

Contextual Operators: *respective*, *respectively*, and *vice versa*

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0. Introduction: contextual operators

The special kinds of meaning properties that sentences acquire in scalar contexts have been extensively studied by Horn, Ducrot, Anscombe, Fauconnier and more recently by Fillmore, Kay and O'Connor (1988) with respect to sentences containing the expression *let alone* and by Kay (1988) with respect to sentences containing the word *even*. The papers just cited argue that certain linguistic items, in particular *let alone* and *even*, contain as part of their semantic content instructions to the addressee to construct the interpretation of any utterance that contains them in conformity with stipulated contextual parameters. More specifically, *let alone* and *even* require the interpreter to construe the context as scalar and provide the interpreter with a concrete plan for integrating the semantic information presented in the sentence with the scalar information presupposed to obtain in the context. Scalar operators in effect say to the addressee: 'Construe the context of interpretation for the present utterance as containing a set of interrelated propositions conforming to a scalar model (elsewhere defined) and assign to the proposition(s) asserted or presupposed by the present utterance the following position(s) ... in that structure' (where what fills the ... will depend on the particular scalar operator in question).

The scalar operators discussed in the papers referred to above form a subclass of what we may call **contextual operators**. These are lexical items or grammatical constructions whose semantic value consists, at least in part, of instructions to find in, or impute to, the context a certain kind of information structure and to locate the information presented by the sentence within that information structure in a specified way.¹ The present paper deals with another group of contextual operators, which are, for the most part, not scalar, namely: *respective*, *respectively* and *vice versa*. While it is possible to argue that such scalar operators as *let alone* and *even* fail to affect truth conditions while nonetheless affecting so-called conventional implicature aspects of initial interpretation -- though this point depends on the evaluation of some subtle examples -- the contextual operators we are concerned with here unquestionably affect truth conditions, however this notion may be construed.

1. *Respective* versus *respectively*

It is generally known that *respective* and *respectively* share a common semantic property, roughly that of providing or evoking a mapping between the members of two sets (McCawley 1976). In the paradigmatic examples, a predicate is distributed over the pairings of the mapping attributable to *respective* or *respectively*. Thus the (b) versions of (1) and (2) provide glosses of the (a) versions.

- (1-a) Mr. Smith and Mr. Jones love Mrs. Jones and Mrs. Smith, respectively.
- (1-b) Mr. Smith loves Mrs. Jones and Mr. Jones loves Mrs. Smith.
- (2-a) Mr. Smith and Mr. Jones love their respective wives.
- (2-b) Mr. Smith loves Mrs. Smith and Mr. Jones loves Mrs. Jones.

The distributed predicate is in each case LOVE. I believe it is obvious that *respective* and *respectively* affect the conditions under which these sentences will be judged true.

There is, however, a semantic difference between *respective* and *respectively* which to my knowledge has not been previously noted and whose consideration will lead us to conclude that these are indeed contextual operators. Note as a preliminary that the expression 'the three respective highest scores' is not syntactically ill formed, as illustrated in

- (3) On the syntax, semantics and phonology exams, the three respective highest scores were received by transfer students.

We now need to explain the distributional contrasts highlighted by **bold-face** in the following three examples:

- (4-a) The three best students received the three highest scores, **respectively**.
- (4-b) *The three best students received the three **respective** highest scores.
- (5-a) John and Jack received the longest and the shortest comments from the teacher, **respectively**.
- (5-b) *John and Jack received the longest and the shortest **respective** comments from the teacher.
- (6-a) *The students were pleased by their scores, **respectively**.
- (6-b) The students were pleased by their **respective** scores.

Our problem is to discover the property shared by (4) and (5) and absent in (6) that permits *respectively* and prohibits *respective* in the former two cases (that is, (4) and (5)) while prohibiting *respectively* and permitting *respective* in the latter, (6). This property cannot reside simply in the presence or absence of conjoined NPs: neither (4) nor (6) contains a conjoined NP; the former accepts *respectively* and rejects *respective* while the

latter accepts *respective* and rejects *respectively*.

I propose that the controlling generalization is the following:

- (7) *Respectively* can denote or evoke a mapping between the denotata of two plural or conjoined constituents iff that mapping is achieved via independent linear rankings of the two constituents.

Respective can denote or evoke a mapping between the denotata of two plural or conjoined constituents iff that mapping is not achieved via independent linear rankings of the two constituents.²

In (4) each of the plural, superlative NPs, *the three best students* and *the three highest scores*, provides an independent linear ranking of its members. *Respectively* then maps the top student to the top score, the second best student to the second best score, and so on. In (6) neither of the NPs *the students* nor *their scores* provides on its own a ranking of its members. The mapping from students to scores is achieved, not by lining up the corresponding members of independently supplied rankings of students and scores, but by an entirely different process, one which depends crucially on our general knowledge that exam scores are given out one to a student.

Now, what about (5)? According to generalization (7), since (5) permits *respectively* and prohibits *respective* the two semantically plural NPs *John and Jack* and *the longest and the shortest comments* should both satisfy the independent linear ranking provision of (7). And so they do if we interpret the sequence of mention of the conjuncts in a conjoined constituent as one way of providing the linear ranking of a constituent called for in (7). The reference in (7) to the linear ranking of a constituent, rather than to the linear ranking of the denotata of a constituent, was intentional. With regard to selection of *respectively*, a constituent may be linearly ranked either by a notional ranking of its denotata or by the sequence of mention of its conjuncts. *Respectively* is thus appreciably less finicky than any self-respecting linguist would be, blissfully confounding under a single, abstract criterion of linear ranking a meaning relation over the content of a constituent and a metalinguistic relation over the form of a constituent.

2. Further predictions

A conjoined constituent is always susceptible of a linear ordering interpretation, since the order of mention of its conjuncts is always available for this interpretive purpose. Thus, when a conjoined NP co-occurs with a non-conjoined NP accorded an independent linear ordering

interpretation we should find *respectively*. This prediction is confirmed.

- (8) The two prettiest girls in the class dated the captain of the football team and the captain of the basketball team, *respectively*.
- (9) Mary and Sue dated the two biggest macho jerks in the class, *respectively*.

We see in (8) and (9) that in the case of *respectively* one ranking can come from order of mention and another from construal. Relative syntactic position does not matter: in (8) the conjoined NP is the object and in (9) the subject.

Another consequence of (7) is that conjoined NPs need not, although, of course, they often do, select *respectively* rather than *respective*. That is, conjoined NPs may be interpreted semantically simply as plurals, thus under contextually appropriate conditions triggering *respective* rather than *respectively*.

- (10-a) On the syntax, phonology and morphology exams, the three *respective* highest scores were received by students specializing in semantics.
- (10-b) *On the syntax, phonology and morphology exams, the three highest scores were received by students specializing in semantics, *respectively*.³

Note that *respective* in (10-a) maps exam subjects to highest scores. Neither of the NPs *the syntax, phonology and morphology exams* nor *the three highest scores* receives an **internal** ranking. Despite the fact that one of the NPs subject to the R-mapping is conjoined we find *respective* and not *respectively*. Example (10) may then be contrasted with (8) and (9), in which a single conjoined NP accompanies the choice of *respectively*. Now, comparing (5) with (11), we see that a sentence containing two conjoined NPs can likewise accept either *respective* or *respectively* depending on the construal process given in (7).

- (11-a) The husbands and lovers were writing letters to their *respective* wives and sweethearts.
- (11-b) Every officer and enlisted man wrote a letter to his *respective* wife or sweetheart.

Occurrence with NPs of *respective* versus *respectively* is not determined by presence or absence of conjunction; it is determined by the generalization about construal given in (7).

Limitations of time prohibit our considering examples in which *respectively* occurs with non-nominal conjoined constituents, other than to note their existence as in (12) through (15)⁴ and to mention that all of

them call on the order-of-mention interpretive strategy.

- (12) John and Mary sang and danced, respectively.
- (13) The three top prize winners sang, danced and played the kazoo, respectively.
- (14) John's and Mary's manuscripts were competent and brilliant, respectively.
- (15) John and Mary were furious, volubly and icily, respectively.

Respectively thus confounds constituents that can be considered ranked because of the interpretation of what they denote with constituents that can be considered ranked because of the order in which their conjuncts are uttered. A notion of context must not only be employed to explain the function of *respectively* but 'context' must here be construed broadly enough theoretically to comprehend both the interpretation of the content of a phrase and the order in which elements of its surface manifestation are uttered.

3. Independent evidence for the contextual character of the R-words

If we leave aside the order-of-mention basis of *respectively* and consider only those uses of *respectively* based on the *notional* ordering of a semantic plurality of elements, we can see that this also is context dependent. For example, in a horse race to 'finish in the money' means either to win the race and pay the most money, or to come in second and potentially pay a smaller amount of money or, lastly, to come in third and potentially pay a yet smaller amount of money. For those who know, or have just learned, these non-linguistic facts, example (16) is immediately acceptable; example (17) is not acceptable for anyone.

- (16) The horses finishing in the money were Shadrach, Meshach and Abed-nego, respectively.
- (17) *The horses finishing out of the money were Shadrach, Meshach and Abed-nego, respectively.

The acceptability difference between (16) and (17) arises from the fact that the background knowledge about what finishing in the money is permits, as specified in generalization (7), a notional ordering of the members of the subject NP in (16), but not in (17). This ordered set is then mapped by *respectively* to the denotata of the names of the three horses given in the nominal complement phrase, themselves ordered by the order-of-mention strategy.

4. *Respective*

Not much needs to be said to establish *respective* as a contextual operator. *Respective* very frequently, although not invariably, occurs in a NP whose determiner is possessive. I will take as established that the genitive construction (when the head noun is non-relational) itself has the contextual property (See Kay and Zimmer 1976). Thus while (18-a), with a relational head, appeals directly to the parental relation, (18-b), with a non-relational head, can evoke any of the relations indicated in (19) according as the context dictates.

(18-a) John's mother

(18-b) John's book

(19-a) John owns a book.

(19-b) John wrote a book.

(19-c) John illustrated a book.

(19-d) John intends one day to write/own/illustrate/... a book

(19-e) John has a book in his hand at the moment.

And so on.

Inserting *respective* in a possessively determined NP does nothing to reduce its contextuality. Thus the relation of John and Mary to the books mentioned in (20) has all the possibilities indicated in (19).

(20) John and Mary were worrying about their respective books.⁵

Similarly, in (21) the relation between each philatelist and his associated congressman will be different in the case in which the philatelists are congressional aides from the case in which they are ordinary citizens.

(21) The philatelists admired their respective congressmen.

Similar examples may be multiplied *ad libitum*.

Although not directly relevant to the issue of *respective* as a contextual operator, it should nonetheless be noted in passing that *respective* provides the principal source of examples in which the R-mapping is **not** employed in the service of distributing a predicate over the pairs of the mapping, as happens to be the case in all the examples we have considered so far and, to my knowledge, all of the examples that have been treated in the literature.

(22) Twelve generals and admirals from the United States, the Soviet Union and their respective allies ... met for two days of discussions.⁶

Note that no predicate is distributed over the mapping from the two countries to the sets of their respective allies. *Respective* is frequently

employed in this way, simply to indicate a plurality of objects which one can construct by increasing the size of a smaller set of objects through adding to it the image of each member under the R-mapping. Thus,

- (23) Two rock stars and their respective entourages can fill a small stadium.

5. *Vice versa*

There is a great deal to be said about *vice versa* and not enough time to say it in. But to make the main point of this paper with regard to *vice versa*, namely that this also is a contextual operator, two brief observations will suffice. The first is that *vice versa* can operate parasitically upon an R-mapping. Thus, if we add *vice versa* to the ambiguous *respective* sentence (21), the ambiguity is preserved.

- (24) The philatelists admired their respective congressmen, and vice versa.

That is, the congressmen who admire the philatelists will be either their elected representatives or their employers according as the context has already fixed the philatelists who admire certain congressmen to be the constituents or the employees of those congressmen. What gets 'interchanged' by *vice versa* is neither a pair of noun phrases (Fraser 1970) nor a pair of 'elements of [a] clause' (McCawley 1970), nor even the denotata of these. Rather, the items that *vice versa* interchanges are a pair of participants in the scene that is evoked by the interpretation of a sentence uttered in a particular context. The output of the contextually dependent construal process that yields an interpretation for (21) serves as input to the construal process that yields the interpretation of (24).

Since *vice versa* operates, not directly on the syntactic or semantic representation of sentential constituents, but rather on the participants in the contextually dependent interpretation of the utterance, ambiguities that are resolved only by extra-grammatical, context sensitive processes must be resolved before *vice versa* can apply. One such ambiguity is that between a bound variable reading of a pronoun and a simple anaphoric reading, as illustrated in the following.

- (25) Each of the men called his supervisor.

In an utterance of (25) only the context can decide whether the men are reported each to have called his own supervisor (bound variable reading) or, alternatively, each to have called the supervisor of some other man. call him Max, who has been previously mentioned in the discourse.

If we add *vice versa* to (25), as in (26-a), the interpreter must decide which reading to give to (25) before assigning to the interpretation of the semantic clause induced by *vice versa* either something glossable along the

lines of (26-b) or something glossable along the lines of (26-c).

(26-a) Each of the men called his supervisor and vice versa.

(26-b) And each man received a call from his own supervisor.

(26-c) And each man received a call from Max's supervisor.

Analogously, when *vice versa* is added to a sentence containing an ambiguity based on anaphora of sense versus anaphora of reference, that ambiguity must be resolved by the context of utterance in order for an interpretation to be given to *vice versa*.

(27) The Joneses don't like their next door neighbors but we do, and vice versa.

In (27), the proposition induced by *vice versa* will be understood as (28-a) rather than (28-b) just in case the zero anaphor in (27) is contextually resolved in favor of anaphora of sense rather than anaphora of reference.

(28-a) Our next door neighbors like us.

(28-b) The Jones's next door neighbors like us.

That is, whatever process(es) of pragmatic interpretation settle on the sloppy or standard identity interpretation of *we do* in a particular utterance of (27) will determine the participants understood to like us in the semantic clause induced by *vice versa*.

As we saw earlier with *respective* and *respectively*, *vice versa* is a contextual operator.

6. Conclusion

Neither *respective*, *respectively* nor *vice versa* is indexical. None of these expressions points to an aspect of, or a participant in, the speech situation in the way that constitutes the defining property of those expression types, such as personal pronouns or tenses, that are called 'indexicals.' The kind of extra-linguistic information to which contextual operators are sensitive is open-ended, unlike the reference of the closed-class indexicals. The latter locate an utterance in a fixed and bounded, if perhaps extensive, coordinate system, but contextual operators do not function within any pre-existing coordinate system: they can marshal the full productive capacity of language to specify that part of the context in which the addressee is to seek the information that they instruct him to incorporate into his interpretation of the utterance.

Nevertheless, the presence in a sentence S of a contextual operator such as *respective*, *respectively* or *vice versa* will affect the conditions under which we judge S true. The existence of such non-indexical, contextual operators establishes that truth judgments can depend on context in non-indexical ways. Thus, truth conditions are not properties of

sentences, even indexically fleshed out sentences, but of situated utterances. Consequently, truth conditions cannot be theoretically prior to sentential content but rather the other way round: if part of the literal content of a sentence *S* is a set of instructions that leads the interpreter of an utterance of *S* to interrogate the context to discover, amongst other things, what conditions will make that utterance of *S* true, then it must be the content of *S* that determines its truth conditions, not the truth conditions of *S* that determine its content.

Richard Montague's useful dictum notwithstanding, there does appear to be at least one significant theoretical difference between natural and formal languages.⁷ Natural languages have evolved within their contexts of use in such a way that their grammars have developed the capacity to provide, as part of the meaning of a sentence, a set of instructions for integrating contextual information into the interpretation of each utterance of that sentence. Formal languages, on the other hand, have evolved in an environment in which such a capability would have been a drawback. It is therefore not surprising that formal languages do not contain the contextual property of natural languages. Contextuality in natural languages is, as we have seen here, not restricted to a finite class of indexical expressions. A realistic theory of grammar and meaning for natural languages needs to be sensitive to this, and perhaps other, structural residues of their evolutionary history.

NOTES

1. Eve and Herbert Clark in their 1979 study of English denominal verbs introduced the term 'contextual expression.' Kay and Zimmer (1976), following the seminal work of Pamela Downing, later published as Downing (1977), argued that the English nominal compound and also certain genitive constructions have the contextual property. More recently, Herbert Clark (1983) has discussed many such contextual phenomena from a parsing perspective.

The general idea that, issues of indexicality aside, linguistic content significantly underdetermines first level, 'literal,' interpretation is not original here. Among those whose treatments of various aspects of this large problem have had a direct influence on the work presented here are Jean-Claude Anscombe, Eve Clark, Herbert Clark, Pamela Downing, Oswald Ducrot, Gilles Fauconnier, Charles Fillmore, George Lakoff, Ivan Sag, John Searle, Dan Sperber, François Recanati, Robert Wilensky, Deidre Wilson, and Karl Zimmer.

I would like also to acknowledge fruitful discussion with Claudia Brugman and Charles Fillmore regarding some of the specific issues of analysis reported here.

2. I am indebted to Claudia Brugman for discussion leading to the formulation in (7).

I assume here that in constructions where non-constituents are conjoined, as for example in right-node-raising cases, the result is nevertheless a constituent.

Each instance of *respective* or *respectively* betokens one case of the mapping referred to in (7), but there may, of course, be more than one such pairwise mapping to a clause.

- (i) Dawn and her roommate received first editions of the *I-Ching* and the *Book of the Hours*, respectively, from their respective admirers.

McCawley (1976) gives comparable examples.

A provision that the mapping provided by *respective* or *respectively* be one-one would be too strong, applying in most but not all cases. An attested counterexample to such a one-one provision is given in (iii), which comes from the New York Times, courtesy of Robert Amsler.

- (iii) The three women are, respectively, the mother and sisters of Randall Dale Adams, who has been ...

I am indebted to George Bergman for discussion of the last point.

3. Example (i), which violates (7) in the same way as (10-b) does, is felt by some to be less flagrantly unacceptable than the latter. Consider also example (ii), which if deemed acceptable will violate (7) in the direction opposite from that in which (i) will. [I am indebted to George Lakoff for offering (ii) as an acceptable sentence at the oral presentation of this paper.]

- (i) ?On the syntax, phonology and morphology exams, the three highest scores, respectively, were received by students specializing in semantics.
- (ii) ?Billy Martin and Tony La Russa are known for their respective volatility and calm.

An unsystematic survey shows considerable variation in judgment on both of these sentences. This variability may perhaps be explained as follows. Note that (i') is unproblematical. Example (ii') is equally unproblematical once one has the background knowledge that Martin and La Russa are baseball managers with reputations for excitability and calm, respectively.

- (i') On the syntax, phonology and morphology exams, the highest scores were received by students specializing in semantics.
- (ii') Billy Martin and Tony La Russa are known for their volativity and calm.

Note further that, although (i') and (ii') are not restricted by their grammar to the readings obviously intended for (i) and (ii), these are the most salient readings of (i') and (ii') given the available background information. In this respect, (i) and (ii) bear the same relation to (i') and (ii') as (iii) does to (iii').

- (iii) The men called their respective wives.
- (iii') The men called their wives.

That is, the use of the R-operator in the non-prime version is effectively otiose in that the mapping which the R-operator is employed to induce would probably be inferred by the interpreter even if the R-operator were not employed.

It seems to be under circumstances such as these -- in which use of any R-operator will be felt as pleonastic since the context is sufficient to lead the interpreter to the intended understanding without its use -- that judgments are fairly lenient if the wrong R-operator is used. This line of reasoning would predict that the judgments of unacceptability for (iv) should be about as much softened as those for (i) and (ii).

- (iv-a) ?The men called their wives, respectively.
- (iv-b) ?John, Jack and Harry, respectively, called their wives.

An empirical prediction of this line of explanation, which I have not had the opportunity to test, is that speakers should tend either to reject all the examples in this note marked with '?' or to accept them all.

4. McCawley (1976) makes this point as well.

5. Interestingly, it does not seem to be possible that a different relation is contextually established between John and the book associated with him from the one between Mary and the book associated with her. For example, sentence (20) can not be used to describe a situation in which John is obsessed with a novel he is reading while Mary is obsessed with one she is writing. It appears that an R-mapping must be imaginably coherent, intensionally tidy if you will, and not merely extensionally successful in context. In our hypothetical situation, if some speaker were actually to say (20), while we might not be able to escape realizing that reference was intended to the book being read by John and to the book being written by Mary, we would nonetheless be forced to conclude that this speaker had either failed to learn the conventional use of *respective* or else was engaging in an unfamiliar kind of word play. An R-mapping must cohere at the level

we once reluctantly acknowledged as notional and now proclaim as cognitive.

6. The example is from the New York Times, courtesy of Robert Amsler.

7. Of course, to say that natural languages and the languages of logic differ with regard to some properties, for example the contextual property, is not to say that natural languages are inherently unamenable to study by precise methods. To claim that linguistics is not a branch of logic is not to maintain that there is nothing in the subject of logic that linguists need to know. Indeed, when one considers the history of the subject of logic, it would be surprising if none of the concepts of modern logic were relevant to natural language.

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Discontinuous reduplication in vernacular Malay

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Most current theories of partial reduplication depend on some model of templatic morphology. They treat partial reduplication as a process which associates segmental or "melodic" elements of the base form to positions in an autosegmental template or "skeleton" of the appropriate prosodic shape. This paper discusses a somewhat unusual pattern of partial reduplication reported in at least three distinct dialects of vernacular Malay.¹ This pattern poses two fundamental problems for the template-matching theory of reduplication. First, the process involves copying of discontinuous material, i.e. "melody skipping", of a type not previously discussed. Second, the shape of the reduplicative affix depends on the shape of the base in a way which seems to violate standard assumptions about the persistence of timing slots in templatic skeleta.

Templatic theories treat reduplication as a special type of affixation. Reduplicative affixes are special in that they lack segmental material -- they define only a prosodic structure. In the theory developed by McCarthy and Prince (1986), these bare affixes trigger a process which copies the melody of the base form, allowing the timing slots of the affix to associate with the copied melodic elements. This process of autosegmental association is assumed to proceed from Left-to-Right in prefixing reduplication, Right-to-Left in suffixing reduplication, until the template is full.

For example, to derive the well-known Ilokano forms shown in (1), a bare syllable template is prefixed to the base form. This triggers the copying of melodic material, which associates left-to-right to the slots in the template until a maximal syllable is defined. Unassociated melodic material is then deleted.

(1) Ilokano (data from McCarthy and Prince 1986:13)

a. /basa/	ag-bas+basa	<i>be reading</i>
b. /dait/	ag-da+da.it	<i>be sewing</i>
c. /adal/	ag-ad+adal	<i>be studying</i>
d. /takder/	ag-tak+takder	<i>be standing</i>
e. /trabaho/	ag-trab+trabaho	<i>be working</i>

A variation of this model, developed by Mester (1986) and Uhrbach (1987) is illustrated in (2a). In this approach, the prosodic affix is attached as a "parafix", i.e. added in parallel to the base form. After association of melodic material to the base, the result is linearized by a process analogous to tier-conflation.

