

TEXT STRUCTURE AND TEXT SEMANTICS

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Text Structure and Activity Structure

The structure of a text is the result of the structured social practices that create that text. In this sense we may consider a text structure to be a special case of an activity structure (Lemke 1984, 1985a). Such a notion of text structure then applies equally to the structure of spoken and written language because we formulate the structural relations as relations among actions, rather than among spoken or written text units.

Activity structures are characteristic of a community. They are regular, repeatable and repeated, sequences of context-dependent options for the organization of meaningful actions into socially recognizable events or situation-types. The social meaning of an action is determined to a large extent by the activity-structure context in which it is performed. Each action takes its meaning from a context which it itself helps to create. More precisely, the dynamic meaning of an action is its meaning in the context-up-to-now (the time created by its performance), at which point it has a further meaning potential contingent on the possible actions that may follow it within the same activity structure. When an activity structure has been, at least potentially, completed, all its constituent actions are retroactively assignable their synoptic meanings in the completed structure (cf. Bourdieu 1972, Martin 1985, and Lemke 1984, 1985a). The tendency to regard all meanings as synoptic derives from the overemphasis in text study on written texts. It neglects some essential aspects of meaning, and structuration, that are clearer if we consider the dynamic flow of spoken language or even the moment-to-moment meaning-making processes of reading an 'object-text' (Lemke, in press-c).

The object-text belongs to the order of 'things' rather than that of meanings per se. It is the physical text, the printed marks on paper, the illuminated pixels on the screen, the magnetized domains on tape or disk. The social conventions of reading practices, enacted in the activity structure of reading, writes a 'meaning-text' with the object-text. There are as many meaning-texts as there are readings, and it is only the commonality of the social conventions concerning reading that lets us speak even approximately of a 'meaning of the text.' It is a dangerous approximation, mainly used rhetorically by those in authority to demand limits on the meaning-texts made in a community from object-texts considered (by a related set of conventions) to be tokens of the same abstract text, e.g. different printings of 'a text.' But this relatively unproblematic abstract text is not a valid warrant for claims that 'the text' in any sense determines the meanings made with it. There is no sense of 'the text' for which this makes sense. For both text semantics and an analysis of text structure, we are on much firmer ground if we look to the activity structures by which meaning-texts are made.

To illustrate these points, consider the object-text in the Appendix to this chapter. It was made as a product of several activity structures: printing it, reformatting it (i.e. its abstract text) for the Appendix, transcribing it from an audiotape, taping it originally, and the various classroom activity structures that gave rise to the speech recorded on the tape in the first place. I make sense of this text by reading it in the context of the rest of the recorded lesson, the notes and recollections I have from observing the lesson as it was recorded, other lessons and events sharing its genre and rhetorical structures (see below), and other lessons and texts that share its thematic formations (roughly its content semantics, see below again).

What is the activity structure in this episode? That can only be answered in terms of an analysis of many episodes and lessons (Lemke 1983b). The episode presents an instance of an optional element, Student Initiated Dialogue, within the activity structure of Classroom Lesson. Classroom Lesson is an obligatory element within a larger structure we might call School Routine, the activities of a day at school. This subtype of Student Initiated Dialogue has a regular pattern

with obligatory elements Student Question and Teacher Answer and optional Teacher Check-up and Student Response, all in that order. The optional elements have the teacher ask the student if he or she is satisfied with the answer, and the student reply. In this case two other optional elements precede the Student Question: a Student Bid, realized by Cheryl's raising her hand, and a Teacher Nomination, 'Cheryl' at the end of line [1]. The Question is asked in lines [2-3], the Answer is realized by an extended rhetorical structure of Triad Dialogue (see below and Lemke 1983b), covering lines [4-27]. The Check-up is line [28], and the Response is an implied Negative, realized by an uncompleted structure beginning with a Student Challenge in line [29]. The episode concludes with the obligatory Teacher Reply to a Negative Response, lines [30-33, 34-37], and a new Student Question, starting another Student Initiated Dialogue. Dynamically, we do not know at the end of line [1] that the synoptically definable activity structure just described has indeed begun. Cheryl might have raised her hand to signal a Bid in any one of a number of activity structures (e.g. Getting the Pass, or Bid to Answer in relation to the Question on line [1], etc.). Note moreover, that her utterance is not initially in the form of a direct question, nor is the Answer immediately recognizable as an answer. In fact it proceeds almost immediately to a question, line [5]. Members of this community, or any community that uses these activity structures, will not be unsure for long, however, what is happening. When line [28] is reached, even the novice analyst has no doubts about the synoptic structure. We will continue to analyze this episode throughout the chapter. First, however, we need to consider more carefully a fundamental notion.

What do we mean by 'structure'? Following Halliday's (1985) notion of 'multivariate structure', and neglecting infinite recursion, we can define the notion of 'a structure' as a set of relations on a linear sequence of units, such that criteria can be defined for when the structure (a higher-level unit in a constituency hierarchy) has been completed (instanced, realized). Nominal groups, clauses, folktales, soccer matches, concerts, Catholic masses, and washing-up are all structures in this sense. To define a completed, or at least a possibly completed structure, we need to use a functional rather than strictly a formal set of relations and units. Neither the units nor the relations need take priority. What is a 'process' but whatever can stand in a 'process-participant relation' to a 'participant'? We tend to give priority to units only because of the habit of reification. Functional relations define functional units, and vice versa. More importantly, the relations must be (at least in part) relations between heterogeneous units. If all units are of the same functional type (class), and all relations are, say, 'participant-participant' relations, completable structures can be defined only formally (e.g. a 3-participant homogeneous 'structure' or a 5-participant one). A true multivariate structure must contain at least two functional types of unit (or equivalently at least one heterogeneous relation) to be functionally, and generally completable. We know that we have a (possibly) complete structure of a given kind when we have a specific number of units in specific relations to one another. Otherwise, as in Halliday's 'univariate' structures, recursion dominates and there is never any reason to expect an end (cf. a cohesion chain, a recursive verbal-complex or clause-complex). These are not properly structures at all in the sense I am using the term now. My own 'covariate structure' (Lemke 1985a), which includes Halliday's univariate type, is for the case of homogeneous relations of co-classed units, and should perhaps be called a 'structuring principle' rather than a kind of structure.

It does not matter to the notion of completability that it is possible to go on extending an actual realization of a structure indefinitely in principle. What matters is rather that it is possible to stop at some points, but not at others, and have the cumulative sequence count in a community as complete. Special cases, such as acceptable ellipsis, also do not matter to the principle, since each structure is defined as a set of 'context-dependent options' and these must take into account when ellipsis is or is not acceptable. If it is not clear from the definition and examples, we should note explicitly that an activity structure may realize an action within a larger (higher-order, or rank) structure. Context-dependence refers not only to the occurrence of units at the same rank, within a structure, but also to dependence on details of the higher structure.

In our classroom episode, if we look at line [10], we clearly need the full hierarchical structural context to make sense of it. The initial 'The S' is a confirmation, a Positive Evaluation of Cheryl's own 'S' in line [9]. It is followed by a Teacher Elaboration on that answer, which presumes the whole exchange from line [5], and the rhetorical structure of Triad Dialogue, whose typical extended pattern is: Teacher Preparation, Teacher Question, Student Bid, Teacher Nomination, Student Answer, Teacher Evaluation, Teacher Elaboration. The semantic structural relations of these units are implied by their names, and could be formalized as a thematic formation (see below). At the next higher rank, all of this Triad Dialogue is realizing the element Teacher Answer in the classroom activity structure of Student Initiated Dialogue, which is itself an optional element in the larger activity structure of the Classroom Lesson. The elements in all these structures are defined functionally, and completability is insured once the final obligatory element has occurred, even though recursive options might continue indefinitely.

Activity Structure and Genre

Genre in the sense of 'generic structure potential' (Halliday and Hasan 1985, Chap.4; Hasan 1984, Forthcoming) corresponds exactly to a specification of a completable activity structure, though there are differences of perspective. The notion of the obligatory elements shows both the feature of heterogeneity and of completeness despite optional recursion. The specification of options, and of ordering, completes this picture. What is less considered are the relations that must be construed between elements (pairwise or otherwise) for them to count as being those elements. I.e. in what semantic relation must we construe the realizations of two elements in order for us to be able to make them fit the pattern of the structural formula of elements. In a GSP, each element has a functional label, but a great deal more is implied by these labels about the semantic relations of the elements, and this needs to be specified. Specifying the semantic features of elements and their typical realizations is only a very indirect, and incomplete, way of specifying the semantics of their relationships. By and large it is only the formal (e.g. ordering) relationships that are specified directly in the GSP approach.

Another, and perhaps more important, aspect of the activity structure specification which is not foregrounded in the notion of the GSP is context-dependence. Within a structure (at a single rank), this is closely related to the semantic relations of elements. Whether or not something counts as an element within this GSP will in part depend on whether or not some other element has occurred, and what its specific semantic valences for other elements and their realizations might be. Which GSP element something is assigned to likewise has this sort of context-dependence. I should note that this point has recently received more emphasis in Hasan's (Forthcoming) discussion of genre in terms of 'outline.'

When we consider the dependence of the structural meaning of an element on one structure's place in a larger structure, things become more complex. It is only a rough approximation to take a genre or GSP as being autonomous; i.e. being itself definable independent of its wider context. For some very ritualized genres, the approximation will work, and naturally it is a wise choice to study these genres first to develop a model of genre structure. But in general a sequence of acts may be construed, apart from context, as fitting many possible genres or subgenres, and rather than making the definitions of the genres fixed and absolute, context-dependent definitions of the genres themselves are possible. This would enable us to look at the dynamic genre meanings of actions (including realizations of GSP elements), and not just at synoptic meanings.

The synoptic meaning of an element derives from our construing it as a particular functional unit in a particular structure. This assumes that we have a completed structure (even if itself ambiguous) of reference, i.e. that we know which GSP is relevant. But dynamic meanings occur on the way to a completed structure. Since structures of many ranks may be involved, there is always a degree of incompleteness, and the meaning of an action (or bit of text) depends in part on these wider, still indeterminate contexts. Real life and its texts are full of surprises. In literature it takes consummate artistry to shape later events so as to compel wholesale reinterpretation of what has gone before. In life it happens all the time, and dynamic meanings are correspondingly important. If a text from life turns out in a certain way, the path it took to get where it did depends on the moment-to-moment dynamic meanings that its creators, and we, responded to. We do not follow finished scripts. We branch, diverge, and realize options in ways not predictable before the events we respond to occurred. We respond to the dynamic meanings of those events, as they seem at the time. Times, always, when the longer-term synoptic picture is not available to us; when the meanings of the moment depend on still uncompleted and unpredictable larger structures of action in which we find ourselves immersed.

To give an adequate account of the structural organization of meanings in a text, we must be able to follow the continuous recontextualizations of meaning as it emerges moment to moment, and so our notions of the context-dependence of GSP assignments, or equivalently of the GSP definition of a functional genre, must be adequate to this important task.

The last major difference between the activity structure perspective and that of genre defined through a GSP are their answers to the question of what it is that is structured. Neither really makes the mistake of claiming that 'text' is structured. In a GSP it is the relations of the functional elements that are structured, i.e., it is the genre itself that is structured. A text is construed as having a particular genre structure when we read a GSP 'onto' it. The alternative view is that it is the social activities that give rise to the text which are structured. We can read a structure onto a text by interpreting its meanings (making the meaning-text) as if the abstract text had been produced by the actions of a familiar activity structure. Or more simply, we 'write' the meaning-text using some particular activity structure of reading practices. The activity structure perspective forces us to consider genre structure as both more contingent, and as more the product of social practices, than a view which tends to reify genres as givens.

Of course the same dangers exist with respect to the activity structures themselves, but hopefully the overall emphasis on social practices rather than texts as fundamental will help us avoid this more easily than might be the case with the notion of genre by itself. From here on, I will use the term genre to refer to an activity structure in which language is used in such a way as to produce a specific, context-dependent set of semantic relations among the elements defined and ordered by a GSP. This use of genre will refer equally to speech genres and written genres.

Finally in this section it seems appropriate to comment on Martin's (1985) suggestion that GENRE be set up as a connotative semiotic above REGISTER, with registers as its realizations. This proposal has the advantage that apparent pre-selections in register can be attributed to selections at the level of GENRE. It is certainly true that once we find ourselves in a particular framework of an institutionalized activity of the community, only particular selections from Field, Mode, and Tenor will regularly co-occur. It is also true that this should be explained in terms of activity structures, and that activity structures do form a social semiotic system. However, that system is not best regarded, I think, as in a connotative semiotic relation to the semiotic system of register. The reason is that the 'stacked semiotics' approach leaves out a flexible account of context-dependencies. We need to specify the contextualization relations as well as the systemic options and realization rules at each level (Lemke 1984). This means that we need to specify which selections from field, tenor, and mode will have which social meanings, in relation to which activity structures, according to which GSP genre assignments. The contextualization formalism is a much more flexible means of doing this, or at least of helping us remember what needs to be done and how to keep it all properly sorted out. A semiotic system is a system of resources. It ought not also be asked to describe the strategies by which those resources are actually co-deployed to make the regular meanings of a community. We need to carefully distinguish between resource semiotic systems, like register and lexico-grammar, and typical patterns of use of those systems in a given community (genres, activity structures, and the thematic and discourse formations discussed below). The latter, moreover, are not completely described until the context-dependencies of both their occurrences and their social meanings for a particular community have been described.

The Semantics of Structural Meaning

The meanings we assign to any stretch of text, or to any action, are, of course, a function of many contexts. The analysis of those contexts and how a community assigns meanings differently according to them is the study of its social semiotics in general, and in the particular case of meanings made with the resources of the linguistic semiotic system, the study of semantics. Some of these contexts are paradigmatic ones, as in the meaning of one lexicogrammatical selection from a system vs. another. Others are syntagmatic, as in the case of the meanings we assign according to the functional role of a unit in a group, clause, or genre structure. Some are textual, in the sense that the context lies in some sense within what we take to be the same overall text as what is contextualized. Others are intertextual, and may belong to the same activity structure (but not the same text), to the same genre, or to the same thematic or discourse formation (see below and Lemke 1985a).

I want first to consider here the nature of structural meaning, of the semantic contribution of functional role in a genre (and more generally in an activity structure).

In any genre or activity structure the assignment of a portion of text or an action to a functional role contributes to the meaning we make with them. The same statement may function as both a Thesis (in an initial position) and as a Conclusion (in a final position) in a genre of Argument-from-Evidence (cf. Lemke, in press-b). But its synoptic meanings are quite different depending on whether, in the one case, it precedes, or, in the other, follows Evidence. Likewise, a potential Thesis is synoptically different in structural meaning depending on whether it was followed by Evidence, or by its Consequences (in which case we might label it Cause, rather than Thesis, synoptically, i.e. after the fact). A Teacher Question carries a very different meaning interactively when part of a Review, in which students are expected to know the Answer, than in a Development episode, where they are not necessarily expected to. Similarly for a Negative Evaluation in the two cases (Lemke 1983b). The meaning of any action is a function of the relations we construct for it to other actions, thereby making them its contexts. Typical contextualizations are made in a community by means of its typical activity structures for contextualizing (cf. meta-contextualization relations in Lemke 1984). Structural meanings arise from connections we make, the structural semantic relations we construe, between an element and other elements within the same (including hierarchically higher-level, embedding) structure. The organization of structural meaning in a text is one of the two fundamental constituents of text semantics (the other being the interlocking organization of thematic meaning, discussed below).

The organization of structural meaning is segmental, structural, and hierarchical. It is segmental in the sense that elements of a structure tend to be realized by one or more discrete linear segments of a text (or linear sequences of actions in general). It is structural in the senses we have already discussed: completable sequences of functional elements with heterogeneous semantic relations to one another. It is hierarchical in the sense of constituency hierarchies and rank-realization hierarchies. Each element of a structure may in turn be itself a substructure (constituency). Or its realization may be a structure of a different kind. Hasan (1984 and Forthcoming) has argued convincingly that 'exchange structures', defined as sequences of speech acts, are not constituent substructures of genre structure, but are rather possible realizations of its elements. For similar reasons I have been led to define rhetorical structures as multivariate, regular functional sequences of speech acts, which can realize elements of more than one genre structure (Lemke, in press-b). Frequently, a genre structure element can also be realized by more than one possible rhetorical structure. The notion of 'speech act' itself is not a fundamental or privileged level in the analysis. It is merely a placeholder name for the elements of a rhetorical structure, or where no ambiguity arises, for units at still lower ranks. Which 'speech act' a given portion of text is, cannot be determined from that bit of text alone, but only from a contextualization of it, at least in the next higher-rank structure. Rhetorical structures, while not by this definition genres, are still of course activity structures. The classroom Triad Dialogue pattern referred to above (Teacher Question, Student Answer, Teacher Evaluation and optional elements) is thus a rhetorical structure, while Review or Development, whose elements may be realized by Triad Dialogue sequences, are speech Genres. In our classroom episode we have seen the Triad Dialogue rhetorical structure used to realize a Teacher Answer, an element of the Student Initiated Dialogue classroom genre. The Thesis-Evidence-Conclusion pattern is also a rhetorical structure, as is the Cause-Consequence pattern (see Lemke, in press-b and in press-c).

With rhetorical structures, as with activity structures at all ranks, and no matter how realized (i.e. by resources of whatever semiotic system, including non-linguistics systems), assignment to a structural element entails structural semantic relations (e.g. the thesis-evidence relation, the cause-consequence relation, the question-answer relation) that contribute to text-semantic meaning.

Thematic organization of meaning

Multivariate structures are not the only principles by which meaning is organized in texts. Nor, of course, is structural meaning the only kind of meaning a text element can be given. We are accustomed to talking in terms of the semantic meanings of words and other text units, and even to thinking of these as relatively fixed meanings that are properties of the words or phrases themselves. But all meaning is made by contextualization; the actual occurrence-meaning, use-meaning, or text-meaning of a word or phrase depends entirely on its contextualization (Lemke, in press-b). This is not to deny that in addition to text-meaning, it is also useful to speak of the meaning potential of a lexical item: the sets of semantic options that are regularly realized by it within the systems of lexicogrammar (cf. Hasan 1985, 1986). But a lexical item does not have to be used only in its typical ways; by creating text and action contexts around it, we can use it in new ways (see Lemke 1983a on semantic novelty). Indeed its typical meanings, its meaning potential, in any community must be dynamically reconstituted through its actual uses. What is most often missing in contextual models of semantics is reference to intertextual contextualization (Lemke 1985a). It is not just by construing semantic relations to the immediate textual, or even situational, context that we make a word or phrase mean. It is also by construing relations to other texts and situations in which that word or phrase has been used. This kind of contextualization would be hopelessly underdetermined, of course, were it not for the fundamental fact that patterns of semantic relations among the same or closely related words and phrases are regularly repeated over and over again in many texts in a given community. These patterns I have called thematic formations (Lemke 1983a, 1985a, in press-a, in press-b). The use-meaning of a word or phrase tends to be established mainly by contextualizing it with co-thematic texts, those that share the same thematic formation. We can, therefore, speak of thematic contextualization, in which each text element is construed as being in particular semantic relations to other elements according to the pattern of a thematic formation abstracted from the set of co-thematic texts.

If, in reading a text, we come across the lexical item 'electron,' and also 'atom,' 'orbital,' and 'valence,' then we can construct semantic relations among these items (thereby also specifying semantic features for each, as relevant), according to a pattern we have encountered in many other texts. That pattern is a characteristic of the community, much as an activity structure is (both are semiotic formations; see Lemke: Forthcoming). There may of course be more than one thematic formation in which the constituent thematic items are realizable by these lexical items. In each there could be different semantic relations among the items. But wider contextualizations of situational and actional contexts (cf. register) are usually sufficient to make only one match probable, at least in a particular subcommunity. Thus the

relation of [electron] to [atom] -- as thematic items now, realized by the lexical items -- in typical thematic formations for the discourse of chemistry and physics, may be that of part to whole (meronymic), or [atom] may be the regular locative circumstantial attribute whose carrier is [electron], i.e. 'electrons are in atoms' (see Halliday 1985 for the categories, Lemke 1983b, 1985b for the formation).

In the classroom episode, the first formation that is instanced is one having to do with <School Homework>, but as we pass into the Student Initiated Dialogue we find thematic items from <Electron Configurations> which include here: 1s², orbital, energy. A semantic relation of the formation is that 'orbitals have energies', which is in fact a grammatical metaphor realizing the underlying intertextual semantic relation [Carrier: orbital / Attribute: energy]. (See Ravelli's discussion of grammatical metaphor in this volume.)

A thematic formation may be represented as a weblike, non-linear diagram (mathematically, a directed graph), whose nodes are thematic items (realizable by a set of formation-specific near synonyms), connected, perhaps multiply, to one or more other nodes by lines which specify the thematic relation between them. A thematic relation may either be a semantic category relation of the kind used in traditional lexical semantics (synonym, antonym, meronym, hyponym, etc.), or it may be the regular grammatical semantic relationship in which the items are typically found (e.g. carrier/attribute, classifier/thing, process/goal, etc.). 'Typically' here simply means that it is possible to define a set of co-thematic texts where the specified thematic-semantic relations of the items obtain. Entire formations may be glossed by lexical items and have thematic relations to items or other formations. They may also have metadiscursive relations, such as heteroglossic relations to one another (Lemke, in press-a, in press-b).

Use-meanings depend on thematic contextualization as well as structural contextualization. We make sense of a word or phrase, both in terms of an assignment to a functional role in a grammatical, rhetorical, or genre structure, and in terms of an assignment to a thematic item with specific thematic relations to other items (both those that occur in our particular text and those that may only occur in other co-thematic texts). This view of semantics not only allows for intertextual contextualization, complete context-dependence of use-meanings, and analysis of the discourse formations actually in use in a community, it also provides the basis for understanding the thematic organization of meanings in a text, a non-structural pattern of organization.

As we move through the linear sequence of a text, at first dynamically, and eventually synoptically as well, first one and then other thematic formations are instanced in the text. Of course, it is possible for a text to be a pure instance of one formation, but in general texts interweave several formations, or subformations, in complex but analyzable ways. One formation might continue to be relevant to the thematic meanings all through a text (carrier formation), while other formations appear only over shorter stretches. Within a given structurally defined unit, we might have many formations 'active' in the sense of being instanced (i.e. being used to make sense of the semantic relations in that stretch of text). We can imagine a representation of a text like an orchestration for a line of sung lyrics. The text line has below it other lines on which we indicate whether or not a given formation (instrument, voice) is active. This enables us to define a prosodic thematic organization for the text. Units of linear text can be defined by which overlapping formations are active in them. A prosodic boundary between units will then always be characterized by the entry or exit of one or more thematic 'voices' (i.e. active formations). Major boundaries are then either (1) those where many formations either all enter or all cease to be active at once, or (2) those where formations which are active over long stretches of text enter or (perhaps temporarily) become 'silent.'

These thematic strands (like cohesion chains, cf. Lemke: in press-b) do not merely run parallel to one another. Texts make explicit semantic connections between them. It should be clear that this can only be done by establishing structural semantic relations between thematic items of different formations (cf. interacting chains, Halliday and Hasan 1985: Chap. 5, and Azis' discussion in this volume). So, for example, an item of one formation may be introduced in a rhetorical structure as a Cause for a Consequence realized by an item from another formation. Or a grammatical structural link, such as Actor/Process, or Classifier/Thing may be forged. Similarly, genre structure relations may be used in the same way. Particularly important prosodic segments of texts may be those where the maximum number of locally active formations are all linked by the relations of a single lower-rank structure (e.g. clause or clause-complex; cf. the notion of a thematic nexus in Lemke, in press-b).

In the classroom episode, at line [15] the <Electron Configurations> formation is joined to one we can call <Hotel>. The link is forged by <electron--go into --hotel>, where the grammatical semantic relations of the elements of this abstract clause bridge between two otherwise quite disjoint formations. Of course we recognize here a rhetorical strategy of Conceit, based on an implied correspondence (itself a metadiscursive relation of the formations) in which:

Electron-->	Traveler
Atom	--> Town
Orbital	--> Hotel
Energy	--> Cost

The stretch of text where both these formations are active, lines [15-17] can be defined as a prosodic thematic segment, independently of any purely structural segmentation of the text here.

The thematic relations of a formation are as they are because such structural connections among their constituents have been made in the past, and continue to be made in the same ways. Structural relations create new thematic relations as they become 'institutionalized' in a community. Conversely, of course, our ability to 'parse' structures, i.e. to assign lexical items and strings to functional roles in particular structures depends most often on recognizing a common thematic formation pattern for such relations (at least at the level of grammatical structures, and perhaps above). This essential interplay of structural and thematic patterns operates across the global organization of meanings in a text, as well as locally.

Text Structure and Thematic Organization

We have just seen how it is possible to define two segmentations of a text. One is based on the hierarchy of genre, rhetorical, and grammatical structures. The other is a prosodic segmentation based on changing constellations of active thematic formations. These two aspects of text organization work together. As I have shown elsewhere (Lemke, in press-b), there is a strong tendency for there to be an inverse correlation between the rank in the hierarchy of a structural boundary and the number of formations that are continuous across that boundary. This means that for major boundaries, e.g. between genre elements, there will be few (often only one) thematic formation in common on both sides of the boundary, but that for minor boundaries, e.g. between elements within a rhetorical structure, there will be a maximum continuity of formations (and their interactions).

Thematic and structural organization in a text are complementary in the interests of maintaining its coherence (and, a fortiori its cohesiveness). When thematic continuity is at a minimum, e.g. when there is a total change of topic, coherence is maintained by rhetorical and genre structure, so that the new topic may be seen as a digression, a new case, or example of a specific sort which will later be synoptically reintegrated somehow into the structure of the text. Conversely, when structural continuity is at a minimum, e.g. when we are at a transition from one major genre or activity substructure to another, thematic continuity maintains the unity of the text or event.

In our classroom episode, the major structural boundary is between lines [1] and [2], where a major thematic shift also occurs (from <Homework> to <Electron Configurations>). Two lesser boundaries occur at lines [27-29], between elements within the Student Initiated Dialogue genre structure, and lines [37-38] between the first and second such episode in a series. The <Electron Configuration> formation is continuous across these boundaries, as is its interaction with a related subformation <Order of Orbitals>. What changes at the minor boundaries is only whether this subformation is linked semantically to <Energy Order>, before and after, or to <Chart Order> in between. A brief intrusion of the formation <Nature Order> is in fact challenged by a student, line [34], as a violation of the norms of classroom science discourse (see Lemke 1983b). This moment, dynamically pregnant, but synoptically isolated by the teacher's failure to either respond to the potential challenge, or to further use the <Nature> formation, also illustrates the role of contextualization relations in the use of an activity structure or thematic formation. In the context of Classroom Lesson, and the immediate context of a Teacher Answer to a question using a Science formation, the use of an anthropomorphizing formation <Nature>, can be interpreted as incompetence or disrespect for the addressees. Without such an analytical framework, there is no discursive regularity to the occurrence of line [34], whereas in fact it is a highly regular and probable response in this context.

For a detailed analysis of the prosodic thematic organization of an episode in relation to its structural organization, see Lemke (in press-b).

The organization of meaning in a text can thus be seen to be a complex function of the hierarchy of structures and the interconnection of thematic formations instanced in it. Every stretch of text is made sense of in terms of its functions in

these structures and its semantic relations in these formations. The elaboration of hierarchical structures in a text and the interplay of its thematic formations allows meanings to be made at the level of whole texts that cannot be made in single clauses, or even clause complexes, no matter how long. That is why these resources have been developed historically in our community and its predecessors. Since construal of a structure, or of a thematic formation, ultimately relies on relations a text may have to other (co-thematic or co-generic) texts, these resources are properly intertextual ones. It is ultimately the resources of intertextual contextualization that underlie text structure and text semantics.

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EPISODE TRANSCRIPT

(DRS: 12L23-14L4, CHERYL'S QUESTION)

- 1] T: [Pause] OK. Do I have all the homework papers? ... Cheryl.
- 2] Ch: What I don't understand ... I don't understand is why do
- 3] they come this way: 1s2, 2s2, 2p, then, um, 2p6, 3s
- 4] T: All right. [8 secs, T draws at board]
- 5] This is energy. [Pause] What orbital has the lowest energy?
- 6] ... Cheryl.
- 7] Ch: K
- 8] T: That's a, that's a shell. What orbital has--
- 9] Ch: S
- 10] T: The S ... and that would be, the lowest one would be, 1s,
- 11] OK? Which one has the next lowest energy?
- 12] Ch: 2s
- 13] T: Which one has the next lowest energy?

14] Ch: 2p
15] T: OK? ... Electron comes to town, wants to go into the cheapest
16] hotel. It goes into the cheapest one that's available. If the
17] 2s is there, if it's empty, fine. 2p? great. What's the
18] next lowest? Josephine?
19] Jo: 4s
20] T: Thank you. ... What happened to 4d? [means 3d]
21] Jo: It has less, it has less energy than ... I mean ... I don't
22] know how to explain it.
23] T: Yes you do.
24] Jo: It has less energy than 4d, uh, 3d.
25] T: Which has less energy?
26] Jo: 4s
27] T: Yes. 4s is lower energy level than the ... 3d.
28] Does that answer your question, Cheryl?
29] Ch: But in here it has the 3d first. [Pause] On the chart--
30] T: On the chart it-- because the chart was put together by a
31] printer, who likes to go in numerical order, if it was put
32] together by a chemist, or of it was put together by nature
33] ... it would go this way.
34] St: Mother Nature, right?
35] T: And I-- I as=as a matter of fact, when I tend to write
36] these down, and think about 'em, this is the order I think
37] about. And I would write down 4s before I'd write down 3d.
38] St: What's after 3d ?