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THE SEMANTICS OF MASS EXPRESSIONS

DERIVED FROM GRADABLE VERBAL EXPRESSIONS

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Abstract

What semantics should we attribute to mass expressions like *love* and *work*, which are derived from gradable verbal expressions? We first examine how these expressions are used, then how they are interpreted in their various uses. Two uses stand out as central: one in which reference is made to an instance of a property (as in *John admired Julie's love for Tom*), another in which something is said concerning the degree to which this property manifests itself (as in *Julie felt more love for Fred than for Tom*). We then propose the following model to account for these data. A mass expression derived from a gradable verb denotes a function that takes several arguments. One of them corresponds to an instance of a property. Moreover, the mass expression has an associated measure function. This model also explains where the semantic unity of abstract and concrete mass expressions lies. Belonging to the realm of common nouns, mass terms have the capacity to refer, and nouns like *love* refer specifically to property instances. Moreover, being mass expressions, they not only refer, but have an associated measure function, this fact allowing a comparison of the instances they denote, as required by comparatives and indefinite quantifiers like *a lot of*.

1. Introduction

The topic of this paper is: what semantics should we attribute to mass expressions derived from gradable verbal expressions, i.e. verbal expressions that accept comparatives:¹

- (1) Julie loved Fred more than Tom.

From the verbal expression *to love Fred*, one can form the nominal expression *love of Fred*. Other examples of such pairs include: *to respect* ® *respect*, *to work* ® *work*, *to write poetry* ® *writing of poetry*.

We begin by saying a bit more concerning the class of nominal expressions that we are interested in. We then look at the interpretations that these nouns can receive in their various uses. After which we address the following questions: What formal representations may one associate with these interpretations? How do these depend on the formal representation associated with the verbal expression? And in what respects is the semantics of these derived, mass expressions similar to that of concrete mass nouns, like *wine* and *furniture*, on which research in formal semantics has focused?²

2. Mass expressions derived from gradable verbal expressions

We look at cases in which a gradable verbal expression gives rise, through nominalization, to a nominal expression which behaves morphosyntactically like a mass noun (like *wine* or *furniture*).³ This means that the nominal expression can be used in the following ways.

First, it can appear together with a possessive phrase: *Julie's love for Tom*, *the work of Julie*, or in a definite nominal expression with a relative (non-possessive) phrase: *the love that Julie felt for Tom*, *the work that Julie did for Tom*.

Second, it can appear together with an indefinite, mass determiner like *a lot of* or *much*:

- (2) Julie felt a lot of love for Tom.
- (3) Julie didn't do much work.

Third, it can appear in comparative constructions, its grammatical number being singular:

- (4) Julie had more love for Tom than for Fred.

Fourth, it can be used without any determiner, in sentences that are not comparative:

- (5) Julie encountered love.
- (6) Work is good.

Fifth, it is in general invariable in grammatical number: it seems hard, for instance, to talk of *loves for Fred* or *works*; doing so requires a special context and induces a change in meaning. Finally, it may sometimes be used together with a count determiner, notably in expressions of the form [*a(n) + adjective + nominal expression*]: *an incredible love / a great work*. In particular, for process verbs like *to work*, it is well-known that nominalization often gives rise both to a mass noun that denotes the process and to a count noun that denotes the result of the process (*This such a great work!*).

Can the class of verbal expressions that give rise to mass expressions be characterized more precisely? Two concomitant conditions appear to be necessary. Since a mass expression is gradable, the original verbal expression must itself be gradable. It must also be atelic, i.e. accept duration prepositional phrases like *for two hours* and reject phrases like *in two hours* (Vendler 1957). Indeed, observation suggests that a verbal expression is gradable if and only if it is atelic.

However, these conditions are not always sufficient (even though they are generally so). A form of nominalization that often gives rise to a mass expression may fail to do so in some cases. Thus, gradable verbs like *love*, *respect* and *work* give rise to a phonologically identical mass expression. But this is not always the case: the mass expression that corresponds to a verb like *walk* is not *walk* but *walking*. We also find exceptions when we consider more complex verbal expressions. Among the following sentences, while some are perfectly acceptable, others are somewhat odd:

- (7) Too much writing of poetry can be dangerous
- (8) ?Too much writing of poems can be dangerous
- (9) Too much watching of films can hurt your eyes
- (10) ?Less eating of chocolates would do you good.

We will focus on the cases in which the gradable verbal expression does give rise to a mass expression. Let us see what interpretations mass nouns like *love* receive in their various uses.

3. The interpretations of mass expressions derived from gradable verbal expressions

3.1. The interpretation of possessive and definite uses

Take sentences like:

(11) Julie's love for Fred attracted Tom.

They may be understood in two ways that can be paraphrased as:

(12) The particular love that Julie had for Fred attracted Tom.

(13) The fact that Julie loved Fred attracted Tom.

Under the first interpretation, the noun phrase *Julie's love for Fred* refers to an instance of a property, an instance of love. Julie's love for Fred is unique to her, and differs from, say, Sophie's love for Fred. Instances of properties are also known to philosophers as moments, tropes or modes. Their existence depends on the existence of other particulars (Mulligan et al. 1984). Thus, Julie's love for Fred can exist only if Julie and Fred exist. The work Julie did for Tom, John's eating of the cake, Julie's wisdom, and the red of Julie's shirt are other examples of instances of properties. We see in particular that the eventualities described by verbal expressions, that is, states, processes and events, are all instances of properties. For reference, the ontology defended by Lowe (1998) offers a general, metaphysical framework congenial to the views we defend.

Under the second interpretation, the expression *Julie's love for Fred* refers to a fact, that Julie loved Fred, and it is this which is understood to have attracted Tom, rather than the particular love that Julie had for Fred. A natural hypothesis is thus that expressions like *Julie's love for Fred* are ambiguous between two interpretations, an instance-interpretation as characterized in (12), and a fact-interpretation as in (13).

A datum in favor of this hypothesis is of course the availability of the paraphrases in (12) and (13): these paraphrases capture the intuition that sentences like *Julie's love for Fred attracted Tom* may be understood in two different ways. Another important datum comes from the existence of predicates that license one interpretation but not the other.

We observe first that there are predicates, like *acknowledge* and *admit*, that accept expressions like *Julie's love for Fred* as argument, license a fact-interpretation and do not give rise to an instance-interpretation:

(14) It took Tom a long time, but he finally acknowledged Julie's love for Fred.⁴

The sentence can be understood as: Tom finally acknowledged that Julie loved Fred. But it could not be taken to mean something that could be paraphrased as: Tom finally acknowledged the particular love that Julie had for Tom. Predicates like *acknowledge* require that the referent of *Julie's love for Fred* be a fact.⁵

Second, we find that there are predicates, like *describe* and *admire*, that accept expressions like *Julie's love* as argument, license an instance-interpretation and do not give rise to a fact-interpretation:

(15) Tom described Julie's love for Fred.⁶

(16) Tom admired Julie's love for Fred.

In these sentences, the expression *Julie's love for Fred* may not be understood as meaning something like: the fact that Julie loved Fred. These predicates license only the instance-interpretation, where the expression may be paraphrased as: the particular love that Julie had for Fred.

Finally, as observed at the beginning of this section, there are predicates, like *attract* and *surprise*, that allow for the two interpretations:

(17) Julie's love for Fred attracted Tom.

(18) Julie's love for Fred surprised Tom.

We can therefore conclude that expressions like *Julie's love for Tom* are ambiguous between an instance-interpretation and a fact-interpretation. Given their meaning, certain predicates allow for only one of these two interpretations, while some license both.

3.2. *The interpretation of indefinite and comparative uses*

Consider now uses of the nominal expression together with an indefinite determiner characteristic of mass nouns, like *much* or *a lot of*:

- (19) Julie didn't feel much love for Fred.
- (20) Julie felt a lot of love for Fred.

The determiner quantifies over love, and these sentences express something concerning the degree of Julie's love for Fred.

Something similar is observed when the noun is used in a comparative construction:

- (21) Julie felt more love for Fred than for Tom.

The degree of Julie's love for Fred is compared to the degree of Julie's love for Tom.

3.3. *The interpretation of bare uses*

Nominal expressions like *love* can also occur without any determiner, outside of comparative constructions:

- (22) Julie encountered love.
- (23) Love is good.

These sentences differ in their interpretations. The first makes an existential claim concerning an instance of a property: Julie encountered an instance of love from a certain individual. The second makes a general claim concerning instances of a property: generally, instances of love are good (cf. Moltmann, 2004). Notice that the fact that derived expressions receive such interpretations in these uses is another important piece of evidence that these expressions apply to instances of properties.

3.4. *The interpretation of count uses*

Consider now a sentence like:

(24) Julie had an incredible love for Fred.

This is a case of conversion, where the mass noun *love* is used as a count noun. Its interpretation parallels that of a comparable sentence, where *love* is replaced by a concrete mass noun like *wine*:

(25) Julie bought an incredible wine.

This sentence says that Julie bought an instance of wine that is of a particular type, to which the predicate expressed by the adjective applies (all the instances of wine that can be said to be incredible belong to this type). Similarly, the sentence that concerns love says that the instance of love felt by Julie is of a particular type, to which the predicate expressed by the adjective applies (all the instances of love that can be said to be incredible belong to this type).

4. The semantics of the mass expression and its link with that of the verbal expression

4.1. A simple semantics for gradable verbal expressions

We now want to specify the semantics of the mass expression and its link with that of the verbal expression. So we must adopt some type of semantics for verbs. Although we are not committed to any particular framework, we choose, for simplicity and concreteness, a Davidsonian semantics (cf. Parson 1990, Larson and Segal 1995). This means that verbs are taken to be predicates of eventualities, i.e. of events, processes and states. Semantic roles such as agent and patient are often used in such frameworks, but we do not need them for our present purposes. We also do without any representation of tense and mood. So, if *j* corresponds to *Julie* in the model and *f* to *Fred*, a sentence like *Julie killed Fred* receives the following truth-conditions:

(26) “Julie killed Fred” is true
 iff $\exists e$ [kill(*e*,*j*,*f*)]
 iff there is an eventuality *e* of *j* killing *f*

This example involves a non gradable verb (**Julie killed Fred a lot*) and $\text{kill}(e,j,f)$ is a function from triples (e,j,f) to truth-values. When we turn to gradable verbal expressions, another element must be added to their semantics, in order to account for their gradability. We do so by assuming that gradable verbal expressions have an associated measure function (measure functions have been discussed mostly in connection with gradable adjectives; cf. Kennedy, 1999 and Klein, 1991). More precisely, we suppose that the gradable verb *love* denotes a function to truth-values, $\text{love}(e,j,f)$, and that it also has an associated measure function, $\mu_{\text{love}}(e,j,f)$. This measure function associates to any eventuality e of j loving f the degree at which j loves f . These assumptions give us the following truth-conditions:

- (27) “Julie loved Fred” is true
iff $\exists e [\text{love}(e,j,f)]$
iff there is an eventuality e of j loving f
- (28) “Julie loved Fred a lot” is true
iff $\exists e [\text{love}(e,j,f) \wedge \mu_{\text{love}}(e,j,f) > d^\circ]$
iff there is an eventuality e of j loving f and the degree at which j loves f is superior to a contextually fixed degree d°
- (29) “Julie loved Fred more than Tom” is true
iff $\exists e \exists e' [\text{love}(e,j,f) \wedge \text{love}(e',j,t) \wedge \mu_{\text{love}}(e,j,f) > \mu_{\text{love}}(e',j,t)]$
iff there are eventualities e and e' of j loving f and j loving t and the degree at which j loves f is superior to the degree at which j loves t

Notice that the measure function $\mu_{\text{love}}(e,j,f)$ appears in (28) and (29), but not in (27). In (29), a comparison is explicitly asked for by the comparative construction. In (28), a comparison is implicitly asked for, by the expression *a lot*, the meaning of which can only be determined contextually. This corresponds to the condition $\mu_{\text{love}}(e,j,f) > d^\circ$. But in (27), no comparison is made. It is simply asserted that Julie loved Fred.

This being specified⁷, we can turn to the semantics of the mass expressions derived from gradable verbal expressions. We begin by modeling their possessive and definite uses.

4.2. Modeling possessive and definite uses

We address here only the instance-interpretation of sentences like *Julie's love for Fred surprised Tom*, reserving the fact-interpretation for future work.⁸ A simple model of such sentences is obtained as follows. We assume that the noun *love* is based on the same function as the verb, $\text{love}(e,j,f)$, and that it has the same associated measure function, μ_{love} . We take the variable e to denote a state (the state of Julie loving Fred), and this state to be an instance of a property (the love that Julie had for Fred).

Now, the expression *Julie's love for Fred* has the same meaning as the expression *the love of Julie for Fred*. An element of definiteness is thus part of the meaning of *Julie's love for Fred*. We take this element to be provided by an implicitly present iota operator.⁹ The expression *Julie's love for Fred* gets the following conditions of application:

(30) “Julie’s love for Fred”: $\iota e [\text{love}(e,j,f)]$

And the truth-conditions of the utterance are:

(31) “Julie’s love for Fred surprised Tom” is true
iff $\exists e' [\iota e [\text{love}(e,j,f)]$ is such that $\text{surprised}(e',e,t)$
iff there is an eventuality e' in which the eventuality e of j loving f surprises t

4.3. Modeling indefinite and comparative uses

In order to treat sentences with indefinites and comparatives, we make the assumption that they have the same truth-conditions as their counterpart with the verb *love*. Thus:

(32) “Julie felt a lot of love for Fred” is true
 $\exists e [\text{love}(e,j,f) \wedge \mu_{\text{love}}(e,j,f) > d^\circ]$
iff there is an eventuality e of j loving f and the degree at which j loves f is superior to a contextually fixed degree d°

- (33) “Julie felt more love for Fred than for Tom” is true
 iff $\exists e \exists e' [\text{love}(e,j,f) \wedge \text{love}(e',j,t)] \wedge \mu_{\text{love}}(e,j,f) > \mu_{\text{love}}(e',j,t)$
 iff there are eventualities e and e' of j loving f and j loving t and the degree at which j loves f is superior to the degree at which j loves t

4.4. Modeling bare uses

Dealing fully with bare uses would force us to take a stance on an issue that is not our direct concern. This is the general issue of how to model sentences with bare mass nouns and bare plurals. Some researchers take bare plurals and bare mass nouns to be indefinites (Gillon 1990). Others see them as ambiguous between an indefinite reading and a kind-reading (Wilkinson 1991). Yet others take them to uniformly refer to kinds, and a certain mechanism derives their existential interpretations (Carlson 1977).

However, for the purpose of the present paper, we do not need to adjudicate between these positions. Indeed, whatever we end up saying concerning bare mass nouns and plurals, we should be able to say it, in the same way, in the specific case of mass nouns derived from gradable verbal expressions. Thus, concerning the sentences we gave as examples in 3.1.3, any position will give them truth-conditions that will turn out to be essentially equivalent to:

- (34) “Julie encountered love” is true
 iff Julie encountered an instance of love from an individual
 iff $\exists e \exists s [\text{love}(e,j,s)]$

- (35) “Work is good” is true
 iff generally, instances of work are good

4.5. Degrees for concrete mass nouns

All this is perfectly parallel to what it is natural to propose in the case of concrete mass terms. Consider indeed sentences like:

- (36) Julie bought a lot of wine.
 (37) Julie bought more wine than Tom.

Wine is gradable, so it is natural to assume that it has an associated measure function, that indicates the quantity of wine contained in an instance of wine. Indeed, simplicity suggests that the semantics of expressions like *a lot of wine* be handled in the same fashion as that of expressions like *a lot of love*.¹⁰ We can thus represent the first sentence as:

- (38) “Julie bought a lot of wine” is true
 iff $\exists e \exists x [\text{buy}(e,j,x) \wedge \text{wine}(x) \wedge \mu_{\text{wine}}(x) > d^\circ]$
 where d° is a contextually fixed quantity of wine

And for the second sentence:

- (39) “Julie bought more wine than Tom” is true
 iff $\exists e \exists e' \exists x \exists y [\text{buy}(e,j,x) \wedge \text{buy}(e',t,y) \wedge \text{wine}(x) \wedge \text{wine}(y) \wedge \mu_{\text{wine}}(x) > \mu_{\text{wine}}(y)]$
 iff Julie bought an instance of wine, Tom bought an instance of wine, and
 the quantity of wine Julie bought is greater than the quantity of wine Tom bought

5. Discussion

5.1. Recapitulating so far

The model we propose is the following. A mass expression derived from a gradable verbal expression denotes a function that takes several arguments. One argument denotes an instance of a property. Another denotes an individual in which this instance manifests itself. When the original verbal expression is transitive, the object of the verb corresponds to a third argument of the noun (denoting who is loved, for instance).

Moreover, the noun has an associated measure function. This makes it possible to capture the interpretation of comparatives like *more* or *less* and of quantifiers like *much* or *a lot of*.

The semantics of a gradable verbal expression and that of the derived, mass expression are based upon the same functions. However, the nominal expression can be used in a referential way (in definite descriptions like *Julie's love for Tom*), while the verbal expression cannot.¹¹

This set of assumptions allows us to account in a simple way for the interpretations that these nominal expressions are observed to have, as well as for the link with the semantics of the verbal expression.

It also explains where the semantic unity of abstract and concrete mass expressions lies. Belonging to the realm of common nouns, mass expressions have the capacity to refer, and nominal expressions like *love* refer specifically to property instances. Moreover, being mass expressions, they not only refer, but have an associated measure function, this fact allowing a comparison of the instances they denote, as required by comparatives and quantifiers. Let us make here some comments concerning the semantics of the verb. In this paper, we have adopted a Davidsonian account for the semantics of all types of verbs, whether they correspond to events, processes or states. Doing so is not necessary: what we have presented would carry over in much the same way if the semantics of the verb were conceived of in a more traditional way, with no eventuality variable. However, the representations of the verb and the noun would then become different: the verb *love* would denote a function from couples (j,f) to truth-values, while the corresponding noun would denote a function from triples (e,j,f) to truth-values. While this is possible, it is less economical than the solution in which verb and noun are based on exactly the same function. This is one reason to adopt a Davidsonian semantics. But of course, the thrive of theoretical economy should not be blindly followed. If it turned out that there are convincing arguments against the representation of some verbs in a Davidsonian fashion (as suggested for instance by Katz 2000 and Maienborn 2004), then one should have different semantics for these verbs and the corresponding nouns and specify their links.

Let us illustrate this debate on another case, that of nouns derived from gradable adjectives.

5.2. Mass nouns derived from gradable adjectives

Gradable adjectives, like *wise* or *sad*, give rise to mass nouns, like *wisdom* or *sadness*, and the account we have proposed extends easily to such cases.

To show this, we first need a semantics for gradable adjectives. In line with our treatment of predicates like mass nouns and gradable verbs, we use measure functions to capture the gradability of these adjectives. However, in the case of gradable adjectives, there is no need for a separate function to truth-values. An adjective like *wise* can simply be taken to denote a measure function, μ_{wise} , since in all its uses, it asks for a comparison. More precisely, the difference between these various types of gradable predicates is that the unmodified adjective (as in *Julie is wise*) asks for an implicit comparison to a contextually fixed standard, while an unmodified, concrete mass noun (as in *This is wine*) and an unmodified, gradable verb (as in *Julie loves Fred*) do not.

If we then adopt a Davidsonian semantics for sentences where the adjective is attribute, we get the following truth-conditions:

- (40) “Julie was very wise” is true
 iff $\exists e [\mu_{\text{wise}}(e,j) > d^\circ]$
 iff there is an eventuality of Julie being wise at a degree superior to a contextually fixed degree d°

And then for the noun *wisdom*, we have:

- (41) “Julie had a lot of wisdom” is true
 iff $\exists e [\mu_{\text{wisdom}}(e,j) > d^\circ]$
 iff an instance of wisdom manifests itself in Julie at a degree superior to a contextually fixed degree d°

with the constraint that $\mu_{\text{wisdom}}(e,j) = \mu_{\text{wise}}(e,j)$.

But suppose we do not adopt a Davidsonian semantics for the sentence with the adjective. Then our overall account becomes slightly more complex. For the noun *wisdom*, we still keep the representation in (41). But the sentence with the adjective is now rendered as:

- (42) “Julie was very wise” is true
 iff $\mu_{\text{wise}}(j) > d^\circ$
 iff the degree at which j is wise is superior to a contextually fixed degree d°

And the link between adjective and noun is specified by:

- (43) $\forall j \forall d > 0 [\exists e [\mu_{\text{wisdom}}(e,j) = d] \text{ iff } \mu_{\text{wise}}(j) = d]$
 An instance of wisdom manifests itself in an individual at a certain (strictly positive) degree iff that individual is wise to that degree

The conditions stated in (41), (42) and (43) raise an interesting issue, that we address in the following section.

5.3. Why we can't make do only with degrees

Looking at these formulas, and especially (43), we may wonder whether the argument of the noun *wisdom* that denotes an instance of a property is really needed (at least in a non-Davidsonian framework). Couldn't we characterize the semantics of *wisdom* by just using the measure function of the adjective, $\mu_{\text{wise}}(j)$? This, if feasible, would be more economical. And indeed, an author like Tovená (2001) suggests that the interpretations of a noun like *wisdom* make only access to degrees of wisdom.¹² But would degrees of wisdom, or, equivalently, the measure function $\mu_{\text{wise}}(j)$, be enough?

In such an approach, it would of course be straightforward to account for indefinite and comparative uses. Indefinites like “a lot of” and comparatives like “more” would simply impose conditions on $\mu_{\text{wise}}(j)$, similarly to what was proposed above.

But what of possessive and definite uses? What would they refer to, notably in sentences like (44)?

(44) Tom admired Julie's wisdom.

The following might perhaps be proposed.¹³ In (44), the nominal expression *Julie's wisdom* would mean: the type of wisdom that Julie has. This would be something general, something that Julie could share with someone else: it might happen that, e.g., Sophie has the same type of wisdom as Julie.

However, several arguments militate against this hypothesis. First, as a matter of fact, it does seem that (44) can concern a particular instance of wisdom, Julie's wisdom, something which is unique to her and that she cannot share with anyone else (cf. Mulligan et al. 1984 and section 3.1).

Moreover, a type is always a type of instances, a type of tokens. The existence of a type of wisdom implies the existence of instances of wisdom that are of this type. So such a model would have to incorporate, next to types of wisdom, instances of wisdom.¹⁴

And finally, one also needs to account for bare uses:

(45) There was wisdom in that man.

(46) Wisdom is rare.

(47) Wisdom is good.

The interpretation of each of these sentences involves property instances: (45) says that an instance of wisdom manifested itself in that man, (46) says that instances of wisdom are rare, and (47), that instances of wisdom are good.

Overall, then, we see that accounting for the interpretations of possessive and definite uses and of bare uses requires to have property instances in the model: in definite and possessive uses, reference is made to property instances, and in bare uses, quantification is made over property instances. We can't make do with degrees only, property instances are necessary.

To close this section, let us add a few remarks about the uses and interpretations of nouns like *wisdom* where something is said about degrees of wisdom. Tovená cites them as evidence that the interpretation of nouns like *wisdom* involves only degrees of wisdom. But, as we will show, our model accounts for them in a natural manner.

Consider first sentences that contain comparatives or indefinites like *a lot of*:

(48) Julie had a lot of wisdom.

They say something concerning the degree of wisdom of an individual. Yet, something similar is true in the case of concrete mass nouns like *wine*. Comparable sentences with *wine* replacing *wisdom* say something concerning the quantity of wine contained in an instance of wine:

(49) Julie had a lot of wine.

Still, it is natural to maintain that the noun *wine* denotes an instance of wine in (49), the quantity of which is said to be a lot. The same goes for (48): in this sentence, the noun *wisdom* denotes an instance of wisdom, the degree of which is said to be a lot.

Next, consider uses of *wisdom* in connection with adjectives like *exceptional*, *incredible* or *excessive*:

(50) Julie's wisdom was exceptional.

(51) Julie's exceptional wisdom amazed Tom.

(52) Julie showed an exceptional wisdom.

In the model we propose, these sentences are easily accounted for in terms of adjectival predication or adjectival modification. Take (50). It simply says that the instance of wisdom that manifested itself in Julie was exceptional:

- (53) “Julie’s wisdom was exceptional” is true
 iff $\exists d > 0$ [$\exists e$ [$\mu_{\text{wisdom}}(e,j) = d$] is such that exceptional(e)]

Given the meaning of *exceptional*, the predication of the adjective to this instance of wisdom may then further be seen as implying something concerning the degree of Julie’s wisdom. The same holds for (51) and for (52), which is a count usage of the mass noun *wisdom* (cf. section 3.4 for the analysis of a similar case).¹⁵

To conclude this paper, let us see how our account applies to other abstract mass nouns.

5.4. Other abstract mass nouns

5.4.1. Nouns like “beauty”

In English, a noun like *beauty* is not derived from any adjective. On the contrary, there is an adjective, *beautiful*, derived from the noun. The direction of the derivation turns out to make no difference. Indeed, a natural account for the noun *beauty* exactly parallels that for *wisdom*.

- (54) “Julie’s beauty attracted Tom” is true
 iff $\exists e' \exists d > 0$ [$\exists e$ [$\mu_{\text{beauty}}(e,j) = d$] is such that attracted(e',e,t)]

- (55) “Julie had more beauty than Mary” is true
 iff $\exists e \exists e' [\mu_{\text{beauty}}(e,j) > \mu_{\text{beauty}}(e',m)]$

And if, say, we use a Davidsonian semantics for an attributive sentence with the adjective *beautiful*, adjective and noun being based upon the same function, μ_{beauty} , we have:

- (56) “Julie was more beautiful than Mary” is true
 iff $\exists e \exists e' [\mu_{\text{beauty}}(e,j) > \mu_{\text{beauty}}(e',m)]$

5.4.2. Nouns like “chaos”

Take finally a mass noun like *chaos*. It is not derived and, when understood as in *The chaos of the bedroom worries Tom*, its meaning cannot be adequately paraphrased using the derived adjective *chaotic*. Still, it is natural to give it a semantics similar to that of *wisdom*, except that, when understood in this way, there is no link with any adjective. We just take the mass noun *chaos* to denote a two-place function, that sends instances of chaos and entities in which they manifest themselves to degrees of chaos. Thus:

(57) “The chaos of the bedroom worried Tom” is true
 iff $\exists e' \exists d > 0$ [$\mu_{\text{chaos}}(e, b) = d$] is such that worried(e', e, t)

(58) “There was more chaos in the bedroom than in the kitchen” is true
 iff $\exists e \exists e' [\mu_{\text{chaos}}(e, b) > \mu_{\text{chaos}}(e', k)]$

¹ I would like to thank F. Corblin, P. Egré, B. Gillon, J. Jayez, F. Moltmann, P. Schlenker, B. Spector, A. von Stechow and L. Tovena for comments on some of the ideas developed in this paper.

² For reviews of the literature, see Pelletier and Schubert (1989), Krifka (1991) and Nicolas (2002).

³ In many languages, including English, common nouns divide into two morphosyntactic subclasses, mass nouns and count nouns (Gillon 1992). A defining characteristic of mass nouns, like *milk*, is that they are invariable, while count nouns, like *cat*, can be used in the singular and in the plural. Depending on the language, this basic morphosyntactic difference between the two types of noun is often supplemented by differences as to the determiners they can combine with. Thus, in English, mass nouns can be used with determiners like *much* and *a lot of*, but neither with *one* nor *many*. On the contrary, count nouns can be employed with numerals like *one* and determiners like *many*, but not with *much*.

It is of course well known that mass nouns can, in certain contexts, be used as count nouns (*You should take a hot milk with some honey*), and vice versa (*You will find a lot of rabbit around here*). One then talks of conversion. Conversion is a common grammatical possibility, whereby a member of a grammatical category is used in the morphosyntactic environment characteristic of another grammatical category. For instance, proper names can be used as common nouns: *The professor has two Picassos in his class* (cf. Gillon 1992, Kleiber 1994). Uses of nominal expressions like *love for Fred* with a count determiner are cases of conversion, from mass to count.

⁴ Adapted from a similar example given in French by Van de Velde (1995: 141).

⁵ Notions like “factives” and “factive contexts” have been discussed in the literature (see, e.g. Kiparsky and Kiparsky 1971, Delacruz 1973). So has Vendler’s idea that gerunds of the form *her performing the song* would

refer to facts (Asher 1993, Vendler 1968, Kistler 1999). However, we have found very few predicates that, with expressions like *Julie's love for Fred*, license a fact-interpretation and clearly refuse an instance-interpretation. Consider for example “factive predicates” like *surprise*, *bother* and *attract*. These predicates are said to be factive because, when they take a clausal subject, they presuppose that the embedded sentence be true. If the sentence *That Julie loved Fred surprised Tom* is true, this entails that the sentence embedded in the subject (*Julie loved Fred*) is also true. Nonetheless, in general, these predicates accept many things as the referent of their subject, including ordinary people (Julie), property instances (the love that Julie felt for Fred) and facts (the fact that Julie loved Fred).

⁶ The sentence is ambiguous: it can also be understood as meaning that Tom described, for Fred, Julie's love.

⁷ These particular assumptions are not crucial for our analysis. We could also say that a verb like *love* takes an additional, degree argument. We would get representations like the following:

“Julie loved Fred” is true iff $\exists e [\text{td} [\text{love}(e,j,f,d)] > 0]$

“Julie loved Fred a lot” is true iff $\exists e [\text{td} [\text{love}(e,j,f,d)] > d^\circ]$

They are truth-conditionally equivalent to the representations we adopt. However, we prefer to use associated measure functions because in sentences like “Julie loved Fred”, no explicit or implicit comparison is made. The difference between the two kinds of representations should also be linked to the notion of an argument of a linguistic predicate, and to the criteria for deciding what is a legitimate argument of a linguistic predicate and what is not.

⁸ This interpretation is also available with nouns derived from gradable adjectives, when they are headed by a possessive construction: *Julie's wisdom surprised Tom*. There must exist a general mechanism that, given a nominal expression derived from a gradable predicate, constructs an interpretation in terms of fact: that Julie loved Fred surprised Tom. We may note that this mechanism is lexicalized in an overt construction: *the fact that* + S, where S is a sentence. Semantically, it constructs a fact, given a proposition, like the proposition expressed by the sentence S.

⁹ See Barker (1995, Ch. 2, §5) for an account of this element of definiteness in terms of presupposition conditions.

¹⁰ On the use of measure functions with mass nouns like *wine*, see also Higginbotham (1995).

¹¹ As in any Davidsonian approach, this is a syntactic fact, not a semantic one.

¹² Tovena (2001) is concerned with a class of nouns that is not exactly identical to ours. She considers what Van de Velde (1995) calls “intensive nouns”. These nouns are characterized semantically, by the fact that their quantification does not concern a quantity of “matter” or “time”, but “intensity”. Expressions like *love* and *respect* are thus included in this semantic class. So are nouns derived from gradable adjectives, like *wisdom* and *sadness*. But nouns derived from verbs denoting processes, like *work* and *sleep*, are not, since, according to Van de Velde, their quantification concerns a quantity of time.

¹³ Tovena does not take into consideration these uses and so does not try to account for them. But her remarks (Tovena, 2001: 575) point in the direction explored here.

¹⁴ On the other hand, in the model we adopt, it is not surprising that an interpretation in terms of type may arise. For this is a general possibility with all count nouns and mass nouns. For instance, in *This is the car that John*

bought, the expression *the car that John bought* may the expression refer to a type of cars. Likewise in *This is the wine that we drank last time* (it may refer, for instance, to a certain type of red wine).

¹⁵ The arguments developed in this section apply *mutatis mutandis* to mass expressions derived from gradable verbal expressions.

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