

INTONATION, GRAMMAR AND UTTERANCE INTERPRETATION: EVIDENCE FROM ENGLISH EXCLAMATORY-INVERSIONS

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Abstract

McCawley (1973) identified a range of constructions, resembling yes-no interrogatives in some ways and exclamatives in others. She termed these "exclamatory-inversion sentences". Our view is that they are syntactically and semantically indistinguishable from the corresponding yes-no interrogatives. The various possible interpretations depend on procedural clues encoded in certain lexical items and also provided by contextual assumptions and intonation. Intonational interpretation is, at basis, the decoding of tonal structures into representations which can be used in the recovery of "affective representations", by an extra-grammatical module. The outputs of linguistic and melodic decoding are input to inferential processes. This view is applicable to a wider range of data, such as the interpretation of certain syntactically declarative utterances as interrogatives. The data can be analysed in terms of the preference rule systems discussed by Jackendoff (1983, 1987) and shed light on the way in which such psychological computations operate in utterance interpretation.

1. Exclamatory-inversions

McCawley (1973) called constructions such as (1)-(3) "exclamatory-inversion sentences".

- (1) (Boy) is syntax easy!
- (2) (Wow) am I hungry!
- (3) (My god) does he make delicious coffee!

These constructions are widespread in American English but probably rather less so in British dialects, where they are often perceived as Americanisms and/or informal. There is no obvious reason to consider their syntactic structure different from that of yes-no interrogatives, and we will assume that they are syntactically identical. They seem to be semantically similar to the constructions in (4)-(6) and (7)-(9):

- (4) Syntax is so easy!
- (5) I am so hungry!
- (6) He makes such delicious coffee!
- (7) How easy syntax is!
- (8) How hungry I am!
- (9) What delicious coffee he makes!

They usually involve a degree adjective but this is not always the case. McCawley offers the following as a possible exchange:

- (10) A: Does she have children?
- B: Boy, does she have children!

It is more difficult (though not impossible) to imagine contexts where examples like (11) would be appropriate:

- (11) My god, is London the capital of England!

Two further features which both McCawley and Elliot (1971) point out are particularly interesting. They observe firstly that exclamatory-inversions are typically pronounced with falling intonation while yes-no interrogatives are typically pronounced with rising intonation, and secondly that interjections like *boy*, *wow*, *my* and so on are permissible in exclamatives but not in interrogatives. McCawley claims that both (12) and (13) are ill-formed, if pronounced with rising intonation.

- (12) *Boy, is syntax easy?
 (13) *My, does he make delicious coffee?

(We will asterisk all dubious utterances, without implying ungrammaticality.)

The intonational facts are rather more complex than this. Any well-formed intonation pattern may be associated with these constructions; the relevant issue here is whether the resulting utterances may be interpreted as questions or as exclamations.

In exclamatory-inversions there is preference for a falling nuclear pitch accent on the particle *or* the clause. However, scarcely any particular combination defies contextualisation, and we will now examine the effects resulting from the various combinations. The intonationally-relevant possibilities may be separated into choices of phrasing and accent location and choices of pitch contour. Firstly, we will consider the intonational possibilities when the interjective particle is present. When it is present, there is a two-way choice of phrasing: either the whole sentence may be associated with a single intonation phrase (that is, a domain containing only a single nuclear pitch accent), or the particle may be one nuclear domain and the main clause may be one or more further nuclear domains. We will take the latter possibility first, and look at different pitch contour possibilities. Consider the following examples with falling intonation on the particle (notated rather informally with "tonetic" symbols; the high fall symbol "´" can be taken to represent a generic fall, for which low falls and rise-falls may be substituted without affecting the basic intuitions in question):

- (14) `Boy | is syntax `easy
 (15) `Boy | is syntax ,easy
 (16) `Boy | is syntax ~easy
 (17) `Boy | is syntax ´easy *!

The most uncomfortable pitch accent here is the high rise in (17), which for many dialects/diolects almost forces interrogative interpretation. However, it may be used (particularly in American English, perhaps) in association with strong emotion and an emphatically slow tempo.

Nor is there a problem with further intonational structure within the clause. (18) and (19) contain two widely discussed phrase-long sequences, the so-called "contradiction contour" (proposed by Liberman and Sag 1974; we ignore here the irrelevant question whether this contains one or two nuclear domains) and the "surprise-redundancy" contour (proposed by Sag and Liberman 1975). (20) shows the possibility of emphatically adding further nuclear domains. (21) shows that the nuclear pitch accent in the clause is not restricted to the degree adjective.

- (18) `Boy | is ^syntax ,easy ("contradiction")

- (19) 'Boy | is ,syntax `easy ("surprise-redundancy")
 (20) 'Boy | is `syntax | `easy
 (21) 'Boy | is `syntax easy

Most significant is the fact that the intonational possibilities on the clause are drastically reduced when the particle is absent. Not only do we seem pretty much restricted to falling nuclear pitch accents, obligatorily on the degree adjective, but it seems that there has to be an accent (minimally plain high, sometimes another falling nucleus) on the subject NP:

- (22) Is 'syntax `easy !
 (23) Is `syntax | `easy !

The accent on the subject NP is necessary even in the case of a pronoun:

- (24) a. Would you say syntax is easy?
 b. Is it `easy ? *!
 c. Is 'it `easy !
 d. Is 'it | `easy !

Note that, if the hearer repeated the word *syntax*, a plain high accent on it -- cf. (22) -- would not now be enough to make the sentence exclamative, since content NPs will generally get some prominence anyway. Therefore a full nuclear fall -- cf. (23) -- would have to be resorted to:

- (25) a. Would you say syntax is easy?
 b. Is 'syntax `easy ? *!
 c. Is `syntax | `easy !

But it seems that nuclear non-falls simply will not do, as exemplified by (26)-(30). Nor may the degree adjective lack a nuclear accent (see (31)). Moreover, the phrase-length contours are incompatible with exclamativity when the particle is absent, even if, as in the case of the surprise-redundancy contour, it contains a falling nucleus (see (32) and (33)).

- (26) Is ,syntax ,easy *!
 (27) Is ,syntax | ,easy *!
 (28) Is `syntax `easy *!
 (29) Is 'syntax `easy *!
 (30) Is ,syntax easy *!
 (31) Is `syntax easy *!
 (32) Is ^syntax ,easy *! ("contradiction")
 (33) Is ,syntax `easy *! ("surprise-redundancy")

Two further types, both with the particle present, must be considered: multiple-phrase constructions with non-falling intonation on the particle, and particle-clause constructions associated with a single intonation phrase and nucleus. Firstly, multiple-phrase particle-clause constructions with non-falls on the particle turn out to pattern with the cases in (22)-(33) which lack the particle. That

is, exclamativity prefers the clause to be associated with the falling patterns exemplified in (22)-(23):

- (34) ,Boy | is 'syntax `easy!
- (35) ~Boy | is 'syntax `easy!
- (36) ,Boy | is `syntax | `easy!

Non-falls on the clause are much less compatible with exclamativity and sound rather strange:

- (37) ,Boy | is 'syntax ,easy *!
- (38) ~Boy | is ,syntax | ,easy *!
- (39) ,Boy | is `syntax ~easy *! etc.

The particle in (34)-(36) seems not to be contributing much to exclamativity, and is replaceable with vocative or pause material:

- (40) ,John | is 'syntax `easy!
- (41) ~Well | is 'syntax `easy

By contrast, such material is not permissible in single-phrase constructions with the nuclear pitch-accent before the clause, although exclamative interjections like *boy* definitely are:

- (42) `Boy is syntax easy !
- (43) * `John is syntax easy
- (44) * `Well is syntax easy

But note that this is a property of exclamatives, inverted or not:

- (45) `Boy syntax is easy !
- (46) My `god he makes delicious coffee !
- (47) * `Well syntax is easy
- (48) * `John he makes delicious coffee

Non-falls seem more odd. Note, however, that the exclamative interpretation is more plausible than the vocative-plus-interrogative interpretation:

- (49) * ,Boy is syntax easy
- (50) * ,Boy syntax is easy
- (51) * My ,god does he make delicious coffee
- (52) * My ,god he makes delicious coffee

The interrogatively-biased high rise seems even odder than the low rise, and would certainly require intense emotion and slow tempo. The fall-rise, however, sounds "spuriously" acceptable since it is interpretable as a two-phrase construction (cf. (15)):

- (53) * 'Boy is syntax easy !
- (54) ~Boy is syntax easy ! "=" (15) `Boy | is syntax ,easy

Finally, as for single-phrase constructions with the nuclear pitch accent on the clause, the generalisations seem to be the same as in (22)-(33). The pitch patterns seem restricted to high level and falling, and the particle must have an accent, even if non-nuclear:

- (55) 'Boy is syntax `easy
 (56) 'Boy is syntax ~easy *!
 (57) 'Boy is syntax ,easy *!
 (58) „Boy is syntax `easy *! (surprise-redundancy)

(It is possible for (56) to sound reasonable if one "hears" the falling prenuclear contour as a falling nuclear pitch accent on *boy*.)

The intonational details may be distilled into the following table of preferences for exclamatory inversions:

(59)

Single phrase		Multiple phrase	
Nucleus on particle	Nucleus on clause	Fall on particle	Non-fall on particle
FALL	FALL	Any pattern possible on clause	FALL on clause

In the next section we will outline the semantic analyses of exclamatives and interrogatives proposed by Sperber and Wilson (1986; Wilson and Sperber 1988). In section 3 we will show how this approach interacts with our account of intonation to explain the exclamatory-inversion data presented above.

2. The semantics of interrogatives and exclamatives

According to Wilson and Sperber both exclamatives and interrogatives involve the notion of "interpretive use": the thoughts which they (interpretively) represent are themselves interpretations. Rather than involving the description of a state of affairs, which might be true or false, they represent other thoughts, by means of resembling them to a greater or lesser degree. The slightly modified version of the semantics of interrogatives which is presented in "Mood and the analysis of non-declarative sentences" (Wilson and Sperber 1988) suggests that interrogatives and exclamatives might be even more alike than originally suggested in *Relevance* (Sperber and Wilson 1986). In this section we will outline the earlier and the more recent analyses of the semantics of interrogatives, and consider the reasons for the change. We will then look at what Sperber and Wilson have suggested about the semantic analysis of exclamatives where a similar modification seems to be required.

2.1 Interrogatives

In *Relevance* Sperber and Wilson analyse interrogatives as interpretations of desirable (i.e. relevant) thoughts: an interrogative with propositional content *p* encodes that *p* represents a thought which would be relevant if true.

There is an interesting difference between *wh*-interrogatives and *yes-no* interrogatives: while *yes-no* interrogatives can have a propositional form which is capable of being true or false (ignoring for the moment the pragmatic processes involved in recovering this propositional form), the propositional form of a *wh*-

interrogative, because of the presence of the *wh*-word, is necessarily incomplete. Hence the propositional form of (60)a. is the fully propositional (60)b. while the propositional form of (61)a. can only be completely specified when a value is given to the gap left in (61)b. by the *wh*-word.

- (60) a. Did John drink the whisky?
 b. John drank the whisky.
 (61) a. Who drank the whisky?
 b. ____ drank the whisky.

As Sperber and Wilson put it, "yes-no questions...have not only a logical but also a fully propositional form" while "wh-questions...have a logical form but no fully propositional form." (1986: 252).

This difference is reflected in the semantic analyses of the two types of interrogative. The utterance of a yes-no interrogative with the propositional form *p* encodes that the thought interpreted by *p* would be relevant if true. The utterance of a *wh*-interrogative with the less-than-propositional logical form *wh-p* encodes that there is some completion of the thought interpreted by *wh-p* into a fully propositional thought which would be relevant if true.

Thus the speaker of the a. forms in (62)-(64) communicates that there is a completion of the corresponding b. forms which would be relevant if true.

- (62) a. Who drank the whisky?
 b. ____ drank the whisky.
 (63) a. What do you say before you leave the table?
 b. You say ____ before you leave the table.
 (64) a. What are the binding principles?
 b. The binding principles are ____.

In each case the hearer has to make some assumption about who the speaker thinks the thought interpreted would be relevant to. In making this assumption he is guided by contextual factors and the presumption of optimal relevance. The difference between different kinds of question is explained by different assumptions the hearer makes about the following questions: (i) from whose point of view does the speaker consider the interpreted thought to be relevant? (ii) who does the speaker consider to be aware of the relevant completion?

Assuming that (62)a. is a genuine request for information the hearer, guided by the presumption of optimal relevance, will assume that the completion of (62)b. would be relevant to the speaker and that the speaker assumes the hearer is aware of what the relevant completion would be. Assuming that (63)a. is a rhetorical question, the hearer will assume that the completion of (63)b. is relevant to himself and that the speaker believes the hearer is aware of the relevant completion. (In other words, a rhetorical question functions like a reminder.) Assuming that (64)a. is an exam question, the hearer will assume that the completion of (64)b. will be relevant to the speaker because of the indirect evidence it provides about the hearer's knowledge.

Thus, Sperber and Wilson claim that this analysis interacts with the presumption of optimal relevance to account for both straightforward requests for information and other, previously more problematic, kinds of interrogative.

In "Mood and the analysis of non-declarative sentences" Wilson and Sperber propose a slightly different semantic analysis for interrogatives. Interrogatives no longer represent answers which would be relevant if true. They now simply represent answers which the speaker regards as relevant. In other words, the analysis no longer makes reference to the notion of truth.

The reason for this change is that there are clear counterexamples to the claim that the most relevant answer to a question is always a true one.

- (65) a. Who is a rat?
b. John.
- (66) a. How far is Aberdeen from London?
b. 500 miles.

The answer in (65)b. communicates the proposition that John is a rat. If we assume that John is a human being, then this proposition is clearly false. However, it is easy to imagine contexts in which this answer would be relevant. Hence, the relevant completion of the logical form of the question is not necessarily a true one.

If Aberdeen is actually 522 miles from London, then the answer in (66)b. is also strictly false. Yet it is intuitively clear that (66)b. might be a perfectly adequate and relevant response. Thus, again, the relevant answer to the question is not necessarily a true one. So, in metaphorical questions like (65)a. and questions whose answers involve loose talk like (66)a., it is not the case that the propositional content of the utterance represents an answer which the speaker would regard as relevant if true. Rather, the incomplete proposition simply represents an answer which the speaker would regard as relevant.

This does not mean that the relevant answer cannot be a true one, but it does mean that when the desired response is a strictly true one, this fact is recognised by the hearer on the basis of inferential pragmatic processes rather than by linguistic decoding alone.

2.2 Exclamatives

In *Relevance* Sperber and Wilson give an account of the semantics of wh-exclamative sentences which provides an interesting explanation for the often-perceived similarity between wh-exclamatives and interrogatives.

- (67) a. How tall is John?
b. John is ____ tall.
- (68) How tall John is!

The interrogative (67)a. and the corresponding exclamative (68) share the propositional content in (67)b. According to the earlier account of interrogatives, (67)a. encodes that there is a completion of (67)b. which would be relevant if true. On the other hand, the exclamative in (68) encodes that there is a completion of the same proposition which would be true if relevant. An interrogative with propositional content *p* encodes that a true completion of *p* is relevant, while an exclamative with propositional content *p* encodes that a relevant completion of *p* is true.

So the speaker of (67)a. is telling the hearer that if he finds a true completion of (67)b. the speaker will consider it relevant. The speaker of (68), on the other hand, is telling the hearer that if he finds a relevant completion of (67)b. the speaker considers it true. The presumption of optimal relevance should lead the hearer to entertain a relevant completion along the lines that John is tall enough for his height to be relevant, e.g. taller than the hearer would otherwise have thought.

Thus, this account seems to provide an intuitive explanation of the semantics of exclamatives as well as suggesting an explanation for the similarity between the two forms.

However, we have seen above that the analysis of interrogatives proposed in *Relevance* doesn't quite work. This analysis of exclamatives is unsatisfactory

for the same reason: there are, for example, exclamatives containing metaphorical expressions like (69):

(69) How I hate the rat who drank all the whisky!

Assuming that the drinker of the whisky is a human, then there is no true completion of the logical form of this utterance which would be relevant. So the speaker cannot be guaranteeing the relevance of a true completion of the logical form of this utterance.

So the analysis of exclamatives needs to be modified in just the same way as the analysis of interrogatives. Both constructions are now seen as simply representing thoughts which the speaker regards as relevant. This raises the crucial question: how do the semantic analyses of wh-exclamatives differ from the semantic analyses of the corresponding interrogatives?

Deirdre Wilson (personal communication) has suggested that, while both exclamatives and interrogatives are interpretations of desirable thoughts, exclamatives also encode two extra pieces of information:

- (70) a. The speaker already has the relevant (completion of the) propositional form in mind.
- b. The (completion of the) propositional form is relevant to the speaker.

Thus it is clear that the speaker of (69) is aware of just how much she hates the person who drank all the whisky and finds this information relevant. This is in accordance with the observation made by Elliot (1971, 1974) and Grimshaw (1979) that exclamatives are incompatible with a state of ignorance on the part of the speaker.

So exclamatives are now seen as almost identical semantically to interrogatives, differing only in that two features which are occasionally true of interrogatives (and pragmatically determined) are always true of exclamatives (and semantically encoded). Interestingly, interrogatives do not seem to occur with both of these features together, although we have already seen examples where they have one or the other alone (see (62)-(64) above). In the next section we will discuss how this analysis might be extended to account for the examples discussed by McCawley (1973).

3. The semantics of exclamatory-inversions

So far we have seen how Wilson and Sperber analyse yes-no interrogatives, wh-interrogatives and wh-exclamatives. Yes-no interrogatives differ from wh-interrogatives in that they have not only logical but also fully propositional forms. Wh-exclamatives differ from wh-interrogatives in that the speaker already has the relevant completion in mind and this completion is relevant to herself. All are interpretations of desirable, i.e. relevant, thoughts.

Given that wh-interrogatives have exclamative counterparts, one would perhaps expect to find an exclamative construction corresponding to yes-no interrogatives. In this section we argue that the constructions discussed by McCawley are the exclamative counterpart of yes-no interrogatives, filling out the matrix of predicted possibilities:

(71)	Wh	Yes-no
Interrogative:	How easy is syntax?	Is syntax easy?
Exclamative:	How easy syntax is!	(Boy) is syntax easy!

The fact that examples like (1) do not necessarily expect a positive or negative response does not mean that calling them yes-no exclamatives is absurd as there are many bona fide interrogatives which also do not expect an explicit response from the hearer, such as the rhetorical wh-question exemplified in (63) which we discussed above and the rhetorical yes-no question in (72).

(63) What do you say before you leave the table?

(72) Is it my fault if syntax is difficult?

So what would we expect the exclamative counterparts of yes-no interrogatives to be like? In particular, what would they be like if the difference between yes-no exclamatives and yes-no interrogatives was exactly parallel to the difference between wh-exclamatives and wh-interrogatives?

We have assumed that wh-exclamatives, just like wh-interrogatives, are interpretations of thoughts which the speaker would consider relevant to someone. Wh-exclamatives, unlike wh-interrogatives, always represent thoughts which the speaker already has in mind and considers relevant to herself (i.e. (70)). Yes-no interrogatives also represent desirable thoughts. With a positive yes-no interrogative the speaker communicates that either a positive or a negative answer would be relevant. In fact, as discussed by Wilson and Sperber (1988), a positive answer is, if anything, more relevant than a negative one. We believe that an adequate explanation of the interpretation of utterances like (1) is possible if we assume that exclamatory-inversions share this semantic representation, with the added assumptions of (70), that the speaker has the relevant proposition in mind and considers it relevant to herself.

We predict that the speaker always has in mind either the propositional form of her utterance or its negation and whichever proposition this is will be relevant to the speaker. Let us see what this predicts about the interpretation of (1).

(1) Is syntax easy!

If (1) were simply a yes-no interrogative, we would predict that either the information that syntax is easy or the information that it is not easy is relevant, and that the positive proposition is, if anything, more relevant than the negative one. Now, for a yes-no exclamative we predict that the speaker already has in mind either the positive or the negative proposition and that this proposition is relevant to the speaker.

With a question, there is always the possibility that the speaker is using the positive proposition as shorthand for a disjunction of the positive proposition and its negation. However, this possibility is ruled out if the speaker already has the relevant proposition in mind; in (1) the speaker is hardly likely to find it relevant that syntax either is or isn't easy, as this is true for all academic subjects.

So we predict that the speaker communicates that she is entertaining the thought that syntax is easy and finds the thought relevant. The hearer will make an assumption about the extent to which the degree adjective is true. The most natural assumption is that syntax is easy enough to make the thought relevant to the speaker, e.g. easier than the speaker had previously thought, or easier than the speaker expects any academic subject to be.

In fact, the hearer will assume that the speaker thinks syntax is easier than could have been communicated by uttering a corresponding declarative. This is because the speaker could have communicated that syntax is easy to a relevant degree by uttering a descriptively used declarative like (73):

(73) Syntax is easy.

An exclamative, unlike (73), involves interpretive use, which entails constructing a more complex representation and thus greater processing effort. If the speaker of (1) merely intended to communicate what she could have communicated by uttering (73), then she would be putting the hearer to unjustifiable processing effort, and her utterance would be inconsistent with the principle of relevance. Hearers never assume this, so the hearer of (1) is forced to derive more contextual effects than would follow from (73). Thus exclamatives always communicate more than corresponding declaratives. On this view, exclamatives can be seen as similar to utterances which give rise to the "stylistic effects" discussed by Sperber and Wilson (1986: 217-224), in which "the hearer is encouraged to be imaginative" in interpreting the utterance. Here, the hearer is encouraged to imagine just how easy syntax is and how the speaker feels in thinking about it. This accords with our intuitions about the meaning of (1) and of exclamatives in general. (For further discussion, see Clark (forthcoming).)

Consider also examples without degree adjectives, e.g. B's utterance in (10):

- (10) A: Does she have children?
B: Boy, does she have children!

B's utterance would lead A to wonder what it is about the third party's (having) children that B finds relevant. Again, the hearer is encouraged to use his imagination and derive more contextual effects than could have been communicated by a declarative.

So the speaker of (1) is communicating her surprise at the extent to which syntax is easy, and this follows from the simple assumption that exclamatory-inversions are the exclamative counterpart of yes-no interrogatives. Specifically, exclamatory-inversions are just like yes-no interrogatives with the added assumptions of (70), that the speaker has the relevant proposition in mind and considers it relevant to herself. So they are related to yes-no-interrogatives, and they are related to wh-exclamatives in the same way that yes-no interrogatives are related to wh-interrogatives.

Wh-interrogatives differ formally from yes-no interrogatives in the same way that wh-exclamatives differ from exclamatory-inversions: due to the presence of the wh-word. Wh-interrogatives differ from wh-exclamatives due to the inverted word order. How do exclamatory-inversions differ from the corresponding yes-no interrogatives? We believe that the difference is signalled by intonation, the presence of a particle, or both.

Relevance theory, in the words of Wilson and Sperber (1990), "treats utterance interpretation as a two phase process: a modular decoding phase is seen as providing input to a central inferential phase in which a linguistically encoded logical form is contextually enriched and used to construct a hypothesis about the speaker's informative intention." The two assumptions (70)a. and b. are encoded in English non-inverted wh-structures. We suggest that the lexical entries for exclamative particles such as *boy* and *my* encode that the speaker finds some representation relevant. Obviously, when uttered together with an inverted structure like (1), this will lead the hearer to entertain (70)a. and b. But we have seen that exclamatory-inversions do not require such particles; see (22)-(25) above. In such cases, assumptions (70)a. and b. must be arrived at on the basis of context and of intonation. Assumptions are derived from the context not by decoding but by inference. How are assumptions derived on the basis of intonation?

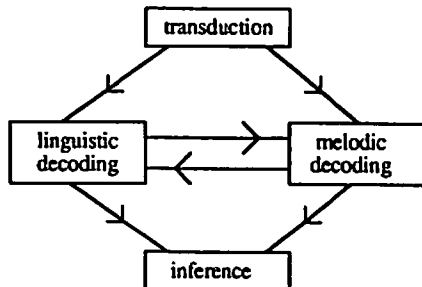
There are various ways in which pitch can contribute to meaning. Languages allow arbitrary meaning changes to be associated with pitch differences, either in conjunction with particular segmental strings (as in lexical tone systems), or to some extent independently of segmentals (as in the tonal marking of, for

example, verb class). That is to say, it is possible for pitch to enter fully into the phonological aspect of what is traditionally called the double articulation of language. But many languages, including English, seem to lack arbitrary tonal marking of this kind entirely. Conversely, it seems that no language entirely lacks "iconic" use of pitch, that is, usage which by-passes the double articulation of language and associates sound with meaning directly, intuitively depicting extra-linguistic entities, such as strength of emotion and tension/resolution. Following Lindsey (1985), we will use the term "intonation" to refer to any and all uses of pitch which do by-pass the double articulation of language in this way.

Attempts to posit linguistically coded meanings for intonation have not been successful; see, for example, the "morphemic" meanings advanced for three nuclear pitch accents in Gussenhoven (1983) and the criticisms of them in House (1984) and Lindsey (1985). Minimally, such an account fails to capture the generalisations regarding iconicity and the by-pass of double articulation: it fails to explain why, in language after language, pitch is used in similar ways to perform similar functions. On the other hand, the view of intonation as an atomistic or continuous gestural phenomenon (as advanced, to an extent, by Bolinger 1982) is equally problematic in that it fails to account for the degree of conventionalisation that exists in intonational systems, and for such clear-cut intuitions as those exemplified in (18)-(19) and (32)-(33) above, which show that two phrase-length contours are compatible with exclamatory-inversions only if "licensed" by a preceding particle with falling intonation. It is not clear how hand or eyebrow gestures, for example, might interact with linguistic phenomena to produce intuitions of this degree of discreteness.

We will follow Lindsey (1981, 1985) in taking the meanings of intonation not to be morphemic or grammatical, nor to be purely iconic or gestural. We suggest the following partial picture of the processing of an utterance, from the perceptual "transduction" of the full speech signal, via modular input systems, to central inferential processes (in the spirit of Fodor 1983):

(74)



Intonation is interpreted by reference to a specifically melodic component, the rules and principles of which define a code. This code assigns representations to tonal structures which can be used in the recovery of other mental representations, namely "affective representations". The representations which are the output of melodic decoding can be thought of as corresponding to the "prolongational elaborations" in Lerdahl and Jackendoff's (1982) generative theory of tonal music. These are structurally precise (arborically-notated) and reflect intuitions regarding "relative stability expressed in terms of continuity and progression, the movement toward tension or relaxation, and the degree of closure or nonclosure" (p. 123); for further discussion of these and of affective representations, see Lindsey and Gil forthcoming. Thus, just as the output of

linguistic decoding is used to recover conceptual representations, the output of melodic decoding is used to recover affective representations. (This contrasts with House's view (1989: 15) that "all types of intonational 'meaning' are recoverable using pragmatic rather than decoding processes." Our claim is that the recovery of intonational meaning must rest on decoding, but that melodic decoding is extra-grammatical.) Melodic interpretation plays no direct role in the construction of logical or propositional forms. Further, assumptions derived from linguistic coding cannot be undone by melodic interpretation.

Intonational meaning is somewhat iconic, in two ways. On the one hand, there is a relation of resemblance between the output representations from the melodic component and affective representations. On the other hand, there also exists, universally, a relation of resemblance between input representations to the melodic component and affective representations. That is, humans can respond affectively to raw (transduced) pitch contours, universally associating high pitch with affective strain and low pitch with affective relaxation. This universal iconism provides an explanation for the failure of intonation systems to develop full arbitrariness, in that potential clashes with it rule out some logically possible outputs of the melodic module. On the other hand, the infant in a lexical tone language environment will encounter many such clashes. These, we suggest, trigger the setting of a parameter which allows the positing of tonal structures as arbitrary lexical or grammatical markers (and hence the arrow in (74) from the melodic module to the linguistic module). In the absence of such a setting, all tonal distinctions are processed "intonationally", and highly counter-iconic innovations will be unlikely. (The arrow in (74) from the linguistic component to the melodic component is necessary since information regarding tune-text mapping is needed in order to be able to distinguish, for example, accentual from non-accentual and nuclear from non-nuclear pitch excursions.)

Note that there exists a parallel relation of resemblance between certain input representations to the linguistic component, such as the raw (transduced) sound pattern of the word *splash*, and certain conceptual representations, such as those of splashing sounds. Such onomatopoeia, however, is clearly marked and rather sporadic in language, and hence there is no question of parameter settings to license or prohibit it.

Intonational meaning is also somewhat arbitrary, also in two ways. First, although the melodic component is universally present (hence the universality of musical systems), it will have dialect- and language-specific characteristics (analogous to the differences between musical idioms described by Lerdahl and Jackendoff, 1982: 294-5). Thus, while a terminal high rise perhaps universally represents strong non-resolution or incompleteness, a low rise is more resolved or complete in Belfast, Tyneside and Merseyside English than in standard British and American English dialects. Second, the melodic component also contains a "lexicon" of a particular kind, comprising structures associated with more specific meanings (e.g. "contradiction", "surprise") than the basic ones (e.g. "tension/resolution"). Note however that such relatively specific meanings are consistent with the basic ones. Their non-arbitrariness is captured by the existence of well-formed inferential procedures between the melodically coded meanings and the more specific ones; certain of these well-worn inferential paths become hardwired in the maturation process, allowing immediate accessing of the stereotyped meaning. This hardwiring corresponds to the "stereotyping" of certain utterance-length contours discussed by Bolinger (e.g. 1982). We suggest that the intuitive degree of arbitrariness will reflect the length and complexity of the underlying inferential procedure.

To take the surprise-redundancy contour as an example, the particularly emphatic quality of its gradual rise plus abrupt nuclear fall will, in many contexts, be sufficient for the hearer to infer a "surprised" or "redundant" attitude on the part

of the speaker. In addition, however, the language learner acquiring English associates this contour with these meanings in the melodic lexicon. (Bolinger 1982: 530: "It is so commonly associated with the two notions of 'surprise' and 'obviousness' that, if any tune can be said to have a set meaning -- divorced from a particular verbal content -- this is it.") Such specific intonational form-meaning combinations are rather analogous to the arithmetical multiplication tables which many individuals have internalised. The interpretation of "7 x 9" as "63" is hardwired for such individuals, but rests on a well-formed and introspectively accessible procedure of the mathematical faculty. Grammatical analogues include lexical collocations, such as that relating *drink* and *heavy* to yield *drink heavily*, *heavy drinker*, etc. The collocation is hardwired (in contrast, for example, to the absence of any such relation between *drink* and *weighty*) but is licensed by a valid inferential procedure according to which *heavy* (but not, say, *loud* or *green*) is appropriate for the representation of a large quantity of drink. Unlike intonation, however, lexical collocations do not violate the double articulation of language.

The specific intonational form-meaning combinations do not belong in the grammatical lexicon, since (like all intonational meanings) they are semantic "overlays" and play no direct role in the construction of logical or propositional forms. This sort of meaning is rather marked for grammar, but is an essential characteristic of intonation. The hardwiring of form-meaning combinations of this type, if they are viewed as entries in the grammatical lexicon, is bizarre or exceptional. The non-grammatical view presented here, on the other hand, suggests that intonational meanings of all types may be taken as a window into our affective world, just as the semantics of the grammar and its lexicon may be taken as a window into our conceptual world.

We are now in a position to work through some example utterances:

- | | | |
|------|------------------------|----|
| (26) | Is ,syntax ,easy | *! |
| (15) | 'Boy is syntax ,easy | ! |
| (29) | Is 'syntax 'easy | *! |
| (49) | ,Boy is syntax easy | * |
| (22) | Is 'syntax `easy | ?! |
| (31) | Is `syntax easy | *! |
| (33) | Is ,syntax `easy | *! |

The hearer decodes the intonation pattern by reference to the melodic module, according to which a low rise nuclear pitch accent as in (26) will lead to a non-resolved or incomplete affective representation (Lindsey and Gil forthcoming). This incompleteness is in conflict with assumption (70)a.:

- (70) a. The speaker already has the relevant (completion of
 the) propositional form in mind.

The hearer is thus unlikely to derive the additional assumptions necessary for an exclamative interpretation, and is likely to fall back on the interpretation which does not require these additional assumptions, namely the interrogative one.

The hearer of (15) will derive essentially the same interpretation of the intonation pattern on the clause. Here, however, the assumptions (70)a. and b. are derived from the presence of *boy*. Assumptions derived from linguistic coding cannot be undone by melodic interpretation, and the exclamative reading stands. The terminal rise is not however bleb of meaning. Rather, the hearer will infer some relevant overlay of "incompleteness" that is not in conflict with exclamativity, for example an invitation to the hearer to comment on the exclamation. The overlay will be lacking in any all-falling exclamative:

- (14) `Boy | is syntax `easy
- (20) `Boy | is `syntax | `easy
- (21) `Boy | is `syntax easy
- (22) Is `syntax `easy
- (23) Is `syntax | `easy
- (42) `Boy is syntax easy

Note that the choice of the exclamative reading of the particle *boy* is itself guided by an associated falling pitch accent. The speaker might of course be using the noun *boy* pre-clausally as an attention-arresting vocative. This would more naturally be associated with an "opening" or "incomplete" rising pitch accent. If the hearer opts for a non-exclamative reading of *boy*, the assumptions (70) do not follow, and an exclamative interpretation of the utterance as a whole is unlikely. These facts, we suggest, account for the intuitions regarding exclamativity in (34)-(39) above. (It would therefore be interesting to know if (26) is more likely to be interpreted as an exclamative in those dialects where the low rise pitch accent is compatible with neutral declaratives.)

Consider the third example, (29), with the high rise:

- (29) Is 'syntax 'easy *!

Our prediction is that, across dialects, this will be even more difficult than (26), and perhaps impossible, to interpret exclamatively. Addition of *`Boy* creates a highly marked structure; it could be interpreted exclamatively only in those dialects (American, we believe) in which a terminal high rise is interpretable, given appropriate tempo, gesture, etc., as intense excitement.

The fourth example (49) is peculiar:

- (49) * ,Boy is syntax easy

The particle is present, but, instead of the exclamativity-favouring fall, bears a rising pitch accent. One might then expect the interrogative interpretation to be more natural. This is not the case. As pointed out above, although utterances like (49) (and (50)-(52)) sound odd, an exclamative interpretation is more plausible than an interrogative one:

- (50) * ,Boy syntax is easy
- (51) * My ,god does he make delicious coffee
- (52) * My ,god he makes delicious coffee

Why should this be? First, notice that single-phrase constructions with a falling nuclear pitch accent before the clause are well-formed as exclamatives but not as interrogatives, e.g.:

- (42) `Boy is syntax easy !
- (45) `Boy syntax is easy !

The absence of any accent on the inverted clause, though possible after exclamative particles, is impossible after initial vocatives, sentence adverbials, etc., for instance:

- (43) * `John is syntax easy ?

Specifically, (31) exhibits contrastive stress. (33) contains one of the most semantically specific intonation contours, the so-called surprise-redundancy contour. As Sag and Liberman (1975) point out, it is particularly appropriate for conveying one of these two attitudes:

(75) Amazing! μ Syntax is `easy !

(76) How many more times do I have to tell you? μ Syntax is `easy !

While (22) is perfectly compatible with an exclamative interpretation, (33), which superficially differs from (22) only in having a gradually rising prenuclear contour rather than a level one, is most unlikely to be interpreted exclamatively. This, interestingly, is despite the fact that the surprise-redundancy contour itself typically conveys an "exclamatory" attitude, as (75) and (76) demonstrate. Certain intonation patterns such as that in (26) are in conflict with exclamativity:

(26) Is μ syntax μ easy *!

(31) and (33) are not, by contrast, but still they are unlikely to be interpreted as exclamatives.

These facts, we suggest, are due to the "blinding" effect of the contrastive stress pattern in (31) and the surprise-redundancy pattern in (33). These patterns, while not ruling out exclamative interpretation, draw the hearer's attention towards another, not necessarily incompatible, aspect of the utterance, thus "distracting" the hearer from the possibility of an exclamative interpretation. That contrastive stress and surprise-redundancy are not incompatible with exclamativity is revealed when the exclamative particle encoding (70) is prefixed, to give the exclamatives (21) and (19):

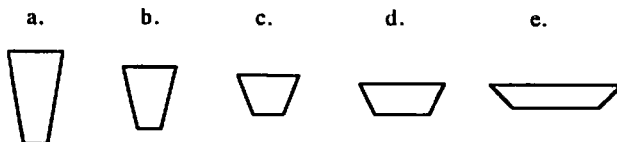
(21) `Boy | is `syntax easy

(19) `Boy | is  $\mu$ syntax `easy

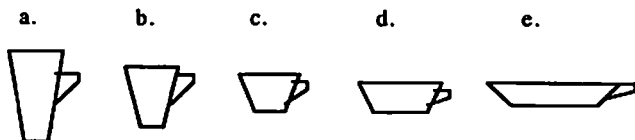
In these utterances the meanings of the two prosodic patterns survive, in addition to the exclamativity.

These data resemble strikingly the perception of the "Labovian cups" described by Jackendoff (1983: 137). Discussing Labov's observations, Jackendoff observes that "having a single handle is a typicality condition on cups but not on vases or bowls. As a result, examples with a wider range of height-width ratios will be judged cups if they have handles than if they do not. For example, [our (78)b., d.], without handles, are vague between cups and non-cups; but [our (79)b., d.], with the same height-width ratios but handles, are more likely cups":

(78)



(79)



We would like to suggest that the addition of handles to the Labovian cups is parallel to the addition of particles to vague utterances. If we consider a syntactically inverted utterance with neutral falling intonation, such as (22), to be analogous to container (78)c., we see that an "exclamative" judgement is as comfortable as the parallel "cup" judgement. Replacing the falling intonation with a low rising pattern, as in (26), is equivalent to distorting the shape of the cup to (78)b. or d., towards vaseness or bowliness, which tends to rule out "cup" judgements. Cupness or exclamativity can be returned by, respectively, the addition of handles (as in (79)b. and d.) or the prefixing of exclamative particles (as in (15)). In (79)b. and d., returning cupness by means of a handle correspondingly diminishes vaseness or bowliness; likewise, returning exclamativity by means of a particle as in (15) rules out certain interpretations of the rising intonation (e.g. incompleteness of the speaker's thought) in favour of others (e.g. an invitation to the hearer to comment on the exclamation). A terminal high rise, as in (29), distorts the cup to (78)a. or e., for most speakers irredeemable even by addition of handles or particles.

Contrastive stress and phrase-length contours like the surprise-redundancy contour, as in (31) and (33), have a rather different effect, analogous perhaps to piling container (78)c. high with ice cream. In such a case, (78)c. might well be perceived far more readily as "some ice cream" than as "a cup". That is, although the ice cream is not in any way incompatible with (78)c.'s cupness, it has a blinding or distracting effect. Again, affixing the handle/particle re-asserts cupness/exclamativity -- now not in any conflict with the ice cream/prosody, but rather in addition to it.

Jackendoff claims that the perception of the Labovian cups illustrates the interaction of the kinds of graded "typicality conditions" which constitute his "preference rule systems". The above mentioned typicality condition on cups, for instance, appears to correspond to a "preference rule". Jackendoff (1983, 1987) presents an impressive array of evidence that the patterns of intuitions to which he gives the label "preference rule systems" are characteristic of many different cognitive domains; he suggests, however, that "at the moment we have too few actual analyses in terms of preference rules to be able to attack the combinatorial problem [of how cognitive subsystems interact] intelligently, but that it must be a priority of the near future" (1987: 148). Our work here might be taken as a detailed formalization of the way in which the interaction of certain cognitive subsystems produces such patterns of intuitions, and thus an initial response to Jackendoff's challenge.

In the next section, we consider how similar interaction between intonation and particles occurs in certain declarative utterances.

4. Particles and intonation in declaratives

Relevance theory claims to describe universal cognitive strategies but not to determine the grammar. On the basis of the semantic analyses of Wilson and Sperber (1988) the existence of exclamatory-inversions is predicted, but there is no claim that these sentences will be generated by the grammars of all languages and dialects. The picture that we have sketched of intonational and grammatical collaboration in the interpretation of utterances has been exemplified with reference

to this rather exotic construction. We would like here to discuss briefly some evidence that our sketch is more generally applicable, in particular to the interaction between declarative syntax and interrogative interpretation.

It is well known that in many languages and dialects, syntactic declaratives may be interpreted interrogatively when combined with intonation of strong non-resolution/incompleteness:

(80) They liked our 'article?

It is less well known that declaratives may have any nuclear intonation (even falling) and still be interpreted as questions:

(81) They liked our 'article? Tell me!

(82) You were present on the night of the 'fifth?

Nonetheless, certain phrase-length intonational patterns of the type that we have already encountered sit uncomfortably on would-be-interrogative declaratives:

(83) They ,liked our 'article *? ("surprise-redundancy")

(84) You were ,present on the night of the 'fifth *?

(85) ~They liked our ,article *? ("contradiction")

(86) ~You were present on the night of the ,fifth *?

Interestingly, as Lindsey (1985) points out, interrogative interpretations of these structures are licensed by the appearance of certain preposed or postposed particles:

(87) So they ,liked our 'article ?

(88) So you were ,present on the night of the 'fifth ?

(89) They ,liked our 'article then ?

(90) You were ,present on the night of the 'fifth then ?

(91) So ^they liked our ,article ?

(92) So ^you were present on the night of the ,fifth ?

(93) ~They liked our ,article then ?

(94) ~You were present on the night of the ,fifth then ?

The explanation runs along the same lines as the explanations of (31) and (33) above. The phrase-length contours have a "blinding" effect, distracting the hearer from the possibility of an interrogative interpretation, which as we argued above is more marked (by virtue of involving two interpretive relationships) than a descriptively used declarative interpretation (involving only a single interpretive relationship). However the encoded meaning of the particles *so* and *then* encourages interrogative interpretation, and if used they will override the blinding effects of the intonation. However, the meanings of the phrase-length contours survive in (87)-(94), as overlays.

These data can also be viewed in terms parallel to the Labovian cups. The phrase-length contours in (83)-(86) are, again, like ice cream piled into the handleless but otherwise cup-compatible container (78)c., blinding the hearer to an interrogative interpretation, which as stated in section 2 is more marked than a

descriptive declarative interpretation. Adding *so* or *then* re-asserts interrogativity by means of lexical coding.

5. Conclusion

We have argued that exclamatory-inversions cannot be linguistically distinguished from yes-no interrogatives. Inversions are syntactically defined structures interpretable as interrogatives or exclamatives. The different interpretations depend on pragmatic factors, intonation and the presence or absence of particles like *boy*. Thus the term "exclamatory-inversion" refers not to a type of linguistic structure but rather to one way ("exclamatorily") of interpreting a structure ("inversion").

We have adopted the relevance-theoretic assumption that the interpretation of an utterance involves firstly a decoding phase and secondly an inferential phase, and we have proposed that the decoding phase involves at least two modules, linguistic and melodic. The interpretation assigned to the utterance's tonal structure by the melodic module does not contribute to the conceptual-propositional form associated with the lexico-syntactic structure, but both are evaluated in the central inferential processes which derive the preferred utterance interpretation. Our examination of these processes may be thought of as a relatively detailed characterisation of a Jackendoffian "preference rule system". Relevance theory and the view of intonation sketched here provide a relatively explicit framework for further study of this form of psychological computation.

6. References

- Bolinger, D. (1982). Intonation and its parts. *Language* 58.3. 505-533.
- Clark, B. (forthcoming). *Linguistic form and propositional attitudes*. Ph.D. thesis, UCL.
- Elliot, D. (1971). The grammar of emotive and exclamatory sentences in English. Ph.D dissertation, Ohio State University. *Ohio State Working Papers in Linguistics* 8.
- Elliot, D. (1974). Toward a grammar of exclamations. *Foundations of Language* 11. 231-46.
- Fodor, J. A. (1983). *The modularity of mind*. Cambridge, MA: MIT Press.
- Grimshaw, J. (1979). Complement selection and the lexicon. *Linguistic Inquiry* 10.2. 279-326.
- Gussenhoven, C. (1983). *A semantic analysis of the nuclear tones of English*. Bloomington: Indiana University Linguistics Club. Reprinted in Gussenhoven, C. (1984) *On the grammar and semantics of sentence accents*, Dordrecht: Foris.
- House, J. (1984) Review article of Gussenhoven (1984). *Linguistics* 22. 899-912.
- House, J. (1989). The relevance of intonation? *UCL Working Papers in Linguistics* 1. 3-17.
- Jackendoff, R. S. (1983). *Semantics and cognition*. Cambridge, MA: MIT Press.
- Jackendoff, R. S. (1987). *Consciousness and the computational mind*. Cambridge, MA: MIT Press.
- Lerdahl, F. and R. Jackendoff (1982). *A generative theory of tonal music*. Cambridge, MA: MIT Press.
- Liberman, M. and I. Sag (1974). Prosodic form and discourse function. In *Papers from the 10th Regional Meeting*, Chicago Linguistics Society. 416-27.
- Lindsey, G. (1981). Intonation and pragmatics. *Journal of the International Phonetic Association* 11.1. 2-21.

- Lindsey, G. (1985). *Intonation and interrogation: tonal structure and the expression of a pragmatic function in English and other languages*. Ph.D. thesis, UCLA.
- Lindsey, G. and D. Gil (forthcoming). Towards a theory of melodic interpretation. Paper to be presented at LP '90, Prague, August 1990.
- McCawley, N. (1973). Boy is syntax easy! *Papers from the 9th Regional Meeting*, Chicago Linguistics Society. 369-77.
- Sag, I. and M. Liberman (1975). The intonational disambiguation of indirect speech acts. In *Papers from the 11th Regional Meeting*, Chicago Linguistics Society. 487-97.
- Sperber, D. and D. Wilson (1986). *Relevance: communication and cognition*. Oxford: Blackwell.
- Wilson, D. and D. Sperber (1988). Mood and the analysis of non-declarative sentences. In Dancy, J., J. Moravcsik and C. Taylor (eds.) *Human agency: language duty and value*. Stanford: Stanford University Press.
- Wilson, D. and D. Sperber (1990). Linguistic form and relevance. This volume.