Disciplinarity: Functional Linguistic and Sociological Perspectives

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Chapter 3

Bridging Troubled Waters: Interdisciplinarity and What Makes it Stick

J. R. Martin

Until my association with Halliday in the 1960s, and especially, until I had the possibility of holding discussions with Ruqaiya Hasan . . . I was unable to find a means for describing the texts which were indicators of codes. This . . . required a theory whose descriptors . . . placed language in the context of a social semiotic. As Halliday points out . . . there is no dichotomy between langue *and* parole. *There is system potential and textual actualisation: one not two different orders. It became possible for me to think about linguistics in sociological terms and sociology in linguistic terms. Although the code theory developed towards the understanding of the pedagogising of symbolic control, Halliday's liberation of the study of language continued to provide a point of creative dialogue and tension.*

Bernstein (1995: 398)

Interdisciplinarity

For some time now interdisciplinarity has been a fashionable theme, especially for those managing disciplinarity (from both within and without academe) and also for those needing help with real-world problems of various kinds – educational, clinical, forensic, therapeutic etc. The vision driving this fashion argues for research endeavours whose products are in some sense more than the sum of their disciplinary parts; the undermining reality may in fact entail a loss of disciplinarity as incommensurable knowledge structures in vertical[1] discourse collapse into horizontal discourse in order to achieve common ground – a problem besetting applied linguistics in many forms (Martin 2000).

The dialogue between systemic functional linguistics (hereafter SFL) and Bernstein's sociology of education (hereafter social realism[2]) has, I believe, avoided such pitfalls over at least three phases of dialogue – in relation to coding orientation and the enactment of meaning in relation to gender and class; in relation to pedagogic discourse and the design of democratic literacy pedagogy and curriculum; and in relation to knowledge structure and the

semiotic resources underpinning vertical discourse. In this chapter I'll touch on the first of these and then briefly explore the second and third phases of interaction, with a view to understanding something about what makes interdisciplinarity a productive exercise in spite of the intellectual burden (and excitement) of learning to theorize in another discipline's terms. Finally I imagine how a recently developing phase, around concerns with community and identity, might proceed.

Disciplinarity

Before proceeding further it is necessary to clarify how, following Bernstein, disciplinarity will be conceived here. First his distinction between singulars and regions:

> A discourse as a **singular** is a discourse which has appropriated a space to give itself a unique name . . . for example physics, chemistry, sociology, psychology . . . these singulars produced a discourse which was about only themselves . . . had very few external references other than in terms of themselves . . . created the field of the production of knowledge . . . in the twentieth century, particularly in the last five decades . . . the very strong classification of singulars has undergone a change, and what we have now . . . is a regionalisation of knowledge . . . a recontextualising of singulars . . . for example, in medicine, architecture, engineering, information science . . . any regionalisation of knowledge implies a recontextualising principle: which singulars are to be selected, what knowledge within the singular is to be introduced and related? . . . **Regions** are the interface between the field of the production of knowledge and any field of practice . . . (Bernstein 1996: 23)

I'll use the term discipline to refer to singulars below. This means that we need to be wary of singulars with hybrid, perhaps even hyphenated, names such as those proliferating in the discipline of linguistics: sociolinguistics, psycholinguistics, text-linguistics etc. In Labovian sociolinguistics for example there is no sociology. What we find is simply the recognition of phonological and morphological variation (different ways of saying the 'same' thing) depending on common sense notions of style (formal/informal) and dialect (mainly generation, ethnicity). In linguistics the hybrid names and hyphens simply reflect the need to weaken the classification of what counts as language for linguists positioning themselves in relation to the narrow confines of the formalist hegemony within the discipline; the naming does not usually indicate an interdisciplinary exercise. In this regard we need as well to be wary of disciplines whose singularity rests on shaky ground. Is it the case for example that formal and functional linguistics constitute a single discipline, or, as Muller has suggested (in Christie et al. 2007), are there two singulars, one taking native speaker judgements of grammaticality as data, to be explained in relation to

neurobiological constraints resulting from a putative genetic mutation, and the other focusing on naturally occurring texts, to be explained in relation to the social system they enact? For purposes of this chapter I'll maintain linguistics as a disciplinary singular, but gaze at interdisciplinarity from a functional linguistic perspective. (See Muller this volume for related discussion.)

What then might we mean in terms of productive interdisciplinary dialogue across singulars, taking the SFL/social realism dialogue as an exemplar? As noted above there are several phases to consider:

– semantic variation & coding orientation (60s; 80s)
– genre-based literacy & pedagogic discourse (80s–90s . . .)
– field & knowledge structure (00s . . .)
– individuation/affiliation & identity (00s . . .)

What happens when singulars enter into dialogue, and start talking, almost certainly from disciplinary margins – since disciplinary centres don't need to bother (they can afford to talk to themselves)? Judging from the SFL/social realism experience, conversation is fostered by having a problem with which both disciplines are concerned, the ability to trespass on each other's domain by providing complementary perspectives on comparable phenomena, and possession of a discursive technology which can make visible things the other discipline wants to know. As the Bernstein quote with which I opened this chapter indicates, the semantic variation/coding orientation phase in this dialogue has been very well documented (Bernstein 1995; Halliday 1973, 1995; Hasan[3] 2005, 2009) and for reasons of space, and because I was not myself directly involved, I'll pass over it here. As Bernstein writes therein, 'It became possible for me to think about linguistics in sociological terms and sociology in linguistic terms.' Note in passing what is not implied here, namely, the establishment of a common metalanguage above and beyond linguistics and sociology (an inter-language or 'pidgin' if you will). Rather what is at stake is provocation – the generative tension of rethinking one's own discipline in alter-disciplinary terms. Productive interdisciplinarity in other words enriches disciplinarity; it doesn't water knowledge down.

Genre-based Literacy and Pedagogic Discourse

My own first close encounter with disciplinarity of the Bernstein kind grew out of my work in educational linguistics, specifically the genre-based literacy initiatives of what has come to be known as the Sydney School (for general reviews of this action research see Christie 1992; Martin 1993a, 1998b, 1999, 2000a, 2000b, 2009a; Rothery 1996). During the 1980s, we were developing a pedagogy for teaching writing in which teachers assumed an authoritative role and interacted in various ways with students at various stages of the teaching/learning cycle (a canonical version of which is outlined in Figure 3. 1).

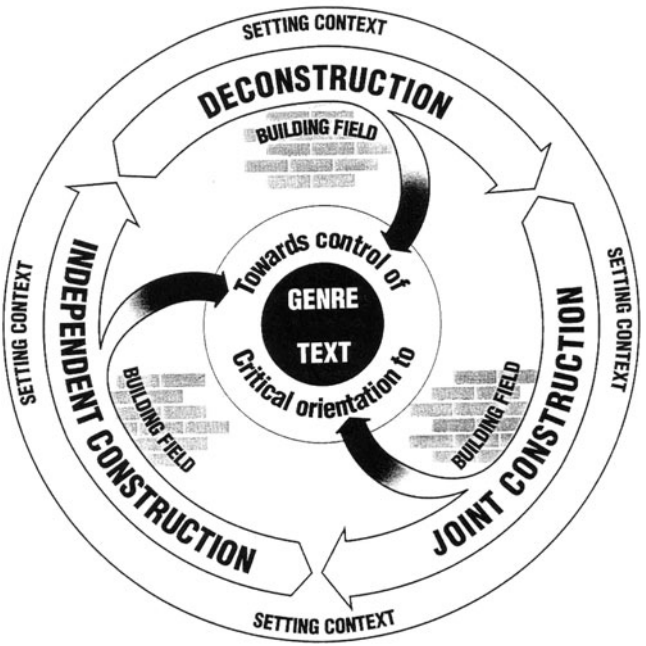

Figure 3.1 Sydney School teaching/learning cycle

Bernstein's notions of visible and invisible pedagogy, together with his concepts of strong and weak classification and framing, gave us the conceptual tools we needed to reflect on the various stages in this cycle – in order to better 'theorise a model of teaching and learning which uses explicit knowledge about language as the basis for double classification and double framing and to propose this as the basis for post-progressive developments in educational theory and practice' (Martin and Rothery 1988). This pedagogy has continued to develop in relation to different sectors of education (Martin 2006a; Martin and Rose 2007b), with classification and framing providing useful tools for fine-tuning each recontextualization (Martin 1998a).

As our work became better known I continued to be puzzled by the vehement reactions it produced and as a linguist I could not see the class basis of the confrontations. We knew as an issue of social justice that we were attempting to redistribute the literacy resources of the culture, so that working class, migrant and indigenous learners excluded by traditional pedagogies and further marginalized by progressive ones could access the powerful forms of discourse they needed to renegotiate their position in society. But until studying Bernstein we did not understand the traditional and progressive debate as a struggle over education between factions of the middle class, and our own 'othered' position in relation to these debates. Bernstein's topology of pedagogies immeasurably

clarified our stance and the friction we caused and heartened us greatly in our determination to make our political project succeed. His topology, Figure 3.2 below, has a vertical dimension indicating 'whether the theory of instruction privileged relations internal to the individual, where the focus would be *intra-individual,* or . . . relations *between* social groups (inter-group)' and a horizontal dimension indicating 'whether the theory articulated a pedagogic practice emphasising a logic of acquisition or . . . a logic of transmission' (Bernstein 1990: 213–214). Although unaware at the time of our work, Bernstein's characterization of the lower right hand quadrant as 'a radical realization of an apparently conservative pedagogic practice' and his comment that the 'top right-hand quadrant is regarded as conservative but has often produced very innovative and radical acquirers' (Bernstein 1990: 73) imagined our observations and experiences perfectly. Over time we adapted his diagram along the lines of the topology in Figure 3.2, christening our quadrant as 'subversive' because of its attempt to challenge social order by giving away the keys to knowledge then almost exclusively appropriated by agents of symbolic control.

Bernstein's work on pedagogic discourse also provided us with a model for re-interpreting the interplay of regulative and instructional discourse in our teaching/learning cycle. Drawing on Christie's work (e.g. Christie 2002) Martin 2008a notes that regulative discourse was in fact projecting or giving voice to two instructional discourses, one recontextualizing linguistics (knowledge about language) and the other recontextualizing disciplines as subject

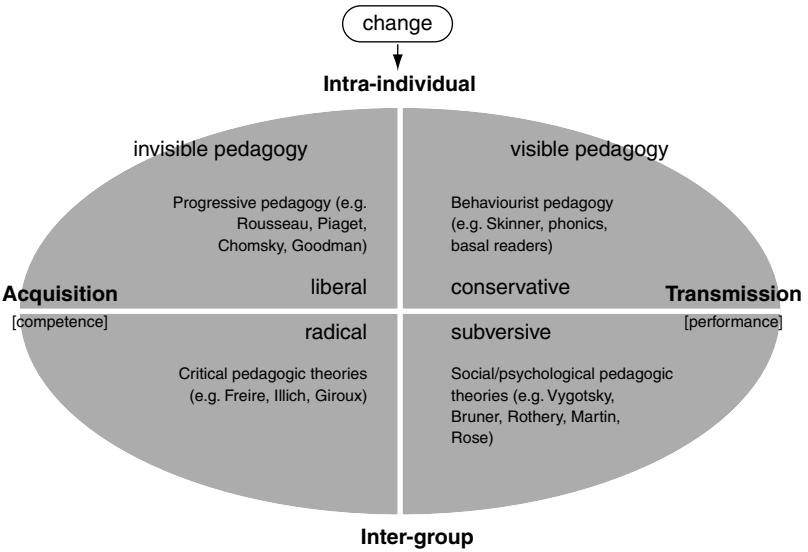

Figure 3.2 Sydney School adaptation of Bernstein's topology of pedagogies

areas (math, science, history etc.). Rose in press further develops this dialogue in relation to SFL register theory.

As far as this phase of interdisciplinarity was concerned I have no doubt that linguists were learning to think sociologically about educational linguistics. But the dialogue was pretty much a one-way street since social realists were apparently not aware of our Sydney School work until at least 1996 when Christie organized the symposium in Melbourne which gave rise to the collection of papers in Christie 1999.

Field and Knowledge Structure

For two-way dialogue we need to turn to a further phase of SFL/social realism interdisciplinarity, which brought scholars from the two traditions together in symposia at the University of Sydney in 2004 and 2008. Christie and Martin 2007 reflects discussion from the first of these meetings (see especially the contributions by Maton and Muller, Martin, Muller and the 'Taking stock' discussion involving Christie, Martin, Maton and Muller at the end of the book), and this volume arises from the second. Significantly Maton's emigration to Australia in 2005 brought Sydney School scholars into ongoing first-hand contact with social realism for the first time. The dialogue we are focusing on here has to do with SFL's conception of field (after Martin 1992, 1993b, 2007a, 2007b) as a set of activity sequences oriented to some global institutional purpose (including the taxonomies of participants involved in these activities) and social realism's conception of knowledge structure, evolving out of Bernstein's ongoing concern with the complementarity of common sense and uncommon sense discourse (Bernstein 1996/2000; Maton and Muller 2007).

Muller 2007 in fact notes the similarity between Martin's 1992 provisional taxonomy of fields (reproduced as Figure 3.3 below) and Bernstein's work on horizontal and vertical discourse. There I was attempting to scaffold SFL research on school and workplace discourse (Christie and Martin 1997; see also the references in Martin 2009b), foregrounding context dependency, especially in relation to apprenticeship, and within decontextualized discourse, foregrounding the pragmatic purpose of the discourse (proposals for action or propositions about the world) and the degree of technicality used to construe uncommon sense (Halliday and Martin 1993; Martin and Veel 1998; Martin and Wodak 2003).

Bernstein makes comparable distinctions between horizontal and vertical discourse, and within vertical discourse between hierarchical and horizontal knowledge structures (outlined in Figure 3.4). His characterizations of these discourses are reprised below, and have stimulated considerable re-articulation in SFL as far as the social semiotic description of disciplines is concerned

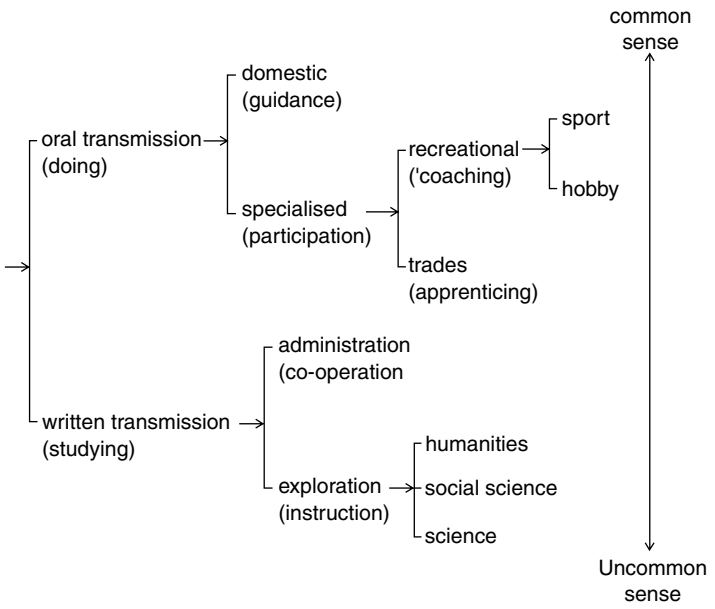

Figure 3.3 Martin's 1992 taxonomy of fields

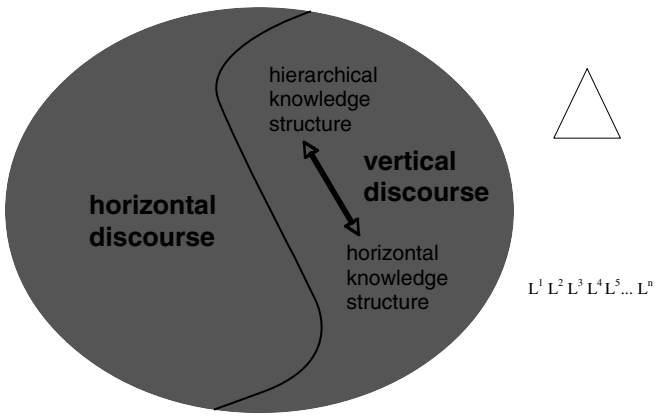

Figure 3.4 Bernstein's 1996/2000 reformulation of common and uncommon sense

(compare for example the monologically SFL papers in Christie and Martin 1997 with the more dialogic stance of those in Christie and Martin 2007):

> A *Horizontal discourse* entails a set of strategies which are local, segmentally organised, context specific and dependent, for maximising encounters

> with persons and habitats. . . . This form has a group of well-known features: it is likely to be oral, local, context dependent and specific, tacit, multi-layered and contradictory across but not within contexts. (Bernstein 2000: 157) . . . a *Vertical discourse* takes the form of a coherent, explicit and systematically principled structure, hierarchically organised as in the sciences, or it takes the form of a series of specialised languages with specialised modes of interrogation and specialised criteria for the production and circulation of texts as in the social sciences and humanities. (Bernstein 2000: 157)
>
> . . . A hierarchical knowledge structure is 'a coherent, explicit and systematically principled structure, hierarchically organised' which 'attempts to create very general propositions and theories, which integrate knowledge at lower levels, and in this way shows underlying uniformities across an expanding range of apparently different phenomena' (Bernstein 1999: 161–162) . . . A horizontal knowledge structure is defined as 'a series of specialised languages with specialised modes of interrogation and criteria for the construction and circulation of texts'. (Bernstein 1999: 162)

To these distinctions Bernstein adds his conception of strong or weak, internal or external grammars. With reference to internal grammar, Muller 2007 proposes the term verticality to describe how theories progress – via ever more integrative or general propositions or via the introduction of a new language which constructs a 'fresh perspective, a new set of questions, a new set of connections, and an apparently new problematic, and most importantly a new set of speakers' (Bernstein 1996: 162). Borrowing Bernstein's image of the triangle for hierarchical knowledge structures and iterating languages for horizontal ones, Muller's conception of verticality is schematized in Figure 3.5 below.

With reference to Bernstein's external grammar Muller proposes the term grammaticality[4] to describe how theoretical statements deal with their empirical predicates (cf. Bernstein's strong/weak external grammar). The stronger the grammaticality of a language, the more stably it is able to generate empirical correlates and the more unambiguous because more restricted the field of referents. Hierarchical knowledge structures in other words **test** theories against data; horizontal knowledge structures use theory to **interpret** texts. See Figure 3.6.

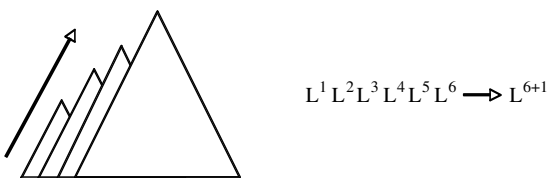

Figure 3.5 Verticality in relation to progress for hierarchical vs horizontal knowledge structures

Figure 3.6 Grammaticality in relation to empirical correlates for hierarchical vs horizontal knowledge structures (testing vs interpreting)

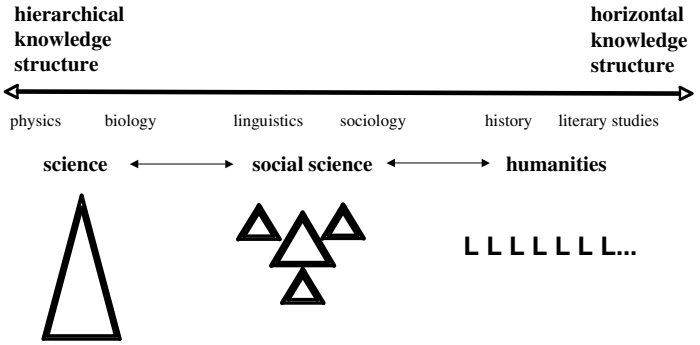

Figure 3.7 Vertical discourse as complementarity and cline

Wignell, in his presentation at the 2004 symposium, (but not in Wignell 2007) suggested that the social sciences might best be conceived as warring triangles since they tend to model themselves on science rather than humanities (where the drive to integration via ever more general models and propositions is much less strong). Although the warring triangles battle institutionally and epistemologically for hegemony, and often single theories become dominant, successfully marginalizing rivals, no one theory ever manages to take over the whole discipline and reigning theories come and go. It appears that in social science verticality and grammaticality are simply not strong enough to enable theoretical integration in relation to the complex social phenomena being described. Rather the social sciences 'progress' like the horizontal knowledge structures they are, by adding new triangles with new sets of speakers (e.g. various functional theories such as SFL, Role and Reference Grammar, Lexical Functional Grammar, Functional Grammar in linguistics, or various gazes on the past we might denominate as Traditional, Marxist, Feminist, Queer, Post-colonial in history). Wignell's construal of vertical discourse as more of a cline than an opposition or complementarity is outlined in Figure 3.7 above, filling in some exemplary singulars ranged along the scale. Muller 2007 discusses the continuity vs. complementarity issue in relation to the question of whether one is emphasizing semiotic convergence (continuity) or social distribution (complementarity).

To date one of SFL's main concerns in this dialogue has been to identify grammatical metaphor as the critical linguistic resource used to construe vertical discourse (Halliday 1998, 2004, 2008; Halliday and Matthiessen 1999; Martin 1989, 1993b, c; Simon-Vandenbergen et al. 2003), with respect to both taxonomy (uncommon sense classification) and explanation (reasoning inside the clause). Dialogue around grammatical metaphor, the ways different knowledge structures use it to construe hierarchical and horizontal discourse and the challenge of explaining it to non-linguists has inspired recent work by Maton (Chapter 3 of this volume) on theory building by Bernstein and Bourdieu (as part of a sociological interpretation of how knowledge structures come to be valued within and across disciplines). So let's glance briefly here at SFL's account of grammatical metaphor and then Maton's sociological recontextualization of comparable phenomena.

Bernstein, discussing his reservoir/repertoire perspective on the allocation of semiotic resources exemplifies, then interprets sociologically (beginning *Now . . .*) as follows:

> Consider a situation where a small holder meets another and complains that what he/she had done every year with great success, this year failed completely. The other says that when this happened he/she finds that this 'works'. He/she then outlines the successful strategy. /// Now any restriction to circulation and exchange reduces effectiveness. Any restriction specialises, classifies and privatises knowledge. Stratification procedures produce distributive rules which control the flow of procedures from *reservoir* to *repertoire*. Thus both Vertical and Horizontal discourses are likely to operate with distributive rules which set up positions of defence and challenge. (Bernstein 2000: 158)

His example consists of three sentences, which can be broken down into 9 ranking[5] clauses (including 1 embedded clause, enclosed in double square brackets); so on average the sentences involve 3 clauses containing just over 2 content words (i.e. lexical items committing specific experiential meaning), underlined below.

Consider a situation [2]
where a small holder meets another [3]
and complains [1]
that [[what he/she had done every year with great success]], this year failed completely. [7]
The other says [1]
that when this happened [1]
he/she finds [1]
that this 'works'. [1]
He/she then outlines the successful strategy. [3]

His interpretation consists of 4 sentences, each consisting of one ranking clause (including 2 embedded clauses); on average these contain 7.5 content words.

> Now any restriction [to circulation and exchange] reduces effectiveness. [5]
> Any restriction specializes, classifies and privatizes knowledge. [5]
> Stratification procedures produce distributive rules [[which control the flow of procedures from *reservoir* to *repertoire*]]. [10]
> This both Vertical and Horizontal discourses are likely to operate with distributive rules [[which set up positions of defence and challenge]]. [10]

In Halliday's terms (e.g. 2008) the example reflects the complexity of spoken language – relatively intricate clause combinations with sparse lexical commitment; conversely the interpretation reflects the complexity of written language – relatively simple sentences with dense lexicalization. Every reader feels the change of gears, from easy to follow everyday discourse to the challenging verticality of horizontal knowledge structure.

Density and intricacy however are but symptoms of a deeper qualitative contrast between the example and interpretation, namely the relation between lexicogrammar and discourse semantics. In the example, processes are for the most part realized verbally (underlined below); and logical connections between processes are realized conjunctively (italics below).

> Consider a situation where a small holder meets another *and* complains that what he/she had done every year with great success, this year failed completely. The other says that *when* this happened he/she finds that this 'works'. He/she *then* outlines the successful strategy.

The exception has to do with achieving expected outcomes (the process 'succeed'), which is twice realized nominally (in the service of evaluation it would appear): *great success, successful strategy*. Setting these aside, nominals in the example are fairly concrete, including 6 realizations of the holder (*a small holder, another, he/she, The other, he/she, He/she*), 2 temporal locations (*every year, this year*), 2 fairly general abstractions (*situation, strategy*), the two underspecified instances of text reference (*this, this*). Rhetorically speaking Bernstein has constructed an example accessible to a wide range of English readers (including linguists unschooled in his sociological discourse).

Bernstein's interpretation on the other hand is likely to stop unacculturated linguists in their tracks. None of his nominal groups refer to entities from horizontal discourse one might hope to touch, taste, feel, hear or see (embedded phrases enclosed in single square brackets below):

> any restriction [to circulation and exchange]
> circulation
> exchange

effectiveness
any restriction
knowledge
stratification procedures
distributive rules [[which control the flow of procedures from *reservoir* to *repertoire*]]
    the flow [of procedures] [from *reservoir* to *repertoire*]
        procedures
            reservoir
            repertoire
both Vertical and Horizontal discourses
distributive rules [[which set up positions of defence and challenge]]
    positions [of defence and challenge]
        defence
        challenge

There are 10 nominal groups realizing processes (*restriction, circulation, exchange, restriction, flow, defence, challenge; stratification procedures, distributive rules, distributive rules*[6]) and 1 realizing a quality (*effectiveness*). In addition there are 4 nominal groups realizing technical terms (*reservoir, repertoire, Vertical and Horizontal discourses*) and 3 realizing abstractions (*knowledge, procedures, positions*). So what was an exception in Bernstein's example (the realization of 'succeed' as *success/successful* and the abstractions *situation* and *strategy*) becomes the norm in his interpretation where most of his nominal groups are realizing processes and qualities not participants – and the 7 participants that are present are non-sensory ones rather than concrete people, places or things (i.e. technical terms and abstractions).

Neither can the verbal groups in Bernstein's interpretation be taken at face value. All relate process, qualities and technical terms and abstractions to one another; there are no concrete people or things affecting one another:

> Now any restriction to circulation and exchange reduces effectiveness. Any restriction specializes, classifies and privatizes knowledge. Stratification procedures produce distributive rules which control the flow of procedures from *reservoir* to *repertoire*. Thus both Vertical and Horizontal discourses are likely to operate with distributive rules which set up positions of defence and challenge.

Rather the verbal groups (underlined below) realize agentive relationships between processes, qualities, abstractions and technical terms. Their function is to fine-tune cause-and-effect relationships relating sociological entities to one another – Agent affecting Medium in Halliday's terms. And the nominal groups realizing Agent and Medium enable Bernstein to compile semantic processes, qualities and technical and abstract participants into precisely the cause and

effect he wants to relate precisely to one another – via iteration (e.g. *circulation and exchange*) and embedding (e.g. *the flow [of procedures] [from reservoir to repertoire]*).

With cause realized inside the clause the only work left for conjunctions to do is to realize rhetorical connections (technically internal conjunctive relations) between the stages of Bernstein's explanation (between his example and interpretation – *Now*, and to signal his culminative move to a deeper level of theorization – *Thus*).

Now any restriction to circulation and exchange [Agent]
reduces
effectiveness [Medium]

Any restriction [Agent]
specializes, classifies and privatizes
knowledge [Medium]

Stratification procedures [Agent]
produce
distributive rules which control the flow of procedures from *reservoir* to *repertoire*. [Medium]

(distributive rules) which [Agent]
control
the flow of procedures from *reservoir* to *repertoire* [Medium]

Thus both Vertical and Horizontal discourses [Agent]
are likely to operate
with distributive rules which set up positions of defence and challenge. [Medium]

(distributive rules) which
set up
positions of defence and challenge

What we see then is the familiar logogenetic drift from congruent exemplificatory discourse in which processes are realized verbally, participants nominally, qualities adjectivally and logical relations conjunctively to grammatically metaphorical interpretative discourse in which processes, technical and abstract participants and qualities are realized nominally and logical relations are realized verbally in Agent Process Medium structures. An outline of the shift in the relationships between discourse semantics and lexicogrammar from example to interpretation is provided in Figure 3. 8.

The pay-off as far as construing vertical discourse is concerned is two-fold. On the one hand it enables uncommon sense explanation, via cause in the clause and flexibly assembled causes and effects, as just illustrated. On the other it

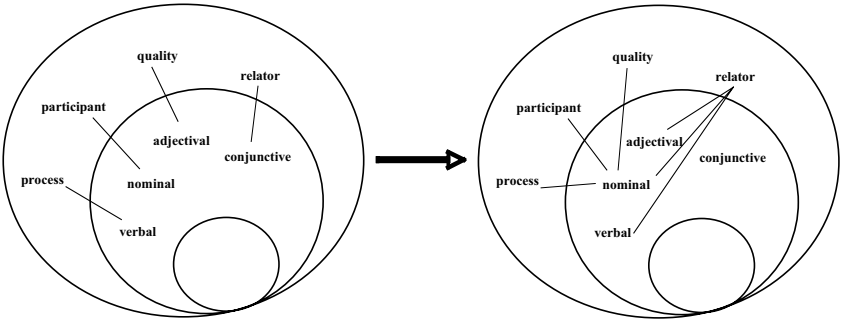

Figure 3.8 Rhetorical drift from congruence to grammatical metaphor in Bernstein's explanation

enables the construal of uncommon sense technical concepts (via definitions) which can then be arranged into specialized classification or compositional taxonomies (e.g. Figure 3.3 above) and theoretical superstructure of other kinds (Figures 3.1–2, 3.4–7 above), and re-deployed in explanations (as were 'Vertical and Horizontal discourses' in the explanation just reviewed).

Bernstein's definitions of horizontal and vertical discourse were introduced above. Like all definitions they relate one nominal group to another (typically[7] a Token to a Value in an identifying relational clause in Halliday's terms). Just as grammatical metaphor enables just the right consolidation of meaning as Agent and Medium for explanations, so too for Token and Value in definitions:

. . . a *Vertical discourse* (**Token**)
takes the form of (=)
a coherent, explicit and systematically principled structure, hierarchically organized as in the sciences, (**Value**)

or it (**Token**)
takes the form of (=)
a series of specialized languages with specialized modes of interrogation and specialized criteria for the production and circulation of texts as in the social sciences and humanities. (**Value**)

A *Horizontal discourse* (**Token**)
entails (=)
a set of strategies which are local, segmentally organized, context specific and dependent, for maximizing encounters with persons and habitats. (**Value**)

Note how grammatical metaphor is appropriated in these examples to condense meaning as technical Tokens (a word or two long) and to accumulate relevant meanings in Values (which can be very complex, including considerable

embedding and grammatical metaphor, and additional already familiar technicality). One important function of **technicality** is to kill off grammatical metaphor, distilling metaphorical discourse as compact entities for purposes of theory building. Seen in these terms technicality is an important linguistic reflex of Muller's verticality. The more vertical the knowledge structure, the more it will tend to deploy technicality to construe additional technicality. Note how the following definition of English Subject in SFL distils relationships among 11 additional technical terms, familiarity with which is assumed in a definition of this kind (cf. Bernstein's less technical Values above):

> The **Subject** (Token)
> is
> the interpersonal clause function which changes sequence with the Finite to change MOOD between declarative and interrogative and is referred to by an anaphoric pronoun in mood tags. (Value)

Dialogue around grammatical metaphor and technicality and the ways different knowledge structures use one or both to construe hierarchical and horizontal discourse, and the challenge of explaining these phenomena to non-linguists has inspired recent work by Maton (Chapter 3, this volume) on theory building in the work of Bernstein and Bourdieu (as part of a sociological interpretation of how knowledge structures come to be valued within and across disciplines). As part of his Legitimation Code Theory he proposes a number of principles, one of which concerns semantics and involves with social/symbolic referent relations. His technicalizing distillations are:

> ***Semantic gravity*** (SG) refers to the degree to which meaning is dependent on its context. Semantic gravity may be relatively stronger (+) or weaker (–). When semantic gravity is stronger (SG+), meaning is more closely related to its context; when weaker, meaning is less dependent on its context.
>
> ***Semantic density*** (SD) refers to the degree to which meaning is condensed within symbols (a term, concept, phrase, expression, gesture, etc). Where semantic density is stronger (SD+), the symbol has more meaning condensed within it; where semantic density is weaker (SD–), the symbol condenses less meaning. (As I discuss later, what has been condensed is not necessarily an empirical description – it can be, for example, a feeling). (Maton, this volume)

Concerned that his model be applied to unfolding discourse and action, Maton also adopts a logogenetic perspective with respect to processes of strengthening or weakening semantic gravity and density:

> One may also talk of *processes* of weakening semantic gravity, as one's understanding is lifted above the concrete particulars of a specific context or case,

> and strengthening semantic gravity, as abstract or generalised ideas are made more concrete; and of strengthening semantic density, such as when a lengthy description is 'packaged up or condensed into a term or brief expression, and weakening semantic density, when an abstract idea is fleshed out with empirical detail.' (Maton, this volume)

Comparing degrees of verticality in Bernstein and Bourdieu, he then comments on the relative depth of Bernstein's theorizing (as schematized by Maton in Figure 3.2, this volume):

> For example, Bernstein's analysis of progressive pedagogy (1977, chapter 6) begins with an empirical description of what he argues are the six fundamental characteristics of a progressive classroom (see Figure 1). The structuring features are then theorised in terms of relations between different forms of 'criteria', 'hierarchy', and 'sequencing rules', which are condensed into a distinction between 'visible' and 'invisible' pedagogies (see Moore 2006). Their underlying principles are in turn abstracted and condensed in terms of classification and framing (-C, -F) . . . (Maton, this volume)

If we turn this analysis back on the Bernstein explanation of reservoir and repertoire analysed above, we arrive at an analysis in which semantic gravity weakens and semantic density strengthens from example to interpretation (Figure 3.9 below). This of course resonates strongly with the SFL grammatical metaphor and technicality analysis presented above, which was itself in part responsible for Maton's extension of his Legitimation Code Theory subsequent to his first-hand encounters with the Sydney school.

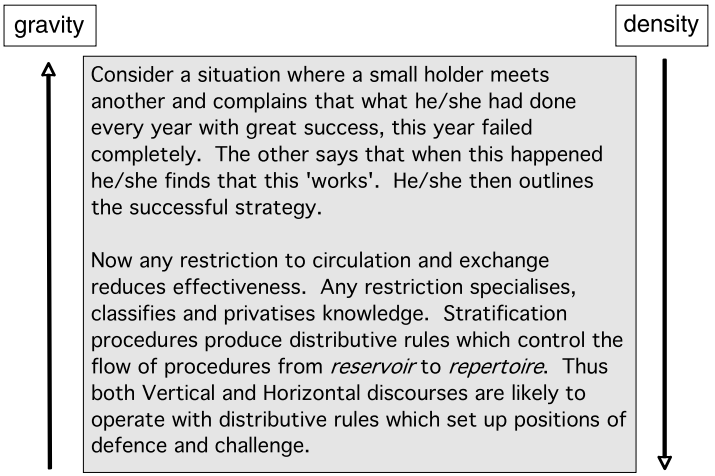

Figure 3.9 Unfolding semantic gravity and density from example to interpretation

Significantly however, Maton's perspective provokes reconsideration by linguists of the semiotics of vertical discourse, since there is no simple mapping of gravity and density to grammatical metaphor and technicality. There are various ways for example in which meaning can be more or less closely related to context. Exophoric reference to the material situation setting may bind phoric[8] items whose meaning has to be resolved through sensory access (visual access in the example below):

> A small holder met another and complained that what she had successfully done every year, this year failed completely.
>
> She met him and complained that she'd used this variety successfully in that field, but this year that variety failed completely in that one.

Alternatively, the resolution of phoric items may depend on shared information based on membership in a specific community (e.g. recognizing names of people, agencies and specific places below):

> A small holder met another and complained that what she had successfully done every year, this year failed completely.
>
> Barbara Marshall met Barnaby Jones and complained that Monsanto variety approved by Co-Extra had failed completely in the back paddock.

We can also decontextualize a message by changing its nominal and verbal deixis from specific participants and events to generic ones:

> A small holder met another and complained that what she had successfully done every year, this year failed completely.
>
> Small holders often meet one another and complain that what they do successfully every year, some years fails completely.

Experiential grammatical metaphor can have a comparable decontextualizing effect as processes lose their temporality as they are reformulated as generic nominal groups:

> Small holders often meet one another and complain that what he/she does successfully every year with great success, some years fails completely.
>
> Small holders often meet and exchange complaints about success and failure.

This effect may be compounded, further deflating contextual dependency, when logical metaphors are deployed to relate two nominalized processes to one another through 'habitual' verbalizations:

> Small holders often meet one another and complain that what he/she does every year with great success, some years fails completely.
>
> Farmers' successful strategies in some years do not result in the same success every year.

Turning from gravity to density, we can vary the amount of meaning committed, specifying for example the kind of holder involved and the particular strategy under review:

> A small holder met another and complained that what she had done every year with great success, this year failed completely.
>
> A small wheat farmer met another and complained that planting genetically modified varieties had increased yield every year, but this year had not.

And we can push the density up still further by technicalizing the genetic modification deployed:

> A small wheat farmer met another and complained that planting new genetically modified varieties had increased yield every year, but this year had not.
>
> Our results are in agreement with the hypothesis that the transgenes we used to increase wheat defence to fungal pathogens do not interfere with the flavonoid biosynthesis pathway.[9]

Finally, as Maton (2008, to appear), indicates, we need to keep in mind the axiological loading with which even apparently experiential meanings are charged. The political ramifications of the difference between the specification of *new genetically modified varieties* and *new disease resistant varieties* below alert us to the semantic condensation of evaluation in discourse:

> A small holder met another and complained that what she had successfully done every year, this year failed completely.
>
> A small wheat farmer met another and complained that planting new genetically modified varieties had increased yield every year, but this year had not.
>
> A small wheat farmer met another and complained that planting new disease resistant varieties had increased yield every year, but this year had not.

As we can see Maton's categories involve a number of linguistic variables, not all of them well understood. Certain dimensions have been relatively well explored

in linguistics – specific vs. generic reference, punctual vs habitual behaviour and technicalization for example; but for others, such as the amount of meaning committed in a text, and the iconization processes whereby axiological meaning is charged and experiential meaning discharged, research is barely underway (Martin 2008a, 2010). And the issue of how exactly to quantify shifts in density or gravity in linguistic terms is an extremely challenging issue. In a sense Maton has tossed back the gauntlet which SFL perhaps considered it had thrown down social realism way. And that of course is what interdisciplinarity at its best is supposed to do – make each discipline rethink what it thought it knew, so that new knowledge can be born.

Compared with phase 2 of the SFL/social realism dialogue, phase 3 gives us a stronger sense of two-way traffic (see Figure 3.10). Social realism's mapping of types of knowledge structure and the ways they progress stimulated renewed interest in social semiotic construal of disciplines in SFL. SFL's concern with the discursive construction of knowledge rebounded on social realism's concern with the legitimation of discourse and knowers' positioning by them, leading to work on semantic gravity and semantic density – which has in turn challenged SFL's modelling of contextual dependency in relation to mode, as well as commitment and iconization in relation to instantiation. Throughout, this phase of negotiation has I believe featured bilingualism rather than pidginization. It has not in other words given rise to an inter-language (or supra-theory), above and beyond social realism and SFL; rather it has challenged sociologists and linguists to learn something of each other's codes – to think linguistically about sociology and sociologically about linguistics, and to renovate and expand the respective knowledge structures, the refreshing perspective of learning to talk a new discourse requires.

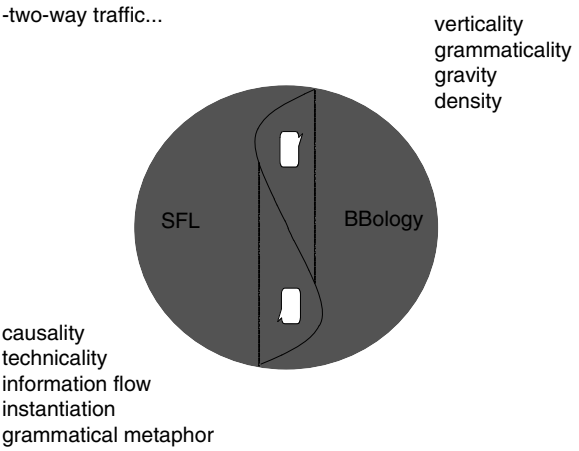

Figure 3.10 Parameters of third phase field/knowledge structure negotiation

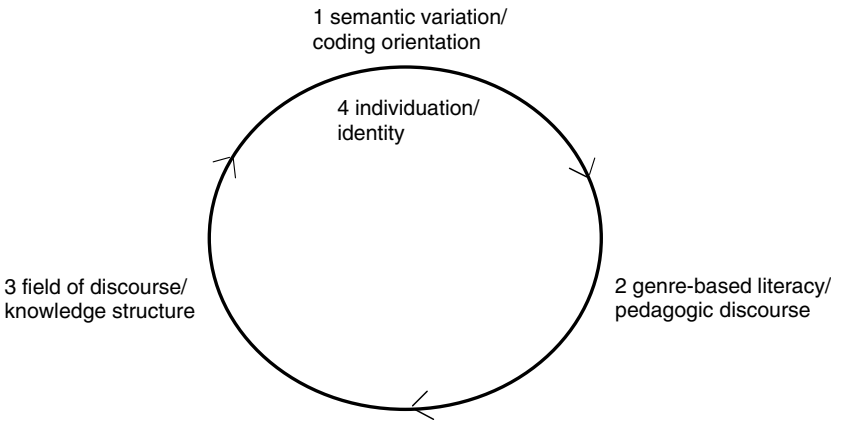

Figure 3.11 Four phases of SFL/Social realism interdisciplinary dialogue

Currently this dialogue has entered a fourth phase around questions of identity and community, drawing on SFL's concern with individuation/affiliation (Martin 2006b, 2008b, 2010) and Maton's (2008, to appear) work on cosmology and constellations in relation to why theories become popular. Martin 2009c introduces some preliminary negotiation in relation to mapping the identities performed by young offenders in youth justice conferencing inspired by Maton's work on 'knower structure'. This work in effect brings the dialogue between social realism and SFL full circle, focusing as it does on users of language, and the social distribution of repertoires of meaning in social stratified communities – as outlined in Figure 3.11.

Complementarity

In closing I'd like to reflect on some of the conditions that facilitate supplementary singulars becoming complementary ones, fostering the kind of interdisciplinary dialogue reviewed and alluded to above. I'm not the only SFL linguist or social realist to reflect on these concerns and will be drawing on a number of observations by Hasan, the key linguist involved in the semantic variation/coding orientation dialogue, and Maton, one of the key sociologists involved in later phases concerned with knowledge structure and identity.

i. **exotropicity** – Hasan considers exotropicity to be one key ingredient, which she characterizes as follows. 'Endotropic theories are centred onto their own object of study, isolating it from all else. The phenomena they attempt to describe are viewed as if they were self-generating, self-fertilizing, self-renewing;

they are thus autonomous with respect to their central problematic . . . By contrast, an exotropic theory is not confined within the bounds of its object of study. Rather, it is cosmoramic, typically embedding its central problematic in a context, where the processes of its maintenance and change originate in its interaction with other universes of experience' (Hasan 2005: 51). In her terms, both SFL and social realism are exotropic theories par excellence.

ii. **reciprocity of concern –** To this Hasan adds her notion of a reciprocity of concern: 'A metadialogue, much like an object dialogue, presupposes reciprocity of a positive kind and a necessary condition for theories to engage in dialogue is a reciprocity of concern . . . this does not reside in simply sharing the same problematic, otherwise all linguistic theories would be in dialogue, which is patently not the case. What I mean . . . is that one's theory's mode of addressing its problematic – the conceptual syntax . . . in terms of which its theoretical goal is interpreted – complements the conceptual syntax of the other reciprocating theories' (Hasan 2005: 50–51).

iii. **conceptual resonance –** Hasan's concern with complementary conceptual syntax aligns with Maton's comment that both SFL and social realism '. . . attempt to generate strong external languages of description [strong grammaticality in Muller's terms: JRM], concepts that get to grips with problems in empirical research. This gives them the possibility of a shared purchase on the world, enabling dialogue . . .' (Maton in Christie et al. 2007: 240). Another point Maton has made to me is that both are relational theories, drawing heavily on typological and topological categorizations (as exemplified in Figures 3.2, 3.3, 3.4 and 3.7 above).

iv. **a problem –** Maton comments further that dialogue has been facilitated because '. . . both SFL and Bernstein sociology share an allegiance to a problem rather than to an approach. Intellectuals in both traditions are willing to look beyond the confines of their knowledge structures for conceptual tools that enable them to explain better the part of the world they focus on . . .' (Maton in Christie et al. 2007: 240). To this I would add the notion of a shared commitment to change the things they don't like about the world, a point taken up by Maton and Moore 2010 in their introductory manifesto for social realism, in a section entitled 'Social realism for social justice' (Maton and Moore 2010: 8–10).

v. **readiness –** Having one's conceptual syntax in order at the right time is also crucial. Halliday for example notes some ways in which SFL was ill-prepared for productive dialogue during initial discussions in the 1960s: 'But there were problems with this [= Bernstein's: JRM] very demanding program of research, with its focus directed primarily on language. One was that the linguistic theory was not yet really able to cope with the cryptotypic features of grammar that were now beginning to be recognised as critical. My work on transitivity and theme had been published . . . and the essential metafunctional principle

behind the grammar was in place and being worked out . . . but only a partial study of cohesion was available . . . and there was little or no work in the key areas of the clause complex, and other "complex" structures, or grammatical metaphor . . .' (Halliday 1995: 135).

vi. **space/time –** Needing to be ready of course depends on opportunities to collaborate, and this depends on securing funding and on the appointment of the right people to the right position in the right place at the right time (variables which are very hard to control). Halliday and Hasan's departure from London in the late 1960s arguably stalled dialogue for over a decade, pending the resurgence of SFL work on coding orientation, directed by Hasan, once she got established in Sydney.

vii. **independence –** One corollary of successful dialogue of course is breathing room: time to stop talking, take stock and develop knowledge on one's own terms. As Bernstein comments in relation to the collaborative SFL/social realism work in the Sociological Research Unit at the University of London: '. . . this question about the development of the theory . . . I started the Sociological Research Unit in 1963, and it continued with about 15 to 16 people, sociologists, psychologists, linguists . . . [to] round about 1970-ish . . . I was really fed up, not so much with the Unit but with the whole empirical research scene . . . I went to Scandinavia . . . I left Brian [Davies: JRM] and another member of the Unit to coordinate efforts to produce a new plan and a new direction . . . when I got back, to my great relief no new direction was forthcoming so it was then I made the decision to disband the Unit . . . being involved in the daily necessities of empirical research on a vast program I had no time to think . . . so really, I think it was the fact that I was basically disappointed with the inability to properly conceptualise the code theory that made me move on' (Bernstein 2001: 370–371). We need in other words to be careful of those prescribing perpetual interdisciplinarity, as if too much dialogue was barely enough.

viii. **power –** To these points I would add the comment that dialogue is far more likely across the margins of disciplines than between centres, especially in horizontal knowledge structures (warring triangles), for the simple reason that hegemonic triangles command attention whereas researchers in marginalized triangles need colleagues to talk to.

There is obviously no easy way to distil these and other relevant parameters. Perhaps the best we can do is invoke Halliday's 2008 notion of complementarity, which he develops in re-consideration of the relation of grammars to lexis, of system to text and of speaking to writing, with a view to achieving a more coherent account of language as appliable linguistics:

> 'Complementarity means having things both ways – that you eat your cake and have it . . . (Halliday 2008: 184) . . . [complementarities: JRM] provide the surplus energy, the flexibility that enables a language to flourish in its

> eco-social environment' . . . (Halliday 2008: 83) . . . complementarity is a special form of complexity: one can think of it as the management of contradiction . . . (Halliday 2008: 84) Complementarity is what turns 'either/or' into 'both/and'. Light is either particle or wave; it can't be both – but it is. We have to choose what it is we want to know, what we want to measure: where a thing is or how fast it is. And in the act of measuring, we perturb . . . (Halliday 2008: 36)

Those of us who have participated in interdisciplinarity dialogue know that life wasn't meant to be easy; but at its best we have all experienced moments in which the effort involved proved more than worthwhile. Paraphrasing Halliday, we might adapt his notion of complementarity to negotiation between singulars as follows:

- interdisciplinarity means having things both ways – that you eat your cake and have it.
- interdisciplinarity provides the surplus energy, the flexibility that enables knowledge to flourish in its eco-social environment.
- interdisciplinarity is a special form of complexity: one can think of it as the management of contradiction.
- interdisciplinarity is what turns 'either/or' into 'both/and'. Society is either meaning or social relations; it can't be both – but it is. We have to choose what we want to know, what we want to measure: what communication is or what it relays. And in the act of measuring, we perturb.

As Bernstein alludes, interdisciplinarity is a contradiction in terms, since disciplinary specialization means that we shouldn't be able to talk to one another. But we do. And from the tension of the contradiction, knowledge grows.

> Perhaps Donne is wrong and we now can only 'peepe through lattices of eyes and hear through labyrinths of ears'. Yet lattices and labyrinths, whilst they localise both the beholder and the beheld, and so their meaning for and to each other, their very particularity may lead through to a tension, to expand the contexts of seeing and hearing. (Bernstein 1995: 422)

Notes

[1] I'm following Bernstein in my use of terminology here, with 'vertical' referring to both hierarchical and horizontal knowledge structures.

[2] Maton and Moore (2010) have proposed the term 'social realism' for the 'coalition of minds' I have referred to as 'BBology' in recent presentations (a term I coined, in part, to provoke the broader coalition to name themselves); although there remain sociologists of education using Bernstein who might not use the term, I'll continue to use Maton and Moore's designation for the purposes of discussion in this chapter.

[3] See especially Hasan 2005, chapters 1 2, 5, 6, 9, 10; the Hasan 2009 volume compiles her social linguistic studies in relation to coding orientation, including important references to work by collaborators.

[4] It is a matter of interest that although social realism has mainly interacted with functional linguistics, it has often appropriated terms from formal paradigms (e.g. competence, performance, code, rule, acquisition, embedding, syntax, grammaticality).

[5] SFL grammar analysis used in this chapter is based on Halliday and Matthiessen 2004; discourse semantic, register and genre analysis draws on Martin and Rose 2003/2007a, 2008.

[6] The last three of these comprise technical terms with processes realized as Classifiers.

[7] Elaborating nominal group complexes can also be used (nominal group 'apposition' in traditional terms) – for example *rhetorical connections (technically internal conjunctive relations)* above.

[8] See Martin and Rose 2003/2007a for discussion of the identification resources deployed in these examples.

[9] From Ioset et al. http://www.springerlink.com/content/m212u06283110j72/

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