Content and formal cognitive operations in construing meaning

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Over the last few years, Mark Turner and Gilles Fauconnier have popularized the theory of blending (or conceptual integration) as a cognitive process that operates over mental spaces and applies over many areas of conceptualization. This includes categorization, inference, metaphor, analogy, and metonymy, among others. According to this theory, the understanding of some metaphorical expressions typically involves the activation of four different mental spaces: two input spaces (i.e. a source and a target space), a generic space, and a blend. Turner & Fauconnier contend that this process is characterized by irregularities, such as the existence of asymmetries and non-correspondences between source and target. In this paper, we examine Turner & Fauconnier's proposal and argue that there are no irregularities in conceptual projection. In our view, irregularities are only apparent and can be regarded as the result of the activation and principled combination of partial source and target inputs which are projected and integrated into single composite source and target spaces. These composite spaces have all the structure necessary for the metaphorical cross-domain mapping to take place in such a way that there are no non-correspondences or asymmetries between source and target. We also argue that the default interpretation of expressions involving conceptual projection and integration is a matter of the activity of any of a number of cognitive operations: (i) correlation and contrast, which are usually associated with the interpretation of metaphorical expressions; (ii) domain expansion and reduction, which are converse metonymic operations; (iii) strengthening and mitigation, which work to produce non-literal interpretations of scalar concepts; (iv) counterfactual reasoning, which may be considered a subcase of mitigation in cases of impossible events. Finally, in this alternative account, there is a projection space that is constructed on the basis of the conceptual structure resulting from such operations. This space is available for additional implicative operations that are often needed to derive the ultimate value of expressions in context. [1]

0. Introduction

This paper is, first of all, an elaboration of previous ideas expounded by Ruiz de Mendoza (2002) and Ruiz de Mendoza & Pérez (2003) on the question of the relevance-theoretic distinction between implicature and explicature derivation as two forms of pragmatic inferencing and the applicability of this distinction to the prevalent understanding of metaphor and metonymy in Cognitive Linguistics

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(cf. Lakoff 1987, 1993; Lakoff & Johnson 1980, 1999). Until very recently, cognitive linguists have not paid much attention to work within the field of pragmatics and to possible areas of enquiry with potentially converging interests for both pragmatics and Cognitive Linguistics. Some notable exceptions are found in Marmaridou (2000) and in Panther & Thornburg (2003), mostly with preliminary work carried out in the area of the relationship between metonymy and pragmatic inferencing. In Ruiz de Mendoza (2002) and Ruiz de Mendoza & Pérez (2003) it is argued that metaphoric and metonymic operations are to be listed among the explicature-generation mechanisms. This claim – which is somehow connected to previous proposals made by Papafragou (1995) and Carston (1997, 2000), although there are important differences, as will be seen below – endows the notion of explicature with a more prominent role than it had in the canonical relevance-theoretic framework, as expounded by Sperber & Wilson (1986) (see also Blakemore 1992).

Second, our paper is intended to be sensitive to the notion of mental spaces. This notion was first proposed and used by Fauconnier (1985). It was later taken over and developed by Gilles Fauconnier in collaboration with Mark Turner (cf. Fauconnier & Turner 1996, 1998, 2002; Turner & Fauconnier 1995, 2000) in their systematic study of conceptual integration, which they have labelled *blending*. In rough outline, a mental space is a knowledge packet –derived from our long-term knowledge store– which is built up provisionally and used in combination with other mental spaces for the purpose of performing certain cognitive operations. Thus, although it is admitted that metaphoric operations involve setting up correspondences between two conceptual domains, one of which (called the 'source') allows to understand and reason about the other (called the 'target'), it is pointed out that not all of what we know about the two domains is called upon in this process. A simple example may illustrate this. Think of different metaphors based on our knowledge about dogs. People say that someone has been treated like a dog when they are talking about a situation which is partially relatable to the situation in which a dog is ill treated by people (e.g. children hitting the animal with a stick or throwing stones at it). Here dogs are seen as harmless victims. In contrast, calling someone a dog is an insult based on the idea that dogs may be dangerous or otherwise harmful. One major assumption of blending theory is that conceptual integration is a widespread phenomenon underlying a vast array of cognitive phenomena: categorization, metaphor, metonymy, inference, analogy, and making hypotheses, among others. Another crucial

assumption is that in blending there is an intricate network of conceptual connections among the spaces involved in the process, including potential asymmetries and irregularities which give the blended space its own peculiar emergent structure. This view has been challenged in Ruiz de Mendoza (1998) and Ruiz de Mendoza & Peña (2002). More specifically, Ruiz de Mendoza & Peña (2002) argue that purported irregularities are only apparent and may be accounted for on the grounds of multiple activations of input spaces. This alternative view is called the Combined Input Hypothesis, which in their view replaces Turner & Fauconnier's original proposal to which they refer as the Emergent Structure Hypothesis. In the Combined Input Hypothesis there is no blending of non-correspondences but rather the principled correlation and combination of conceptual structure into one single space (called the *projection space*). Ruiz de Mendoza & Peña's analysis is particularly interesting for our purposes since it discusses a number of cognitive operations which are previous to the creation of a projection space. We believe that such operations may be related to the activity of explicature and implicature generation.

Within this research context, the present paper has two aims: one is to refine and expand on the proposals made in Ruiz de Mendoza (2002) and Ruiz de Mendoza & Pérez (2003) on the question of explicature-derivation mechanisms since it is the authors' belief that explicature-derivation is a much more widespread process in language use than has been recognized so far; the other aim is to integrate the implicature-explicature distinction within the framework of Ruiz de Mendoza & Peña's (2002) Combined Input Hypothesis. Before undertaking this task, however, we will offer an overview of the essentials of our own vision of the implicature-explicature distinction and of the Combined Input Hypothesis in conceptual integration tasks.

1. Coding and inference

Relevance Theory maintains a clear-cut distinction between coding-decoding as a linguistic task and inferencing as a pragmatic task in understanding utterances. Since verbal messages usually fall short of fully encoding the speaker's intentions, interpreting a message almost invariably requires making inferences as to what the speaker really meant. In this process, the output of decoding is just taken as evidence about speaker's meaning. Inferential activity may be of two kinds: explicature-derivation and implicature-derivation.

For Sperber & Wilson (1986) a proposition is explicated rather than implicated if it is the development of the blueprint provided by the linguistic expression. Implicatures are the result of a premise-conclusion calculation where the set of relevant premises is derived from the context. A clear example of explicature is the inference that by *some time* is meant 'a long time' in *It will take some time to repair your car*. This is a case of what Sperber & Wilson call "enrichment". Récanati (1989) has made a useful distinction between two kinds of enrichment: saturation, which occurs when an incomplete expression is filled with the help of the context (e.g. *She's ready*, meaning 'She's ready for the party'); and strengthening where, by this process, the enriched conceptualization entails the weaker conceptualization obtained from decoding the expression. While explicatures are obtained by adapting the decoded message to the context, implicatures work in a different way. In the example above, we can think of contexts where by informing the addressee that the car will take long to repair the addressee may be expected to derive further meaning implications. Imagine the addressee was planning on making a trip and that this piece of information is available to the speaker. A relevant inference could be 'You will have to postpone your trip' or 'You will have to find alternative means of transportation'. Inferences like this, where it is necessary to call upon supplementary rather than complementary contextual information, would be implicated meaning.

Sperber & Wilson (1986) have identified enrichment, fixation of reference, and disambiguation as widespread explicature-derivation mechanisms. More recently, Papafragou (1995) has argued for the inclusion of metonymy as another such mechanism. A similar claim is made in Ruiz de Mendoza (2002), although from a different perspective, since for Ruiz de Mendoza metonymy is a much more complex phenomenon which exhibits a number of interaction patterns with metaphor. This proposal departs significantly from Sperber & Wilson's analysis, where metonymy is regarded, with other so-called tropes, as a matter of implicature. Carston (1997, 2000) has proposed "loosening" as still another form of deriving explicatures. For Carston both strengthening and loosening are treated as forms of *ad hoc* concept construction where there is a departure from literalness. Thus, *some time* in the car-repair example given above would be a non-literal expression to be strengthened into 'a long time'. In the context of a restaurant customer complaining about his meal, the interpretation of non-literal *raw* in the utterance *This steak is raw* demands loosening the lexical concept 'raw' from 'not cooked' to 'underdone'. For

Carston, both metaphor and metonymy are to be regarded as forms of constructing *ad hoc* concepts. However, the two tropes differ in that metonymy is based on strengthening, while metaphor results from loosening. In this way, the interpretation of *Bill is a bulldozer* is based upon a loose use of the item *bulldozer* which results in the creation of an ad hoc concept suggesting self-confidence and determination. In contrast, a metonymy like the one we find in the sentence *The sax has the flue*, where by *sax* is meant 'the person who plays the sax', is based on the development of the lexical concept 'sax' into a more complex conceptual representation.

The strength of Carston's account lies in her understanding that metaphor and metonymy do not provide implicated but explicated meaning. This is best seen in metonymy where one item stands for another. Here, there is no place for more than one implication. However, it is not as clear in the case of metaphor where there is usually a full range of potential implications for a given expression. Even in such straightforward examples as *Bill is a bulldozer*, with a clear central inference, there may be many other implications related to Bill's size, strength, thoughtlessness, and clumsiness, among other possibilities. More complex metaphors, like the ones often cited in the Cognitive Linguistics literature, would of course be more productive in terms of the number of implications. Consider the expression *I plan to keep exploring for a solution*, uttered by a businessman who is faced with a difficult situation which prevents his business from growing. In this metaphor, the solution to a problem is an object hidden somewhere, and finding a solution is finding the hidden object. This metaphor may bring with it a large number of implications related to the businessman's efforts to overcome his problems, his degree of motivation, the difficulties inherent in the task, the degree of tentativeness or determination of his actions, the driving force behind his attempts, and so on.

The potential of metaphor to give rise to so many meaning implications would argue in favour of regarding this phenomenon in the context of implicature derivation, just as Sperber & Wilson do. But there is no crucial difference between the kinds of inference that we derive from metaphor and the ones we obtain from metonymy, enrichment and other explicature-generation mechanisms. They are all forms of adjusting the meaning of utterances to contextual requirements. Unlike what is the case with implicature derivation, metaphorical interpretation is crucially subservient to the conceptual representation directly arising from the expression itself. There are no implicated premises or implicated conclusions, just conceptual

development and adaptation carried out on the basis of similarity and/or correlations between the different conceptual domains involved in the metaphoric operation. We will come back to this issue in the next section.

2. Content cognitive operations

2.1. Mitigation

The relevance-theoretic literature has discussed fixation of reference, completion (or saturation), strengthening, and loosening as forms of deriving explicatures. To this list, Ruiz de Mendoza (2002) and Ruiz de Mendoza & Pérez (2003) have added "mitigation", as a way of dealing with hyperbole. Mitigation is the converse of strengthening. In this respect, it should be noted that both mechanisms apply when utterances make non-literal uses of scalar concepts. Thus, on a scale which indicates length of time, *some* may be strengthened into 'long'. Conversely, on a different scale, non-literal *raw* may have to be mitigated into 'underdone'. While we agree with Ruiz de Mendoza & Pérez that mitigation has a role in some explicature derivation processes, we feel this explanation of mitigation leaves a number of questions unsolved. We try to offer a more complete picture here. Consider utterances like *This suitcase weighs tons*, *I've told you a thousand times not to do that*, or *She's always telling me what to do*, where the default interpretation requires *tons*, *a thousand*, and *always* to be mitigated in accordance with the context. Thus, in a context in which the person who wants to carry the suitcase is not capable of lifting more than, say, 30 pounds, the concept *tons* may mean something like 'somewhere around 30 pounds or even over'. In other contexts, 'tons' will be mitigated to specify different amounts of weight. The most central implication is that the suitcase has excessive weight and that the speaker feels negatively affected by this fact. *A thousand times* may refer to different amounts of time, depending on the context. It may mean three, four, five times, or more. What matters is that the number of times is judged by the speaker to be excessive, which somehow seems to bother him. This is similar to what happens with many uses of the frequency adverb *always*. In the utterance above, the adverb is aimed to indicate an excessive number of times and the speaker's complaint. Depending on what context we are considering, even two or three times may be considered to be too often. Other contexts may require other frequen-

cy specifications (e.g. ten times, thirteen times, twenty-five times, etc.). These observations are not to be taken to mean that in mitigation the addressee is required to find a specific point along a scale where he has to stop, but simply a more or less manageable range of possibilities that satisfy what Sperber & Wilson (1986) have termed the two criteria of relevance: the semantic specification should offer as many meaning implications as necessary for interpretation for the minimum processing cost. So, what a speaker does by using hyperbole is to indicate a subjective judgement of excess along a scale plus his or her (usually negative) attitude with respect to such a situation. If we apply this understanding of mitigation to the steak example above, it becomes obvious that obtaining the explicature involves much more than simply creating the non-complex *ad hoc* concept 'underdone'. The utterance also conveys an idea of an extreme situation and a negative evaluation by the speaker.

2.2. Metaphor and metonymy

There are still other explicature derivation mechanisms. Let us go back to metaphor and metonymy. As we noted above, metaphor has been associated with loose uses of language (Sperber & Wilson, 1985/86), which has led Carston (1997) to talk about loosening as a way of producing explicated meaning. Metonymy, in contrast, is considered a form of strengthening. In our view, this account poses a number of difficulties. First, the notion of loose use applies well to many cases of language use where there is a departure from literal meaning but which do not involve a cognitive operation of the kind that we have with metaphor. Loose uses of language are very common when giving accurate information is either unnecessary or even misleading. As an example of the irrelevance of giving exact information in some contexts, think of a situation in which you are stopped in the street and asked to tell the time: it would be strange for you to produce an answer like *Ten minutes and thirty-five seconds past two*, while *Ten past two* would be enough. Or imagine it is one minute to two. In most situations it will be perfectly acceptable to say that it is two o'clock. The same criterion holds for other expressions of measurement. The distance between cities is expressed in miles or kilometres, but it would be rather uncommon to add the number of feet and inches. Similarly, the speed of a car is just measured in miles per hour, and the weight of a ship in tons, not in tons, stones and pounds, and so on. In other cases, giving accurate information may lead the hearer into making incorrect assumptions. By way of illustration,

imagine you have taken up residence in Las Rozas, a suburb located in one of the outlying areas of Madrid, but that you commute to work every day and do most of your social life in the city. Then, while attending a Conference in Los Angeles, California, you become involved in a rather casual conversation with a colleague who asks you where you live. A relevant answer would be Madrid, rather than the name of the obscure suburb where you actually live, especially since it is Madrid where you develop most of your daily routine (see Sperber & Wilson, 1986/1995 for further discussion of similar cases).

Loose uses of language, therefore, seem to involve a degree of (often intentional) vagueness. However, one can hardly say that metaphor exhibits any kind of vagueness. Metaphor may in fact be used for purposes of intentional accuracy when literalness falls short of expressing the speaker's actual communicative intent. Thus, *Bill is a bulldozer* conveys much more than simply saying that Bill is self-confident and determined. It allows us to understand Bill's behaviour in terms of the way we think of a bulldozer moving forward unimpeded to knock down a building. We see the energy and damaging effects of Bill's actions as comparable to those of a bulldozer. In this connection, it must be noted that hedges like *loosely speaking* or *approximately* do not combine with metaphor (**Loosely speaking / approximately, Bill is a bulldozer*), metonymy (**Loosely speaking / approximately, the sax has the flue*) or hyperbole (**Loosely speaking / approximately, the meat is raw*). However, such hedges combine better with real cases of loose use of language: *John lives in Madrid, loosely speaking*; *It is ten miles away, approximately*; *The car passed by at seventy miles an hour, approximately*.

Metonymy, in its turn, is not a matter of strengthening in the same way as scalar concepts like 'some time'. If anything, there is some superficial similarity between the metonymic development of some expressions and the enrichment phenomenon identified as completion or saturation. However, unlike metonymy, which is purely conceptual, completion is guided by syntactic constraints, as in *She's ready (for the party)*. Furthermore, in metonymy, but not in completion, there is a 'stands for' relationship between what the expression literally denotes and what it actually means. Thus, in *The sax has the flue*, *the sax* stands for 'the person who plays the sax'. Another way of looking at this relationship is by regarding it as what Langacker (1993) has called a "reference point phenomenon": one item gives us mental access to a related item. Still another way of looking at it is by considering the domain-subdomain relationship that holds between 'sax player' and 'sax', where the latter concept is part of the

former. In terms of this domain-inclusion relationship, the metonymic shift from 'sax' to 'sax player' is one of *domain expansion*, i.e. one in which what is meant encompasses what is said.

We identify domain expansion as a form of generating explicatures. But this is not the only metonymic (i.e. 'stands for') explicature-generating mechanism. There is a converse operation which we call *domain reduction*. In domain reduction a conceptual domain serves as a reference point for one of its subdomains, as in *Chrysler has fired 100 workers*, where by Chrysler is meant not the whole company but the people in charge of its employment policy.

So far, we have identified two explicature-generating mechanisms (i.e. domain expansion and domain reduction) associated with the production of metonymy and one related to metaphor (i.e. comparison). There is still another mechanism which falls under the umbrella of metaphor: *correlation*. Correlation in metaphor has been an all-time favourite of cognitive linguists ever since *Metaphors We Live By* (Lakoff & Johnson 1980) came to light. Grady (1999) has made a very useful distinction between metaphors based upon experiential correlations and those that work on the basis of resemblance. The bulldozer example above is a case of resemblance metaphor. There are two conceptual domains with some corresponding attributes. In Lakoff & Johnson's proposal, one of them, called the "source", allows us to talk about the latter, known as the "target". In the case of correlation metaphors, no attributes are shared. Instead, what we have is a correspondence between different but naturally co-occurring dimensions of experience. Think of the correlation between 'affection', as a metaphoric source, and 'warmth', as the target (e.g. when a mother cuddles her baby), which licenses metaphorical expressions like *have a warm heart*, *give a warm welcome*, and *have a cold voice*; or consider the correlation between 'quantity' and 'height' (e.g. when piling up books or when filling a bottle with water) which lies at the base of many metaphors: *prices are going up*, *costs have soared*, *labor dispute lawsuits have sky-rocketed*, *advertising revenues have dropped*, *tool demand plummeted*, and so on. We use expressions like these to talk about quantity (the metaphoric target) in terms of height (the metaphoric source).

We believe that the account we have offered above does greater justice to the relevance-theoretic distinction between explicated and implicated meaning than an approach in terms of loosening and strengthening. It requires, though, acceptance of the existence of a set of cognitive operations that regulate the production of inferences of whatever kind. On a final note for this section, let us observe that

even implicatures are the result of cognitive operations of the condition-consequence (or if-then) type. For instance, by saying *Bill is a bulldozer* the speaker may mean that Bill is determined in a certain compelling way. This would be a development through metaphoric comparison of the literal meaning of the linguistic expression. But, on another level, the same utterance may be a warning to the hearer that he has to stay away from Bill. For the utterance to be taken as a warning, it is necessary to call upon the supplementary information that it is not advisable to interact with people who do not think of the consequences of what they are doing. This is the if-part of the inferential calculation. The then-part is the inference that since Bill is a good example of the kind of person described in the if-part, then it is better to avoid contact with him. Note that the derivation of the implicated meaning is ultimately metonymic: the speaker trusts that the hearer will construct an inferential condition-consequence schema such that by mentioning a relevant part of it, the whole will be invoked.

2.3. Parametrization

Consider now the interpretation of the word *safe* in the expressions *dolphin-safe tuna* and *shark-safe beach*, which we borrow from Turner & Fauconnier (1995). *Dolphin-safe* appears on tuna cans and suggests that measures were taken to avoid doing harm to dolphins during the harvesting of tuna. *Shark-safe* refers to the conditions in which swimmers and divers may use a beach. Turner & Fauconnier use these and similar examples to address the issue of non-compositionality of conceptual constructions. Their point is nicely made since it is evident that when we combine these words, we do not combine their meanings. The words simply act as minimal cues that afford access to larger ranges of conceptual structure that the hearer needs to integrate in an imaginative way into a relevant scenario. For Turner & Fauconnier, expressions like *dolphin-safe* and *shark-safe* involve integration of features from partial conceptual structures (called "input mental spaces" or simply "inputs") into a larger one in a process which they call *blending*. In the case of *dolphin-safe tuna*, as a result of blending we see the dolphin in the role of a potential victim in the context of large-scale fishing operations and we see safety as every action taken to avoid doing harm to dolphins while fishing. Interpreting 'shark-safe beach' requires the activation and integration of information according to which sharks are seen as dangerous fish that may attack and kill people with information

about what to do to keep sharks off the shores; in this case, creating safety conditions involves protecting people. We agree that information has to be selected and integrated into a larger picture. However, something is missing from Turner & Fauconnier's account. There are some cognitive operations that take place before actual integration can happen. Note that it is possible to paraphrase *shark safe beach* as 'beach that is safe from sharks', and *dolphin-safe* 'tuna as tuna fishing activities that are safe for dolphins'. In the two cases, what the formal aspects of the noun plus adjective structure indicate is that the conceptual connection between 'shark' and 'safe' (i.e. safe in terms of what we know about sharks), on the one hand, and between 'dolphin' and 'safe' (i.e. safe in terms of what we know about dolphins), on the other, is closer than the rest of the conceptual relationships. But it is left to the hearer to decide about what that connection is like. In other words, there is a need for parametrization of a vague conceptual association. Even though there are default values, such a parametrization is highly dependent on adapting the basic conceptual layout provided by the expression to other textual and contextual clues. In the case of *shark safe beach* our knowledge about the dangers of sharks for swimmers is what allows us to interpret *shark safe* as 'safe from' rather than 'safe for'. In the case of *dolphin-safe tuna* it is our knowledge about our efforts to protect dolphins that triggers the 'safe for' reading, which in turn demands the metonymic shift from 'tuna' to 'tuna fishing activities'. It is evident that *parametrization* is one more cognitive operation to add to the list of explicature-generating devices.

2.4. Non-compositionality

The examples we have dealt with in this section are strong evidence that semantic interpretation is not compositional, as Turner & Fauconnier themselves have pointed out. However, we believe that it is not only compositionality that is at issue here, but also the notions of coding and decoding if by these terms we mean finding one-to-one correspondences between formal expressions and their corresponding concepts. Interpretation, even of the most straightforward expressions, is mostly inferential, although constrained by a limited set of cognitive operations. This is very clear in the case of the *dolphin-safe* and *shark-safe* examples, and whenever we have metaphoric or metonymic operations like comparison, correlation, expansion, and reduction. But what about more straightforward combinations of words, like the adjective *good* used as a noun modifier, as in *good person*, *good feelings*, *good*

fight, *good time*, and *good life*, among many other possibilities? Is meaning not compositional here? Think, first of all, of *good person*. In some contexts a good person is just a nice person who behaves kindly with other people. In other contexts, a person is considered good if the person lives up to a number of moral standards. *Good feelings* are usually feelings of tenderness. A *good fight* is usually a high-quality one that pleases the viewers. A *good time* is a pleasurable experience. Finally, *good* in a *good life* may be a close synonym of *virtuous* or even *admirable*. Of course, there is a polysemy issue here, so it may be argued that there are different senses of "good" that apply to the regular senses of the nouns it combines with in a compositional manner. But maybe it is unnecessary –and even misleading– to postulate a large number of different senses for *good* if we find a central characterization that applies to all cases. We suggest the following: 'an entity, a situation or an event is good if it is positively assessed by the speaker'. Whether such a positive assessment takes place in terms of morality, pleasure, or admiration is a matter of parametrizing this understanding of *good* in accordance with textual and contextual clues.

Our proposal solves a number of difficulties related to the interpretation of content words in combination. Think of the sentence *She's a good nun*. In it, one strong default value for the interpretation of *good* would be 'virtuous', but *good* here might also mean 'efficient in doing her job', or just 'kind'. So it is the context in which the expression is produced that will allow us to find the right parametrization of the generic meaning that we have ascribed to the adjective *good*. The noun 'nun' may be variously profiled in the domains of the moral values held by religious people, of labour, and of human interaction, among other possibilities. Profiles are not word senses, but just vantage points from which we see some aspects of an entity or an event to the detriment of others (Langacker 1987). So, in interpreting *good nun* we are not combining words senses, but just finding the right constraints on the generic value of *good* in terms of the specific way in which the noun is being used.

Our discussion so far suggests that meaning derivation, even at the level of explicit information, is based on inferential cues. This proposal is more radical than the one found in Sperber & Wilson (1986) and most relevance-theoretic literature, since it is assumed that there is no coding-decoding stage in linguistic production-interpretation. In our view, the formal aspects of utterances act as cues that allow speakers to work out explicated meaning. Meaning derivation at this stage is a linguistically-cued inferential process. At the stage of implicature derivation, meaning is obtained on the basis of con-

text-driven inferences. Ultimately, what we propose combines insights from current thinking in Cognitive Linguistics and from work on inferencing in Relevance Theory. We shall come back to these and related issues later (see section 3.1. below).

One final piece of evidence in favour of the strength of this account is provided by the apparently simple combination of adjective plus noun in the phrase *big donor*, as found in the sentence *DeVos was a big donor* (i.e. a person who gave a 'big' donation) *in the Bush presidential campaign*. A donor is a person who supports an organization or an institution by giving money to it. If *donor* were to be profiled in the domain of size, a *big donor* would be understood as 'a person who has donated money to an institution and who happens to be big in size'. This reading is not impossible but it is hardly likely to occur except in jokes or puns (e.g. it would apply to a rich person, big in size, who has given a ridiculously small sum of money to a charity). The default value is strongly cued by the meaning commonly associated to the word *donor* plus the fact that it is not generally relevant (since it is not economical in terms of processing cost) to use specific-level categories to focus upon attributes that belong to their superordinates. What is specific about the meaning of donor is that a donor makes donations. *Big* in the sentence above applies (metaphorically) to the amount of money or goods donated to the presidential campaign. It is also evident that there is a metonymic shift from 'donor' to 'donation', which is in turn cued by the meaning of 'big' as an adjective of size that may be metaphorically applied to the domain of quantity. Processing *big donor* is a non-compositional inferential process involving correlation and metonymic reduction operations.

3. Formal cognitive operations

Content cognitive operations are lower-level operations used to make inferences on the basis of cues provided by the linguistic expression or the context in which it is produced. However, by themselves these operations are insufficient to explain how the meaning derivation process is carried out. There are other higher-level operations, of a formal nature, which act as prerequisites for content operations to be possible at all.

3.1. Cueing

Consider first the formal operation of *cueing*, which we have

briefly introduced above. Linguistic and textual cues serve as guides for the conceptual activation of pieces of world knowledge or "mental spaces", in Turner & Fauconnier's terminology. We have observed that the conceptual items in mental spaces are worked upon by the language user with the purpose of developing the full range of inferences that is relevant for the interpretation of the expression. But linguistic expressions also provide us with cues as to what operations are necessary. Consider the different interpretations of *rabbit* in *We eat rabbit every now and then*, *There was rabbit all over the road, He wears rabbit regularly, She loves her little rabbit*. Examples like these abound in the literature on literalness and polysemy. The first example refers to the meat, the second one to the flesh, the third one to the fur, and the last one to the animal. As is evident, it is possible to account for all the different uses of *rabbit* on the basis of metonymic operations. The last example would provide a central non-metonymic characterization, while the others would require metonymic shifts from the animal, as the main domain or matrix domain (cf. Ruiz de Mendoza 2000, for details on this terminological choice), to different relevant subdomains as cued by the lexical and constructional features of each expression. Thus, 'eat' would activate the subdomain of the meat obtained from rabbits, 'wear' the subdomain of the fur of the animal, and so on. In all these metonymies, an object is metonymically conceived of as material and therefore grammatically treated as a mass noun (cf. Kövecses & Radden 1998: 51, and Ruiz de Mendoza & Pérez 2001: 336, for further discussion on the relationship between subcategorial conversion and metonymy). There are therefore two content operations involved here: one by means of which an object stands for (part of) the material constituting the object (what we have called domain reduction); another operation, by means of which the hearer has to determine the kind of material that is meant (what we have called parametrization). The first operation is grammatical and is cued by constructional mechanisms like the use of indefiniteness indicators; the second operation, which is lexical, hinges on the semantic characterization of the verbal predicate.

3.2. Abstraction

There are other formal operations involved in meaning derivation. Think of a resemblance metaphor like *There are several small farming hamlets strung out along the valley*. Here *strung out* invokes the idea of the hamlets being spread out in a line as if they were on a string. There is a metaphorical resemblance operation that maps the

image of stretched strings onto the overall shape of the hamlets as seen from a distance. The mapping is possible because both images have some basic structure (of an imagistic nature) in common. Turner & Fauconnier have postulated the existence of a generic mental space that contains structure of this kind; in their view, the function of a generic space is to license the correspondences between the metaphoric source and target. Without a generic space metaphoric correspondences based on resemblance, which are a form of content operation, are not possible.

In our view, generic spaces are not exclusively based upon shared conceptual structure. Consider the case of the metaphorical correlation between quantity (the target) and height (the source), as in *Prices are soaring*. Interpreting this sentence requires the activation of a mental space about commercial activities, where goods have prices, and of another space where a certain man-made device such as a missile or a rocket moves quickly up into the air. Interpretation also requires finding significant correspondences between the two spaces. This is possible because the two spaces we have mentioned are sensitive to the experiential correlation between quantity and height. However, the only thing these concepts share is co-occurrence in our experience (we observe the rise and fall of levels as more is added or taken away). In this case, conceptual structure in the generic space is not shared but simply correlated, but the correlation at the generic level licenses the metaphorical mapping. Generic spaces owe their existence to the human ability to derive relevant generic structure from lower-level concepts. As such, generic spaces are constructed on the basis of formal *abstraction* operations which are preconditions for content (or low-level) metaphoric operations of correlation or resemblance.

3.3. Integration and projection

A third formal operation is *integration*, which we will discuss for convenience in connection with *projection*, our proposed fourth formal operation. Integration should not be confused with blending, as discussed by Turner & Fauconnier. First, blending is described by these authors as the end-result of cognitive activity, while integration, as we shall show, happens at previous stages. Second, a blended space may contain emergent structure not found in any of the input spaces. In integration there is no such thing as independent emergent structure: all relevant structure is derived from the input spaces. The problems of Turner & Fauconnier's claim have been dealt with by

Ruiz de Mendoza (1996, 1998), Ruiz de Mendoza & Díez (2002), and Ruiz de Mendoza & Peña (2002) in considerable detail. In these studies the apparent irregularities, asymmetries, and non-correspondences between inputs observed by Turner & Fauconnier in many of their analyses are accounted for in terms of the activation of multiple input spaces which are combined and integrated in a constrained fashion before any other cognitive operation takes place.

Consider in this respect a modified version of one of Turner & Fauconnier's best-known examples (cf. Fauconnier & Turner 1998, among other sources). Imagine a professor of philosophy teaching a class about Kant's theory of morality. In so doing, the professor acts as if Kant were debating with him in the classroom and argues and counterargues in accordance. In this context, an imaginary conversational turn like the following would be fully meaningful:

> So, Mr. Kant, you would like us to believe that most of the time people allow their feelings to rule their choices and decisions. However, why not think that choices are most of the time, if not invariably, a consequence of rule-of-thumb reasoning?

Following Turner & Fauconnier's way of dealing with examples like this, we would have two active input spaces: one has the philosophy class professor in his role as a teacher; in the other we have the 18th century philosopher pondering and writing about the metaphysics of morals. Selected structure from these spaces is then projected and combined in a third space, called the blended space or blend. In the blend we have the impossible situation of the philosophy professor and Kant engaged in actual debate in the context of a classroom. The philosopher is not writing but debating. Only the philosopher's arguments are imported into the blend, but not the vehicle of expression (i.e. Kant's writings). This and other mismatches between the two inputs are resolved in the blend where there is emergent conceptual structure (e.g. Kant could not possibly address the professor's criticism, although we may find potential counterarguments in his writings). It is in the blend that the debate can take place, not in the inputs. In the Combined Input Hypothesis, as postulated in Ruiz de Mendoza & Peña (2002), there is a projection space (rather than a blend) whose makeup results from developing and integrating conceptual structure derived from as many inputs as is necessary to activate for the purposes of relevant interpretation. Information is not "blended" in an unconstrained manner. There are linguistic and contextual cues to the activation of relevant input

spaces that are combined and projected following pre-established sets of options. The application of the Combined Input Hypothesis to the simulated philosophical debate example would require the activation of at least three input spaces: there is one source input that provides us with the structure of lively debate between thinkers; then we have a combination of two target inputs in which we see two thinkers, Kant and the modern philosophy professor, expressing their views (the first one in writing and the second one in the spoken form). The structure of the source and the combined target is then placed in correspondence in such a way that we see the views entertained by the two thinkers as part of a debate. It is this structure that makes up the projection space.

Figure 1 below represents the Emergent Structure Hypothesis (which Turner & Fauconnier refer to as the "four-space model") and Figure 2 a slightly modified version of Ruiz de Mendoza & Peña's Combined Input Hypothesis:

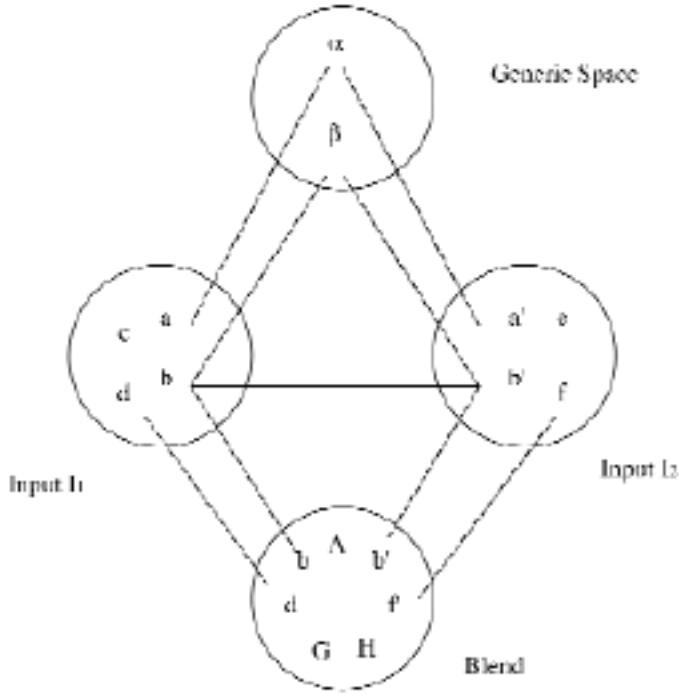

Figure 1. Turner & Fauconnier's four-space model.

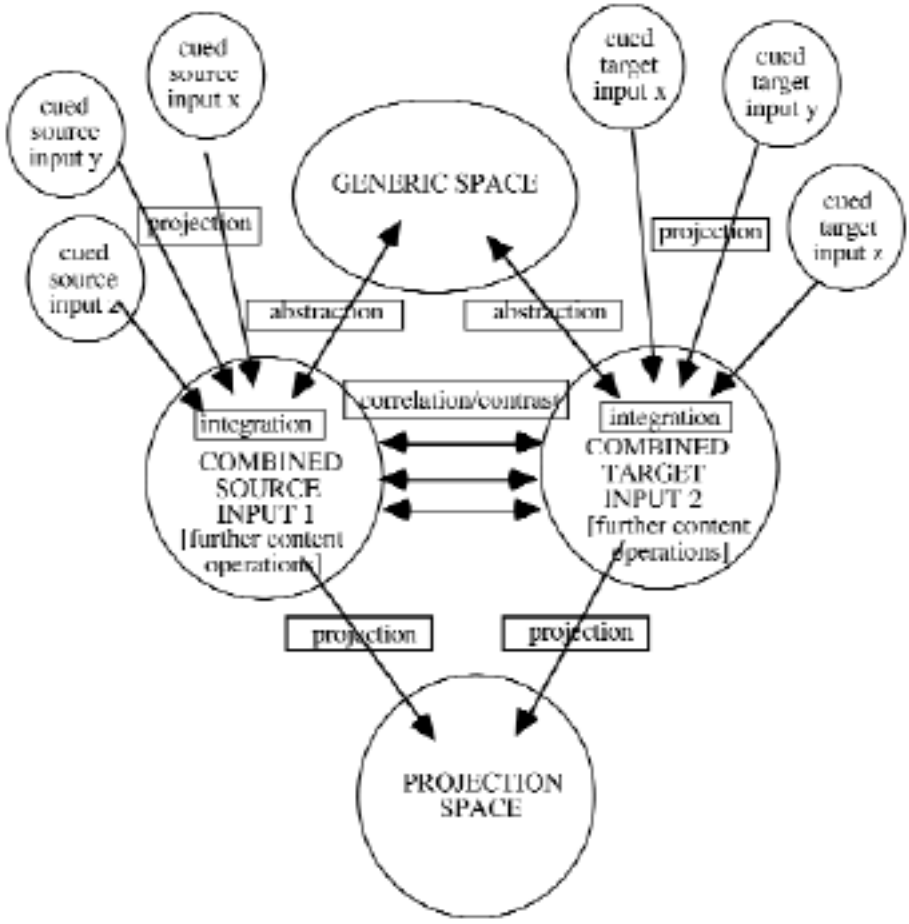

Figure 2. Ruiz de Mendoza & Peña's Combined Input Hypothesis.

Figure 2 improves on Ruiz de Mendoza & Peña's original formulation in that it incorporates two more formal operations (cueing and abstraction) and in that it neatly separates formal from content operations. Still, we have one further refinement to make. In our view, integration operations may be of two kinds: integration by *schematic enrichment* and integration by *combination*. We discuss each mode of integration in turn.

3.3.1. Integration by schematic enrichment

The notion of schematic enrichment (not to be confused with Sperber & Wilson's notion of enrichment as strengthening or completion, discussed in section 1 above) was first proposed by Fornés & Ruiz de Mendoza (1998) in the context of image-schema interaction. It was initially applied to cases in which an image-schema incorporated into its structure other image-schemas of a subsidiary nature or even propositional cognitive models which fleshed out part of the generic conceptual structure of the image schema. A clear example of image-schematic enrichment is provided by the expression *She was led into a depression*, where the conceptual structure of the 'path' schema underlies the figurative motion of the protagonist into a certain state conceptualized as a location. The 'path' schema is enriched by the container schema filling in the end-of-path structural slot. In this operation the 'container' schema becomes subsidiary to the 'path' schema. The notion of image-schematic enrichment has been developed by Peña (2003: 216-220) who has distinguished three possibilities:

(i) The integration of basic and subsidiary schemas, as in our previous example.

(ii) The convergence of image-schemas, whatever their status as basic or subsidiary, into a linguistic expression which invokes at least one of them, the other remaining implicit. For example, in *He has more and more love inside him; in fact, he's full of love,* the explicitly invoked 'full-empty' schema is enriched by the implicit 'verticality' schema, which is necessary for the figurative quantity-height correlation to take place.

(iii) The merging of image-schematic structure with any other kind of cognitive model, whether propositional, metaphoric, or metonymic, as in *He's way ahead of himself*, where the protagonist is seen as racing against himself along a path and therefore as losing control over himself; here there is a metaphor that has been called by Lakoff (1996) 'the divided self', whereby the person is seen as made up of a rational part (called the subject) and a bodily and/or emotional part (called the self). In the ideal state the rational self keeps his/her other self under control. The notions of subject and self are part of a metaphorical model that enriches the path-schema, i.e. it fills in the structural slots corresponding to the moving entities which travel towards a common destination.

Peña's analysis is very useful for our purposes since it allows us to derive a principle of conceptual integration by enrichment: the

generic structure from one of the schemas involved in a conceptual interaction operation (i.e. one cued input space) will always provide the blueprint for the projection and combination of other schemas. In this respect, it must be noted that, whatever their intrinsic degree of genericity, a conceptual structure, in being built into another, becomes subsidiary to it. Thus, in *She was led into a depression*, while the protagonist is inherently less generic than the 'path' schema, the 'container' schema becomes so on an *ad hoc* basis for the purpose of the interaction operation. In fact, there is nothing in the intrinsic structures of the 'path' and 'container' schemas that makes us rank them on a different degree of genericity. Not so with other schemas: thus, compulsion and blockage are force-dynamic constructs (cf. Talmy 1988) subsidiary to the 'path' schema since they cannot be conceived independently of this schema. However, the notions of 'path' and 'container' are not mutually dependent.

3.3.2. Integration by combination

In conceptual integration by combination the input spaces to be initially combined – whatever their number – are never subsidiary to one another. Integration is then made possible by calling upon additional input spaces that will provide the necessary structural slots for the integration operation to be possible. The imaginary debate between Kant and the present-day philosophy professor provides a good case in point. In it, we have a metaphorical operation with a combined target input that consists of Kant's ideas as set in contrast to the professor's claims. A source input containing structure pertaining to live debate between scholars maps onto the combined target so that the way the contrasting views are put forward is seen in terms of the way debaters argue and counterargue. The projection space receives all the implications from this operation. Of course, not all that we know about debates is part of the correspondence between the source input and the combined target input, since some possible elements of debates (e.g. the presence of a moderator) are not brought to bear upon the mapping operation. Only conceptual structure from the combined target which has a counterpart in the source is relevant. This is a cognitive principle which is true of all metaphoric mappings. We shall call it the *Correlation Principle* and claim it to be a significant part of all integration operations since non-corresponding conceptual structure is never part of a combined input space. In the case of the imaginary debate example above, the Correlation Principle leads us to discard such elements as a moderator and the applause from the audience. Once these elements are discarded it is

possible to combine the rest of the elements and understand them in terms of corresponding ones in the source.

The Correlation Principle also applies in cases of integration by enrichment. Consider the expression *The Colorado Archaeological Society came into existence in 1935*. Here, existence is metaphorically treated as a bounded region in space located at the end of a path. The metaphoric source, therefore, has a path, with a figurative container at the end of it; the container, which is the destination of a travelling entity, becomes subsidiary to the 'path' schema and enriches it by filling in one of its structural slots (the end-of-path). The target has the creation of an archaeological society. In the mapping being created is seen as figuratively moving from non-existence to existence, i.e. a change of state from not being into being is understood in terms of motion into a different location. The metaphor maps locations onto states and movement from one location to another as changes of state (see Lakoff, 1993; Lakoff & Johnson, 1999, for details on this kind of metaphor). There are other elements of the 'path' schema that are left out of the mapping operation: the source, the landmarks, and obstacles to movement, among others.

We find that the Correlation Principle works in combination with a version of Lakoff's "Invariance Principle" (Lakoff 1993: 215) that has been labelled by Ruiz de Mendoza (1998: 263, 265) the "Extended Invariance Principle". Lakoff's formulation of the Invariance Principle is concerned with the preservation of cognitive topology (i.e. image-schematic structure) of the source domain of metaphoric mappings in a way which is consistent with the inherent structure of the target domain. This principle explains why, for the 'path' schema, destinations map onto goals. On the grounds of experience, the destination at the end of a journey along a path is typically the traveller's goal. Mapping destinations onto a person's activities in life, for example, would not be consistent with the structure of the target where life's goals are seen as something people achieve as a result of life's activities. Evidently, finding source-target counterparts is not only a matter of discovering relevant conceptual structure to be mapped, but also of not doing violence to the inherent conceptual makeup of source and target inputs. However, Lakoff's formulation of the Invariance Principle deals exclusively with image-schematic structure. The Extended Invariance Principle, in contrast, covers all generic-level structure, whether image-schematic or not. This makes Ruiz de Mendoza's proposal more interesting for our purposes. Lakoff's Invariance Principle, in combination with the Correlation Principle, would allow us to determine the exact nature of the

metaphoric mapping from motion to change of state associated with the expression 'come into existence'. But it would be insufficient to explain the Kant versus philosophy professor example, where cognitive topology plays no role. The Extended Invariance Principle has been formulated by Ruiz de Mendoza (1998: 265) as follows:

> All contextual effects motivated by a metaphoric mapping will preserve the generic-level structure of the source domain and of any other input space involved, in a way consistent with the inherent structure of the target domain.

This formulation is sensitive to the notion of mental space and to the claim that more than two spaces may be involved in the configuration of the metaphoric source and target. It further incorporates the relevance-theoretic notion of *contextual effect*, to be understood as the meaning impact produced by a message in the addressee's cognitive environment (i.e. the set of beliefs entertained by the addressee whether derived from his world knowledge or from his perception of linguistic and contextual clues). The overall idea captured by the Extended Invariance Principle is that consistency is not restricted to source-target correlations, but is extended to all information projected into the projection space. Note that no implication captured by the projection space can be inconsistent with the information that has been placed in correspondence.

The Extended Invariance Principle and the Correlation Principle, as discussed above, are high-level principles that work in combination to constrain formal cognitive operations of integration and projection. Although initially formulated in connection with metaphor, their operational value ranges over all other content operations. It must be borne in mind that integration and projection underlie all semantic operations where mental spaces are activated. Consider hyperbole again, as in *This suitcase weighs tons*. The impact of this expression lies in thinking of the actual suitcase that the speaker is trying to handle in terms of an imaginary case that is impossible to lift. What we have is a mapping from the imaginary to the actual situation, very much like in metaphor, with projection and integration into a single combined space of a number of relevant elements that have been correlated beforehand: the physical and emotional impact of the excess of weight of the real case on the speaker is seen in terms of the extreme weight of the imaginary case. The mitigation operation of *weighs tons* into 'weighs a lot' is thus accompanied by the extra meaning effects provided by the mapping, in such a way

that in the final stage of interpretation at the level of explicature-derivation we have a speaker complaining about the excess of weight of a suitcase he is trying to handle. The Correlation Principle allows us to discard from the mapping irrelevant elements such as the purpose of the suitcase or the materials that it is made of. The Extended Invariance Principle ensures that there is conceptual consistency in the correspondences that play a role in the mapping.

Strengthening may be treated in a similar fashion. Think of the utterance *Your college is some distance from here*, where *some distance* is to be strengthened into 'a long distance'. There are added contextual effects like the idea that the college is further away from where speaker and hearer are than the hearer thought. The speaker uses the attenuated concept 'some', in a tentative way for politeness reasons. In many contexts *some* means *not much*, but is, at the same time, vague enough to allow for strengthening if required by the context. In terms of the conceptual mapping involved, the source domain has a vague expression of measurement, while the target has the real situation with the long distance. Speaking of a long distance as if it were not necessarily long has the effect of leaving it up to the hearer to determine whether the distance is felt by him to be long or not. In fact, the mapping provides the speaker with a face-saving strategy (in the sense of Brown & Levinson 1987) at the same time as the speaker is trying to get the hearer understand the real situation by producing a less than literal expression (like *a long distance* would have been) which still may convey the right contextual effects. As with other cognitive operations, irrelevant information is left out of the meaning-derivation process and conceptual consistency is maintained throughout (i.e. it is based on the same scalar magnitude).

Other cognitive operations, like completion or parametrization, are not explainable in terms of conceptual mappings. However, this does not mean that the two high-level principles we are discussing are irrelevant. All to the contrary. Think again of the expression *dolphin-safe tuna*, where there is integration of different mental spaces as guided by our beliefs about the protection of some endangered species. The overall generic structure of the input spaces (i.e. tuna harvesting operations and dolphin preservation measures) are kept intact, while some elements are omitted as irrelevant in the integration of the inputs (e.g. not all we know about protective measures to preserve dolphins is brought into the resulting space).

The above discussion calls for a refinement of the Extended Invariance Principle as formulated by Ruiz de Mendoza (1998) in order to make it cover all content or lower-level cognitive operations

involved in explicature derivation. We suggest the following wording:

> *The Extended Invariance Principle* (refined version):
>
> All contextual effects motivated by a low-level cognitive operation will preserve the generic-level structure of all input spaces involved in the operation in a way consistent with their inherent structure.

4. Implicatures, explicatures and the Combined Input Hypothesis

We have seen that explicature-derivation is a constrained process which obeys a number of high-level and low-level cognitive operations, of which the former are prerequisites for the latter. As we have briefly suggested above, implicatures also result from content cognitive operations, but there are three essential differences with explicatures: (i) in implicature-derivation, the operations are of the premise-conclusion kind; (ii) implicatures are not adaptations to the context of the (underdetermined) meaning of linguistic expressions, but rather meaning implications obtained by invoking supplementary information cued by the relevance relationship between the context and the explicated meaning associated with a given expression; (iii) as a consequence, explicature-derivation precedes implicature calculation. The following very straightforward example will allow us to illustrate this point:

A: Did you enjoy your film?

B: It was a Western.

In a context in which it is manifest to speaker A that his interlocutor does not like Westerns, B's answer will generally be taken to mean that he did not enjoy the film. But B's answer is much more than a way of answering negatively. If this had been B's only intention, an utterance like *No, I didn't* would have been enough. B's utterance seems to be giving a reason why he did not enjoy the film, plus something else. An alternative response like *No, I didn't because it was a Western and, you know, I'm not very fond of Westerns*, might have conveyed a very similar range of contextual effects, but at a higher processing cost. Note that what the longer alternative response does is explicate the information that is used as an implicit premise to process the meaning of B's actual answer.

Implicature-derivation tasks involve the activation of contextu-

ally cued implicit knowledge, which takes the form of another mental space, which is then used as a premise in a condition-consequence pattern. This requires a metonymic operation of domain expansion which allows us to convert the explicature generated on the basis of the short answer *It was a Western* into a fully specified proposition which contains all the ingredients of the long answer *No, I didn't because it was a Western and, you know, I'm not very fond of Westerns* (see figure 3 below). The cue for this metonymic operation would be the lack of relevance of the short answer to produce by itself the right contextual effects. This kind of explanation is consonant with the metonymy-based account of indirect speech acts in terms of illocutionary scenarios put forward in Thornburg & Panther (1997) and Panther & Thornburg (1998). According to this proposal, which has been further elaborated by Pérez & Ruiz de Mendoza (2002), the interpretation of indirect speech acts may be ultimately reduced to a metonymic operation in which one of the felicity conditions of a given speech act stands for the whole illocutionary scenario. For instance, in *Can you pass me the salt?* a question about the hearer's ability to pass the salt metonymically activates the whole request scenario.

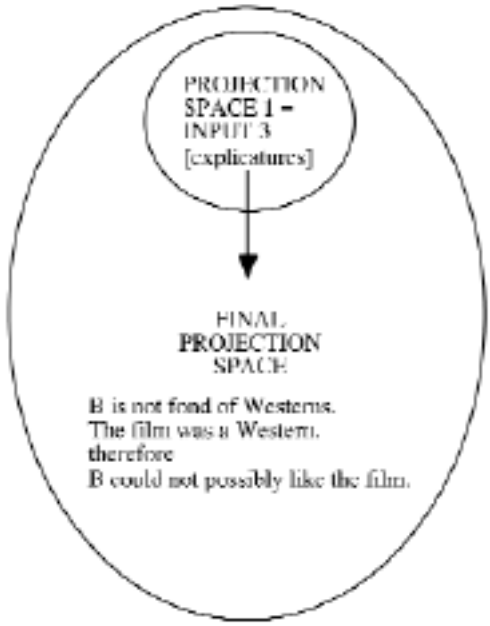

Figure 3. Implicature-derivation task.

5. Conclusions

Relevance theorists have correctly observed that pragmatic inference not only operates at the level of implicature-derivation, but is also a relevant phenomenon at the level of explicitness. The present paper has shown that pragmatic inference is even more pervasive than commonly assumed. We have identified a number of low-level or content cognitive operations, not found in the canonical relevance-theoretic literature, that seem to play a significant role in communicating explicit assumptions, i.e. those assumptions which arise as adaptations of utterances to the context. Other operations work on a higher level and have a formal nature. Such operations are a prerequisite for content operations to take place. Underlying this account of linguistic processing is the radical assumption –consonant with current thinking in Cognitive Linguistics– that there is no such thing as coded meaning, but rather the formal aspects of utterances prompt the hearer to call upon different mental spaces which interrelate on the basis of formal and content cognitive operations. Our discussion of formal operations has allowed us to formulate the Correlation Principle, which constrains the number of relevant correlations between input mental spaces in integration and projection tasks. It has further allowed us to account for consistency between input spaces in terms of a refined version of the Extended Invariance Principle, as formulated in Ruiz de Mendoza (1998). Finally, we have addressed the question of the place of the implicature-explicature distinction within our own version of conceptual integration which replaces Turner & Fauconnier's account in Cognitive Linguistics.

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