**The Semantic Mass-Count Distinction for Categories Lacking a Syntactic Mass-Count Distinction**

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The mass-count distinction is a syntactic distinction among nouns and is generally taken to have semantic content, that is, to reflect a semantic mass-count distinction. There are two main approaches as to what such a semantic mass-count distinction consists in: [1] mereological properties of the extension of nouns and [2] mereological properties of the entities (or entities-in-contexts/situations) in those extensions. The notion of an atom is central for the first view, on which atoms make up the extension of singular count nouns, but not mass nouns. The notion of integrity is central for the second view: entities that have a boundary, form or other sort of integrity make up the extension of singular count nouns, but not mass nouns. Theories of the semantic mass-count distinction of either sort generally face two sorts of major challenges: [1] from classifier languages such as Chinese, which lack a syntactic mass-count distinction among nouns and in which all nouns are, it seems, treated as ‘mass’ or better ‘number-neutral’, regardless of their extensions or the entities they describe, and [2] from ‘object mass nouns’, a rather large class of nouns in English (and other languages) such as *furniture, luggage,* *personnel, hardware*, and *police force*, to which standard semantic characterizations of mass nouns do not apply. Yet the syntactic mass-count distinction clearly appears to go along with a semantic mass-count distinction of some sort.

 Given that there is a semantic mass-count distinction correlating with the syntactic mass-count distinction, the question arises: how does such a semantic mass-count distinction apply to syntactic categories lacking a syntactic mass-count distinction in languages like English (that have a syntactic mass-count distinction for nouns)? Do such categories exhibit the same semantic mass-count distinction as nouns even if it is not reflected syntactically? That question has often been answered (most notably by Bach 1986) with respect to the domain of events described by verbs, VPs, or sentences, that is, with respect to what I will call *the verbal domain of events*. The verbal domain of events, so the view, displays the same semantic mass-count distinction as nouns, with achievement and accomplishments (or telic VPs or sentences) classifying semantically as count and activities and states (or atelic VPs or sentences) as mass.

 This paper will challenge that view and, more generally, the view that categories lacking a syntactic mass-count distinction display a semantic mass-count distinction (of the sort that correlates with the syntactic distinction). Just as nouns in classifier languages such as Chinese classify as number-neutral (mass), so do verbs in English with respect to their Davidsonian event argument place. Verbs display a range of diagnostics of mass status rather than count status, in particular regarding the form of adverbial quantifiers, which are those of classifier languages, and, in German, the failure to support plural anaphora, the selection of relative pronouns, and the applicability of number-neutral quantifiers with a lexical specification of countability.

 The classification as number-neutral appears to generalize to other categories lacking a syntactic mass-count distinction, such as *that*-clauses and numerals in argument position, which exhibit at least some of the diagnostics for number-neutrality. The generalization then is as follows:

(1) Syntactic categories lacking a (syntactic) mass-count distinction classify semantically as

 number-neutral, rather than dividing into mass and count.

This generalization can be further extended to non-referential uses of NPs on which semantic properties of extensions won’t matter, such as NPs used intensionally, predicatively or as measure phrases. On such uses, NPs semantically classify as number-neutral rather than count, regardless of their syntactic category (as mass or count) and regardless of the semantic properties one may attribute to their contents or intensions.

 (1) assigns particular importance to number-neutrality as a semantic notion, which, of course raises the question how that notion is to be understood. Standard extension-based and object-based approaches to the semantic mass-count distinction are unsuited for characterizing number-neutral domains, just as they are unsuited to apply to object mass nouns and Chinese nouns in general. This paper will suggest that number-neutrality is best accounted for in terms of the absence of a primitive notion of unity, to be understood as a cognitive notion of being ‘one’ conveyed by the syntactic count category and absent in number-neutral domains. An entity in the denotation of a singular count noun is viewed as being ‘one’, but not an entity in the denotation of a number-neutral category. This primitive notion of unity may go along with the entity being an atom or an integrated whole, but need not, and conversely, something being an integrated whole or atom does not guarantee it being viewed as ‘one’. The mass-count distinction will thus involve a perspectival ontology of ‘grammaticised individuation’, in the sense of Rothstein (2017), a language-driven ontology that may diverge significantly from the ontology involved in cognition and perception, which is based on conditions of form, structure or boundaries and which precedes the acquisition of language.

**2. The standard view about Davidsonian events and the mass-count distinction**

Two types of standard approaches to the semantic content of the mass-count distinction among nouns can be distinguished: [1] the extension-based approach and [2] the object-based approach. The extension-based approach can be traced to back to Quine (1960), the object-based approach to Jespersen (1948).

 On the extension-based approach, the semantic distinction between singular count, plural and mass nouns resides in properties of their extensions, generally formulated in terms of extensional mereology (Link 1983, Krifka 1989, Chierchia 1998, Champollion/Krifka 2017). A common version of the approach is given below, making use of the proper-part relation < and the sum formation operator (on sets) ⊕:

(2) Extensional mereological account of the semantic mass-count distinction

 a. For a singular noun N, [N] is atomic, i.e. ∀x(P(x) →∀y(y < x → ¬ P(y)))

 b. For a plural noun Nplur , [Nplur] = {x |∃P (P ≠ ∅ & P ⊆ [N] & x = ⊕P}

 c. For a mass noun N, N is cumulative P (P ≠ ∅ & P ⊆ [N] → ⊕P ∈ [N]) and not atomic.

Sometimes a stronger condition than lack of atomicity is imposed on mass nouns, namely divisiveness (a predicate P is divisive iff ∀x(P(x) →∀y(y < x → P(y)))).

 The extension-based approach to the mass-count distinction faces two sorts of well-known problems. First, atomicity does not generally hold for singular count nouns, for example not for count nouns like *entity*, *twig*, *sequence* or *part* (Moltmann 1997, 1998, Zucchi/White 2001, Rothstein 2010). Moreover, object mass nouns such as *police force, furniture, personnel, clothing, jewelry*, a rather large subcategory of mass nouns in English, fail to satisfy standard extensional mereological conditions on mass nouns such as not being atomic (Chierchia 1998, Rothstein 2010, Cohen, to appear).

 On the object-based approach, the semantic distinction between singular count, plural and mass nouns resides in the sorts of properties nouns attribute to entities (or entities in contexts/situations) in their extension. Singular count nouns convey properties that involve a boundary or more generally conditions of integrity (Simons 1987) or integrity in a situation of reference carrying contextual information (Moltmann 1997, 1998). Entities in the extension of mass noun extensions lack a boundary or integrity, or integrity in a situation of contextual information. The following is an integrity-based (and situation-based) account of the mass-count distinction along the lines of Moltmann (1997, 1998):

(3) Integrity-based account of the semantic mass-count distinction

 a. If N is a singular count noun, then for a situation of reference s if <x, s> ∈ [N], then x is

 an integrated whole in s.

 b. For a plural noun Nplur , [Nplur] = {<x, s> |∃P(P ≠ ∅ & P x {s} ⊆ [N] & x = ⊕P)}

 c. If N is a mass noun, then for a situation of reference s if <x, s> ∈ [N], then x is not a

 (strong) integrated whole in s.

The integrity-based account avoids the problems for atomicity: a part of an entity in a count noun extension (such as that of *entity* or *sequence*) may be in the extension again as along as it satisfies the (integrity-imposing) conditions of the count noun. But the account faces difficulties of its own. There are nouns to which the notion of integrity is hardly applicable, for example *amount, sum*, or *loose collection*, or *sequence*, which would require a notion of merely conceived integrity (Moltmann 1997). Moreover, the integrity-based account faces similar difficulties as the extensional mereological account for object mass nouns, whose extensions consists in inherent integrated wholes.[[1]](#footnote-1)

 There is a long tradition of classifying events or rather event predicates into different types or Aktionsarten, distinguishing in particular achievements and accomplishment from activities and states (Kenny 1963, Vendler 1957, Mourelatos 1978). A related distinction is that between telic and atelic VPs as well as that between non-homogeneous and homogenous VPs (Verkuyl 1972, Bach 1986, Krifka 1989). *Run to the house* is telic, *run* and *run toward the house* are atelic; *eat an apple* and *drink the wine* are telic, *eat apples* and *drink wine* atelic. A common criterion for telicity (non-homogeneity) is the applicability of *in*-adverbials (*John ate an apple/drank the wine / ran to the house in five minutes*, \* *John ate apples / drank wine / ran toward the house in five minutes*). A common criterion for atelicity is the applicability of *for*-adverbials (*John ate apples / drank wine / walked toward the house for one hour*, *\* John at the apple / drank the wine / ran to the house for five minutes*).[[2]](#footnote-2) Telicity (of a VP or sentence) depends on the meaning of the verb, properties of temporal modiﬁers, grammatical aspect (progressive, perfective and imperfective), as well as mereological, quantiﬁcational and referential properties of nominal arguments expressing event participants (Verkuyl 1972, 1992, Bennett/Parte 1972, Dowty 1979, Krifka 1998).

 Bach (1986) was the first to explicitly argue that events divide into a mass and a count domain strictly parallel to that of the nominal domain, taking the extension-based approach to the mass-count distinction (see also Krifka 1989 and Champollion 2017). Bach associates events not with verbs (as Davidsonian arguments), but rather takes sets of events to be the denotations of more complex ‘verbal expressions’ (whose composition influences the relevant mereological properties). Those denotations are then classified just like that of nouns: as mass in case they are cumulative and divisive (homogenous) (*John ran, John drank wine*), singular count in case they are atomic (*John ate the apple, John ran to the house*) and plural in case they consist of sums of atomic events (*John jumped, John ate apples*).

 The fact that sentences rather than just verbs are classified in terms of the (semantic) mass-count distinction is in fact peculiar, since the semantic mass-count distinction was meant to be the content of a syntactic category. Classifying VPs or sentences according to a semantic mass-count distinction makes the (verbal) domain of events not parallel to the nominal domain. As a matter of fact, complex NPs could be classified in the same way as VPs or sentences with respect to the semantic mass-count distinction. Applying the extension-based approach to the semantic mass-count distinction means that *the water in the glass* would classify as singular count, since it satisfies atomicity (no proper part of the entity that is the denotation of *the water in the glass* is also the denotation of *the water in the glass* (which refers to the maximal quantity of water in glass)). Moreover, *the water in the glasses* might satisfy the criterion for semantic plurality since the denotation of *the water in the glasses* is a fusion of entities that are referents of *the water in a glass* and as such classify as atoms (with respect to that description). However, the mass-count distinction is generally not applied to complex NPs that way.[[3]](#footnote-3), [[4]](#footnote-4)

**3. The number-neutral status of the verbal domain of events and its semantic characterization**

I will focus strictly on verbs rather than sentences or other larger constituents when examining the verbal domain of events with respect to the mass-count distinction.

 The syntactic mass-count distinction consists most importantly in that count nouns come with a singular-plural distinction, but mass nouns don’t. There are a number of further criteria that are generally taken to distinguish mass nouns and count nouns, such as applicability of numerals, quantifier choice, and choice of anaphora (*one* vs *some*). I will focus on the following five diagnostics, which are all applicable to verbs: [1] choice of mass quantifiers, [2] obligatory numeral classifiers, [3] number-neutral quantifiers with lexical specifications of countability, [4] choice of relative pronouns in German, and [5] support of plural anaphora in German. [3]-[5] pertain specifically to German and are new.

[1] Choice of mass quantifiers

In English, mass nouns go along with the quantifiers *much* and *little,* rather than *many* and *few*. The same holds for verbs in the sense that *much* and *little* act as adverbial modifiers, but not *many* of *few*:

(4) a. John slept / worked too little / \* too few.

 b. John slept / worked too little / \* too much.

(5) a. John jumped too much / \* too many.

 b. John stumbled only a little / \* too few.

*Much* and *little* apply as adverbial modifiers to an extent regardless of the aktionsart of the verb, as indicated by (5a, b).

[2] Obligatory numeral classifiers

Unlike count nouns, mass nouns do not take numerals. The same holds for verbs in the sense that simple number words do not form adverbials, but can act only as modifiers of the count noun *time* for events to be counted. This holds again regardless of the Aktionsart of the verb: number words as adverbials are excluded even with achievements and accomplishments:

(6) a. \* John died only one

 b. John died only one time.

(7) a. \* John jumped three.

 b. John jumped three times.

(8) a. \* John ran to the house two.

 b. John ran to the house two times.

*Times* also allows the count quantifiers *few* and *many* to apply:

(9) a. John worked a few times.

 b. John stumbled many times.

With activity and stative verbs, *times* imposes a condition on temporal separation, ensuring countability in that way:

(10) a. John slept three times today.

 b. Mary worked out three times this week.

 c. John was truly happy three times in his life.

*Time* is on a par with numeral classifiers in a language such as Chinese, serving to make a numeral applicable to a non-count category. *Time(s)* in factexhibits other properties characteristic of sortal numeral classifiers, such as not allowing adjectival modifiers (Cheng/Sybesma 1999):

(11) a. \* John stumbled three unusual times.

 b. \* We met three beautiful times.

*Time(s)*acts as a numeral classifierby imposing *times* a condition of temporal separation on events, permitting countability even for activity verbs.[[5]](#footnote-5) Classifiers like *times* in English can be found in many other languages, including Italian (*volta*), Spanish (*vec*), French (*fois*), German (*mal*) and Mandarin Chinese *ci* (Moltman 1997).[[6]](#footnote-6)

 Verbs thus behave like nouns in Chinese, requiring a numeral classifier for counting, and that regardless of their lexical content, semantic context, and the nature of the events they describe.[[7]](#footnote-7)

[3] Number-neutral quantifiers with lexical specifications of countability

Verbs (of any actions art) allow for frequency adverbials, which are apparent count quantifiers:

(12) a. John stumbled frequently.

 b. John slept frequently.

However, *frequently* and *rarely* do not just count events; rather they count events at particular, temporally separated occasions, involving thus the same sort of temporal separation condition as the event classifier *time(s).* Frequency adverbials, thus, do not presuppose a countable domain as such, but rather they come with a particular lexical condition ensuring countability.

 In fact, the adjective *frequent* from which *frequently* is derived is syntactically not a count expression. *Frequent* can modify event mass nouns as in (13a, b) and not just plural nouns as in (13c) (Moltmann 1997):

(13) a. the frequent rain

 b. the frequent fog in this region

 c. the frequent rainfalls

*Frequent* imposes the same condition of temporal separation as *time(s),* a condition which can be fulfilled by events in a number-neutral domain as well as by events in a plural domain. *Frequent(ly)* thus is a number-neutral expression that induces countability by way of its lexical meaning.

 *Frequently* is not the only apparent count quantifier applying to number-neutral categories. In German, *vieles* ‘many’ is a quantifier that is syntactically mass (being singular), yet has the meaning of ‘many’ counting well-distinguished units and contrasting with *viel* ‘much’ (Moltmann 1997). The units may be distinguished contextually or in virtue of the nature of the substance. For example, *vieles* in (14a) counts either units of wood that are well-distinguished from each other in the context or else types of word; by contrast *viel* in (14b) only has a measurement reading:

(14) a. vieles Holz

 many wood

 ‘many pieces / sorts of wood’

 b. viel Holz

 ‘much / a lot of wood’

*Vieles* thus is a number-neutral quantifier whose lexical meaning imposes a conditions of discreteness on the domain it applies to, ensuring countability. It does not require the noun to which it applies to be count to ensure countability.

 *Vieles* does not apply as an adverbial to events. But it illustrates the possibility for a quantifier that is syntactically number-neutral to impose countability on a domain by way of its lexical meaning.

 There is one other quantifier in German that imposes countability lexically and that does apply to events. This is the floated quantifier *beides* ‘both’. *Beides* is syntactically singular and thus number-neutral (or mass). *Beides* can act as a floated quantifier with respect to the mass pronoun *das*, which in turn can relate anaphorically to a mass NP if the mass NP displays two well-individuated subquantities:

(15) Hans kaufte Wasser und Bier. Das war beides sehr billig.

 John bought water and beer. It was both very cheap

 ‘John bought water and beer. They were both very cheap.’

*Das beides* thus is a number-neutral pronoun-floated-quantifier combination which requires the (mass) antecedent to stand for two well-distinguished units. *Das beides* demonstrates again the possibility of imposing countability on a number-neutral domain lexically.

 *Das beides* can also relate to events introduced by a conjunction of VPs:

(16) a. Es blitzte und donnerte. Das hat beides nicht lange gedauerte.

 It was lightning and thunder. It has both not long lasted.

 ‘There was lightning and thunder. They did not last long.’

 b. Hans schrieb einen Brief und unterzeichnete ihn. Er hat das beides gestern gemacht.

 ‘John wrote a letter and signed it. He did it both yesterday.’

The ability of *das beides* relating to events described by verbs shows again the number-neutral status of the verbal domain of events.

[4] Support of plural anaphora in German

Another diagnostics for the number-neutral status of verbs (with respect to their event argument) comes from support of plural anaphora from some languages. Geiss (1975) observed that conjoined VPs do not support plural anaphora in a subsequent sentence:

(17) John opened the door and closed the window. He did \* them / ok that an hour ago.

(17) in itself is not indicative of the number-neutral status of the verbal domain of events since conjunctions of definite mass NPs in English do support plural anaphora:

(18) a. John drank the water and the wine. He drank them quickly.

 b. John ate the turkey and the meat. He ate them alone.

However, in other languages, for example German, conjunctions of definite mass NPs do not support plural anaphora. In German, plural anaphora require an antecedent that is syntactically plural:[[8]](#footnote-8)

(19) Hans trank das Wasser und das Bier. Er trank es (beides) / ?? sie schnell.

 ‘John drank the wine and the beer. He drank it both / them quickly.

Note that German permits *es* *beides* ‘it both’ in (19), the number-neutral pronoun-quantifier combination that specifies countability lexically.

 In German, as in English, conjunctions of VPs do not support plural anaphora (the German translation of (17) with *them*, *Hans oeffnete die Tuer und schloss das Fenster* is equally bad), which now shows the number-neutrality of verbs regardless of their Aktionsart.

[5] Selection of relative pronouns in German

There is another indication in German for the number-neutral status of verbs, and that is the choice of relative pronouns. German has two kinds of relative pronouns: w-pronouns (*was*) and d-pronouns (*der, die, das*). The generalization roughly is that count NPs select d-pronouns, whereas non-definite mass NPs select w-pronouns:[[9]](#footnote-9)

(20) a. das Kind, das / \* was

 ‘the child that’

 b. alles / etwas Wasser, was / \* das im Behaelter war

 ‘all / some water that was in the container’

 c. das Wasser, das / \* was im Behaelter war

 ‘the water that was in the container’

More precisely, neutral non-definite mass NPs select *was*, but not masculine or feminine mass NPs, which select *das*:

(21) a. aller Sand / Wein / Unfug, der / \* was

 ‘all (the) sand (masc) / Wine (masc) / nonsense (masc), that’

 b. alle Farbe / Fluessigkeit / Schoenheit , die / \* was

 ‘all (the) color (fem) / liquid (fem) / beauty (fem) that’

This means that, provided the gender category of the noun is neutral (that is, unmarked), the selection of w-pronouns is indicative of number-neutrality. Only definite NPs need to be set aside: by referring to a maximal quantity, they refer to an integrated whole, making w-pronouns inapplicable. In any case, the choice of w-pronouns is a sufficient though not necessary condition for the status of as number-neutral.

 The observation then is that verbs always select w-pronouns rather than d-pronouns, regardless of their Aktionsart:

(22) a. Hans lachte, was / \* das er selten tut.

 ‘John laughed, which he does rarely’.

 b. Hans klopfte an der Tuer, was / \* das er selten tut.

 ‘John knocked at the door, which he rarely does.’

This is a further indication that verbs regardless of their lexical content and semantic environment classify as number-neutral.

 The status of the verbal domain of events as number-neutral means that the two standard approaches to the semantic distinction between count and mass (or number-neutral) fail to get that distinction right. What makes the verbal domain of events number-neutral is not actual or perceived mereological properties of events (since that domain includes bounded as well as unbounded events or states). Moreover, it is not the applicability of verbs, VPs or sentences to parts of events or their sums (the domain relates to both telic and atelic or homogenous event predicates). I want suggest, instead, that what characterizes a number-neutral domain is the absence of a primitive notion of unity: events in the verbal domain are simply not viewed as one, in contrast to entities (including events) in the extension of singular count nouns. Singular count nouns, on that view, specify entities in their extension as one, as being single entities; mass nouns or number-neutral expressions don’t, regardless of their lexical content or the nature of the entities in their extension. The way entities are presented in terms of the mass-count distinction then diverges significantly from the ontology based on perception and cognition. In perception and cognition, conditions of form or ‘gestalt’ are constitutive of unity and thus countability. That said, those conditions may still matter semantically. In English, for example, the telicity of VPs or sentences matters for the acceptability of *for*- and *in*-adverbials. However, those distinctions do not form the content of the syntactic mass-count distinction. I will elaborate the proposal further in Section 5.

**4. Other categories or uses of categories lacking a mass-count distinction**

Verbs are not the only category that lack a syntactic mass-count distinction and to which other criteria for mass and count can be applied. First, there are non-nominal categories that can appear in argument position and to which some of the criteria for mass and count can apply, in particular clauses and numerals. Second, nominal categories can be used non-referentially, so that their usual extension won’t matter and semantic criteria for mass and count might apply to the content of their non-referential use. These are intensional and predicative NPs, measure phrases, and pure quotations. Non-nominal categories in argument position and non-referential uses of nominal categories, we will see, display diagnostics of number-neutrality.

**4.1. Clauses and numerals in argument position**

It is a common view that clausal complements or subjects act as referential terms standing for propositions, though there are also alternative views according to which clauses have a non-referential function (e.g. acting predicatively, Moltmann 2017). Whatever view one may adopt, one thing that is clear is that clauses are not referential NPs and as such do not display a syntactic mass-count distinction.[[10]](#footnote-10) However, some of the diagnostics for the mass-count distinction apply to clauses and are indicative of their status as number-neutral.

 First, conjoined clauses fail to support plural anaphora, in German as in English (Moltmann 1997):

(23) Hans glaubt, dass Maria unschuldig und Bill unschuldig ist. Er glaubt, das (beides) /

 sie seit langem.

 ‘John believes that Mary is guilty and Bill innocent. He has believed that (both) /

 \* them for a long time.

 Second, clauses in German take w-pronouns, not d-pronouns:

(24) Hans glaubt, dass es regnen wird, was / \* das Mary auch glaubt.

 ‘John believes that it will rain, which Mary believes too.

 Finally, quantifiers in place of clauses are mass, rather than count, as in seen in (25a, b), unless they modify the noun *thing,* as in (25c), which serves as a kind of numeral classifier:[[11]](#footnote-11)

(25) a. John assumes little / too much.

 b. \* John assumes too few / too many.

 c. John assumes a few things / several things / many things.

Thus, whether or not clauses have the status of referential terms, they are classified as number-neutral, rather than count.

 Numerals can occur in argument position, seemingly acting as number-referring terms. Numerals do not come with a syntactic singular-plural distinction, and thus the question is, how do they fare with respect to the semantic mass-count distinction in argument position? It appears that they display the diagnostics of number-neutrality in German, taking w-pronouns and not supporting plural anaphora (Moltmann 2013a, 2017):[[12]](#footnote-12)

(26) a. Zwei was / \* das eine Primzahl ist, …

 ‘Two, which is a prime number…’

 b. Maria addierte zehn und drei. Hans addierte \* sie / ok diese Zahlen auch.

 ‘Mary added ten and three. John added them / those numbers too.’

 To summarize, given the semantic behaviour of clauses and numerals in argument position, it is safe to generalize that syntactic categories which do not take part in a syntactic mass-count distinction semantically classify as number-neutral. This means that if those categories stand for entities, those entities will be part of a number-neutral domain rather than dividing into mass and count semantically.

**4.2. Intensional, predicative, and measure NPs, and pure quotations**

A further question to pursue is: how are nonreferential uses of NPs categorised with respect to the semantic mass-count distinction, that is, uses of expressions on which their usual denotation (extension) plays no role? Setting aside the (generally controversial) question of what exactly the semantics of such nonreferential NPs is, let us just ask how such NPs fare with respect to the diagnostics for mass and count.

 The first case to consider is NP-complements of intensional verbs. Such NPs classify as number-neutral by taking w-pronouns and not supporting plural anaphora in German:

(27) a. Hans braucht eine Assistentin, was / \* die Bill auch braucht.

 ‘John needs an assistant, which Bill needs to.’

 b. Hans braucht eine Assistentian und eine Trainerin. Bill braucht das / \* sie auch.

 ‘John needs an assistant and a trainer. Bill needs them too.’

The same holds for predicative NPs, which are non-referential as well:

(28) a. Hans ist ein Lehrer, was / \* das Bill auch ist.

 ‘John is a teacher, which Bill is too’.

 b. Hans ist ein Vater und ein Lehrer. Bill ist das / \* sie auch.

 ‘John is father and a teacher. Bill is that / \* them too.’

 Measure phrases such *two kilos* have been considered nonreferential, or at least taking semantic values not from the domain of entities (Rizzi 1990). Again, measure phrases show a classification as number-neutral, by taking w-pronouns:

(29) John wiegt 90 kilo, was / \* das zuviel ist.

 ‘John weighs 90 kilo, which is too much.’

Moreover, measure phrases can be replaced only by mass quantifiers such as *little* and *much*, as is also the case for intensional and predicative NPs.

 Finally, pure quotations show a classification as number-neutral by the same criteria:

(30) a. ‘Rouge’ bedeutet ‘rot’, was / \* das ‘red’ auch bedeutet.

 ‘Rouge’ means ‘red’, which ‘red’ means too.’

 b. ‘Cher’ bedeutet ‘lieb’ und ‘teuer’. ’Dear’ bedeutet das / \* sie auch.

 ‘Cher’ means ‘lieb’ and ‘teuer’. ’Dear’ means that / \* them too.’

Pure quotations are generally considered referential terms standing for expression types (however that may be achieved), but as such they do not take part in a mass-count distinction.[[13]](#footnote-13) That pure quotations display the diagnostics of number-neutrality is thus expected.

 The more general conclusion then is that non-referential uses of NPs classify semantically as number-neutral.

**5. Towards a new characterization of number-neutrality**

The generalization this paper has established is that categories that lack a syntactic mass-count distinction classify as number-neutral regardless of their conceptual content and the mereological properties of their extension or domain, and similarly for nonreferential uses of NPs. This then raises two obvious questions.

 First, what is the status of the number-neutrality? Is it a syntactic or a semantic property? What should bear on this question is the fact that intensional and predicative NPs classify as number-neutral in the very same way as clauses, even if their head noun is count. This should mean that their number-neutral status is a semantic, not a syntactic property of syntactic categories lacking a syntactic mass-count distinction.

 This leads to the second question, namely what does number-neutrality as a semantic property of a domain of entities consist in? The two standard approaches to the semantic mass-count distinction won’t help for an answer, since extensional mereological properties of extensions and actual or perceived integrity cannot characterize number-neutral domains such as that of Davidsonian events. A number-neutral domain does not preclude entities to be divided into natural or contextual units. In fact, we have seen that number-neutral quantifiers like *frequent, vieles* and *beides* can relate to such a division.

 In fact, even in classifier languages such as Chinese, entities in the denotation of (number-neutral) nouns may come in natural units that will be semantically relevant, for example by determining the choice of particular numeral classifiers. Also in the case of object mass nouns, the individuation of entities in their denotation (their boundary and shape) matters for the application of predicates of size and shape (*large furniture, round hardware*).

 On the present view, what is characteristic of a number-neutral domain is the absence of a primitive, cognitive notion of unity. That is, entities in a number-neutral domain are not viewed as ‘one’, regardless of whether they form natural units or not.

 Such a cognitive notion of unity has intuitive plausibility: a configuration of objects may be regarded as a single thing or else a mere plurality of distinct things. Having a structure or boundary may be conducive to viewing it as ‘one’, but that does not enforce it. Forming a natural or contextual unit (based on integrity) does not guarantee unity. Unity in the relevant sense, then, is not derivable from any actual or perceived properties an entity may have (integrity) or from mereological properties of the extension of the expression used to refer to it (atomicity). It is simply associated with the syntactic count category and its absence with the syntactic mass category as well as number-neutral domains (such as the denotations of syntactic categories lacking a syntactic mass-count distinction).[[14]](#footnote-14)

 This characterization of number-neutrality allows for major discrepancies between the ontology of countability conveyed by language and the cognitive ontology in which entities are individuated according to conditions of integrity, function, and persistence across times and situations. This matches findings in cognitive science: the cognitive division of entities into objects and stuff has been shown to precede the acquisition of language and so is independent of the mass-count distinction as such (Chierchia 2018).

 The same should hold for events: in perception or cognition in general events are individuated as having a boundary or being unbounded (or homogenous). But that kind of individuation does not play a role in the way natural language treats events when they belong to the verbal domain. Here events still require the use of a numeral classifier or lexical unit specifier to be countable.

 Events are categorized as countable, though, when they are referents of counts nouns, including deverbal nominalizations that are count (such as *jump, walk, death*). Deverbals count nominalizations then do more than just pick up an event argument of a verb; they also impose a condition of unity. This is of course not the case for event nominalizations that are mass (*laughter, rain*).

 Nominalization in a semantic sense arguably is also involved in the use of the morpheme *thing*, which appears to act as a numeral classifier, as we have seen. In fact, quantifiers of the sort *something, everything* and even *what* arguably involve some form of reification (nominalization in a semantic sense), leading to a domain of entities that are potential referents of nouns (Moltmann 2013a, b). What this means for the formal semantics of constructions relevant in the present context, however, needs to be pursued in greater detail elsewhere.

**6. Conclusions**

This paper has argued that the verbal domain of events classifies semantically as number-neutral, rather than dividing into mass and count, and more generally that categories that lack a syntactic mass-count distinction classify semantically as number-neutral as do uses of NPs not involving their usual denotations (intensional, measurement, and quotational uses). The standard semantic approaches to the semantic mass-count distinction, based on mereological properties of extensions or entities, are not suited for characterizing such number-neutral domains, just as they are unsuited for the semantics of object mass nouns.

 The paper has suggested an account of the content of the mass-count distinction in terms of a primitive notion of unity: entities in the denotations of singular count nouns are conceived as ‘one’, but not so for the denotations of mass nouns and number-neutral domains. Being conceived as one tends to go along with the entity being an atom (with respect to an expression) or with having integrity of some sort, but it need not. Conversely, being an atom (with respect to an expression) or having integrity does not guarantee being conceived as ‘one’. The content of the syntactic mass-count distinction thus is a matter of ‘grammaticized individuation’ rather than a matter of a substantive difference in cognitive ontology (see also Treves and Rothstein, to appear). Language imposes its own notion of syntax-based unity, which may or may not go along with unity at the level of cognitive ontology or perception (or of course reality).

 The characterization of number-neutrality in terms of the absence of primitive unity obviously remains suggestive and requires much further development for the purposes of formal ontology and semantics as well as of its cognitive and philosophical foundations.

 As a subsidiary contribution, the paper has shown that countability may be lexically imposed by particular quantifiers, that is, quantifiers which can apply to mass categories or number-neutral domains. Frequency expressions, which apply to mass nouns as well as verbs, are one example. The German quantifiers *vieles* and *beides* are other examples. The possibility in general for quantifiers to specify countability lexically appears to be manifest also in languages in which numeral modifiers can apply to number-neutral nouns e.g. Yudja (Lima 2018). In those languages, numerals likewise would have a lexical meaning imposing countability on a number-neutral domain.

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1. The situation-based version of the object-based approach might permit an account of object mass nouns by allowing the situation of reference to present an integrated whole without conditions of integrity, by ‘leaving out’ even essential conditions of integrity (see Cohen, to appear). [↑](#footnote-ref-1)
2. The criterion is not uncontroversial, though. See Moltmann (1989) for the view that *for*-adverbials do not in fact select homogenous event predicates, but just act as quantifiers over contextually relevant parts of an interval. [↑](#footnote-ref-2)
3. In Moltmann (1997) I actually argued for a semantic mass-count distinction for complex NPs that is independent of the syntactic mass-count distinction, within the object-based approach. *The water in the* glass counts as an integrated whole in a situation of reference s (being a maximal quantity satisfy the property ‘water in the glass’ in s), *the water in the glasses* counts as a plurality of integrated wholes in a reference situation. In Moltmann (2016), I criticized that approach to the semantic mass-count distinction: even if the water in the glass’ is an integrated whole in a sense, it is never treated as ‘one’ for the purpose of counting. Yet, the notion of an integrated wholes in a situations is semantically relevant, for example for semantic selection. See Fn. 4.

 Complex NPs have not been classified with respect to a semantic mass-count distinction within the extension-based approach, but only VPs and sentences. [↑](#footnote-ref-3)
4. Pelletier/Schubert (1989/2013) do take the syntactic mass-count distinction to apply to NPs, rather than just nouns. But that is because on their view all nouns can be used as mass or as count nouns and the identification as mass or count may depend, for example, on the choice of the determiner. They do not apply extensional mereological criteria to the denotation of the NP for identifying them semantically as mass or count parallel to what is commonly done to VPs. [↑](#footnote-ref-4)
5. *Time(s)* generally cannot achieve countability for stative verbs (H. Filip p.c.):

(i) John knew Bill three times.

But there are exceptions, namely when there are clearly distinct constitutive conditions for separate states:

(ii) John owned the painting three times in his life. [↑](#footnote-ref-5)
6. There are also event classifiers that involve natural units in a structured event, rather than imposing a condition on temporal separation. Examples in Mandarin Chinese are ‘turn’-type classiﬁers, as in (ia, b), which contrast with ‘time’-type classifiers, as in (ic) (Huang /Ahrens 2003):

(i) a. (dale) play-ASP san three tang CL taijiquan Tai-Chi yihou after ta s/he shenti body

 shufu comfortable duo more le LE

 ‘S/he feels much better after performing three rounds of Tai Chi.’

 b. dale play-ASP san three bian CL taijiquan Tai-Chi yihou after ta s/he shenti body

 shufu comfortable duo more le LE

 ‘S/he feels much better after performing three rounds of Tai Chi.’

 c. dale play-ASP san three ci CL taijiquan Tai-Chi yihou after ta s/he shenti body

 comfortable duo more le LE

 ‘S/he feels much better after performing three times Tai Chi.’

(ia) with *tang* and (ib) with *bian* are better than (ic) with the time-based classiﬁer *ci.* [↑](#footnote-ref-6)
7. Cinque (2006) argues that temporal measure words such *years* and *days* also act as numeral classifiers in English. [↑](#footnote-ref-7)
8. What seems to matter for plural anaphora in English is that the antecedent stand for a plurality of entities presented as having a boundary or more generally being integrated wholes, in the sense of Moltmann (1997). One way of being presented as an integrated whole is by being described by a singular count noun; another way is by being described as a maximal entity satisfying a property, such as being water or being beer in (18a, b). Thus, (18a) contrasts with (i), where maximality is not satisfied:

(i) ??? John drank some water and some wine. He drank them quickly.

Pluralities of integrated wholes in such a sense is also what certain predicates like *compare* require (Moltmann 1997):

(ii) John compared the wine and the beer / the two drinks / ??? the liquid.

See also Fn 3. [↑](#footnote-ref-8)
9. The selection of d-pronouns by definite mass NPs may be attributed to the fact that definite mass NPs stand for quantities that are integrated wholes and thus are semantically count. See Fn 3 and 8. [↑](#footnote-ref-9)
10. It has been argued that clauses sometimes are headed by a DP node (Kastner 2015), though this still does not mean that they engage in a mass-count distinction. [↑](#footnote-ref-10)
11. In fact, the count quantifiers *few* and *many* require a silent noun restricting a contextually given domain. Thus (24b) can only be understood with *few* and *many* ranging over entities of a particular sort given in the discourse context. [↑](#footnote-ref-11)
12. Number words in argument position have been considered nonreferential in Hofweber (2005) and Moltmann (2013a, b). But see Moltmann (2017) for a recent critique of that view. [↑](#footnote-ref-12)
13. There are also views according to which they are not referential e.g. Moltmann (2013a). [↑](#footnote-ref-13)
14. For approaches to mass nouns and mass quantification somewhat similar in spirit see Laycock (1986) and McKay (2016). [↑](#footnote-ref-14)