knock, but stopped in the middle of action); under the atelic activity interpretation, as expected, it does.

(16) a. John was knocking at the door at t .
 b. \rightarrow John knocked at the door at $t' < t$

Therefore, semelfactives like *to knock* in English are ambiguous between two interpretations, as activities or as (pluralities of) telic events. Iterative adverbials like *two times* preserve the ambiguity: it seems that they can count either two telic events of knocking or two atelic occurrences of the activity of knocking, which are identified as distinct occurrences through aspectual bounding. The question then is the following: are telic events and bounded activities two different types of units counted by the iterative adverbial expression? In the following, I will claim that, for counting purposes, they are indeed considered different types of units: atomic units in the event domain

⁷Let's assume that, even if verbal predicates are born cumulative, telic perfective VPs like (15) denote singular events, cf. Ferreira (2005).

can be counted either on the basis of the inherent atomic structure of the event or through their temporal trace, as aspectually bounded intervals of time.

In the following, I will develop an analysis of VClS in Chinese to explore this hypothesis. I will show that, in Chinese, the two counting strategies can be performed by distinct VClS. It will also appear that the atomic events in the denotation of verbal predicates can be more or less vague, and that vagueness has a consequence for the identification of individuals and for counting. This conclusion echoes the generalization, drawn from the study of plurality and countability in the nominal domain, that not all the units in a discrete domain are directly accessible to counting, and that counting is related to the existence of cross-contextually stable atomic units (Rothstein, 2008; Chierchia, 2010).

3.1. Countable units in the domain

3.1.1. Events

I will assume that the domain E of eventive predicates is a count domain (Dowty, 1979; Rothstein, 2004), cf. (17), and that there is a functional relation between eventualities and time which corresponds to the temporal trace of the event, that is, the interval within which the event unfolds (Link, 1987; Krifka, 1998). Under this view, individual events should be defined both by a verbal property and by their temporal trace, which is a bounded interval of time.

- (17) If $[[VP]] \in E$
 $\exists \epsilon [\epsilon \in [[VP]] \wedge \forall \epsilon' [\epsilon' \sqsubset \epsilon \wedge \epsilon' \in [[VP]] \rightarrow \epsilon' = \epsilon]$
 all eventive VPs have in their denotation at least one event which has no other event as proper part

Their temporal and internal structure divide eventive predicates into different classes with respect to atomicity and countability.

Accomplishments and achievements are sortal predicates that denote by themselves the atoms in their domain. Achievements are atomic in virtue of their temporal structure, which is limited to a minimal interval of change; accomplishments, on the other hand, are construed as atomic wholes by adding linguistic information that creates a telic event. In this case, it is the complex structure of the event, which may be seen as a concatenation of events of different types, such as a process and a change of state (Rothstein, 2004), that makes the telic event as a whole different from any of its proper parts.

Activity predicates, on the other hand, have an extended temporal structure and no specified *telos*. Following Dowty (1979), I will define the atomicity of activities with respect to the *onset* (O) of the activity, that is, the minimal unit in their denotation that establishes the predicate as a specific activity-type. In the definition in (18), minimal units are related to temporal intervals *via* the trace function τ (Krifka, 1998).

- (18) $\forall \epsilon \in [[P]] : O(\tau(\epsilon)) \text{ iff } P(\tau(\epsilon)) \ \& \ \forall \epsilon' [(\tau(\epsilon')) \subset O(\tau(\epsilon)) \rightarrow \neg P(\tau(\epsilon'))]$
 for all the events in the denotation of an activity predicate P, an interval O can be considered the onset of e iff the property P can be applied to O and no proper subpart of O can be characterized by the same property P

The onsets of activities, as Dowty (1979) pointed out, are in most cases vague and undefined. This is the case of predicates like *running*: even if in a particular situation we are able to evaluate if it is true or false that the activity in which John is involved is an activity of running, we probably wouldn't be able to define the minimal temporal extension sufficient to qualify John's motion as running, that is, the minimal interval that may correspond to the onset of the activity of running. And yet, there must be a proper sequence of movements by John, and maybe a minimal distance covered by him, in order to qualify his motion as running.

More recently, Rothstein (2004, 2008) discusses the case of semelfactives, which, she proposes, should be viewed as activities that have lexically accessible and well-defined onsets. The onsets of semelfactives correspond to individual events that can be directly counted and which are not vague. In this framework, the ambiguity of the sentence (14)/(19) can be explained exactly as an ambiguity that derives from the unit that the adverbial *time*-phrase takes as individual unit for counting. The (a)-interpretation obtains when the adverbials counts the minimal events in the denotation of the activity of knocking, whereas the (b)-interpretation results from counting occurrences of the activity of knocking, which may include one or more minimal events.

- (19) John knocked at the door twice.
 (a) John gave two knocks at the door.
 (b) John knocked at the door twice, each time for a few minutes.

In the case of activities that have lexically undefined or vague onsets, counting with *time*-expressions only apply to the level of the whole activity, and not to the minimal events in its denotation. What (20) says is that last week John has been involved in the activity of running two times, but, since the onsets of running are vague atoms, we do not know how many minimal events of running are included in each of the two intervals.

- (20) John ran twice last week.

The example in (14) may therefore turn out to be a good example in order to show the existence of minimal events in the denotation of activities of the semelfactive type. The question now is to determine what is the *time*-adverbial counting in (19)b and in (20).

3.1.2. Occasions

One of the claims that I will defend in this paper is that, in the ontology of language, the event domain can be sorted into entities of more than one type. This claim is not new to the semantic literature. It has been suggested several times that the nominal domain should include entities of more than one sort. Alongside with atomic individuals, Link (1983) introduced the type of plural individuals in the nominal domain. Pluralities whose atomic members are not accessible and which count as units for the purpose of counting have been given a distinct sortal as atomic entities of their own (Landman, 1989). In a more recent work, Landman (2006) proposes explicitly to extend the notion of ‘group’ or ‘complex’ atom also to the event domain.

One of the first studies that mentions the existence of complex atomic units in the domain of eventualities is probably the work by Cusic (1981). Cusic (1981), in informal terms, provides evidence for the existence of a second type of unit besides events, which he calls *occasion*.⁸ Occasions are made of singular or plural events, and are introduced as a distinct unit for counting purposes; their existence is induced in particular by the scope relations between adverbial expressions, as in (21), which may be a true proposition in a situation where John knocked twice at the door in at least two distinct occasions.

(21) John knocked at the door twice again.

More recently, Landman (2006) put forward a similar proposal, which is formalized in a neo-Davidsonian framework. According to Landman, numerical *time*-expressions such as *two times* have the type of indefinite predicational NPs that act as counters in the domain of eventualities. Counting is an operation of *group-formation* (GRIDDING), performed by an intensional operation \uparrow , which is triggered by the *time*-adverbial. The intensional operation of gridding creates complex individuals in E by mapping pluralities of events into groups; groups, being atomic individuals by their own, can be identified and counted.⁹

My proposal matches to certain extent the informal intuition of Cusic (1981) and the essence of Landman’s proposal. I agree with Landman (2006) that counting at a superordinate level, which may include pluralities of (minimal) events, is performed through a type-shifting into an intensional individual, but I would like to propose that the intensional dimension that is relevant for construing complex individuals is given in particular by time. Occasions or groups of events are mapped into individuals through their temporal trace, as convex intervals of time.

⁸See also Donazzan (2008), Tovena (2012) for discussion. Cusic (1981) also introduces a third type of unit, below the event level, which he calls *phase*. I will not discuss phases here, since they are dubious as sorted entities (Tovena, 2010, 2012).

⁹More precisely, if the domain E of eventualities is of type *e* then the *time*-expression triggers the shift from *e* into $\uparrow e$, and the type-shift of the predicate from $\langle e, t \rangle$ to $\langle \uparrow e, t \rangle$. The denotation of $[[\text{time}]]$ is then that of a modifier, the identity function $\langle \langle \uparrow e, t \rangle, \langle \uparrow e, t \rangle \rangle$.

This choice is motivated by two considerations. First, in most languages as in English, *time*-expressions can count also occurrences of stative predicates (22), which, by assumption, cannot be interpreted as pluralities of events.

(22) John has been absent three times this semester.

Secondly, assuming that *time*-expressions count intervals of time may turn out to be an easier way to account for the vagueness of activity predicates. Mapping two instances of running into two distinct temporal intervals is possible also disregarding the accessibility of atomic units in the denotation of the predicate; accordingly, two intervals of running counted by the classifier expression do not need to have the same extension nor to include the same number of minimal events within their boundaries.

I will borrow from Cusic (1981) the label *occasion* to name these complex individuals, and I will provide a formal definition for them as individualized intervals of time (23).

(23) Let T be the set of t ordered by \geq
 ω is a non-empty interval on T and
 $\forall \omega, \omega_1 \in T [\forall t [t \in \omega \rightarrow |t| > 1] \ \& \ \omega \neq \omega_1 \text{ iff } \neg(\omega \circ \omega_1)]$
 occasions are identified as minimally extended and non-overlapping intervals of time

Whether we should consider occasions as distincts ontological primitives or as a by-product of applying the classifier to the predicate, the existence of a complex unit in the domain is attested by empirical evidence in a number of unrelated languages and probably cannot be reduced only to a scope-effect (Landman, 2006; Tovenia, 2010, 2012). In the following, I will show that occasions are part of the ontology of natural language, at least as far as counting eventualities is concerned. The evidence will be provided by the fact that Mandarin Chinese seems indeed to have two distinct categories of verbal classifiers for counting occasions and events.

4. Back to Chinese VCI

4.1. Two types of Verbal Classifiers

In section 2.1, drawing on the descriptive generalization provided by Paris (2011), I introduced the main interpretative and semantic difference that divides VCIs into two semantic classes. The two groups are formed on the one hand by VCIs that can count the multiple occurrences in which verbal predicates are instaciated and therefore receive an iterative interpretation, and, on the other hand, by VCIs that cannot count more than one occurrence and yield, in most cases, a durative reading.

Paris (2011) proposes that the two groups have distinct semantic properties: ‘strong’ classifiers

are classifiers proper, which create telic events, whereas weak classifiers are like measures on the temporal interval of the event: they bound the predicate by delimiting a subinterval. The proposed semantic distinction is consistent with the empirical difference with respect to enumeration and counting: weak VCIs cannot count events, because subintervals established on the basis of an arbitrary interval of time do not correspond to events. However, this proposal also has the disadvantage of splitting the functional category of classifiers in two, by suggesting that some VCIs do not act as classifiers as for their semantic contribution.

My hypothesis is, on the contrary, that VCIs are in all cases classifiers of events, but that they sort out entities in two ways: either by singling out minimal units in the denotation of verbal predicates or by making use of the temporal dimension of eventualities, sorting units through their temporal trace.

More specifically, let's assume that the domain of eventualities is sorted into three types: events (ϵ), states (s) and occasions (ω). States are true of points of time, whereas events and occasions, by assumption, are true of extended intervals of time, i.e. intervals that include more than one point of time. VCI may thus be seen as atomic functions of two distinct types: they can either 'package' predicates which are true of intervals into predicates that are true only of extended intervals (predicates of occasions), or they may sort out the atomic units in a count domain, being similar, in this sense, to classifiers or plural markers that apply to count predicates in the nominal domain.

Let's suppose that English *time*-adverbials are interpreted as 'packaging' VCIs, or Occasion-Related VCI (OR-VCI). When applied to a predicate like *walking*, the OR-VCI yields a predicate $[[\textit{time WALK}]]$ which is true of occasions of walking.

$$(24) \quad \text{OR-VCI (P)} = \{\omega : \omega(\text{P}) = 1\}$$

Event-related verbal classifiers (ER-VCI), on the other hand, are atomic functions that sort out the minimal units in the denotation of P(25). The ER-VCI applied to $[[\text{WALK}]]$ yield a predicate which is true of minimal events of walking.

$$(25) \quad \text{ER-VCI (P)} = \{\epsilon : \text{P}(\epsilon) \ \& \ \forall \epsilon_1 [\epsilon_1 \in \text{P} \ \& \ \epsilon_1 \leq \epsilon \rightarrow \epsilon_1 = \epsilon]\}$$

On this basis, I will propose a different analysis to explain the empirical data concerning Chinese verbal classifiers:

- (i) 'strong' classifiers, despite their apparent similarity with respect to enumeration and in interpretation, are not an homogeneous semantic group: they modify a verbal predicate by sorting two distinct types of atomic units, OCCASIONS vs. EVENTS proper;
- (ii) 'weak classifiers' belong to the group of event classifiers, and the properties that distinguish

them from the 'strong' ones in the same group depend on the aspectual properties of the VP to which they apply.

In other words, 'strong' classifiers, which permit to count and yield iterative interpretations, can be both ER-VCI or OR-VCI; 'weak' VCIs, on the other hand, are a subset of ER-VCI. I will show that I will further propose that the difference with respect to counting, which motivates the 'weak' vs. 'strong' distinction, depends on the accessibility of individual units in the denotation of the verbal predicate, under the assumption that only non-vague, stable units can be properly counted: the impossibility of counting and the durative interpretation that 'weak' ER-VCI convey are due to the structural properties of the eventive predicate to which they apply.

4.2. Occasion-related and event-related classifiers

The assumptions concerning the domain of denotation of eventualities expounded in section 3.1, and the semantic account that I sketched for verbal classifiers in the preceding section, lead to a certain number of predictions concerning the distribution and interpretation of Mandarin VCIs.

OR-VCI, which count eventualities by mapping the running time of the event onto an extended temporal intervals, should be able to take scope over ER-verbal classifiers, but the contrary should not be possible. VCIs that belong to the semantic group of OR-Verbal Classifiers in Mandarin behave on several respects like *time*-expressions in English. They are always 'strong', no matter which is the predicate they combine with. Moreover, they can count pluralities of events. In other words, when modifying activities or semelfactives, OR-verbal classifiers can count multiple occurrences of the overall activity (26-b), and can enter in scope relations with ER-classifiers (26-c)-(26-d).

- (26)
- a. Wo yi ci neng xie san ge zi.
I one ORVCI can write three NCI character
I can write three characters at once.
 - b. Wo qiao-le san ci men.
I knock-ASP three ORVCI door
I knocked three times at the door (each time giving a underspecified number of strikes)
 - c. You yi ci, Zhangsan tui-le wo ji xia.
have one ORVCI Zhangsan push-ASP me few VCI
Once Zhangsan pushed me several times.
 - d. You san ci Zhangsan kan-le ni ji yan.
have three ORVCI Zhangsan watch-ASP you few VCI
(Three times Zhangsan casted a few glances at you.)

The definition of ER-VCLs, on the other hand, is that of atomic functions that single out the minimal instance of an event in the denotation of an eventive verbal predicate. It follows that VCI can apply only when:

- (i) the event denoted by P is not already defined as an atomic whole, i.e. if the domain of denotation of P has accessible atomic units and
- (ii) the predicate has an extended temporal structure that provides the means to identify the minimal events in its denotation.

Accomplishments and *achievements* are already construed as atomic wholes, and they cannot be further measured with respect to their atomic components: as predicted, only OR-VCLs can apply to these predicates.¹⁰

On the other hand, *activities* are countable with respect to their minimal onset, but, as discussed in section 3.1, we may expect that onsets do not correspond in all cases to countable atomic units. When applied to activities with accessible atomic structure (semelfactives, activities measurable on a specific onset or dimension), ER-VCI single out the minimal events in the denotation of the predicate. In this case, ER-VCLs behave like ‘strong’ VCI, in the sense that they can count multiple occurrences of events and therefore yield an iterative reading.

- (27) a. Wo kan-le ni yi yan/ liang yan/ ji yan.
I watch-ASP you one VCI/ two VCI/ few VCI
I watched you one/two/a few times.
- b. Wo ti-le yi jiao/ liang jiao/ ji jiao.
I kick-ASP one VCI/ two VCI/ few VCI
I gave one/two/a few kick(s)

When applied to activities that do not have a well-defined atomic structure, ER-VCI single out atomic units which are by themselves not countable. In this case, applying a ER-VCI yield a vague, temporal interpretation, which corresponds to the minimal temporal interval of instantiation of the event. Moreover, ER-VCLs behave like ‘weak’ VCI with respect to counting, since vague atoms are not accessible as countable units (29).

- (28) a. Wo deng-le yi xia.
I wait-ASP one VCI/ VCI
I waited for a while.
- b. Wo ma-le ta yi dun.
I scold-ASP him one VCI
I gave him a scolding.

¹⁰Paris (2011) offers some examples of ‘weak’ VCLs applying to predicates that may be classified intuitively as achievements. The native speakers that I tested are not really sure of their judgements about these examples; some say that they look more like idiomatic expressions, others question the impossibility of counting multiple occurrences, given appropriate contexts. I leave the issue of achievements for further scrutiny for the moment.

- c. Wo feng-le yi xia.(5)
I sew-ASP one VCI
I sewed for a while.
- (29) a. Wo deng-le yi xia/*liang xia.
I wait-ASP one VCI/*two VCI
b. Wo ma-le ta yi dun/*liang dun.
I scold-ASP him one VCI/*two VCI
c. Wo feng-le yi xia/*ji xia.
I sew-ASP one VCI/few VCI

Following this analysis, the different interpretations of the ER-VCI *xia*, (cfr. (13-a)/(13-b), repeated below) can be explained not as an ambiguity of the VCI itself, but as depending on the temporal structure of the predicate it combines with.

- (30) a. Zhangsan qiao-le yi xia/ liang xia men.
Zhangsan knock-ASP one VC/ two VCI I door
a. Zhangsan knocked one/two strike(s) at the door.
b. ??Zhangsan knocked for a while at the door.
b. Zhangsan deng-le yi xia/ *liang xia.
Zhangsan wait-ASP one VCI/ two VCI
a. #Zhangsan waited once.
b. Zhangsan waited for a while.

Activities like *qiao* ‘to knock’ and *deng* ‘to wait’ have both atomic onsets, but the onset of a waiting event is vague. Accordingly, the VCI *xia*, which can apply to both VPs, singles out in (30-b) an uncountable minimal event of waiting, which is interpreted as a minimal temporal interval.

5. Conclusions

In this paper, I propose a semantic analysis for the grammatical category of verbal classifiers in Mandarin Chinese, which I analyze as functional words that single out individual units in the verbal domain on the basis of the aspectual structure of the predicate. I show that, as a semantic and functional category, VCIs in this language should be distinguished from temporal measure functions to the extent that the units singled out by VCIs count as individuals in the denotation of the verbal predicate. In this sense, the discrete units do not correspond to a measure on the temporal trace of the event, but to events and occasions, which may be considered individual entities of the domain.

The second goal of my study was to provide an insight on the structural property of verbal predicates and on the notion of atomicity across lexical categories. The consequence of the proposed

occasions	events	
	countable O	non-countable O
ω -Related VCI	ϵ -Related VCI	
	<i>xia₁, jiao, bu</i>	<i>xia₂</i>
STRONG countable	WEAK uncountable	

Table 1: Verbal classifiers and countability

analysis is a new classification of classifiers which is not based on the difference with respect to counting or measuring, but depends on two features: the type of unit that the classifiers single out (OCCASIONS and EVENTS) and the accessibility of the unit to counting. As shown in table 1, it appears then that countability, i.e. the possibility of counting and of construing a plural set of individual entities, cuts across the two groups of OR- and ER-verbal classifiers.

This conclusion nevertheless meets Paris (2011)'s intuition that strong classifiers form a autonomous group insofar as they share the common property of applying to countable units. As has been claimed also with respect to the nominal domain (Chierchia, 2010; Landman, 2011), countability seems to be related, also in this case, to the *vagueness* of atoms, which can be uncountable also in a discrete, atomic domain.

The empirical evidence provided by Chinese then suggests at least two generalizations. To start with, the existence of VCIs in Chinese supports the hypothesis of the existence of a functional category of VCIs, which may be expressed by a dedicated grammatical category in some languages. Chinese is particularly interesting, moreover, because, as it is well-known, it possesses overt functional classifiers also in the nominal domain. It has been suggested in the literature that Chinese nominal classifiers should also be divided into the two groups of 'packaging' and 'atomizing' functions.¹¹ This parallel then underlines the similarities and differences between the nominal and verbal domain and the relevance of functional items to individuating entities and to counting. Secondly, the analysis of 'weak' classifiers as atomizing functions that apply to discrete domains with uncountable atoms supports the hypothesis of the cognitive (non-)accessibility of vague units to counting, which may be confirmed also in the verbal domain.

Both of these generalizations should, of course, be put under scrutiny by proceeding to further cross-linguistic inquiry. We may expect that languages differ in the way they map universal functional categories, and that there may be a way in which semantic variation is parametrized (Chierchia, 1998). In this respect, a comparative analysis of Chinese and pluractional or number-neutral languages seems to be a promising line of research.

¹¹See Cheng and Sybesma (1999), who call the two types of NCLs 'mass classifiers' and 'count classifiers', respectively.

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