SYMMETRIC AND ASYMMETRIC COMPARISONS

Yeshayahu SHEN *

The present paper focuses on the distinction between symmetric and asymmetric comparisons of the form 'A is like B'. Three main proposals are made: (1) It is proposed, contrary to a view commonly put forward in various studies of metaphor (e.g. Ortony (1979)), that the symmetry vs. asymmetry distinction in comparison statements is orthogonal to the literal vs. metaphor distinction: i.e., it is argued that both metaphorical and literal comparisons exhibit symmetric and asymmetric types. (2) The key notion, relative to which the distinction between symmetric and asymmetric comparisons is defined, is the 'accepted order': asymmetric comparisons are defined as those in which one of the two possible orders (i.e., 'A is like B' or 'B is like A') is the 'accepted-order', while the other is not. By contrast, in all cases of symmetric comparison there is no preference for one order over the other. The second proposal, then, is a definition of the 'structural' conditions under which a certain order is to be conceived as an 'accepted order': (i) The concepts represented by the A and B terms must both be conceived of as being included in the domain of some easily constructed ad-hoc or stable category G; (ii) The B term must be a prominent member of G. (3) A cognitive account for the relative ease of processing the accepted order is proposed. It is argued that the principles underlying the Reference point–Deviant relations (see Rosch (1975)) can be extended to the domain of ad-hoc categories. Some general implications of these proposals regarding theories of categorization in general are discussed.

Preface

The issue to be addressed in this paper is that of symmetry and asymmetry in metaphorical and literal comparison (or similarity) statements. Comparison statements are statements of the form 'A is like B' (e.g., 'Poland is like Russia' or 'Night is like coal'). Such comparisons can be presented in two possible orders: 'A is like B' or 'B is like A'. One important question with regard to the comprehension of comparisons is whether these two orders are symmetrical or not, in terms of meaningfulness, preference, etc.; that is, whether the comparison 'A is like B' has the same meaning as 'B is like A', whether there is a preference for one order over the other, and so on.

Traditionally, this issue has been divorced from another issue which seems to be an independent one, namely, the metaphorical/literal distinction. Thus, traditional literary and philosophical theories of metaphor (cf., e.g., Black (1962) and Beardsley (1958)) that have attempted to distinguish metaphors from literal expressions have focused mainly on such issues as semantic incongruity, the violation of selection restrictions, and so on, while remaining silent as to the issue of symmetry in metaphors. More recently, however, an attempt has been made to argue that the symmetry/asymmetry issue cannot be divorced from the metaphor/literal distinction; in particular, psychological studies of similarity have argued for the position that asymmetry in metaphorical comparison statements is higher than in literal comparisons. The main proponents of this view have been Ortony et al. (cf., e.g., Tversky (1977) and Glucksberg and Kesar (in prep.)).

The present paper is an attempt to modify and develop Ortony's proposal. In section 1 I will introduce the various types of comparisons included under the 'symmetric vs. asymmetric' distinction. Contrary to Ortony et al.'s proposal, it will be suggested that this distinction crosscuts (rather than correlates with) the metaphorical/literal distinction; that is, it will be argued that both metaphorical and literal comparisons exhibit asymmetric and symmetric types.

Section 2 directly addresses the next question to be asked: what are the 'structural' conditions under which a certain order is to be conceived of as relatively meaningful? These conditions were not explicitly stated either by Ortony et al.'s study or by related studies. Section 3 proposes a cognitive account for these structural conditions.

1. Symmetry/asymmetry and the metaphor/literal distinction

1.1. Tversky's proposal

Since Ortony's proposal is an attempt to extend Tversky's (1977) influential account of similarity judgements for comparisons, let me start by considering very briefly Tversky's well-known proposal.

Contrary to most traditional conceptions of similarity, which have been based on metric axioms implying that similarity is a symmetric relation within a certain 'conceptual space', Tversky et al. argued, on the basis of a series of well-known studies of judgments of similarity, that there are cases of similarity statements which violate these metric axioms in various ways. Of particular importance is the existence of cases of directional similarity judgments, which are asymmetric rather than symmetric: atypical members of categories tend to be judged as more similar to typical members than the reverse. For example, preference will be given to the comparison 'Poland is like Russia' over its

inverse 'Russia is like Poland'; the similarity between the concepts comprising the former is judged as exceeding that of the latter and so on. These data suggest that there are similarity statements which tend to be directional, that is, asymmetrical.

However, as pointed out in Ortony (1979), Tversky's proposal focused mainly on 'literal' rather than 'metaphorical' comparisons; roughly speaking, and without committing ourselves to any particular definition of metaphorical and literal comparison, literal comparisons can be characterized as comparing concepts belonging to the same stable category or domain, such as 'Communist countries' (as in 'Poland is like Russia'), whereas metaphorical comparisons compare concepts which are usually conceived of as belonging to two different domains (such as 'rage' and 'a volcano' in 'rage is like volcano'). Tversky only briefly addresses the question of metaphorical comparison, and only to observe that metaphorical comparisons exhibit the same asymmetry as do literal comparisons. Tversky's paper does not raise the question of whether all metaphors are directional or only certain ones; the possibility that metaphors might exhibit symmetry is simply not considered.

1.2. Ortony's proposal

Ortony et al. (1985), in a major contribution to the study of metaphors, have attempted to develop a 'salience imbalance' model in order to provide a fuller account of the difference between metaphorical and non-metaphorical comparison in terms of the symmetry/asymmetry distinction, arguing that asymmetry in metaphorical comparisons is higher than in non-metaphorical ones. Ortony's starting point was to distinguish between three types of similarity statements, i.e., literal, metaphorical, and anomalous, illustrated in (1a), (1b), and (1c), respectively.

(1a) Billboards are like placards.
(1b) Billboards are like warts.
(1c) ?Billboards are like pears.

Statement (1a) is seen as a literal comparison, since billboards and placards share a number of high-salient attributes (this is Ortony's conception of the literal/metaphorical distinction). By contrast, both (1b) and (1c) are non-literal comparisons, since no high-salient attributes are shared by the comparisons' two terms. Note, however, that in (1b) some high-salient properties of warts can be 'matched' with less salient attributes of billboards (e.g., 'ugliness' or 'sticking out'), yielding a metaphorical comparison. By contrast, there are no such high-salient attributes of pears that can be applied to billboards at all; hence the comparison is anomalous.

With this distinction established, Ortony's main proposal, which has been supported experimentally, was that the degree of asymmetry of similarity in metaphorical comparisons is higher than in either literal or anomalous comparisons.

1.3. Criticism of Ortony's proposal

Ortony's observation is one of the most influential theories of metaphor and comparison statements during recent years, and has been taken as indicative of a robust and pervasive phenomenon in the comprehension of comparisons (see, e.g., Gentner and Clement (in press), Glucksberg and Kesar (in prep.)). Nevertheless, it is my claim that the symmetry/asymmetry distinction is orthogonal to the metaphor/literal distinction. This claim consists of two sub-claims: (1) Some literal comparisons are as asymmetric as some metaphorical comparisons, and (2) Some metaphorical comparisons are as much symmetrical as some literal comparisons. Let me elaborate on each of these claims.

1.3.1. The accepted order

Before presenting the detailed argument against Ortony's view, let me introduce a key notion relative to which the issue of symmetry and asymmetry can be defined: 'accepted order'. The very notion of *asymmetry* in comparisons implies a difference in 'acceptability' or 'readability' among the comparison's two possible orders: one is the 'accepted order', its inverse, 'non-accepted'. Significantly, the distinction between 'accepted vs. non-accepted order' is not a dichotomous but rather a scalar one. This is because the 'acceptability' of a given order, as I use the term, refers to its relative readability or interpretability. The 'accepted order', then, should be understood as referring to a certain portion of the scale, i.e. to those various cases which are relatively easy to interpret; the 'non-accepted order' refers to those cases which are (relatively) very difficult or almost impossible to understand. Although the boundaries between these two cases are not clearly defined, there seems to be a great deal of agreement among subjects as to the relative interpretability of different comparisons, as is clearly shown by Ortony (1985) and Tversky (1977). All the cases to be analyzed in this paper, though, fall clearly under either one or the other of the above two order-types.

The importance of introducing the notion of 'accepted order' is that the distinction between symmetric and asymmetric comparisons (as well as further subdivision of the former into various sub-types to be introduced in the present section) follows directly from it. Thus, all cases of asymmetric comparison can be defined as comparisons in which one of the two possible orders ('A is like B' or 'B is like A') is the accepted order while the other is not. By contrast, in all cases of symmetric comparison either both orders or neither are accepted orders, yielding symmetry in preference. Note that as the notion of (a)symmetry is defined relative to the gradal notion of accepted order, it follows that the distinction of symmetry and asymmetry should itself be viewed as a gradal distinction that allows for certain sub-distinctions, rather than a polar one. Hence when I discuss (a)symmetric comparison I will actually be referring to relatively (a)symmetric comparison.

The issue of symmetric and asymmetric comparison can thus be reduced to the notion of 'accepted order'.

Having introduced the notion of 'accepted order', we may turn to a consideration of Ortony's proposal. Recall that our first argument against Ortony's proposal is that some literal comparisons exhibit the same asymmetry as do (some) metaphorical comparisons.

1.3.2. Asymmetry in literal and metaphorical comparisons

Ortony is no doubt correct in arguing that a large proportion of metaphors exhibit asymmetry. Recall that asymmetric comparisons are those in which one and only one of the orders is an accepted order. A case in point is (2) below (taken from Ortony (1985)), which exemplifies a case of 'metaphorical comparison'.

(2) Questions and crow-bars are alike.
(2a) Questions are like crow-bars.
(2b) ?Cross-bars are like questions.

Clearly, in this case (2a) is an accepted order whereas (2b) is not. Operationally this can be manifested in various psychological tasks, such as judgments of preference, relative ease of assigning readings to these orders, etc. Thus, in a preference task readers would prefer (2a) over (2b); a reading can be more easily assigned to (2a) than to (2b); etc. (cf. Ortony (1985), in which data obtained in various experiments are analyzed).

Note, however, that contrary to Ortony's proposal literal comparisons also exhibit the same kind of asymmetry. Consider, for example, (3) below.

(3) Poland and Russia are alike.
(3a) Poland is like Russia.
(3b) ?Russia is like Poland.

(3) represents an asymmetric comparison. Clearly, (3a) is preferred over (3b), in terms of its higher degree of perceived similarity (as was experimentally shown by Tversky (1977) and Tversky and Gati (1978)) and the lesser processing effort it requires. Whereas the assignment of meaning to (3a) is straightforward, the reader of (3b) must invest some effort before coming up

with a reading. This example shows clearly that literals exhibit asymmetry as much as do metaphorical comparisons.

1.3.3. Symmetry in literal and metaphorical comparisons

Of a greater importance is the claim that some metaphorical comparisons are as much symmetrical as some literal comparisons, in contradiction to Ortony's proposal whereby all metaphorical comparisons exhibit asymmetry.

Let us start first with symmetry in literal comparisons. Recall that two sub-types of symmetric comparisons can be distinguished, namely, those in which both orders are accepted orders vs. those in which both orders are 'non-accepted' as illustrated by (4) and (5) respectively.

(4) America and Russia are alike.
(4a) America is like Russia
(4b) Russia is like America.

(5) ?Switzerland and Indonesia are alike.
(5a) ?Switzerland is like Indonesia.
(5b) ?Indonesia is like Switzerland.

Note that both (4) and (5) above are virtually symmetric comparisons. (4) is symmetric in that, presumably, the reader can easily infer for both orders at least one major reading according to which America and Russia are alike, namely, 'America and Russia are alike in that both are superpowers'. On the other hand, the two orders of (5) are both 'weird' comparisons (unless a specific context is provided), in that in both cases any assignment of meaning whatsoever requires a large amount of processing on the part of the reader. Moreover, out of context it seems that in (4) and (5) there is no difference between the two orders regarding the similarity between the two concepts.

Taken together, the comparisons in (3), (4), and (5) above show that as far as the distinction between symmetry and asymmetry is concerned, literal comparisons cannot be treated as an undifferentiated whole, as suggested by Ortony, but that a distinction must be drawn between symmetric and asymmetric literal comparisons.

We turn now to the other case, that of symmetric metaphorical comparison. Consider, for example, (6) below, which also involves a metaphorical comparison.

(6) Night and coal are alike.
(6a) Night is like coal.
(6b) Coal is like night.

The comparison in (6) is a symmetrical comparison because its two terms can be represented in both orders without any preference being assigned to either. The interpretation immediately activated for both (6a) and (6b) is that these two terms share the property of 'blackness'. This assignment of meaning is straightforward and requires no special processing effort. Moreover, the degree of similarity between the two terms comprising (6a) equals (intuitively speaking) the similarity between the two terms in (6b), a judgment corroborated by the response of five native speakers of English who were asked to judge the similarity degree of the two terms comprising these two orders.

Another counter-example of the same type is 'snow is like flour', which has been judged by various readers as a metaphorical comparison. Again, contrary to Ortony's proposal, this metaphorical comparison is symmetrical: both its orders are accepted ones, and the similarity between snow and flour equals the similarity between flour and snow.

The observations regarding these two comparisons were supported in an informal experiment I carried out, in which readers of these comparisons were asked to indicate the preferred order and to rate the similarity between the two concepts in both orders.

There is a possible objection to the above analysis: one might argue that, for many metaphors, the shared property is being used metaphorically rather than literally, and hence there is no point in talking of the two concepts comprising a literal comparison as being included within the same category. On this account, although the shared property of 'rage' and 'volcano' (in 'rage is like a volcano') can indeed be described as, say, 'things which erupt unexpectedly', the 'eruption' of rage differs qualitatively from the 'eruption' of 'volcanoes' (this problem is discussed in Ortony et al. (1985) under the title 'the inequality of properties'). Hence, so the objection goes, 'rage' and 'volcano' cannot be said to be 'literally' included within the same category of 'things which erupt unexpectedly'. My response is the following.

The very distinction between metaphors and literals is a fuzzy one. In some cases it is not clear whether the given property is 'literally' shared by both concepts or not. A case in point is the comparison 'billboards are like warts' in which the shared property is, say, 'ugliness' or 'sticking out'; it is not at all clear whether 'ugliness' is 'literally' or only 'metaphorically' shared by billboards and warts. Moreover, a closer look will cast doubt on this distinction even in examples which look like straightforward cases of a literal sharing by the two concepts. Thus, even a property like 'slowness' which is, presumably, shared by both 'John' and 'a turtle' (in: 'John is like a turtle' cannot unequivocally be 'really' shared by both, since people are not 'really' as slow as turtles unless they are handicapped (for a similar view cf. Ortony et al. (1985). Thus the very distinction between literal and metaphorical uses of a given property is, at least to a certain extent, dubious. In fact, the use of the notion 'category' enables us to avoid the above problem, since two concepts

can belong to the same superordinate (ad hoc) category without necessarily literally sharing the same property: both rage and volcano are included in the domain of 'things which erupt unexpectedly' even if they do not necessarily hold the same prominence in that category.

To return to our main discussion: Symmetric metaphorical comparisons of the type considered above must be clearly distinguished from another type of metaphorical comparison discussed by Ortony and illustrated by (7) below.

(7) Surgeons and butchers are alike.
(7a) Butchers are like surgeons.
(7b) Surgeons are like butchers.

Clearly, both orders in (7) are acceptable, and both are easy to understand. According to our proposal, then, (7) should be considered as a symmetric comparison similar to (6) above. Note however that, unlike (6) the two orders in (7) are *asymmetric* with respect to their meaning. The reading assigned to (7a) emphasizes the surgeon-like skill and precision of the butcher's manner of cutting, whereas the main reading for (7b) would presumably emphasize the opposite characteristics of the surgeon's work, i.e., butcher-like imprecision and crudity. Both (6) and (7), then, are similarly symmetric with respect to preference of orders but dissimilar with respect to their meanings: whereas the reading assigned to (6a) equals that of (6b) (at least under the reading emphasizing the blackness of both), no acceptable reading of (7a) equals, or even resembles, that of (7b) (cf. also Ortony (1985)).

Note that in addition to these two types of symmetrical comparison another sub-type of symmetric metaphoric comparison should be considered, the type which Ortony proposes to call 'anomalous comparisons'. Consider:

(8) ?Night and a book are alike.
(8a) ?Night is like a book.
(8b) ?A book is like night.

(8) is a symmetric comparison, since there is no one order which is preferred over the other: unlike (6), however, both orders are 'non-accepted' orders, that is, they require a great deal of processing effort in order to be fully understood.

In summary, then, two basic types of comparisons have been distinguished, 'asymmetric' and 'symmetric' comparisons; the latter are further divided into three main subtypes, namely, comparisons in which both orders are acceptable and (roughly) convey the same meaning, those in which the two orders are acceptable but differ significantly in meaning, and those in which both orders are non-acceptable, corresponding to (6), (7) and (8) respectively.

On the basis of the above examples, we conclude that the distinction between symmetric and non-symmetric comparisons, or between degrees of symmetry in comparisons, cannot be correlated with the distinction between metaphorical and non-metaphorical comparisons: both metaphorical and non-metaphorical comparisons equally exhibit symmetry and asymmetry. In fact the distinction between symmetric and asymmetric comparison is a perfectly general one, and applies equally well to any comparison statement of the form 'A is like B'.

Before proceeding, however, let me emphasize the following point regarding the relative nature of the symmetry/asymmetry distinction. As pointed out in Ortony et al. (1985), comparisons conform to the Gricean maxim of informativeness and therefore the predicate (the B term) must always add some information to the topic of a given predication. On this account a case such as 'night is like coal' would be considered a redundant prediction if the meaning it conveys is that 'night is black (like coal)', since this is something that we already knew about night in the first place. Hence, so the argument goes, if this comparison is to be understood as an informative utterance at all it should exhibit some asymmetry of meaning. How, then, can there ever exist any symmetric comparisons?

My response is the following. Surely, any comparison, whether literal or metaphorical exhibits a certain 'default' asymmetry of meaning due to the informativeness constraint. However, comparisons do differ from each other with respect to the asymmetry (of meaning) which is assigned to them as can be seen in certain tasks (though not in all). Such differences show up clearly, for example, when subjects are asked to name a property with respect to which 'A is similar to B' and 'B is similar to A'. In cases of (relatively) symmetric comparisons (e.g., 'night is like coal') the same property will be straightforwardly mentioned for both directions (e.g., 'blackness'), whereas in cases of (relatively) asymmetric comparisons (e.g., 'questions are like crow bars') the reader will come up with different properties for each direction. A difference of this kind clearly cannot be attributed to the default asymmetry, but must rather be ascribed to other factors which will be discussed in the next section.

The main conclusion to be drawn here is that the terms symmetry and asymmetry should be construed as symmetry and asymmetry relative to the (presupposed) 'default' asymmetry which is imposed on any comparison by the pragmatic constraint of informativeness.

Let us return now to our main argument. We face two questions, which are in fact the main questions of the present study: (1) What are the principles which underlie such a distinction?; and (2) How can we account for the different effects this distinction has regarding the preference and similarity judgments of subjects? These questions will be addressed in sections 2 and 3, respectively.

2. The notion of 'accepted order'

Having presented the above observation, we now face the question: what are the principles which underlie the distinction between symmetric and asymmetric comparisons, as well as the (sub)distinctions between various types of symmetric comparisons? It is worth emphasizing again that the crucial step in defining these principles is a definition of the notion of 'The accepted order'. Thus, all cases of asymmetric comparison can be defined as comparisons in which one of the two possible orders (i.e., 'A is like B' or 'B is like A') is the accepted order, while the other is not. By contrast, in all cases of symmetric comparison there is no preference for one order or the other. Note that in the latter case the lack of preferred order shows two subtypes: either both orders are 'accepted' ones, as in 'Night is like coal', or neither is, as in 'mountains are like cigarettes'.

I will address the following two questions: (1) What are the conditions under which a certain order is an accepted one? (2) How can we account for the fact that an order meeting these conditions is in fact an accepted one?

My main proposal is that the accepted order will be the one which best achieves the main purpose of using a comparison between two concepts, namely, to minimize the 'conceptual distance' between the compared two terms. I will argue that the 'accepted order' is the one in which the 'cognitive distance' between the A and B terms is smaller than with the non-accepted order.

2.1. Conditions on the accepted order

I turn first to the issue of conditions on the 'accepted order'. (9) below defines these conditions.

(9) In order for a given comparison of the form 'A is like B' to conform to the 'accepted order', it must meet the following two conditions:
(1) The concepts represented by the A and B terms must both be conceived of as being included in the domain of some easily constructed ad hoc or stable category G.
(2) The B term must be a prominent member of G.

A comparison which meets these two conditions is claimed to be psychologically easier to process, and/or linguistically less marked, than a comparison which does not meet both these conditions.

Two notions, ad hoc category and prominence are crucially important to this account. Let us briefly elaborate on each of them.

2.1.1. Ad hoc categories

A central assumption of the present study is that an essential stage in assigning meaning to a comparison is the (attempted) construction of an ad hoc category (cf. Barsalou (1983)) on the basis of the shared property of A and B. By way of illustration, consider (10) below:

(10) Electric wires are like spaghetti.

On the present account, in order for the comprehender to assign meaning to this metaphorical comparison he has to come up with a superordinate category of which both electric wires and spaghetti are members. Obviously, there is no such stable 'natural' category that is stored in memory. The reader, therefore, must construct in a post hoc manner, rather than retrieve from memory, a (relatively) new ad hoc category for both A and B terms. This ad hoc (that is, non-stable) category is based on a property that can be viewed as being shared by both terms. A reasonable candidate in this case might be the (ad hoc) category 'having tangled and flexible strands', within whose domain both A and B can be included.

Note that this ad hoc category differs from 'stable' categories, such as 'vehicles', 'birds', 'countries' and so on, in that it lacks the 'conceptual stability' which is typically associated with the former. This lack of conceptual stability in memory can easily be seen experimentally by asking subjects to point out the name of a superordinate category when presented with stimulus which is supposedly one of its members. When someone is presented with the stimulus 'spaghetti' and asked to define its superordinate category, he is far more likely to respond with 'food' than with 'having tangled and flexible strands'. Accordingly, 'spaghetti' is more likely to be stored in memory as a member of the category 'food' and not of the category 'having tangled and flexible strands'. Still, in a specific context and for a specific purpose or goal (e.g., for the purpose of constructing the category shared by both spaghetti and electric wires), the reader can and must construct in a post hoc manner, rather than merely retrieve from his memory, such an ad hoc category.

It is worth mentioning, in passing, that recent studies of categorization (Barsalou (1983)) have been paying more and more attention to such ad hoc categories. These studies, however, have not brought out the role of 'ad hoc' categories in the context of comparison structure and comprehension.

In addition to being conceptually (relatively) non-stable and constructed in a post hoc manner, ad hoc categories share an important property with stable categories, namely, they exhibit 'prototype structure'. For example, it was shown by Barsalou (1983) that within the domain of the ad hoc category 'things to take on a camping trip', the item 'a case or box for foodstuffs' is likely to be considered more prototypical than, say, 'a computer' (even though it is conceivable that a true workaholic would always want to take a computer).

This prototype structure is what distinguishes 'ad hoc' (as well as 'stable') categories from the notion of 'set' in classical set-theoretical models. Recall that in these models a property which is shared by two concepts is regarded as the 'set' which the two terms are members of. So defined, the members of the set do not necessarily exhibit 'a prototype structure' (see Lakoff (1987) for a thorough discussion of the differences between 'classical' and 'prototype' conceptions of categories). Considering, for example, the set of 'words starting with the letter A', it is reasonable to assume that its members do not exhibit a prototype structure: all words starting with the letter A equally represent their superordinate categories. Such 'arbitrary categories', which can be specified as a set and which do not exhibit prototype structure, should be distinguished from the notion of ad hoc categories. An ad hoc category is not just any collection, but rather an internally structured category which shares certain structural characteristics with stable categories (see also Glucksberg and Kesar (in progress)).

The distinction between ad hoc and stable categories should, of course, be viewed as representing a continuum rather than a polar distinction: categories such as 'vehicles', 'furniture', and 'countries' represent relatively stable categories, whereas categories like 'things to take on a camping trip' or 'things to take away from a burning house' appear to represent relatively unstable categories. In between are such cases as 'white entities' or 'cold entities' which, presumably, are less stable than 'furniture' but more stable than 'things to take away from a burning house'. Although the theoretical basis for this continuum remains to be investigated, certain tendencies clearly play a role in determining the stability of the category. For example, a high correlation among the properties comprising a certain category contributes to the stability of this category: members of the category 'furniture' clearly share a large number of correlated properties such as function, substance (typically wood), location (typically indoors), and so on. Among categories whose members share only one property (e.g., 'white entities', 'cold entities', etc.), categories which are based on perceptual properties (e.g., 'white entities', 'cold entities'), tend to be more stable than categories based on a functional property. Obviously these are only tendencies, which should be further examined carefully.

The introduction of gradal nature of categories enables us to motivate the view, underlying the present study, according to which there is a basic mechanism of comprehension shared by both literal and metaphorical comparisons which is based on categorization. On this view the comprehension of literal and metaphorical comparisons involves either the retrieval or the construction of a category: the category to be retrieved in the case of literal comparisons is a relatively stable one, whereas that involved in the comprehension of metaphorical comparisons is relatively unstable (for a similar view cf., e.g., Glucksberg and Kesar (in prep.) and Turner (1988)) and thus must be

constructed rather than merely retrieved from semantic memory. Such a view does not lose sight of the insights provided by other proposals that are based on the idea of 'shared property' (e.g. Ortony et al. (1985)). At the same time, it has the advantage of providing a unified framework for both literal and metaphoric comprehension, a framework which accounts for some of the similarities and differences between the comprehension of the two types.

2.1.2. Prominence

On the present account, the prominence of a member of a given category is a complex notion wherein several parameters converge. As the present paper does not centrally address the question of prominence, I will not propose either a formal definition of the concept, or an account of its determinants. Rather, the prominence of a given member relative to its dominating category will be taken intuitively as a given. This method is a relatively reliable one, since, by and large, subjects do tend to agree on such judgments of prominence across various tasks (see Ortony (1985)).

In addition to the incorporation of the notion of ad hoc category it should be emphasized that the main difference between the present proposal and Ortony's is implicit in the second condition. Recall that Ortony's proposal of salience imbalance imposes, for metaphorical comparisons, a constraint on both the A and the B term with respect to the shared property; as already explained, the 'salience imbalance' model argues that the shared property is a high-salient property of the B term and a low-salient property of the A term. Ortony's proposal constrains both the A and the B term with respect to the shared property; by contrast, the present proposal is less restrictive, in that it imposes a constraint only on the B term. The justification for doing this is the inability of Ortony's more constrained version to account for the fact that some metaphorical comparisons (like (6) above) show no salience imbalance with respect to their shared property. This is perhaps the crucial difference between the present proposal and Ortony's one.

2.2. Analysis of examples

Let me illustrate how the constraints on comparison structure described in (9) apply to some of the comparisons presented above as well as others. We will start with asymmetric comparisons.

(11) Electric wires and spaghetti are alike.
(11a) Electric wires are like spaghetti.
(11b) ?Spaghetti is like electric wires.

(11a) is an accepted order since it meets the two conditions in (9). The first condition is met in that it is possible to construct an ad hoc category, such as

'Things having tangled and flexible strands', which includes both 'electric wires' and 'spaghetti' as its members. The second condition is met since among the (potential) members of this ad hoc category 'spaghetti' is surely a prominent member.

By contrast (11b) represents an unaccepted order, since it does not meet both of the above conditions. Although it is indeed possible to construct an ad hoc category which includes both 'electric wires' and 'spaghetti' as its members (the obvious candidate is, of course, the former 'Things having tangled and flexible strands'), in no such category can be the B term ('electric wires') be conceived of as a prominent member. If we do construct a category in which 'electric wires' is a prominent member, it will not include 'spaghetti'. Similarly, (12a) meets both of the above conditions, whereas (12b) does not.

(12) Rage and a volcano are alike.
(12a) Rage is like a volcano.
(12b) ?A volcano is like rage.

Asymmetric literal comparisons are accounted for by the present conditions as well. Consider

(13) Albania and Russia are alike.
(13a) Albania is like Russia.
(13b) ?Russia is like Albania.

Clearly, (13a) meets our 'accepted order' conditions. The superordinate category is 'Communist countries', of which Russia is indeed a prominent member.

By contrast, (13b) fails to meet our conditions. Albania is not a prominent member of the category 'Communist countries', and there appears to be no other easily constructible category which includes both Russia and Albania where the latter can be conceived of as a prominent member.

Let us turn now to a brief analysis of some symmetric comparisons. Recall that symmetric comparisons are those in which there is no difference in the 'acceptability value' for both orders: both orders are either accepted or non-accepted ones. Let us consider

(14) Night and coal are alike.
(14a) Night is like coal.
(14b) Coal is like night.

Both (14a) and (14b) below meet the conditions on the 'accepted order', thus yielding a symmetric comparison: the ad hoc category which is constructed in both cases, is something like 'dark entities', of which both coal and

night can be considered as prominent members. Moreover, the fact that both orders of (14) meet the above conditions may also account for the fact that both are easily processed (as can be easily seen).

By contrast, consider the other type of symmetric comparisons illustrated in (15), the 'anomalous type' where both orders are non-accepted:

(15) ?Night and a pencil are alike.
(15a) ?Night is like a pencil.
(15b) ?A pencil is like night.

In (15a) and (15b), even if the necessary energy is invested to construct an appropriate ad hoc category which will include both night and pencils, any attempt to meet the second condition will fail. Note further that if this is not an easy-to-construct category, it will also violate the first condition. Similar analyses can be proposed for the other novel comparisons that were previously presented.

A symmetric literal comparison such as

(16) China and Russia are alike.
(16a) China is like Russia.
(16b) Russia is like China.

can also be accounted for by the present account. Here the most immediate superordinate category is 'Communist countries', of which both Russia and China are prominent members. Both orders meet our two conditions, yielding a symmetric comparison.

In summary, then, analysis of the various types of symmetric and asymmetric comparisons suggest that the distinction between symmetric and asymmetric comparisons, as well as the differences in the ease of processing among the two sub-types of the symmetric constructions (represented in (14) and (15)), are captured by the conditions I have proposed on the accepted order.

3. Cognitive reference points

Having defined the conditions under which a certain order is to be regarded as the 'accepted order', we may proceed to ask for an explanation. That is, why are the appropriate conditions precisely these? Why is it the case that under these conditions a given order requires the least processing effort? And why, under these conditions, does the similarity between the comparison's two concepts increase?

By way of answer I would like to propose an extension of Rosch's well-known analysis of the notion of point. I suggest that Rosch's notion

which applies to perceptual categories as well as to conceptual stable categories, can be extended to the domain of ad hoc categories. On the basis of this consideration I argue that an order which meets the above conditions will best achieve the (main) function of comparison, which I take to be the maximization of 'similarity', i.e., minimizations of the 'conceptual distance', between its two terms.

As noted, the key notion in this proposal is that of 'Cognitive Reference point'. This notion is taken from Rosch's (1975) study of natural (what has previously been called 'stable') categories (such as colors, numbers, and lines). Rosch herself views her proposal as stemming from (and directly related to) the notion of 'ideal types' which was originally introduced by Wertheimer in his studies of perception. Her idea is that among various stimuli (perceptual as well as conceptual) a distinction can be drawn between 'reference stimuli' and 'stimuli which deviate from the reference stimuli'. In order for a stimulus to be defined as a 'reference point' within a category, it must be shown to be one which other stimuli are seen 'in relation to' (p. 533).

The hypothesis underlying Rosch's study is that 'stimuli slightly deviant from reference stimuli are more easily assimilated to, and thus, judged metaphorically "closer to" the reference stimuli, than vice versa' (ibid.). Thus, for example, Rosch found that vertical or horizontal lines, focal colors, and round numbers are reference points for other types of lines, non-focal colors, and non-round numbers, but not vice versa. Note that the reference stimuli can be described as being either more prototypical (as in the case of focal colors), more familiar (as in the case of vertical and horizontal lines), or more salient (the round numbers) members of their respective superordinate categories.

Note that Rosch is not completely explicit in determining the conditions under which a Reference–Deviant (RE–DE) relation holds between two stimuli. However, a closer look at her argument suggests that the following conditions can be easily extracted from her study: (It should be emphasized again that the conditions below reflect my analysis of Rosch's proposal, and not something explicitly stated by Rosch herself.)

(17) (i) both stimuli must be conceived of as being 'relatively close' to one another. Thus, in the case of numbers, the two numbers must be considered close enough (for example, 97 and 100, but not 52 and 100; or red and pink but not red and blue).
(ii) One of the two (i.e., the Reference Point) must be a more prominent (more salient, or prototypical, or familiar, as described above) member within the dominating superordinate category.

Given these (extracted) conditions for the RE–DE relation to hold between two stimuli, Rosch's main finding can now be stated: The 'conceptual dis-

tance' between the DE (Deviant) and the RE (Reference) is smaller than the distance between the RE and the DE.

This is demonstrated by a variety of psychological and psycholinguistic tasks. For example, in one experiment subjects placed pairs of stimuli into sentence frames consisting of linguistic 'hedges' such as '—is virtually (or essentially)—'. The results showed that the supposed reference stimuli were most often placed in the second (reference) slot rather than vice versa. For example, subjects placed 97 and 100 in the deviant and reference slots respectively, as in '97 is virtually 100', and pink and red in the respective slots as in 'pink is virtually red', rather than the inverse forms ('100 is virtually 97' and 'red is virtually pink'), suggesting that 97 is seen as more related to 100 than vice versa. In another experiment subjects located a stimulus in physical space to represent their impressions of the psychological distance of that stimulus from another spatially fixed stimulus. As in the former task, the results showed that when the fixed stimulus was a supposed reference stimulus, other stimuli were placed closer to it than vice versa.

Having introduced the characterizations of the RE–DE relation, we are in a position to account for the greater ease of processing and the preference for the 'accepted order' over the non-accepted one.

The argument is based on the following considerations.

(1) Our two conditions on the 'accepted order' (given in (9)), as applied to stable as well as ad hoc categories are the counterparts of the two conditions extracted from Rosch's study of cognitive reference points (given in (17)) which applied to natural perceptual and conceptual categories. That is, the relation between the comparison's two terms in the case of the 'accepted order' corresponds to that of the RE–DE relation in natural categories.

Rosch's study has shown that certain principles of cognitive organization apply to both perceptual and conceptual categories. The position I am arguing for in the present paper is that, since natural and ad hoc categories share the prototype structure which is the main factor involved in the RE–DE relation, a similar relation also applies to the two comparison terms included in the domains of either a (relatively) stable or (relatively) ad hoc category.

Rosch's first condition required that both stimuli be conceived of as being 'relatively close' to one another; the counterpart to this condition is the requirement in (9) that both concepts in the comparison must be conceived of as members of an easily constructed ad hoc (or stable) category. But if two concepts belong to the same easily constructible category it follows that these members will be 'conceptually close' to each other with respect to that ad hoc category. Thus, electronic wires and spaghetti are judged as being sufficiently close in the context of their easily constructed superordinate ad hoc category 'things with tangled and flexible strands'; on the other hand, there is no simple and straightforward way to construct an ad hoc category for pairs like 'electric wires' and, say 'glue'.

The correspondence between the second condition in (9) is even more straightforward. Both conditions require that the 'reference' stimulus and the 'B-term' concept are to be prominent members of their respective categories. In both cases similar parameters determine the prominence of a given concept, namely, prototypicality, salience, goodness of figure, familiarity, etc.

In sum, then, the conditions on the accepted order of a pair A–B allow the B term to function as a conceptual *reference point* for the other term.

(2) Recall that Rosch's main finding with regard to the RE–DE relation was that the 'conceptual distance' between the reference stimulus and the deviant stimulus was smaller than the inverse distance. Applying this finding to comparisons, we may suggest that the conceptual distance between the comparison's two concepts is smaller for an 'accepted order' than for a non-accepted order.

(3) Given the above two considerations, we may add one (almost trivial) assumption: that the main function of comparison is to enhance similarity, that is, to 'minimize' the conceptual distance between the comparison's two terms. For example, if one compares electric wires to spaghetti, it is reasonable to assume that one is attempting to highlight the similarity between these two terms, that is to bring them closer together conceptually. An order which achieves this function, as does the 'accepted order', will be preferred over, and will be more easily comprehended than, one which does not, ceteris paribus.

In conclusion, the account I am proposing here is that under the 'accepted order' conditions, the similarity between the comparison's two concepts is higher, and hence the processing of that comparison is easier, than otherwise. Thus the desired goal of reducing the conceptual distance between the comparison's two terms is better achieved in the case of the 'accepted order' than in the non-accepted order.

In general, this argument is fully compatible with Tversky's account of asymmetries in similarity judgements. In fact the very use of the terms 'variants' and 'referent' in referring to the 'A' and 'B' terms, respectively, suggests an explanation similar to the present one. Tversky himself, when addressing Rosch's study of cognitive reference points concludes that his interpretation of asymmetry 'practically coincides' with Rosch's (1975: 337). In both proposals the 'conceptual distance' between variant and prototype is closer (or to put it differently, the 'similarity' is greater) than that between prototype and variant (see Tversky (1977)). As noted in section 1, Tversky's model applies mainly to literal comparisons (which tend to fall into the realm of stable categories), much in the same way that Rosch's account applies to the domain of (relatively) stable categories; the present account extends their proposals to the domain of metaphorical comparisons, which involves the construction of ad hoc categories. The present account, then, suggests that the same principles underlie both stable and ad hoc categories, yielding a unified account for both literal and metaphorical comparisons.

4. Summary and conclusion

The present paper has focused on the distinction between symmetric and asymmetric comparisons. Three main proposals have been made in this paper.

First it was proposed that the symmetry vs. asymmetry distinction in comparison statements is orthogonal to the literal vs. metaphor distinction: both metaphorical and literal comparisons exhibit asymmetric and symmetric types. This claim is opposed to the observations made in the framework of Ortony's 'salience imbalance' model.

The key notion underlying symmetric vs. asymmetric comparisons is that of the 'accepted order', relative to which the distinction is defined. The second proposal, then, was an attempt to explicitly define the conditions under which a certain order would be conceived of as an accepted order. This definition is based on the idea that the comprehension of comparisons involves the retrieval or the construction of a superordinate category, either a relatively stable category or an ad hoc one (for literal and metaphorical comparisons, respectively). The conditions on the accepted order were specified relative to this superordinate category:

Third, a cognitive account for the relative ease of processing of the accepted order was proposed. Thus, it was argued that the principles underlying the Reference point–Deviant relations (corresponding to Tversky's (1977) terms – referent and variant, respectively) can be extended from the domains of perceptual organization (such as colors, horizontal and vertical lines) and stable conceptual categories (as discussed in Rosch (1975) and Tversky (1977)) to the domain of ad hoc categories. This extension made it possible to handle metaphoric comparisons involving the construction of ad hoc categories. Incorporating these principles into the theory of comparison enables us to account for the fact that the 'accepted order' is relatively easy to process, and as a consequence to explain the symmetry and asymmetry which comparisons exhibit.

What these proposals implicitly suggest is that underlying the comprehension of comparisons is a process of categorization. Two main observations made by recent theories of categorization are particularly important:

(1) Members of given categories differ from each other with respect to their prominence (usually the term prototypicality is used, but prototypicality is only one among various determinants of prominence); the relation between the most prominent and the less prominent members of the category is asymmetrical: the conceptual distance from the latter to the former is smaller than vice versa.

(2) Ad hoc categories exhibit the same prominence structure as do stable categories.

Taken together, these two assumptions provide us with an initial framework for handling the data that were presented above. Thus, the asymmetrical

relations between members of a given category made it possible to account for the basic asymmetry which shows up in comparison structure. The second observation regarding ad hoc categories enabled us to extend our analysis to metaphorical comparisons, since the comprehension of metaphorical comparisons involves the construction of an ad hoc rather than a stable category.

The more fundamental issue, at which we only hinted, has to do with the idea that underlying the comprehension of both literal and metaphor comparisons is the same process of categorization. The introduction of the notion of ad hoc categories and the stability scale suggests that there is a basic mechanism of comprehension shared by both comparison types. This proposal seems to be highly compatible with recent studies of metaphors and comparisons (see for example Glucksberg and Kesar (in prep.), or Turner (1988) inter alia) although its full implications still remain to be studied.

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