Sense Generation
or
How to Make the Mental Lexicon Flexible

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Abstract

In this paper we address some key issues in the psychology of word meaning, and thereby motivate a *Sense Generation* approach to the diversity of senses that a word may have. We note that an adequate account must allow for the flexibility and specificity of senses, and must also make appropriate distinctions between default and non-default senses of a word, and between different senses for vague and ambiguous words. We then discuss two central components of a theory of sense. Firstly, *lexons*, the stable representations, in a "mental lexicon", of word meanings; secondly, *senses*, the mentally represented descriptions associated with particular *uses* of words. We argue that the crucial issues in accounting for the diversity of sense, are: the number of lexons we need to postulate, and the relationship between the contents of those lexons and their associated senses. *Sense Selection* accounts, of which we distinguish Strong and Weak versions, both of which find considerable support in the cognitive science literature, fail to account for the flexibility and specificity of senses in a way that is consonant with linguistic evidence regarding the ambiguity of words, and psychological evidence regarding the coherence which underlies their use. We will show how the *Sense Generation* approach, by positing a nonmonotonic relationship between lexons and their senses, respects these considerations. We sketch this approach, and finally note some of its promising implications for other aspects of word meaning.

1 Introduction

In this paper, our aim is to consider some possibilities for certain aspects of a theory of word meaning, and thereby to motivate what we call *Sense Generation*. We briefly outline the crucial phenomena of flexibility and specificity of senses in Section 2. In Section 3 we sketch some of the sorts of object which might be required in a theory of sense, and, most importantly, the relations between them. This provides the apparatus for a discussion of some possible theories of senses, in Section 4. In Section 5, we turn to a more detailed exposition of Sense Generation, indicating how it may account for flexibility and specificity. Finally, we sketch some implications of this view and touch on some wider concerns for theories of word meaning.

2 Preliminaries

The phenomena of flexibility and specificity are best illustrated by example.

> Mary is giving a dinner party at her home in the country. Unfortunately, her cupboards are bare. The appetites of her voracious guests are, however, whetted by the sight of Mary's pet mouse, Midge, tucking into some mouse food, and by the sight of Mary's pet canary eating some bird food. Aware of all this food-eating, one of Mary's less subtle guests asks "Do you have any food, Mary?". Mary replies that there is none but proceeds to feed her dog, Mungo.

How are we to resolve the semantical nature of the guests' problems? They are led to believe that Mary has no food and yet they can clearly see that she has: that she has pet food, but no food fit for human consumption. We require that any theory of word meaning respect the intuition that there are different but related senses attached to the word *food*, senses, for example, which apply to different types of food: human food, dog food, bird food, etc. We employ "sense" in a similar manner to Clark (1983): as the mentally represented aspects of the semantic content of a word on a particular occasion of use; we will be more precise about this in 3. The fact that the same word can seemingly have many different senses, illustrates what we call *diversity*. One aspect of the diversity of senses is illustrated by the fact that *food* seems to have senses corresponding to both types and subtypes of food. In this case, it has senses ordinarily associated with *pet food*, and its subtypes, for example *mouse food*. This aspect of diversity is what we call *specificity*: some senses of a word appear to be more specific than others. The fact that *food* may have senses for different types, for example, senses for "mouse food", "dog food", "mouse food", etc., illustrates another aspect of diversity, *flexibility*.

Our discussion of theories of sense will concentrate on several factors: we will be concerned to respect the arguments of, among others, Clark (1983) and Murphy & Medin (1985), which we will outline in more detail

later. We also require that any plausible account of reflect two important distinctions between types of senses: between senses that express default information and those that express non-default information, and between senses of vague and ambiguous words. Throughout, our overriding concern is to provide an evaluation which not only respects basic linguistic intuitions, but does so in a way that is consonant with a broad range of psychological considerations.

3 Some Components of a Theory of Sense

In this section, we will set out some aspects of a theory of sense. Two categories of object play a central role in our discussion. The first, *Senses*, are descriptions that we take to mediate relations between uses of words and their referents. These descriptions are both publicly specifiable and mentally representable. The notion of sense as employed here, although derived from that of Frege, does not carry a commitment to Frege's abstract semantical "third realm", distinct from the realms of mental and physical objects. The most important aspect of senses for our purposes is the way in which they guide linguistic behaviour. The application of a word to an entity (objects, events, substances - any individuum) is mediated by the sense of that word: in particular, the description that constitutes the sense subsumes the description of the object. So the uses of a word must be explicable in terms of the sense or senses which that word possesses. In this way, senses may be taken to classify the linguistic behaviour of agents.

The description of the phenomena of flexibility and specificity relied upon the various senses noted for *food* being different. This assumption was motivated by the application of what Evans (1976) labels the "intuitive criterion of identity" for senses. This determines that if a rational agent can both assent to and remain agnostic about the application of a referring expression to an entity when used in utterances of the same sentence, then that referring expression must have two different senses. As an illustration, reconsider Mary's dinner guests. Here, *food* is being used in different ways: sometimes it is being used to refer to all food, and at other times to types of food. So it is possible that one of Mary's guests could both assent to, and dissent from the statement, "Mary has food in her house". So it is quite felicitous for Mary to say, of the same entity (i.e., some mouse food, say), both that it is food, and that it is not. The intuitive criterion of identity for senses then requires that we treat *food* as having such different senses. Different senses express the fact that an entity may have different "modes of presentation" with respect to an agent: different ways the agent may refer to that entity. They also correspond to different ways of cognizing that entity: they are indicative of different perspectives that an agent may adopt.

The second type of object that we require is *lexons*. Most accounts of the psychology of language presuppose the existence of a "mental lexicon", in which words have "entries", that contain orthographic, phonological, morphological, syntactic and semantic information. The semantic component has been variously referred to as a "concept" or "lexical concept"; in order to avoid correlative unwarranted assumptions, we will refer to it as the lexon. A lexon, then, is a description that defines the stable mental representation in this mental lexicon; it also forms the semantic contribution of a word to the meaning of the expressions of which it forms a part. We also assume that senses are derivative in some way on lexons. That is, language users arrive at a sense for a word through first accessing its lexon. Given the multiplicity of senses which a word may have it is clear that a major problem for theories of is the relation between senses and lexons. Our discussion of such theories rests primarily on the way this issue is addressed.

Pre-theoretically, we are led to believe that senses usually outnumber the words with which they are associated: that is, the senses of a given word always number one or more. Considering the relations between words and their senses in terms of lexons then gives rise to two crucial questions. One concerns the *number* of lexons we postulate in order to effect these relations; and the other concerns the relations between the *contents* of senses and lexons.

In order to facilitate our discussion we will describe the contents of lexons and senses in terms of feature-structures like the following, which may describe the lexon for *chair*:

$$\begin{bmatrix} \text{legs:} & \begin{bmatrix} \text{number:} & 4 \end{bmatrix} \\ \text{seat:} & \begin{bmatrix} \text{number:} & 1 \end{bmatrix} \\ \text{made-of:} & \text{wood} \end{bmatrix} \quad (1)$$

This feature-structure is not intended to be an exhaustive specification of the content of the lexon for *chair*; it is presented for illustrative purposes only. If any lexon or sense has the same feature-structure as this one, we may conclude that they are in fact identical lexons/senses. There may be cases where one feature-structure subsumes another, by having the same content or some addition of features. Another possible case is where two feature-structures cannot be ordered by this relation. The former is indicated by the relationship between the structures for *chair* and *arm-chair*, and the latter by that between *chair* and *rocking chair*:

$$\begin{bmatrix} \text{legs:} & \begin{bmatrix} \text{number:} & 4 \end{bmatrix} \\ \text{seat} & \begin{bmatrix} \text{number:} & 1 \end{bmatrix} \\ \text{arms:} & \begin{bmatrix} \text{number:} & 2 \end{bmatrix} \\ \text{made-of:} & \text{wood} \end{bmatrix} \quad \begin{bmatrix} \text{legs:} & \begin{bmatrix} \text{number:} & 0 \end{bmatrix} \\ \text{seat} & \begin{bmatrix} \text{number:} & 1 \end{bmatrix} \\ \text{arms:} & \begin{bmatrix} \text{number:} & 2 \end{bmatrix} \\ \text{rocker:} & \begin{bmatrix} \text{number:} & 2 \end{bmatrix} \\ \text{made-of:} & \text{wood} \end{bmatrix} \quad (2)$$

The subsumption relation amounts to the kind of relation that holds between a type and one of its tokens; typically, we might assume that that defining features of a type are possessed by a token that can be categorised as a member of that type.

On just these two dimensions, the number and contents of lexons and senses, we distinguish three classes of theory. The first, Strong Sense Selection ($\mathcal{S}$), is that which Clark demonstrated to be unsound; we will note some additional problems. $\mathcal{S}$ may appear to be a straw man; a more plausible alternative is the second class, Weak Sense Selection ($\mathcal{W}$). $\mathcal{W}$ has two variants, both of which appear to be flawed. The third class, Sense Generation, avoids these difficulties, and is the one we would like to endorse.

4 Problematic Theories of Sense

4.1 Strong Sense Selection

Two assumptions identify $\mathcal{S}$. Firstly, the number of lexons: there is a lexon for each and every sense of a given word. Secondly, the contents of the lexons and senses: $\mathcal{S}$ assumes that the contents of each lexon and its corresponding sense are identical. $\mathcal{S}$ accords well with standard model-theoretic analyses of word meaning. For example, the approach taken in Montague-style semantics requires that different interpretations for the same syntactically unambiguous linguistic string result from the same word having different basic expressions. In the case of *bank*, for example, there would be two distinct basic expressions, $bank'_1$ and $bank'_2$, in the lexicon. $\mathcal{S}$ then offers the possibility of being able to treat the diversity of senses which might be associated with *food* in the same way, and thus to provide a precise semantics. All of the idiosyncratic information which demarcates senses is thus represented in lexons.

The diversity of senses that might be attached to *mother* provides another illustration of $\mathcal{S}$. Such senses include "adoptive mother", "biological mother", "surrogate mother", "foster mother" and "step-mother". According to $\mathcal{S}$ each of these senses is assigned a distinct lexon whose content expresses that of the sense.

Despite its prevalence in formal approaches to word meaning, $\mathcal{S}$ has some irremediable deficits. Some of these, relating to flexibility, coherence and ambiguity, are also problems of $\mathcal{W}$ and we will turn to these in 4.3.

However, there are also problems unique to $\mathcal{S}$. One concerns the number of lexons we are led to hypothesise in order to capture diversity. This is essentially the same point that Clark made in respect of "nonce" senses; however, as we have seen, even for common nouns such as *food* and *mother* the number of senses greatly exceeds the number of words. Accordingly, in $\mathcal{S}$, so does the number of lexons. This is problematic since the multiplication of lexons must make psychological sense. It is unclear that this is so in the case of $\mathcal{S}$ since such a multiplication places an intolerable burden on memory and presumably would result in a highly complex search procedure. These problems are difficult enough in the case of the interpretation of single words: in the case of combinations, such as simple noun phrases, there would be an explosion of combinatorial possibilities, in which the appropriate sense would have to be selected from a list comprising each and every permutation of all of the lexons associated with each constituent.

Regarding flexibility, $\mathcal{S}$ appears to proffer a solution that treats vagueness and context-sensitivity in the same way as ambiguity: by postulating independent lexons for each sense of a vague word. We will return to this in 4.3. It is also clear that specificity raises difficulties for $\mathcal{S}$. The issue is whether we can have a limitless number of ever more specific senses for a given word. We remain agnostic about this possibility though it is clear that very many senses may be associated with the same word. However, $\mathcal{S}$ rules out the possible unboundedness of specificity by *fiat*. That is, the only way that $\mathcal{S}$ can possibly capture specificity is via the multiplication of lexons, and, given the uncontroversial assumption of a finite lexicon, the possible unboundedness of specificity could not be captured by $\mathcal{S}$.

$\mathcal{S}$ also appears unable to distinguish between senses which express default information and those which express non-default information. For instance, the default sense for *mother* is, presumably, "biological mother" yet this sense is accorded the same status as the other senses of *mother*. That is, they are each assigned a separate lexon. Of course, $\mathcal{S}$ theorists may have in mind some other bit of theoretical apparatus which to capture this distinction. The fact is, though, that as it stands, $\mathcal{S}$ does not respect this very important distinction. An alternative to this rather straw-mannish way of trying to capture the phenomena is offered by Weak Sense Selection.

4.2 Weak Sense Selection

$\mathcal{W}$ is characterised by three assumptions: firstly, there may be more than one lexon for a given word; secondly, there may be more than one sense for a particular lexon. Thirdly, it is assumed that the contents of senses and the contents of corresponding lexons lie in the relation of subsumption: that is, the only possible difference between a sense and the lexon from which it comes, is that the sense may have had features added. $\mathcal{W}$ is more appealing than $\mathcal{S}$ in the following ways. Firstly, senses seem to be intrinsically context sensitive: in conventional circumstances *mother* has the sense of "biological mother", but in a social work inquiry, for example, *mother* may have the sense of "biological mother who is also a carer". A way in which this context-sensitive specificity can be captured is through some process by which features are added to the contents of lexons in a manner appropriate to context. Though $\mathcal{W}$ does not specify such a process it is clearly implicit in its definition. This aspect of $\mathcal{W}$ is in the spirit of the findings of Barsalou (1982): different senses may be different "context-dependent" elaborations of a single "context-independent" lexon.

Another appeal of $\mathcal{W}$ is the fact that it allows lexons to express generalisations with respect to the category to which a word applies. That is, $\mathcal{W}$ allows that *lion* may have various senses but that the lexon for *lion* may be a description that applies to all (and only) lions. This is again quite appealing given standard assumptions about word meaning. The arguments of Kripke (1972) and Putnam (1975) for example, assume that senses apply to all and only those individuals to which the word applies. Further, the fact that $\mathcal{W}$ distinguishes between the different senses deriving from a lexon, that is, between those whose content is the same as the lexon and those whose content is an elaboration of the lexon's, *may* allow for the expression of default information. That is, default information might be expressed as part of the content of lexons.

There are two extreme versions of the $\mathcal{W}$ thesis: one is that the number of senses and lexons are equal, which forces equivalence with $\mathcal{S}$; another is what we might term the "Generality" option. This results from the assumption that a word has only one lexon, whose content may be added to and made more specific. $\mathcal{W}$ allows that the number of lexons may be intermediate between the number of words and the number of senses: what we will term an "Intermediate" option. Our previous discussion of $\mathcal{S}$ allows us to consider just the Generality and the Intermediate options of $\mathcal{W}$. The Generality option would operate in the following way. *Mother*, for

example, would be assigned a single lexon whose content would subsume all the senses that *mother* can have. So all of its senses result from the addition of features to this lexon's content. Given the diversity of senses for *mother* such a lexon must needs be maximally unspecific. In contrast, the Intermediate option allows *mother* to have more than one lexon underlying its senses. For example, we might have lexons for "biological mother" and "surrogate mother", say. The latter might be further specified to yield senses for "adoptive mother", "step-mother" and so on.

There are a number of problems with $\mathcal{W}$ some of which we will deal with in 4.3. However, we will outline some problems unique to $\mathcal{W}$ here. A critical problem of the Generality option is that it appears to be unable to express default information. Reconsider the example of *mother*. The appropriate lexon cannot express a relation of genetic inheritance because although some mothers are related this way to their children and some are not (e.g., foster mothers). To specify such a feature in the lexon would be to exclude mothers such as these from the domain of application of the lexon and all its associated senses, since features can only be added to the lexon and not taken away. For similar reasons, the lexon cannot express any relation of caring between mothers and children. And so on for any other feature-specification which we might ascribe to the lexon for *mother*. Arguments such as these indicate that in many cases the Generality option leaves us with a maximally unspecific lexon. This, however, flies in the face of the strong intuition that words *do* have default senses. The fact that this option renders the expression of such defaults as difficult to obtain as the expression of exceptions is a major deficit.

The Intermediate option postulates a *certain* multiplicity of lexons: there might be more than one lexon for *mother* (in contrast to the Generality option), but less than would be postulated by $\mathcal{S}$. The critical problem here is exactly how the number of lexons might be determined. Whereas for $\mathcal{S}$ and the Generality option, there is an overt constraint on the number of lexons postulated, it is not clear what principle there could be for deciding on the number of lexons in Intermediate option. For example, what lexons might we postulate for *chair* so that it may have a sense corresponding to "rocking-chair"? Since feature-adding is the only way in which senses may be derived from lexons, the sense for "rocking-chair" shown in (2) can only be derived from a lexon which either does not specify the number of legs or specifies no legs. Under this Intermediate option we are allowed to postulate several lexons for *chair*: one corresponding to (1), say, and one corresponding to that for "rocking-chair" in (2). A problem may arise, however, in the case of a special type of rocking-chair having no legs and no rockers. Assuming that *chair* can have this sense, the question arises as to how it is derived from the lexons we have postulated. If we only have feature-adding at our disposal, such a sense simply cannot be derived from either of the lexons for chair we have postulated. Our only option is to suppose that there is another lexon for chair. The problem is that, in principle, there seems to be no bound to the number of exceptional chairs we can imagine and for each type, we would be led to posit an additional lexon. The issue then would be, what degree of exception do we rule out as invoking a new lexon? One way of constraining the number of lexons might be to determine a threshold for permitted specificity of lexons: if a particular sense is more specific than the threshold level, it must be represented as a sense deriving from a particular lexon (and not as a lexon in itself). Three problems render such a criterion untenable.

Firstly, it is not clear just how we could go about comparing the relative specificity of senses that have non-overlapping contents; for example, is "biological mother" less specific than "adoptive mother"? The operation of this criterion is perspicuous within groups of senses that *can* be ordered according to specificity (i.e., where the only difference between senses is in the degree of specification of the same set of features), but not in groups that cannot be so ordered. The general application of such a criterion would require a complete theory of content for lexons and senses, and some precise and motivated means for comparison. Neither are at present available. Secondly, to stipulate that lexons must be relatively non-specific may mean that they cannot express default information, since this is typically quite detailed and specific in nature. A third problem concerns the plausibility of postulating independent lexons to account for senses that are discriminable though related. This will be picked up in the next section.

4.3 Difficulties with Sense Selection

There are three principal flaws common to Sense Selection accounts. The first concerns the multiplication of lexons. The second concerns the ability of Sense Selection to account for the full range of flexibility. And the third concerns the underlying commitment to monotonicity, which gives rise to the first two problems.

The difficulty with assuming multiple lexons is that it is not clear to what extent they plausibly reflect mental representations. Arguments from linguistics and psychology caution against unprincipled multiplication. The linguistic considerations concern the difference between ambiguity and vagueness. Accounting for the diversity of senses by postulating distinct underlying lexons assumes that they are, synchronically, wholly independent. That is, supposing different lexons for a given word assumes they are as different as different lexemes with a single orthographic/phonological form. Postulating two lexons for *food* ("animal food" and "human food") treats *food* as an ambiguous item like *bank*. This amounts to making no distinction between different senses of a vague term, and different senses of an ambiguous term. However, if we consider any of the standard linguistic tests for ambiguity (Cruse, 1986), then we find that the independence of content assumed by postulating different lexons does not hold for examples such as *food*. For example, consider zeugmatic contexts (those which give rise to two different senses of a word at one time): "He sat on the bank whilst fishing and put his cheque in it". The strong contrast or opposition between the two senses of *bank* requires the postulation of independent lexons to account for them. In contrast, the various senses for *food* or *mother*, noted earlier, do not produce an opposition of sufficiently marked character. The examples are, rather, characterised by the relatedness of the various senses: they are distinct but clearly *not* independent.

Multiplication of lexons is also countered by psychological considerations raised by Murphy & Medin (1985). Murphy & Medin's discussion bears on the issue of the mental representations underlying the application of words to referents. In the current framework, these are lexons. The question for both $\mathcal{W}$ and $\mathcal{S}$ is whether the postulation of multiple lexons accords with psychological evidence. Murphy & Medin's arguments convince us that such multiplication is unwarranted. Consider whether the postulation of independent lexons for "animal food", and "human food", say, is justified on psychological grounds. The thrust of Murphy & Medin's arguments is to suggest that categories such as food are highly structured, and that the application of *food* to individuals thereof is highly dependent upon this structure. That is, the application of a word to entities in a category reveals what Murphy & Medin call "coherence". And the crucial point regarding coherence is that the application of a word to such an entity is dependent upon our theories concerning that entity. It is the fact that entities can be related by theories that allows their grouping together to be psychologically plausible. If lexons are to be psychologically plausible, then entities that form a coherent category (e.g., all different types of mother) should all fall under the extension of the same lexon.

However, even if we were to allow some multiplication of lexons - that is, even if the above considerations have no purchase - there are still cases in which the postulation of independent lexons to underly senses for a particular word would be implausible. These include the "contextual expressions", discussed by Clark (1983), and many examples noted by Nunberg (1977). Nunberg notes several different possible referents (and therefore, senses) for *newspaper*: a particular token of the newspaper (as in, "here's your newspaper, sir!"), the newspaper company as a whole (as in, "the newspaper's profits are less than expected!"), and a particular journalist (as in the case of a dubious piece of governmental behaviour: "don't say a word, the newspaper is here!"). It is clear that we would not want to claim that *newspaper*, for example, has a pre-stored lexon that expresses the sense of the third use ("journalist"). Yet this is precisely what Sense Selection accounts would have to hypothesise, since this sense of *newspaper* could not be said to be a simple specification of a lexon for *newspaper* (as $\mathcal{W}$ might aver). Clark argues that the parsing of contextual expressions (including certain denominal verbs, such as *to teapot*) stems from the *creation* of interpretations associated with those phrases. It is clear that the same kinds of considerations apply equally to Nunberg's examples. Since the only possibility of a creative process for Sense Selection is provided by the specification mechanism of $\mathcal{W}$, the only contextual expressions that $\mathcal{W}$ could accommodate would be those that are mere specifications of pre-stored lexons. And this cannot capture the flexibility evidenced in, for example, denominal verbs. It is clear that, even though Clark's discussion of $\mathcal{S}$ might appear to have attacked a straw man, his arguments have a broader significance, and have played a central role in undermining the more plausible $\mathcal{W}$.

The preceding discussion leads to the conclusion that none of the versions of Sense Selection are adequate to the task of accounting for the phenomena in a way that does justice to basic psychological and linguistic intuitions and requirements. The major problems stem from Sense Selection's adherence to monotonicity. That is, to the assumption that any alteration in the content of a lexon in the formation of a sense must be feature-addition. The Sense Generation approach (section 5) circumvents these problems by denying precisely this assumption and then tracing the ramifications.

5 Sense Generation

In opposition to the above types of theory, Sense Generation regards the variation we observe in senses to be due not to variation in lexons nor the generality of lexons but to some generative process which generates various senses from a (lexon) base.

5.1 Aspects of Sense Generation

Sense Generation is characterised by the following assumptions. Firstly, the number of lexons is identical to the number of non-ambiguous words. A single linguistic string is assigned more than one lexon if and only if it has genuinely unrelated senses, as indicated by tests for ambiguity. Secondly, the content of a lexon comprises the default sense of the word. Thirdly, the different senses of a word are generated from the lexon for that word. Fourthly, generation may result in a sense that is non-monotonically related to the lexon; that is, generation may result in a sense that does not simply add features to those of the lexon: features may be retracted or negated in the generation process.

Such a view can readily account for the kinds of example that are so problematic for Sense Selection. Recall the different senses for *newspaper*. In Sense Generation the lexon corresponds to the default sense of *newspaper*, perhaps as in "the newspaper hit the mat". The two other senses we have identified would then be non-monotonically derived from this lexon. The sense, for example, in "the newspaper's profits halved" would have to involve a retraction of those features expressing the facts that newspapers are material objects, made of paper, containing ink, etc. It would also need to include features expressing facts about businesses, finance, employment, etc. What Sense Generation claims is that this latter sense can indeed be generated from the lexon for *newspaper*. That is, there is some process by which features are negotiated. The precise nature of such processes is, clearly, a matter for further empirical enquiry but we suggest two possibilities. One is that argued for in Franks (1989) which involves the emergence of the features of a sense being constrained by some implicitly attached noun derived from an instantiation. For example, the sense of *fake gun* may be partly derived from the lexon for *replica* (thus adding features such as the degree of resemblance to a gun, and the way the object might be constructed), which is accessed as a result of the lexon for *fake* defeating certain features of that of *gun* (like firing bullets). Another is that suggested in Braisby (1989) where a related process of combining lexons results in the defeating of features. For example, the sense of *lion* which applies to stone lions, can be seen to result from the combination of a relational lexon such as "statue" and the lexon "lion". Similarly, for other non-default senses: they are derived from the combination of default and other lexons.

5.2 Implications of Sense Generation

The link between Sense Generation and Clark's *sense creation* should be noted. Clark's argument is that there is a restricted and well-defined group of contextual expressions, for which a sense creation process is necessary. Clark suggests that, for other kinds of expressions, a selection mechanism may be adequate. Since Clark's focus of attention is not conventional senses, the impression may be gained that these are not similarly contextual in nature. Where Sense Generation differs from sense creation is in its firm committment to the view that conventional uses are higly contextual and therefore require some generative process to explain the diversity of their senses. It follows that there is no clear dichotomy between contextual expressions and those used conventionally, rather there is a gradation.

Sense Generation is, in general, agnostic about the precise time-course of the role of *context* in determining senses. Indeed, it is meant as a formal, abstract characterisation of a class of theory. Consequently, it is compatible with more detailed accounts which suppose context to play a pre-access as opposed to a post-access role. That is, although context may choose from a number of possibilities for generation, it may also rule out certain possibilities prior to any generative process. Ultimately, this entails that exceptional senses need not require a longer time-course than default ones. Clearly, the exact time-course underlying the generation of senses is a matter for empirical enquiry: it suffices to note that Sense Generation is compatible with either outcome.

One implication of Sense Generation is that there are meanings of which senses are descriptions. Two questions

arise: is there a meaning relation which the default sense of, say, *mother* describes? And, since there are many senses of *mother*, are there also many meanings to *mother*? Whereas the traditional theory of meaning may answer these questions in the negative, support for affirmative answers comes from *Situation Theory*. Indeed the notion of meaning relations as conditional constraints allows us to claim that default senses are descriptions of meanings. The assumption that there are many meaning relations underlying the uses of a word is also perfectly compatible with the framework of Situation Theory.

A further range of issues concerns the connection between Sense Generation and various hypothesised structures and contents for lexons. The Sense Generation approach allows us to endorse certain aspects of both *classical* and *prototype* representations, whilst rejecting problematic implications of both views. In terms of the epistemological rationale of the classical approach, Sense Generation rejects the search for common features or necessary conditions underlying the sense of a word (as a result of nonmonotonicity), whilst it allows us to retain the economical representations that would result were the search for necessary conditions successful. In contrast, the relations between the various generated senses for a word mirror the intuitive and epistemological underpinnings of family resemblance (as a result of nonmonotonicity and the emergence of new features), which is acheived without postulating prototype representations, with their attendant difficulties. That is, the various senses generated for a word in different contexts will be related by a family resemblance, in line with Wittgenstein's (1953) original formulation.

Senses are descriptions that mediate a word's reference. There may appear to be a tension between this fact and the unlimited scope for nonmonotonicity in Sense Generation: if generation defeats all of the default features of a word's lexon, then we may refer to an entity through a description having nothing in common with the usual properties of the type of referent. This point is countered by considering the *perspectival-relativity of categorisation*. A situated agent, in referring to an entity through a particular sense, can be seen to be adopting a perspective on that entity. Even though Sense Generation allows of the logical possibility that words may refer to any manner of entity, an important constraint is deemed to operate. Namely, the agent in making such a reference must be adopting a particular perspective. While a theory of perspectives is something we lack, we note that for such a reference to be posited there must be independent evidence concerning the perspective adopted. Further, we suppose that the nature of the perspectives that people may adopt is such as to determine the content of senses which they relate to referents. This may of itself limit the degree of permissible difference between the content of a word's lexon and its senses, since one of the purposes of perspectives is to allow mutual reference. That is, one constraint is that several agents must be able to share a single perspective.

6 Conclusion

In this paper, we have sketched some of the assumptions that underly prevalent views of the senses of words (Sense Selection views). We have also considered some of the problems that arise when such views attempt to account for some basic phenomena of word meaning in a way that is consonant with linguistic and psychological desiderata. This then motivated an alternative view that circumvents these difficulties (Sense Generation). Finally, we noted some of the other advantageous implications of Sense Generation.

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