On the cognitive aspects of the joke

Rachel Giora*

The present study of the mechanism of humor concentrates on the notion of surprise in semantic jokes. It explicates the 'grammar' of the joke and attempts to differentiate it from both the standard informative text on the one hand, and the 'witty' texts on the other. Both the 'grammar' of standard informative texts and the 'grammar' of the joke derive from principles regulating concept formation. In previous works (Giora 1985, 1988), I showed that categorial organization as delineated by Rosch (1973) and Rosch and Mervis (1975) for example, is applicable to the structure of informative texts. In this study I consider the structure of the joke along the same lines. Given the conditions for text well-formedness (the 'Relevance Requirement' (e.g., Grice 1975, Giora 1985) and the 'Graded Informativeness Requirement' (Giora 1988, following Grice 1975, Shannon 1951, Attneave 1959)), a joke is well-formed if and only if it obeys the 'Relevance Requirement', violates the 'Graded Informativeness Requirement' (the 'Marked Informativeness Requirement') and forces the reader to cancel the immediate unmarked interpretation of the text and replace it with a marked interpretation. The notion of markedness relies on categorial internal structuring which differentiates between the cognitive status of the prototype (the unmarked member) and the marginal status of the marked member.

1. Introduction

The present paper is a study of the structure of jokes form a cognitive perspective. It is an attempt to explicate what seems a necessary concomitant in jokes – the surprise effect. The study of surprise proposed here delimits itself only to that genre of jokes in which the surprise is semantic, evolving mainly from semantic ambiguity. The semantics underlying this work is that exercised by Rosch and her colleagues. The work assumes the semantic relation obtaining between category members. Category members relate to each other in terms of similarity. In this respect the present study belongs in the category of Theories of Incongruity.[1] Particularly, it is very much in line with Suls' (1972, 1977, 1983) approach but even more so with Nerhardt's (1975, 1976, 1977) experimental work. Nerhardt showed that the funniness of

a tested stimulus increases as the similarity to a given stimulus decreases. The given stimulus determines expectations on the basis of class membership. Funniness was shown to result where expectations were violated. Nerhardt can be taken to study the relation between the punch line and the expected material it replaces. His findings, together with those of others referred to in his work e.g., Nerhardt 1977, Shurcliff 1968, Dodd and Lewis 1969, Lewis and Goldberg 1969 and Ertel 1968 (referred to by Berlyne 1972), show that, up to a point, the more dissimilar the stimuli from the class typical quality, the more surprising the effect.

The reduction of the question of surprise to one of its aspects – the semantic perspective – gets support from studies of evoked potentials. Research within the area of brain potentials (e.g., Kutas and Hillard 1980; 1983) shows that semantic surprise effects the brain differently from any other surprise (e.g., syntactic). While P300 is the brain's standard response to any kind of surprise, its reaction to semantic surprise is N400.

Thus, the kinds of joke that this study ignores are those manipulating syntactic (e.g., (1), cited in Shultz 1976) and pragmatic expectations (e.g., (2)):

(1) "Can you tell me how long cows should be milked?"
    "They should be milked the same as short ones, of course."

(2) "You know what tests you have to pass to become a member in Kahana's party?"
    "Well?"
    "You have to kill two Arabs and a cat."
    "Why a cat?"
    "You passed the test."

In what follows, then, I will try to propose a set of necessary conditions for the well-formedness of verbal jokes whose point consists in semantic ambiguity.

2. On the conditions for text well-formedness

Before dealing with the conditions for jokes' well-formedness let me propose some conditions for the well-formedness of texts in general. In previous works (Giora 1985, 1988), I suggested that the principles of text organization should be viewed along the lines of concept formation. Given Mandler's (1984) distinction between schematic and categorial organizations of concepts, I applied categorial organization (as delineated by Rosch 1973, Rosch and Mervis 1975 *inter alia*) to non-narrative/informative texts. On this view a text is well-formed if and only if:

(3a) it begins with the least informative message in the given text or text-segment. This least informative message, termed Discourse Topic (DT), is a generalization that governs the rest of the messages in the text. Cognitively, it functions as the prototypical category member which represents the redundancy structure of the set (the 'Relevance Requirement' of Giora 1985),

and

(3b) it proceeds *gradually* along the informative axis whereby each message is more informative than the one it follows (the 'Graded Informativeness Requirement' of Giora 1988). Given this Graded Informativeness Requirement, the text must end with the most informative message in the text.[2] Informativeness is defined in terms of class membership and in terms of classical theories of information (Shannon 1951, Attneave 1959, *inter alia*).

The notion of informativeness is crucial to the understanding of the mechanism of the humorous text. I therefore recapitulate it here in some detail.

2.1. On defining Informativeness

According to classical information theory (Shannon 1951, Attneave 1959, *inter alia*) *a message is informative relative to the number of uncertainties it either reduces or eliminates relative to a question.* Given that a question has a definite number of equally probable answers, the amount of uncertainty involved in that question corresponds to the number of the alternative answers. Particularly, the measurement of informativeness is computed in terms of a unit called bit (the abbreviation of 'binary digit'). Within this approach, for a message to be informative it must reduce the amount of alternative answers by half. To illustrate this, consider the checkerboard example (Attneave 1959). The goal of the game is to discover which of the 64 possible squares is on the mind of the questioner. It is easy to show that exactly six questions are always necessary and sufficient to locate the square.[3]

---

[2] The study mentioned (Giora 1988) excludes discussion of text sequencing consisting of equally informative messages. Such structuring seems to refute the claim that well-formed texts proceed from the least to the most informative messages in that text. Indeed, well-formed texts do not all consist of only informatively graded messages. Some messages are uninformative and count as evaluative devices (according to Labov 1975; cf. Giora 1991).

[3] (i) Is it one of the 32 on the left half of the board? (Yes.)
(ii) Is it one of the 16 in the upper half off the 32 remaining? (No.)
(iii) Is it one of the 8 in the left half of the 16 remaining? (No.)
(iv) Is it one of the 4 in the upper half of the 8 remaining? (No.)
(v) Is it one of the 2 in the left half of the 4 remaining? (Yes.)
(vi) Is it the upper one of the 2 remaining? (Yes.)

What is essential is that every question should reduce the alternatives by half.

For further explication consider a modification of Sperber and Wilson's (ms.) example (4). Given the context of (4 a–d), it is obvious that (4f) is more informative than (4e) relative to the question: who won the prize?

(4a) People could buy only one ticket.
(4b) There were 39 blue tickets and 1 green ticket.
(4c) Forty people bought tickets.
(4d) The person who bought the green ticket won the prize.
(4e) Someone bought the green ticket.
(4f) James bought the green ticket.

Clearly, (4e) does not reduce the number of uncertainties to such an extent as does (4f).

In terms of probability, (4f) is also much less probable than (4e) (by 0.025 to 1.0). The chances that someone bought the green ticket (4e) are high (1.0). The chances that James bought the green ticket (4f) are low (0.025). In terms of probability, then, the most informative message in a set is the *least probable* message in that set (*f* in the e–f set in our example).

In Giora (1988) I rely not only on the classical notion of informativeness but also on the definition of informativeness in terms of category inclusion. A category is a set of two or more entities which are similar to each other in one or more respects. Category members are said to share common and distinctive features which make them both belong to the same category and be distinct from members of other categories. In terms of class membership, to say that a category member is informative in a given set is to say that it has more features (information) than necessary for category inclusion. Information is thus a relative notion. It is weighed against the category set of common features.

The psychological theories of categorization (Rosch 1973, Rosch and Mervis 1975, Tversky 1977, Smith and Medin 1981, for example) view the category set of common and distinctive features as reflecting the redundancy structure of the category. That is, the information that various members of the category have in common is considered redundant in that category. By contrast, that information which members do not share and which is additional to that set of similar features, is informative in that category. A categorial organization implies that that information which category members do not share and which determines their *distinctiveness* within the given category, constitutes informativeness in that category. In other words, the most informative member is the one *least similar* to the category redundancy structure, i.e., to the set of common and distinctive features. In terms of number of features searched for a decision on category inclusion, it is *least accessible:* the

amount of common features it has is relatively small and measures its *cognitive distance* from the prototypical member – the member representative of the category redundancy structure.

It should be noted, however, that the notion of probability mentioned above is not simply a matter of statistics only. While applying the classical notion of information to language, one should take into consideration the aspect of psychological probability as well. The following examples should illustrate my point. In a math class, for instance, the chance that 'Susan flunk the test' as opposed to 'James flunk the test' when 'Someone flunk the test' is at stake, is much lower, given that Susan is a much brighter student than James. Or, in terms of natural categories, the chance that 'I saw a bird' means 'I saw a chicken' is much lower than 'I saw a robin' (Rosch 1973, Clark and Clark 1977, Sanford and Garrod 1981, Sanford 1985). As a prototype, 'robin' is a much more accessible exemplar than 'chicken' in terms of the bird category. To formulate it in terms of number of possibilities reduced, the reference to 'chicken' reduces a much greater amount of possible condidates for 'bird' than 'robin'. True, a 'bird' could be either 'robin' or 'pigeon' or 'eagle' or 'chicken'. But as 'robin' is a more accessible (i.e., probable) exemplar than the rest, the reference to 'robin' reduces only one alternative, while the reference to 'chicken', being the least prototypical/accessible among the given examples, reduces all the remaining exemplars. The most informative member in a set, i.e., the member bearing the greatest amount of extra information compared to the prototypical member in that set, is thus the least probable in both psychological terms and in terms of number of uncertainties reduced. As it is *least accessible* it is least probable, which explains the greater number of uncertainties it reduces relative to a more prototypical member.

No wonder, then, that informativeness is often assigned *surprise value*. Defined as the least probable message in a set relative to a given question, the informative message is least predictable or most surprising in that set.

The notion relevant to the discussion of joke well-formedness is *marked informativeness*. In terms of *markedness*, the least informative, i.e., prototypical, members are the *unmarked* members of a given set – they best represent the set and are most accessible. The most informative i.e., least accessible, least typical or rather most marginal and most surprising members are considered *marked* in that category. In textual terms, standard expository texts are considered informative, but not *markedly informative* as they evolve gradually from the least to the most informative message. Jokes and point-stories are markedly informative. Their final informative messages are marked in that they are too distant, in terms of number of similar features, from the messages preceding them.

3. On the conditions of joke well-formedness

Given the conditions for text well-formedness (referred to in section 2 above), and assuming that interlocutors observe the Cooperative Principle (Grice 1975), (the text of) a joke is well-formed if and only if it

(5a) obeys the Relevance Requirement

and

(5b) violates the Graded Informativeness Requirement (as specified in (3b) above) in that it ends in a markedly informative message (the Marked Informativeness Requirement)[4]

and

(5c) causes the reader to perform a linear shift: the reader is made to cancel the first unmarked interpretation upon processing the second marked interpretation.

Condition (5a) guarantees the relevance of the last interpretation to the Discourse Topic. As the Relevance Condition requires that the Discourse Topic/prototypical member bear maximal conceptual intersections with the other members of the linguistic set, the joke's marked constituent is least relevant but not irrelevant, that is, not entirely distant or unrelated.

---

[4] In fact the violation of the Graded Informativeness Requirement may take two possible forms. As a result, a joke may either fail to evolve gradually from the least to the most informative message, and will do so abruptly, instead. Or, instead of evolving toward an informative (e.g., subordinate) constituent, it will end in a rather less informative constituent (e.g., of a superordinate order). As the majority of jokes conform with the former, most informative provision, I concentrate here on the explication of this type of jokes. For a more informative/less informative sequence consider the following joke:

The place: the old city of Jerusalem, the Jewish quarter. A tourist asks a local boy: "Where is the Wailing Wall?"

The boy: "In Israel".   (Navon's example)

It should be noted, however, that when the Graded Informativeness Requirement is violated in that ongoing messages do not reduce options by half, that text is not funny either. Consider the following extract by Gertrude Stein (1922/1975: 48):

"She was gay exactly the same way. She was never tired of being gay that way. She had learned very many little ways to use in being gay. Very many were telling about using other ways in being gay. She was gay enough, she was always gay exactly the same way, she was always learning little things to use in being gay, she was telling about using other ways in being gay, she was telling about learning other ways in being gay, she would be using other ways in being gay, she would always be gay in the same way, when Georgine Skeene was there not so long each day as when Georgine Skeene was away."   (Miss Furr and Miss Skeene)

(5b) requires that the joke *end* with a *markedly informative*, i.e., *almost inaccessible* constituent. The last constituent is marked in the given set in that it is either an extremely marginal member of the set evoked by the text. Or, it is hardly accessible in that it is a member (preferably prototypical/unmarked) of a different/neighboring category.

From condition (5b) it follows that, informatively, the joke does not progress gradually from the least to the most informative/marked text constituent. Rather the passage from the least to the most informative message is *abrupt*. So instead of a text evolving gradually along the informative axis (as required by (3b) above), we have a text sequenced from an *unmarked to a marked* text constituent. In terms of cognitive distance, the joke's last constituent – the punchline is most distanced cognitively, sharing the least amount of common features with the previous constituents.

The addition of (5c) is viewed here as a constraint on both (5a) and (5b). A close inspection of the set of rules proposed above reveals that (5a) and (5b) on their own will not suffice as they overgenerate. Apart from jokes, the set of texts or linguistic strings that conform to the Relevance and Marked Informativeness Requirements (5a) and (5b) include metaphors, similes, advertisements; in fact, any text that maintains ambiguity and which I term witty texts. However, unlike witty strings that maintain the ambiguity, the joke is further constrained. Condition (5c) requires that the marked constituent will not be weighed against the unmarked one but erase its impact. (For further discussion consider section 3.1.2 below.)

3.1. On the Marked Informativeness Requirement

To validate the conditions on joke well-formedness I will begin by examining the notion of Marked Informativeness (5b). Consider, first, Grice's example which involves flouting the maxim of quantity (the Informativeness Requirement):

(6) "A is writing a testimonial about a pupil who is a candidate for a philosophy job, and his letter reads as follows: 'Dear Sir, Mr. X's command of English is excellent, and his attendance at tutorials has been regular'." (1975: 52)

This text, exemplifying the violation of the Informativeness Requirement, is usually perceived as funny. As will be discussed below, the specification of this violation of the Requirement of Informativeness (3b) can be accounted for in terms of categorial organization. Given the hierarchical organization of a category, the qualities assigned to the scholar count as least prototypical, least probable, or too informative in the set of qualifications required for a philosophy job. Such violation of Informativeness is the topic of this paper.

For further illustration consider the strings in (7) below (from Keenan 1978 as reported in Sanford and Garrod 1981 and discussed by Ariel 1990). The strings exhibit a correlation between reading time and inferrability difficulty. Reading time was longer for each oncoming string. (7e), Ariel's variation, which enlarges the gap even more and makes the second constituent hardly accessible or unpredictable, is already funny:

(7a) Joey's big brother punched him again and again.
      The next day his body was covered in bruises.
(7b) Racing down the hill Joey fell off his bike.
      The next day his body was covered in bruises.
(7c) Joey's crazy mother became furiously angry with him.
      The next day his body was covered in bruises.
(7d) Joey went to a neighbour's house to play.
      The next day his body was covered in bruises.
(7e) Joey told his girl friend that he wanted to marry her.
      The next day his body was covered in bruises.[5]

For an examination of the structure of jokes, consider the jokes in (8) and (9) below, cited and discussed by Zilberstein (n.d.), and Raskin (1986):

(8) "Did you take a bath?" a man asked his friend who had just returned from a resort place.
     "No," his friend replied, "only towels"/"is there one missing?"
(9) "Is the doctor at home?" the patient asked in his bronchial whisper.
     "No," the doctor's young and pretty wife whispered in reply. "Come right in."

Both (8) and (9) conform to the requirement in (5b). Given the set of things that can be done in a resort place, 'taking a bath' is an *unmarked* i.e., prototypical or redundant member. Taking towels, i.e., stealing, is not (though it might in fact be frequent). Within the set of things that can be done in a resort place, e.g., 'taking a sun bath', 'taking a mud bath', 'taking a swim in the hot spring', 'taking a bath' is prototypical in that it shares various common features with the other members of the category, while stealing does not. Clearly, in the set in which 'taking a bath' and 'taking towels' are members, 'taking towels' or, for that matter, 'taking a bath' in the sense of 'stealing baths' is extremely informative, i.e., *marked* in the sense defined in

[5] Sperber and Wilson (1986) would count (7e) ("Joey told his girl friend that he wanted to marry her") most relevant (in the context of "The next day he was covered in bruises") relative to (7a–d) as it has the greatest number of contextual implications in that context. This, of course means that the punch line in jokes is more relevant than the more standard, less expected proposition which the punch line replaces, which Sperber and Wilson, I believe, would not want to contend.

section 2.1 above. It is *almost inaccessible* as it hardly bears any resemblance to the set of prototypical members possible.

Likewise the text in (9) retains both the *marked* and *unmarked* members of the set of 'whispers'. Given the context of doctor–patient relations, the text first lends itself to the interpretation of 'whisper' as bronchial only. That is, in the set of whispers at a clinic, a bronchial whisper is prototypical, i.e., unmarked or redundant (bearing resemblance to various illness symptoms), while the concealed low voice of a would-be lover is informatively marked. In accordance with (5b) above the marked meaning of the constituent in question is disclosed at the end of the text.

Having examined the jokes above, it will be easier now to consider the notion of *marked informativeness* more carefully so that jokes are distinguishable from regular informative texts. Consider the text in (8') below, which is a revision of the text in (8). The text in (8') is a well-formed informative text:

(8') "Did you take a bath?" a man asked his friend who had just returned
    from a resort place.
    "No," his friend replied, "just a shower."

According to the conditions on text well-formedness, (8') evolves informatively (a point to be discussed later) and ends with the most informative message in the text. Note, however, that the final constituent "No, only showers" is *un*markedly informative. It first reduces the set of possible alternatives by half ("No") (but this is negligible) and then it reduces all other accessible options – the set of possible options mentioned in the analysis of (8) above. By contrast, the final constituent of (8) – the 'stealing baths' sense of 'taking a bath' – is *informatively marked*. Though it is in principle available for the interpreter, it is *hardly accessible*. Given the set of things that can be done in a resort place, it is cognitively distant from the prototypical members.[6]

But ambiguity, i.e. having simply two possible interpretations, is insufficient. (5b) requires a relation of asymmetry between the possible senses of a constituent. For a joke to be well-formed the various interpretations must vary in markedness and that asymmetry must be linearly presented so that the joke evolves from the *unmarked* to the *marked interpretation*. To validate this even further consider first a text (10), which is ambiguous between two equally informative members of the same set. The example in (10) shows that when a text retains two equally accessible meanings, the disambiguation is not at all funny:

---

[6] Kuhlman (1985) shows that subjects enjoy jokes about taboo topics (repressed topics) to a greater extent than they enjoy jokes referring to topics most accessible to the interlocutors.

(10) Hana and Jacob sat down for dinner. Hana hoped from the bottom of her heart that Jacob would enjoy the dinner as it was his birthday. She could tell he liked the candle on the table and the table cloth. But when the waiter appeared ...   (Zilberstein's example).

The text in (10) cannot be a joke because the two members of the set evoked (a dinner at home vs. a dinner in a restaurant) are equally predictable in the given (dinner) set (with probably a slight preference towards the domestic scene). Thus disambiguation by itself is insufficient. In other words, what is necessary for a joke is that the two constituents evoked be asymmetrically related so that the final interpretation is informatively marked.

Note, too, that the requirement in (5b) excludes Raskin's (1986) notion of script oppositeness, as opposition does not necessarily pertain to asymmetrical relation. According to Raskin, dinner at home could be easily conceived of as opposed to dinner in a restaurant. But these equally informative 'opposing scripts' will not result in a funny text.

3.1.1. Marked Informativeness violated
The study by Kreitler et al. (1988) further confirms the Marked Informativeness Constraint (5b). They show that when the constituents of the joke are not distant enough (to use my terminology) the joke is ruined. In their experiments they replaced the originally marked constituent by an unmarked one of the same category. Such manipulation shrunk the distance originally existing between the joke constituents. Consider one of their examples (11) below and their revised versions in (11') and (11'') below:

(11) Obese Max went into a restaurant in order to eat. He ordered a whole round cake. When the waitress brought it to his table she asked: "Should I cut it into 4 pieces or into 8?" "Into 4 pieces", answered Max. "I am on a diet."

(11') Obese Max ... "Into 8 pieces, so I have more pieces to eat."
(11'') Obese Max ... "Into 4 pieces, so it will be more convenient to eat."

The text in (11) is jugded by subjects to be funnier than the texts in (11') and (11'') because the last constituent in (11) is a marked/inaccessible member in the set of possible answers to the question posed. The answers in (11') and (11''), however, are unmarked. Given the set of possible reasons for cutting a cake into either 4 or 8 pieces, the answers in (11') and (11'') count as relatively accessible members. What (11') and (11'') show is that for a text to be a joke, its final constituent must be cognitively distant from the prototypes of the ad hoc set created by the text of the joke. Where it evolves gradually, it is not funny.

For a further examination of the marked informativeness requirement we
can try another joke-killing trick, where the gap between the prototypical and
the marked interpretation is filled by messages gradually more informative
than the prototype. The texts in (12) and (13) below – the revised version of
(8) and (9) above – can illustrate the point:

(12) "Did you take a bath?" a man asked his friend who had just returned
     from a resort place.
     "No," his friend replied, "just a shower. But, to tell you the truth, I also
     did what all the Israelis do in hotels, I took ash-trays and towels."

(13) "Is the doctor at home?" the patient asked in his bronchial whisper.
     "No," the doctor's young and pretty wife whispered in reply. "But you
     are such a handsome man, I guess I can be of some help. Don't you
     fancy me? Come right in."

The texts in (12) and (13) retain their originally marked constituent but the
distance between the first and the last constituents is filled in by the gradually
more informative messages. These messages constitute, in fact, the implicature
(Grice 1975) to be derived by the violation of the Informativeness Require-
ment (3b). We have seen, then, that for a text to be a joke, it is necessary that
it proceeds directly from the unmarked to the marked constituent so that the
gap is maintained and felt.

Ertel (1968) (as reported in Nerhardt 1977) and Nerhardt (1976) can be taken
to confirm the Marked Informativeness Requirement from a different perspec-
tive. They show that it is not only the similar/accessible stimuli that do not
evoke funny response. Too distanced/inaccessible stimuli do not count as funny
either, as they do not violate expectation and are consequently not funny. Ertel
presented his subjects with stimuli in the form of texts representing various
approximations to German. The text that was slightly different from normal
(German) language can be taken to represent little divergence from expectancy.
The text that was moderately removed can be considered a substantial diver-
gence and count as a surprise. The text that was far removed cannot represent
any divergence at all. Being too dissimilar it cannot be treated in terms of class
inclusion. Ertel found that the moderately distorted texts were judged funnier
than either the slightly or the highly distorted ones. Clearly, too dissimilar
stimuli, i.e., those that are inaccessible cognitively, do not result in funny
response. Similarly, Nerhardt's (1976) findings can be taken to confirm the
constraint on distancing. Nerhardt too shows that too dissimilar stimuli such
that are no longer available for class inclusion do not count as funny. In view
of the above, it seems safe to postulate the Marked Informativeness Require-
ment for the well-formedness of jokes. To be funny, then, one has to be highly
informative, yet not at the cost of breaching the Relevance Requirement.

3.1.2. When ambiguities are not cancelled – The case of witty texts

It remains now to show that to be a joke, the marked interpretation must cancel the unmarked one (condition (5c)). To confirm this, let's check texts which obey the first two conditions on joke well-formedness (5a) and (5b), but violate the third (5c). Such texts resemble jokes in every respect apart form the informational load of the final constituent which, instead of cancelling the ambiguity (5c) retains it. Such texts will, thus, either progress from a relatively unmarked constituent to an (even less) unmarked one (see note 4), or from an equally loaded constituent to another. For that purpose, consider a recent Israeli slogan, attached as a sticker onto cars. The ambiguous text (14) first reads as (14′) but is then immediately interpreted as (14″):

(14)   נהג בתבונה – אל תבלום את השלום
       nəhag   bi-tvuna –   al   tivlom et   ha-šalom
       drive/   with-reason – don't   brake/ ACC DEF-peace
       behave   stop

(14′)   Drive reasonably – don't brake peace.
(14″)   Behave reasonably – don't stop peace.

Hebrew *nəhag* means both 'behave' and 'drive', and *tivlom* 'stop' also means 'brake'. The sticker, attached to cars, is initially read as advice to drivers to drive reasonably and not to brake (probably abruptly). This is the first interpretation assigned to the text (14′). When the reading process ends, the final word ('peace') triggers the shift from a cautious driving interpretation to a political statement interpretation (14″). The political statement is intact too, as it refers to an ongoing debate in Israel concerning the international peace conference.

The sticker, all in all, does not read as a joke, though the wit, of course, is discernible. The reason why this text, obeying the joke requirement acknowledged in the literature, is nevertheless not a joke, lies in the relation that obtains between the two constituents. It is either the case that the relation between the two constituents (cautious driving vs. peace making) is symmetrical, that is, given the series of things that can be stopped, stopping a car and stopping a peace process do not vary that much in accessiblity. Or, which sounds more plausible, the juxtaposition of these two constituents lends itself to the interpretation of the slogan as a metaphor in which the danger of stopping peace resembles that of stopping a car. Whatever the processing, the text in (14) conforms to the Informativenss Constraint (5b) but, instead of shifting linearly from one constituent to another (5c), it maintains the two interpretations. That is, where ambiguity is not cancelled but sustained, the effect is witty but not funny.

A consideration of commercial texts provides a further insight into the

nature of maintained ambiguities. The advertisements examined below seem to resemble jokes. They conform to the requirements mentioned above, (5a) and (5b), thus ranking among the set of witty texts. They work by metaphorical readings: the products they promote (the second constituent) are intended to be perceived in terms of the first text constituent (the sexual script in our case). However, they are not funny as they do not obey the linear processing requirement (5c):

(15) She has got it all.
Delta

(15) is a commercial representing a Marilyn Monroe type of woman whose light dress is swirled by the wind so that her legs and panties show. The following inscription – 'Delta' – is the name of a firm for underwear. The viewer is required to assign the underwear the qualities of a sexy woman or associate the two constituents in terms of cause and effect. As much as it is witty, the effect is not at all funny. [7]

Consider a few more examples which enforce a simultaneous processing of marked and unmarked constituents. The advertisement slogans quoted in (16) and (17) exploit the ambiguity of *madlik* between 'setting fire to' (e.g. a candle or a cigarette) or 'turning on' (e.g. the lights of a car) on the one hand, and 'sexy, exciting' on the other. The ambiguity is activated and the reader is required to maintain both readings, probably as associated in terms of cause and effect. Similarly, the sustained ambiguity in (18) between *good-bye* and *good buy* – on a sign at a store in an airport – results in a witty rather than a funny effect:

(16) ani roa iš   madlik   – nelson
I   see man turning-on Nelson
I see $\begin{Bmatrix} \text{a sexy man} - \\ \text{a man lighting} \end{Bmatrix}$ Nelson

(17) ani nehag madlik   – orot ba-gešem
I   driver turning-on   lights in rain
I am a $\begin{Bmatrix} \text{sexy driver} \\ \text{driver who turns on the lights in the rain} \end{Bmatrix}$

(18) Don't leave without a good buy.

In (16), (17) and (18) the texts retain the ambiguity. The man in (16) is both sexy and lighting a cigarette and in (17) he is again both sexy and turning on

---

[7]   In a research on ambiguous messages in advertisements and commercials, a student of mine, Michal Enosh, found out that when commercials are ambiguous as between a sexual and a nonsexual interpretation, the sexual interpretation is always first in the comprehension process.

lights. In (18), leaving with a good buy signifies, simultaneously, leaving with a good-bye. The second constituent in each ad does not eradicate the first. Both constituents ('sexy' and 'light' for 'turn on' and 'good buy' and 'good-bye') seem almost equally accessible. Despite the apparent resemblance to jokes, the constraint on jokes to shift from an unmarked to a marked constituent (5c) does not hold here.

To substantiate the difference between witty texts and jokes, let us check ambiguity in perception.[8] In section 4 below I will consider the difference between equally and unequally accessible percepts.

4. On perceptual ambiguities

In view of the restrictions on the capacity of working memory, it is widely agreed that understanding involves the reduction of multiple readings. The principle of economy thus explains why we would rather open less entries where possible. Consider for example the preference for the organization in figure 1 to that in figure 2. While figure 1 can be seen as an organization of two units – an overlap of a square and circle, figure 2 is a combination of three units which, as a result, requires more processing.
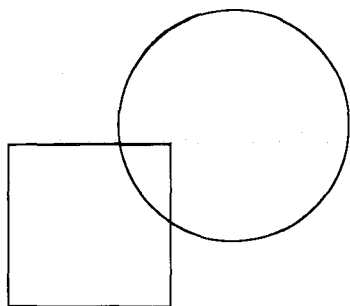

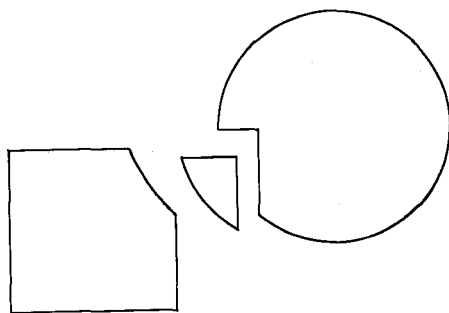Fig. 1.   Fig. 2.

The task of blocking multiple readings is usually assigned to the context. Consider the famous experiment by Leeper (1935) (repeated with verbal material by Lackner and Garrett 1972). Leeper showed that given a context, subjects disambiguate the ambiguous 'young woman/mother-in-law' picture (in figure 3) with respect to the given context. When the context is a picture of a young woman, subjects tend to see in 'young woman/mother-in-law' 'the young woman' (at the cost of ignoring the 'old woman' traits). While the

___

[8] For a similar view of witty texts consider Long and Graesser (1988).

context is a picture of an old woman, subjects tend to see the 'old woman' in the ambiguous 'young woman/mother-in-law' picture, regardless of its 'young woman' features.

Fig. 3. (from Leeper 1935)

Out of context, however, some ambiguities retain their multiple readings. The duck–rabbit and the man–girl figures (figures 4 and 5) are just a few instances in point. Though probably entertained almost simultaneously (unlike the disambiguation process exemplified above where one interpretation is more dominant and occurs initially in processing), they are not perceived at once. According to Attneave (1971), Howard (1961), Kohler and Wallach (1977) and Orbach et al. (1963), for example, the process is dual and repeats itself. The various interpretations alternate to allow for the initial percept to give way to the alternate percept as a result of neural fatigue.
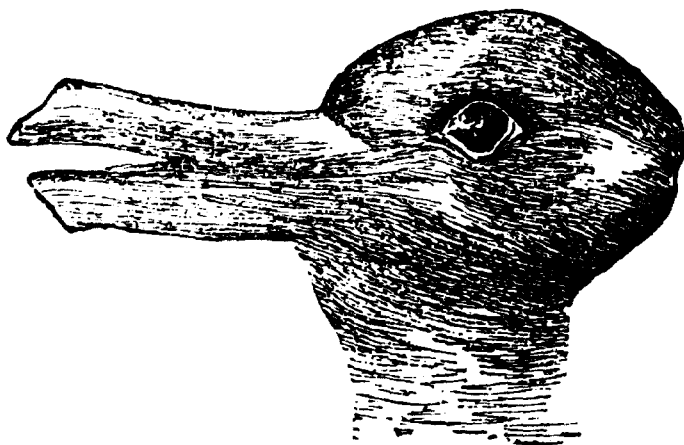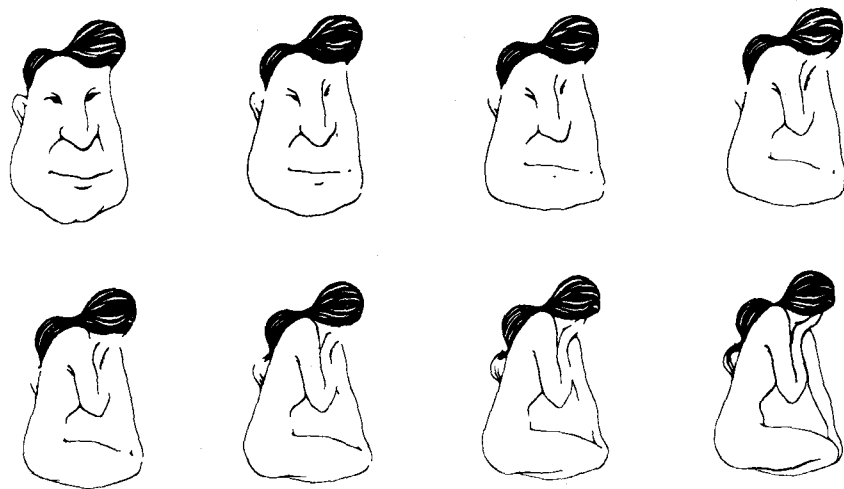
Fig. 4. (from Attneave 1971)

Fig. 5. (from Attneave 1971)

Relevant to our discussion of jokes is the fact that none of these ambiguities results in a humorous effect. Or, rather, the question is, why, given these visual ambiguities, are they not considered jokes? On the face of it, at least,

the passage from one interpretation to another seems equivalent to the passage from one joke constituent to another.

In view of the structure of jokes, the explanation that lends itself here concerns the lack of asymmetry of informational load. Each of the double percepts of the ambiguous figures is equivalently unpredictable or equally accessible in light of the other percept. Their processing suggests that they are perceived (almost) simultaneously, so that a percept shift – the alleged (5c) constraint – does not hold. Thus, the *symmetry* that obtains between the two readings blocks the funny effect. The above findings suggest that where ambiguity does not retain an asymmetry which allows for the *unmarked – marked* reading process, humorous effect does not result.

A consideration of the linear ordering of the joke reveals that jokes manipulate our tendency to minimize the number of readings. The asymmetrical distribution of information in the joke concedes to or, rather, utilizes our 'one-track mind', so that when the second reading is disclosed we are totally unprepared, caught off guard, so to speak. Possibly, what enables such a manipulation of ambiguity is our tendency to save mental effort. Given the hierarchical structure of concepts, where possible, ambiguous constituents will *first* lend themselves to the *unmarked/accessible* reading.

However, to validate this claim with respect to visual perception, it is

Fig. 6.

necessary to show that when the two readings are non-equivalent informatively, visual ambiguity does result in a humorous effect. For that purpose, compare the ambiguities dealt with above (figures 1–5) with the ambiguity of the visual perception in figure 6. Figure 6 (Freud's portrait) is perceived by viewers as funny. What they first capture is Freud's hairy head with his bare forehead. When required to fill in the slot of 'What's on a man's mind', the young woman (i.e., sex) is virtually revealed on top of the head. This is a total surprise. Being markedly informative in the range of possible/accessible fillers (human problems/political issues, etc.), the discovery of the young naked woman allows for an unmarked–marked reading process which retains the alleged asymmetry of funny texts.

Even though it is the inscription below the picture that possibly brings about the asymmetrical reading of the ambiguous picture, that is, brings about the percept-shift (compared to man–girl ambiguity in figure 5, for example,), it is the picture itself that is turned unambiguous at the end of the disambiguating process. Thus, where perceptual ambiguity is symmetrical, the visual text is witty, requesting a certain amount of extra processing, but not funny. On the other hand, where ambiguities are cancelled due to the markedness of the last constituent, the visual ambiguity is funny.

5. Counterexamples – A pragmatic perspective

I would like to conclude with a discussion of a few counterexamples. The examination proposed below of a few modes of witty texts is intended as an insight into the pragmatic constraints on joke telling.

One genre of unfunny texts which the rules of the joke (5a, b, and c above) do not seem to block is the story with a surprise ending. This genre obeys every requirement of the joke, on both the semantic and linear level. Still, it is not, as a rule, funny, though it is witty. One possible reason why such a story is not a joke might lie in that it does not conform to the pragmatics of joke telling. Pragmatically, what joke telling requires is that the hearer's emotions or sensitivity be uninvolved. The psychological theories dealing with the pragmatic constraints on the hearer's sensitivity or emotional involvement are termed disparagement theories. Their findings show that what we laugh at is never our own but others' weaknesses. They show that where the victim of the joke is an ingroup member with whom we identifiy, humor appreciation is impaired (La Fave 1972, Zillman and Cantor 1972, 1976, *inter alia*). As for stories with a surprise ending, they do not observe this preparatory condition on the hearer's attitudes to the victim/hero of the text. Mostly, they call upon the reader's emotional involvement (e.g., Maupassant's 'Necklace') However, where they do not, they are as funny as a joke (e.g., Saki's 'The open window').

Another genre of unfunny texts which seem to obey all the rules specified for jokes, including the constraint on emotional involvement mentioned above, is the detective story. A consideration of the structure of detective texts suggests that jokes need to be further constrained. Detective stories, like jokes, end in the least accessible hypothesis which cancels the rest. Why, then, is the resolution not funny?

Three possible explanations come to mind. First, unlike jokes, detective stories end in a rather complex hypothesis which requires extra processing. Its complexity does the job that would kill a joke. Second, this final hypothesis is to the detective text as the explanation of the joke is to the joke. Explaining a joke kills it by filling in the gap. The funniness of the joke, then, lies in that the hearer finds it easy to resolve the ambiguity by himself. In jokes, it is not only that we laugh at others' weaknesses but rather at others' known or knowable, (e.g. stereotypical) weaknesses, those that are easy to retrieve. Third, which undermines the possibility that detective stories could count as a counterexample, is it not the case that detective stories evolve gradually along the informative axis without, in fact, violating the Informativeness Requirement?

In sum, a surprise ending is a necessary element in jokes.[9] It is the result of the unmarked–marked linear ordering of the text (and processing) of the joke. Yet the breach of the requirement for informativeness and the reduction of alternative hypotheses by a markedly informative message will not suffice to account for the funniness of the joke. Further reseach on ease of processing can help decipher the mystery of the mechanism of humor.[10]

References

Ariel, Mira, 1990. Accessing NP antecedents. London: Routledge. Croom Helm Linguistics Series.

Attneave, Fred, 1959. Applications of information theory to psychology. New York: Holt, Rinhart and Winston.

Attneave, Fred, 1971. Multistability in perception. In: Richard Held and Whitman Richards, eds., Scientific American: Recent progress in perception, 143–151. San Francisco, CA: W.H. Freeman.

Chapman, J. Antony and Hugh C. Foot, 1976. Humour and laughter. New York: Wiley.

Chapman, J. Antony and Hugh C. Foot, 1977. It's a funny thing, humour. Oxford: Pergamon.

Clark H. Herbert and Eve V. Clark, 1977. Psychology and language. New York: Harcourt Brace Janovich.

De Palma, Paul and Judith E. Weiner, 1990. When is a riddle not a riddle. Paper presented at the IPrA Conference in Barcelona.

Dodd, C. and M. Lewis, 1969. The magnitude of the orienting response in children as a function of change in color and contour. Journal of Experimental Child Psychology 8: 296–305.

[9] For a different view see Graesser et al. (1989).
[10] Long after this paper had been accepted for publication, I came to know De Palma and Weiner's (1990) paper which manifests a similar approach to funniness.

Giora, Rachel, 1985. A text-based analysis of non-narrative texts. Theoretical Linguistics 12(2/3): 115–135.

Giora, Rachel, 1988a. On the informativeness requirement. Journal of Pragmatics 12(5/6): 547–565.

Giora, Rachel, 1988b. Victor Raskin: Semantic mechanisms of humor. Philosophia 18(4/7): 409–415.

Giora, Rachel, 1991. On the so-called evaluative material in informative texts. Text 10(4): 299–320.

Goldstein, H. Jeffrey and Paul E. McGhee, eds., 1972. The psychology of humour. New York: Academic Press.

Graesser, Arthur. C., Debra L. Long and Jeffery S. Mio, 1989. What are the cognitive and conceptual components of humorous text? Poetics 18: 143–163.

Grice, H. Paul, 1975. Logic and conversation. In: Peter Cole and Jerry L. Morgan, eds., Syntax and semantics, Vol. 3: Speech acts, 41–58. New York: Academic Press.

Howard, I.P., 1961. An investigation of a satiation process in the reversible perspective of revolving skeletal shapes. Quarterly Journal of Experimental Psychology 13: 19–33.

Keenan, J., 1978. Inferring causal connections in prose comprehension. Paper presented at the American Psychological Convention.

Kohler, R. and Wallach, H., 1977. Figure and effect. An investigation of visual processes. Proceedings of American Philosophical Society 8: 269–357.

Koestler, Arthur, 1964. The act of creation. London: Hutchinson.

Kreitler, Shulamith, Iris Drechsler and Hans Kreitler, 1988. How to kill jokes cognitively? The meaning structure of jokes. Semiotica 68(3/4): 297–319.

Kulman, Thomas L., 1985. The study of salience and motivational theories of humor. Journal of Personality of Social Psychology 49(1): 281–288.

Kutas, M. and Hillyard, S.A., 1980. Event-related brain potentials to semantically inappropriate and surprisingly large words. Biological Psychology 11: 99–116.

Kutas, M. and S.A. Hillyard, 1983. Event-related brain potentials to grammatical errors and semantic anomalies. Memory and Cognition 11: 359–550.

La Fave, Lawrence, 1972. Humor judgements as a function of reference group and identification classes. In: J.H. Goldstein and P.E. McGee, eds., 1972, 73–80.

Labov, William, 1972. Language in the inner city. Philadelphia, PA: University of Pennsylvania.

Lackner, R. James and F. Merrill Garrett, 1972. Resolving ambiguity: Effects of biasing context in the unattended ear. Cognition 1: 359–372.

Leeper, R.W., 1935. A study of a neglected portion of the field of learning. Journal of Genetic Psychology 46: 41–75.

Lewis, M. and S. Goldberg, 1969. The acquisition and violation of expectancy: An experimental paradigm. Journal of Experimental Child Psychology 7: 70–80.

Mandler, Jean, 1984. Stories, scripts and scenes: Aspects of schema theory. Hillsdale, NJ: Erlbaum.

Long, L. Debra and Arthur C. Graesser, 1988. Wit and humor in discourse processing. Discourse Processes 11: 35–60.

McGhee, E. Paul and Jeffrey H. Goldstein, eds., 1983. Handbook of humor Research. Vols. I and II. New York: Springer.

Morreall, John, 1983. Taking laughter seriously. Albany, NY: SUNY Press.

Morreall, John, ed., 1987. The philosophy of laughter and humor. Albany, NY: SUNY Press.

Navon, David, 1983. Characterizing the joke – The inappropriate as seemingly appropriate. The Jerusalem Research of Jewish Folklore 3: 125–145 [in Hebrew].

Nerhardt, Goran, 1975. Rated funniness and dissimilarity of figures: Divergence from expectancy. Scandinavian Journal of Psychology 16: 156–166.

Nerhardt, Goran, 1976. Incongruity and funniness. Towards a new descriptive model. In: A.J. Chapman and H.C. Foot, eds., 1976, 47–51.

Nerhardt, Goran, 1977. Operationalization of incongruity in humour. In: A.J. Chapman and H. C. Foot, eds., 1977, 47–52.

Orbach, J., D. Ehrlich and H.A. Heath, 1963. Reversibility of Necker cube: I. An examination of the concept of 'satiation of orientation'. Perception and Motor Skills 17: 439–458.

Raskin, Victor, 1986. Semantic mechanisms of humour. Dordrecht: Reidel.

Rosch, Elinor, 1973. On the internal structure of perceptual and semantic categories. In: T.E. Moore, ed., Cognitive development and the acquisition of language, 111–144. New York: Academic Press.

Rosch, Elinor and B. Carolyn Mervis, 1975. Family resemblance in internal structure of categories. Cognitive Psychology 7: 573–605.

Rosch, Elinor, W.D. Gray, D.M. Johnson and P. Boyes-Braem, 1976. Basic objects in natural categories. Cognitive Psychology 8: 382–439.

Sanford, J. Anthony, 1985. Cognition and cognitive psychology. London: Weidenfeld and Nicolson.

Sanford, J. Antony and Simon C. Garrod, 1981. Understanding written language. Chichester: Wiley.

Searle, J.R., 1969. Speech acts. Cambridge: Cambridge University Press.

Shannon, C.E., 1951. Prediction and entropy of printed English. Bell System Technical Journal 30: 50–64.

Shultz, T.R., 1976. A cognitive developmental analysis of humour. In: A.J. Chapman and H.G. Foot, eds., 1976, 11–36.

Shurcliff, A., 1968. Judged humor, arousal and the relief theory. Journal of Personality and Social Psychology 8: 360–363.

Smith, Edward and Douglas Medin, 1981. Categories and concepts. Cambridge, MA: Harvard University Press.

Sperber, Dan and Deidre Wilson, 1986. Relevance. Oxford: Blackwell.

Sperber, Dan and Deirdre Wilson (ms.), On defining Relevance.

Stein, Gertrude, 1922/1975. Miss Furr and Miss Skeene. In: Susan Cahill, ed., Woman and fiction, 42–48. New York: Mentor.

Suls, M. Jerry, 1972. A two-stage model for the appreciation of jokes and cartoons: An information-processing analysis. In: J.H. Goldstein and P.E. McGhee, eds., The psychology of humour, 81–100. New York: Academic Press.

Suls, M. Jerry, 1977. Cognitive and disparagement theories of humor: A theoretical and empirical synthesis. In: A.J. Chapman and H.C. Foot, eds., 1977, 41–46.

Suls, M. Jerry, 1983. Cognitive processes in humor appreciation. In: P.E. McGhee and J.H. Goldstein, eds., 1983, 39–57.

Tversky, Amos, 1977. Features of similarity. Psychological Review 84(4): 327–352.

Wittgenstein, Ludwig, 1953. Philosophical investigations. New York: Macmillan.

Zilberstein, Dvora, in prep., The joke from a perception perspective.

Zillman, Dolf and Joanne R. Cantor, 1972. Directionality of transitory dominance as a communication variable affecting humor appreciation. Journal of Personality and Social Psychology 24: 191–198.

Zillman, Dolf and Joanne R. Cantor, 1976. A disposition theory of humor and mirth. In: A.J. Chapman and H.C. Foot, eds., 1976, 46–50.