

# METAPHORICAL REASONING AND REAL PROTOTYPES

## *EMPIRICAL STUDIES OF METAPHORS AND PROTOTYPES OF FOREST*

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*Key words:* reasoning, prototype, metaphor, categorisation, discourse, context

### ABSTRACT.

Whereas rational and formal reasoning should be devoid of contradictions, people must often handle conflicting perspectives in everyday contexts. The present article is based on empirical studies of conflicting prototypes of forest in Sweden and Canada. Conflicting prototypes of forest correspond to different values and actions in real environments. The empirical data demonstrate how metaphorical reasoning arise out of the need to address such conflicting prototypes. Prototypes of forest provide alternative contexts of reasoning and they are essential to explain the metaphorical reasoning involved in contemporary discourse on forest policy and management in Sweden and Canada.

### 1. INTRODUCTION

This article is based on applied and qualitative research on conceptions of forest in Sweden and eastern Canada. The main purpose of the research is to document and explain through discourse and

metaphor analysis varying perspectives on forest resources and management. A secondary aim is to explain how people construct categories in everyday discourse and reasoning. During my attempts to accommodate empirical data and cognitive theory of metaphor and categorisation, there has been a constant problem; there are conflicting perspectives of forest that jointly govern constructions of categories and metaphors, but in general, theories of reasoning in cognitive science are devoid of mechanisms that can handle conceptual conflicts. Cognitive psychologists investigate basic categories, (e.g. Rosch, 1978). Cognitive linguists rely on introspection and phrase categories and metaphors in terms of ideal cognition, (e.g. "ICMs" in Lakoff, 1987). Formalised reasoning excludes contradictions by definition and does not seem suitable for dealing with conceptual conflicts.

In this article, prototypes of forest refer to real and contrasting environments that provide everyday contexts of reasoning and standards of judgement. The notion of prototype relates to both Rosch's (1978) theory of categorisation and Kaplan's and Kaplan's (1989) research on environmental cognition. Prototypes of forest emerge from selective perceptions; depending on values and experiences, people prefer, stress, and elaborate their knowledge of certain forest environments, but not others. The main thesis in this article is that people use metaphorical judgements to explicate their own prototypes when they confront conflicting prototypes. For example, when we depict forests in terms of *supplies and resources*, we neglect and underplay other functional roles. When land is reforested in Sweden and Canada, the main purpose is usually to secure a continuous

supply. A consequence is a reduction of forests suitable for recreation. However, there is now an increasing stress on recreational values, which corresponds to the metaphor of a *sanctuary*. Forest management in terms of lumber creates forests not suitable for sanctuaries, and vice versa. Consequently, conflicting prototypes of forest direct reasoning and form conflicting metaphors and categories in discourse.

”...it is only in the artificial context of exercises in formal logic that it always an error to attend to non logical cues. In natural settings, a person who failed to use such cues ... would find ordinary language incomprehensible and the tasks of ordinary life overwhelming.” (Margolis, 1987:107)

Judgements of value are usually not addressed by cognitive scientists. However, “non logical cues” like values are important in everyday contexts of human reasoning. Industrial, recreational, scientific, and other cultural values shape our forests and environments. We use different information according to various goals and construct different models. Conflicting prototypes of forest arise out of inconsistent actions in forest environments.

Metaphors direct reasoning in discourse by explicitly addressing conflicting interpretations, (Ricoeur, 1977:247–8). Metaphorical reasoning plays on both differences and similarities to stress certain prototypes at the expense of competing ones, e.g. sanctuaries versus economic supplies. Cognitive scientists who stress formal or logical analysis seldom acknowledge any constructive quality of reasoning; reasoning equals abstract manipulations of categories or symbols without any reference to real contexts, actions, and values. In everyday contexts, people must, however, cope with conflicting information and values also on a cognitive level. The present article proposes metaphorical reasoning to this end. However, before going into empirical and theoretical discussions, we need to address some methodological issues and problems.

## 2. APPLIED DISCOURSE ANALYSIS

Discourse analysis deals with the interplay between verbal forms and their contexts. Contexts may range from parts of texts, conversations, to cultural and social settings.<sup>1</sup> The method is not solely a matter of

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<sup>1</sup>In taking context into account, we study how “the environments” of cognition, (Scharfstein, 1989:1–3), e.g. physical, social, and discursive environments informing reasoning. Ecological, action oriented, and cultural cognition are other related perspectives, (cf. Neisser, 1987; Wertch, 1985; Lave, 1988). In contrast, a formal analysis of reasoning *represents* contextual reasoning in finite and closed systems of categories and information, e.g. deductive logic, (cf. Margolis, 1987:106–7). Even if there are more flexible ways to formalise reasoning, (e.g. Johnson-Laird, 1986; Moore, 1986), discourse analysis implies a focus on conditions and constructive aspects of reasoning in everyday contexts, (cf. Brown and Yule, 1983: 25–6).

establishing collective categories, reasoning, and linguistic patterns but should also take conflicting patterns into account (cf. Parker, 1992: 85–103). The mainstream of cognitive science excludes conflicts and contradictions in theories of reasoning but there are reasons for assuming that conflicting judgements and arguments actually form cues in cognitive processes like reasoning.

”In a social context where reasoning-why supporting an intuition is likely to be challenged, or is being challenged, particularly important cues to look closer will come from the counter arguments of adversaries, or anticipation of such arguments.” (Margolis, 1987:106)

Since functional errors occur at very basic levels of human cognition, e.g. illusions, the presence of cognitive conflicts could constitute information when inferring conceptual patterns, both to people in general and to a discourse analyst in particular. In addressing reasoning in everyday contexts, discourse analysis would seem to be highly suitable for dealing with the issue.

When one conducts applied and qualitative research on discourse, recorded statements and verbal expressions are in general not used in homogeneous and collective ways. They may be judged good or bad at all levels, their contents and forms, depending on who uses them, when, how, and why. Therefore, it is necessary to be sensitive to people’s contrasting views, and not to categories and statements at a too general or collective level, e.g. writing norms. The argument is not a plea for relativism but concerns methods of investigation. When dealing with conceptions in everyday contexts, one must take people’s own attitudes and judgements into account and not simply rely on personal introspection, (cf. Brown and Yule, 1983:20–3; Coulthard, 1985). Still, discourse analysis may be based on diverse kinds of empirical data, e.g. books, journals, newspapers, interviews, everyday conversations, TV- or radio programmes, etc., and naturally, the relevant verbal material depends on the task at hand.

The present article includes empirical data on conceptions of forest resources and management in Sweden and Canada collected during the last two years. In the media, forest management is often depicted in a stereotyped way, e.g. resource exploitation, but it is worth stressing that the perspectives involved are much more complex. The data have been gathered from various sources in Sweden, Quebec, and New Brunswick (N.B.).<sup>2</sup> No doubt, the cultural variations in Sweden and Canada are too great to talk about single cultures. However, I

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<sup>2</sup>I would like to thank Joakim Hermelin, my informant who works at the New Brunswick Department of Natural Resources & Energy, for his invaluable help during my visits to Fredericton. He arranged meetings and made my visits very pleasant ones. Without his support, I would not have managed to gather the information that I got in such a short time.

do believe that it is possible to talk about Swedish and Canadian conceptions if the contexts are made explicit. So far, empirical data include different text material that relate to forest management from several points of view, e.g. economy, environmentalism, forestry, ecology, and recreation. The research also involves interviews with official representatives of institutions and organisations in both Sweden and N.B. who have been deemed relevant to questions about forest policy.

Empirical data have also been gathered through *Experimentally Induced Discourse* (EID). EIDs involved subjects who in pairs made pictorial judgements of typicality. The experimental setting is the following: two participants sit on either side of a table with a screen in between to make visual contact impossible. They have the same collection of twelve pictures of forest. The pictures have been taken with the purpose of illustrating conflicting criteria of forest, e.g. pictures of plantations and parks correspond to economic and recreational values respectively. The pictures are described in short terms in appendix I. (The appendix also includes some figures referred to in later sections and explained below.) The main task of the EID is to jointly divide the pictures into two piles, each of six pictures, representing typical, good examples of forest versus non-typical, poor examples of forest. The subjects are not allowed to show the pictures to each other but only to describe and discuss them orally. Discussions and arguments are recorded on tape, transcribed, and analysed with respect to conflicting criteria of forest. The participants were sixty students in economy, anthropology, forestry, and biology at McGill University in Montreal, the Maritime Forest Ranger School and the N.B. University in Fredericton, the universities of Stockholm and Umeå, and the forestry school in Umeå.

The main purpose of EID is to investigate how prototypes of forest formally govern reasoning and arguments. A proper treatment of the experimental findings would demand an article in itself and would have to presuppose the empirical data presented in this article. Therefore, there will mainly be informal references to the EIDs, e.g. extracts are used to exemplify theoretical arguments in later sections and some references to conflicting criteria of forest are made to support other empirical findings. However, the EIDs did produce some figures that are highly relevant to some theoretical and more general arguments in this article.

Before the subjects made co-ordinated judgements of typicality, they had two individual tasks to complete. First, they answered a questionnaire concerning background data on age, gender, and experiences of forest environments. Secondly, the participants ranked the twelve pictures according to their aesthetic values.

Every picture was given a number from one to twelve corresponding to a scale from the most beautiful environment down to the least preferred environment. The purpose of aesthetic judgements was to acquaint the subjects with the pictures before they began to discuss them. Otherwise, too much time would have been spent in silence during the main task. However, aesthetic judgements proved to correlate strongly with co-ordinated judgements of typicality, which is a rather surprising result considering the contemporary stress in cognitive research on formal reasoning. The result supports the thesis that categories in discourse are intertwined with people's values. We will return continuously to this argument in this article.

### 3. NATURAL AND CULTURAL FORESTS

We begin with a general overview of the differences between Swedish and N.B. conceptions of forest management. Different forms of management are stressed in Sweden and N.B. that correspond to different metaphors and definitions of forest. In sum, the forest grow naturally in Canada, "it is a supply," whereas Swedes produce forest, "it is a factory." The metaphors are not just a matter of definition because the forest is perceived in different ways and it provides different contexts of action and reasoning to people in Sweden and N.B. No doubt, there are cultural, historical, and geographic reasons for different forms of forest management but because our focus is on a conceptual level, these other dimensions must be dealt with in a rather informal manner. Let us first go through some relevant figures.<sup>3</sup>

In N.B., 51% of the forest land is owned by private owners and the rest by the public. Public land is divided between the federal and provincial crown, 47% is owned by the province and 2% by the federal government. The eastern parts of Canada differ from the West by having a larger proportion of small private owners. On the average, 67% of the Canadian forest is owned by the provinces, 27% by the federal government, and only 6% by private owners. Despite the appearance, private ownership is actually not important to N.B. forest policy. A large proportion of the private land is controlled by the processing industry, whereas in Sweden, small private owners control 50% of the forest, 25% is controlled by the processing industry, and the remainder is distributed between varying forms of public ownership.

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<sup>3</sup>The figures have been taken from *The Canadian Encyclopaedia* (1988), *The Forest*, *The Swedish National Atlas* (1990), and Curtis (1987).

Swedish and Canadian forest policy differ in many respects, but two aspects are worth emphasising. First, there is an official division of responsibility in Canada that does not exist to the same extent in Sweden. Whereas Canadian provinces primarily manage forest for its economic value, the federal role includes stronger responsibilities for nature reserves and research areas. In Canada, the supervision of forest land is apparently divided between two forms of public government that partly have different goals. In contrast, the Swedish policy is informed by a longer tradition of stronger and more uniform regulations of management. The other aspect worth emphasising is the different attitudes towards private owners. In Sweden, there is a higher proportion of small private owners with stronger economic interests. They are highly organised at many levels, both economically and politically. In contrast, small private owners in Canada have a hard time selling their resource to the processing industry. The industry prefers to exploit the provincial land because of some rather exclusive rights of management, i.e. they may lease areas for many years.

There are many metaphors that depict the differences between Swedish and Canadian forest management. In Sweden, government officials talk about *a cultural heritage*, whereas the corresponding expression in Canada would be *a national treasure*. By emphasising heritages, there is a sense of respect for authority and tradition. In contrast, a treasure is a lawless thing, at least when it is found. The rights to treasures are open questions but not when dealing with heritages.<sup>4</sup> The metaphors correspond rather well to the different forms of ownership and management in Sweden and N.B. Whereas heritages relate to the stronger social identity among private owners in Sweden, the public land in N.B. reinforces an idea of no man's land, a lawless land. The difference is real; a forest ranger in N.B. is partly a kind of policeman, which would be a rather strange combination in Sweden. During discussions with N.B. forest rangers, they confirmed real and physical conflicts between individual and public interests of forest.

When managing a cultural heritage, there is an idea of control, whereas a treasure is beyond social regulations. The contrast also corresponds to the Swedish emphasis on cultural regeneration, whereas natural regeneration is the common method for reforestation in Canada. The demands from the Canadian processing industry is central to their forest management, e.g. the provincial land in N.B. is divided into areas of management that correspond to the demands of the processing industry. The province gives licences to cut trees according to

established plans. In Sweden, to cultivate trees and forest is most of the time a business in itself. The two perspectives are also manifest in contrasting ways to phrase deciduous versus coniferous forest. Whereas the preferred expressions in N.B. are *hardwoods* versus *softwoods*, which stresses processing qualities of wood, the Swedish phrases rather focus on tree species, "leaf forest" versus "needle forest," Sw. "lövskog" versus "barrskog."

"A real conflict may arise between the industry's desire to '*mine*' the resource for profit and society's desire to protect public land." The Canadian Encyclopaedia (1988:811) (italics are mine)

*The Canadian forest supplies the industry with raw material*, like a mine. Swedish economists depict the forest rather in terms of *a lumber factory*; *the forest produces lumber*. Whereas there is much talk about *multiple values* in Canada and U.S.A., which presupposes the lack of cultivation for specific purposes, a large Swedish forest company advertises the recreational opportunities of its forest in terms of *a green factory*. The contrasting metaphors correspond to the different forms of management in N.B. and Sweden, e.g. cultural versus natural regeneration. Forests are supplies in N.B., factories in Sweden. The Swedish forestry law actually defines forest in terms of the growth of trees in an area and prescribes cultivation.

Natural versus cultural regeneration would seem to predict different ideas of culture, nature, and forest, e.g. a supply or a mine may be in *nature* but not a factory, and this is actually the case. Swedish foresters sometimes depict the forest in terms of *a home*. I have discerned no such metaphor in Canadian texts or during interviews in N.B. To be sure, there is the ecological notion of *habitat*, but it retains its technical sense when used, i.e. it relates solely to nature, animals, and plants. A habitat has not the cultural sense that is intended by the concept of home, both humans, animals, and plants form parts of the forest in Swedish discourse. However, Swedish environmentalists have complained about the strange view that the forest is something else but plants and animals, pure nature. Instead, they would like to see the notion of *ecosystem* strengthened because it is devoid of human, cultural, and social dimensions, which explains why the concept seems to be well accepted among N.B. officials dealing with forest policy.

In N.B., forests form parts of nature, whereas they are, to a larger extent, cultural domains in Sweden. The N.B. forests are more natural than the Swedish ones in not being subject to silvicultural treatments. If someone in N.B. cultivates forest, it is not called a forest but *a tree farm*. This is not possible in Swedish discourse because the long and strong tradition of silviculture has neutralised the distinction. When a Swedish environmentalist wants to use a pejorative, it is rather *tree fields*. Thereby, he/she points to the fact that open and empty spaces precede a cultivated forest, which makes it into a degraded form of forest.

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<sup>4</sup>The contrasting use of metaphors is not an exclusive one. For example, I have noticed the idea of *a nature heritage* in Canada. However, a nature heritage is more in line with treasures than with cultural heritages. There is still the lack of social control.

The Canadian conception is much more connected to the idea of *wilderness* that excludes the kind of controlled growth that the Swedish forestry law prescribes. The different perspectives also give contrasting names to places where one produces seedlings, i.e. Canadian *nurseries* versus Swedish *plant schools*, “plantskolor.” Whereas nurseries do not include cultivated children, schools educate them with some purpose. The contrast also corresponds to the mentioned metaphors above, i.e. heritages versus treasures. Heritages are controlled by timeless conventions, treasures are not.

Even the phrase *forest management* is hard to translate into Swedish because the sense of cultivation is lacking. When one cultivates something, there is a sense of future reward and past work. There is a Swedish word that captures this sense and it is used to talk about forestry and silviculture in both economic, political, and everyday contexts, i.e. *bruk*. The word relates more to *habit* and *continuous activity* than to *management*. Management is more directed towards control of things in the present, which is more in line with the Canadian idea of wilderness. Silviculture would seem to be a better notion of Swedish forest management in general. However, it would be a very confusing if we denoted a common theme with different concepts. Still, there is a real conceptual tension. To a Swede, *forest as wilderness* is rather metaphorical. At the same time, many Canadians probably think the same with respect to Swedish *forest cultivation*.

There are conceptual conflicts when Swedes perceive and hear about N.B. natural forests and when people in N.B. perceive and hear about the Swedish cultivated forest. During my visits to N.B., I got the impression that the forest looked messy and untidy; there were too much weed. Other Swedes have confirmed this perception. In contrast, some of the N.B. forestry students thought that Swedish forests look like parks. Most of them had based their judgements on pictures, but one of them had actually been working in Sweden for a forest company during a year. Swedish and N.B. ideas of forest contrast because the forest differ in both real and conceptual ways. The N.B. forest is in general more deciduous than the Swedish coniferous forest and consequently, it is more diverse, e.g. there are many more tree species. Furthermore, the Swedish silvicultural tradition creates a more cleared and uniform forest.

When the N.B. forestry students denoted Swedish forests in terms of parks, I giggled. I could understand what they meant, but I could not agree; parks are either small nature reserves in cities or larger reserves exempted from the Swedish forestry law, i.e. national parks. It was the N.B. forest that looked like large weeds, a statement that made the forestry students giggle in turn. Our arguments reveal conflicting

reasoning, categories and prototypes of forest. Swedish forests correspond to Canadian recreational parks, whereas N.B. forests correspond to bad Swedish silviculture. The metaphors of weed and park were used to assimilate the conflicting perspectives. The Canadian concept of park was applied to a prototype of forest that the Swedish forestry law prescribes. In turn, the judgement of the N.B. forest in terms of weed was done in accordance with the Swedish prototype.

The Swedish and the N.B. prototypes of forest relate to both real, perceptual, and conceptual differences, differences that direct categorisations in discourse. In the EIDs described in the first section, people used several criteria in judging typical, good examples of forest versus non-typical, poor examples of forest. Still, a clear difference exists between Canadian and Swedish participants. Whereas over 50% of the former subjects used the criterion of *unmanaged versus managed forest*, only one Swedish subject did so. The Swedish participants preferred, to a larger extent, a criterion of *good versus bad growth*, which is more neutral with respect to wilderness and nature.

Swedish and N.B. prototypes of forest connect to both real environments, information, and values. In discourse, they manifest themselves as different definitions and metaphors. However, to explain metaphorical reasoning in more theoretical terms, we need a stronger notion of prototype than what is the case in contemporary cognitive research. Furthermore, we need a weaker notion of categorisation that takes negotiations of categories into account, e.g. forests in terms of weeds versus parks. It is worth stressing at this point that metaphorical reasoning occurs whenever people want to state some prototype at the expense of competing ones. It is not primarily a matter of cultural differences. For example, *industrial forests* are not suitable *sanctuaries*, i.e. good recreational forests, and people in both Sweden and N.B. learn about both prototypes in the media. The metaphors correspond to conflicting prototypes of forest that are sustained by industrial versus recreational values, values that exist in both Sweden and Canada.

#### 4. REAL PROTOTYPES: ENVIRONMENTS, INFORMATION, AND VALUES

Prototype theory, (cf. Rosch, 1978), was partly defined in opposition to logical analysis of categories. In logic, categories are defined by necessary and sufficient properties, but prototype theory acknowledges more dynamic qualities of categories and attribution. Truth is side-tracked and pragmatic principles like frequency of experience, perceptual salience, and cognitive economy come to govern the

formation of categories. Categories are understood in terms of graded memberships; there are more or less typical examples of a category. For example, in contrast to younger plantations, a typical forest would be composed of high and mature trees that enclose things inside the forest. Things are more or less typical to a category depending on how many central features they carry. For example, tree plantations are not real forests as long as the trees do not enclose things but there is no absolute distinction. Enclosure is a matter of degree and depends on the tree species.

The prototype theory evolved, and is still evolving, from experimental research, e.g. people is asked to rank things according to their typicality; there are measurements of the time involved in categorisations, and in learning new perceptual and lexical patterns, the longer time, the less typical a thing is supposed to be. Cognitive researchers disagree on the reality of prototypes, (cf. Komatsu, 1992:507–9). Even Rosch (1978) herself doubts the reality of prototypes and prefers to talk about *prototype effects*. In contrast, prototypes of forest have been phrased in terms of real differences between N.B. and Swedish forests. *They are real environments constituting everyday contexts of reasoning*. To grasp this theoretical leap, we must recapitulate some recent findings in cognitive research.

”Categories are not represented by invariant concepts. Different individuals do not represent a category in the same way, and a given individual does not represent a category in the same way across contexts. Instead there is tremendous variability in the concepts that represent a category.” (Barsalou, 1989:114)

Even what is judged typical versus non-typical depends on contexts. For example, most people would think that clear-cuts are definitely not forests because there are no trees at all. However, there are open spaces in forests and there are foresters who denote clear-cuts in terms of forest. Other aspects besides general properties of things must be taken into account. Many scholars propose *adaptation* as a necessary ingredient in a theory of categorisation and/or recognition, (cf. “affordance” in Gibson, 1979; “evaluation” in Kaplan and Kaplan, 1982; “action” in Neisser, 1987; “P-cognition” in Margolis, 1987). Cognitive psychologists show increasing interest in “functional,” “causal,” and/or “explanatory” relationships between things when explaining the formation of categories, (c.f. Komatsu, 1992:515). These views share the idea that the recognition of things does not involve abstract and timeless categories but is based on judgements adapted to everyday contexts. Classifications evolve out of human interactions with real environments that provide contexts of reasoning. Human reasoning forms a part of a larger system of human interactions with real environments.

Reasoning, values, action, and perception mutually inform each other in adapting to varying environments and it is in this cycle of information that prototypes of forest make sense. They are realised through

instrumental actions, conform to values, and they are projected on, mediated by discursive reasoning. For example, deciduous versus coniferous forests provide selective information about forests when actually interacting with these environments. Our actions, in turn, are directed by our values, e.g. natural versus cultural regeneration. Jointly, this cycle of information makes N.B. forests appear strange to Swedes, whereas N.B. people experience the same thing with respect to Swedish cultivated forests. Real prototypes are not as far away from Rosch’s (1978) ideas as they may appear. By taking environments, actions, and values into account, we are in a way just extending the pragmatic considerations.

Kaplan (1988:56–63) argues that judgements of preference are fundamental to reasoning. Human information processing must be constrained by the need of coping with and adapting to unpredictable environments. Information and preferences are intertwined because humans must make “good” decisions. Kaplan and Kaplan (1989) have demonstrated that aesthetic values of natural environments are not arbitrary opinions but correspond to real qualities and biological values. Since prototypes of forest correspond to both real environments and preferences, aesthetic judgements should then predict categorisations in discourse. The EIDs confirmed this in producing a high correlation between aesthetic value and judgements of typicality ( $S = 0.93$ ). The product-moment correlation is based on the average aesthetic value of a picture and the number of times the picture was chosen to represent typical forest; relevant figures and definitions are listed in appendix I. There were only two obvious exceptions out of 30 pairs of participants. Interestingly, subjects seldom justified judgements in aesthetic terms. Their preferences seemed to have influenced them in a more subconscious way. Some subjects were even surprised and intrigued when they, after the experiment, found out that they had been using aesthetic value as a criterion of forest.

The experimental result demonstrates real prototypes. Since preferences correspond to real environments, direct perception, and organise information, different types of forest emerge as varying contexts in everyday reasoning. For example, when asking a Swedish forester and a Swedish environmentalist during interviews what a nice forest meant to them, their answers corresponded to the conflicting prototypes of forestry and environmentalism. Their arguments could be summarised in terms of *a uniform and ordered forest* versus *a wild and undisturbed forest*. As with all operational definitions in experimental research, preferences do not tap prototypes in any complete sense. The context of judgement is always an uncontrollable variable. Still, there are both theoretical reasons and empirical data for assuming that they inform reasoning and categorisations in discursive form.

Prototypes in terms of “adapted” information and preferred environments is in accordance with Rosch’s (1978) proposal. The correspondence between

preferences and environments is a matter of degree. No doubt, prototypes are not representations in the traditional cognitive sense because they demand considerations of everyday contexts of reasoning. Categories have traditionally been associated with more abstract classifications and there are good reasons for distinguishing prototypes and categories of forest. Whereas people construct prototypes of forest when interacting with real environments, categories of forest are discursive judgements subject to pragmatic principles of discourse. Some of these principles are treated in the next section. For the moment, let us take a closer look at some examples of how prototypes of forest manifest themselves in discourse; how different values and actions explicitly inform discursive reasoning. The examples are extracts from interviews and EIDs; transcription codes are listed in appendix II.

The first extract has been drawn from an interview with an information officer at the Swedish Association for Outdoor life. This is a non-political association which aims at promoting outdoor life practically and socially. Its concerns are not just to help urban people to escape outdoors from a stressful city life but also a matter of environmental education. The extract relates to a question of mine about what kind of forest is important to the association.

#### Extract I

”one would never think of [pause] laying a football ground twelve miles outside the town [pause] when it comes to outdoor establishments or a [pause] so to speak forest area close to everyday living then one would think of it [pause] instead of keeping a grove [pause] a forest area one would then move the forest a little bit further away”

The extract shows how the forest takes on qualities of social planning. The forest prototype is informed by the need of forests close to urban dwelling. *Laying*, *moving*, and *keeping forest* sounded metaphorical to me as an interviewer, but I doubt that the interviewee experienced his argument as a figure of speech; he was criticising politicians for their neglect of urban needs. The extract begins with an analogy, the planning of football grounds, but there is obviously something more going on in his reasoning; there is an urban prototype of forest that is not sufficiently addressed by politicians and social planners. The interviewee used a metaphor to explicate the urban values; forests should be planned in the same careful way as football grounds, but it is not the case. However, even if he was aware of conflicting values, he did not explicate them. Social planning of forest is actually something quite strange if one considers the strong tradition of private ownership in Sweden. The next extract involves an official representative of the

National Federation of Swedish Forest Owners and it demonstrates a very different and conflicting prototype of forest.

## Extract II

”the public-right<sup>5</sup> has [pause] in its origin it is [pause] it was a protection of the owner [pause] the one who owns land [?] as they do not take down his trees or [pause] take away [pause] break twigs and things like these that can destroy his forest or [pause] things that can cause fire and so on [pause] the great difference is that now one wants to relate the public-right to [pause] the right for the public to utilise the land”

The argument follows a question of mine concerning present problems with the public-right. The existence of conflicting interpretations came as a total surprise to me; I had no idea that it was possible to interpret the public-right in terms of rights for the owner him-/herself. The interviewee used phrases and expressions that clearly show a conflicting prototype. The forest land forms a private property and it is definitely not something one moves around at will in accordance with social planning. When the interviewee said that the public-right is a protection of the owner against people who may take down his trees, break twigs, and destroy his forest, his view of the public reminded me of children stealing apples from a garden. The private prototype of forest does obviously oppose the urban one and in recent years the conflict has grown in Swedish policy. Private owners have begun to question central planning of forest management in general, probably because of the growing urban need to influence forest-policy. In contrast, the private prototype of forest is much weaker in N.B. Most of the N.B. forest is a public domain, and consequently conflicts arise as varying values in social planning rather than between private ownership and public rights.

It is hard to capture confrontations between conflicting prototypes, i.e. there is usually only one author of a text. Furthermore, people prefer to discuss with like-minded. The lack of ongoing reasoning involving conflicting prototypes is the main purpose of designing the EIDs. The following extract is drawn from an EID involving a Swedish (S) and a Canadian (C) subject. It concerns a picture of a path in a deciduous forest. Canadian subjects did often find the picture controversial, e.g. aesthetic judgements of the picture varied to a larger degree among the Canadian subjects than among the Swedish ones. Canadian subjects thought that the picture reminded them of parks or managed forests. In contrast, most of the Swedish participants found the picture uncontroversial and nice. The reason is that there are more roads and planned paths in Swedish forests than in Canadian ones, e.g. “electricity-lit up-paths,” Swedish “*elljusspår*,” is a Swedish concept denoting planned recreational paths all around the country. The extracts below illustrates the conflicting prototypes:

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<sup>5</sup>The public-right refers to the Swedish custom that people in general may walk and travel on private land that is not close to the owner’s private residence, Sw. “*allemansrätten*.”

## Extract III

- C: okay the one with the path in the middle =  
S: = yeah [pause]  
C: I say that [pause] that’s a typical [pause] wait [pause] wait a minute typical and real forests [pause]  
S: yeah that’s a typical forest with a human path [giggle]  
C: yeah [pause] okay yeah =  
S: okay  
C: yeah I say so

The Swedish subject underplayed the presence of a path whereas his Canadian colleague felt there was something wrong with paths in conjunction with forests. Despite the appearance of an agreement, the Canadian subject was not comfortable with the judgement. The participants returned several times to the picture during the EID. In the next extract, the Canadian subject explicates his prototype.

## Extract IV

- C: see it’s it’s funny for if we’re going to be [pause] technically consistent [pause] we put [pause] all the stuff with the human influence in the non typical  
S: right  
C: and like in our typical pile there’s nothing [pause] with an obvious human [pause] influence and out of these two pictures the one that has a more obvious human influence is the one with the path

Later in the EID, the Swedish subject opposed the Canadian criterion of forest and argued that one cannot be technically consistent in judging the pictures. Furthermore, he stated that *paths are parts of forests*. The conflicting prototypes forced the subjects to explicate them and they used metaphorical statements in adapting to the conflicting prototypes, e.g. *paths are parts of forest* versus *no human influence*. The Canadian idea of wild forests exclude human presence, but the problem is that Swedish forests are not wild in the sense of uncontrolled growth but quite organised environments. The subjects were therefore forced to negotiate the category of forest. Still, they failed to complete the task. The Swedish subject put the picture in the typical pile, whereas the Canadian subject did not. Their prototypes of forest provided stable contexts of reasoning but the discrepancy made the category of forest unstable.

## 5. DISCURSIVE CATEGORIES: JUDGEMENTS AND NEGOTIATIONS IN DISCOURSE

”In general, words serve as cues to patterns, where the patterns cued will depend on the totality of verbal and non-verbal cues available in the context.” (Margolis, 1987:92)



Categorisations in discourse are subject to revision whenever there are conflicting perspectives involved. Socially oriented scholars have criticised cognitive research for not taking multiple perspectives into account when dealing with categorisation; too much theory presupposes single perspectives and is therefore incapable of accounting for categorisations in dialogues, (e.g. Rommetveit, 1990; Billig, 1987). Double and divergent perspectives are often the case in everyday contexts and consequently, people must negotiate categories to establish common ground. A very simple example is given in extract V. It is drawn from an interview with an official at the Swedish environmental protection agency. In the beginning of the interview, I (M) asked the interviewee (I) how to classify him.

#### Extract V

- M: how should I classify you in the research if I put it in that way could one call you forest expert [pause] forest expert at the Swedish environmental protection agency is that okay
- I: forest industrial expert
- M: forest industrial expert
- I: there is a difference
- M: forest [pause]
- I: our tests begin when the wood enters the factories [pause] what happens on the outside [pause] is of no concern to our department
- M: okay

The interviewee worked with problems of pollution within the forest industrial sector, whereas I wanted to discuss forest management. Consequently, our frames of reference clashed. As an interviewer, I adopted his frame of reference. In turn, he explicated his role in the department. The extract illustrates a quite uncontroversial negotiation of categories. However, negotiations of categories are often ignored in cognitive research because statistical and experimental methods exclude contexts of argumentation, (cf. Billig, 1987; Barsalou, 1989:111–2). In studies of everyday discourse, the negotiation of categories is rather a premise in the research, (e.g. Parker, 1992; Markovà and Foppa, 1990).

Verbal categorisations are made with some perspective in mind. Interests in and concerns for our environments direct and govern what aspects we focus on and which perspectives we have. People must negotiate the senses of words and categories whenever there are discrepant information and perspectives involved. If perspectives diverge too much, people may simply be incapable of verbally adapting to each others frameworks. Extract VI below illustrates such a conflict. It is drawn from an EID with two Ph.D. students at the N.B. University in Fredericton. The

subjects were a female (F) student in biology and a male student (M) in forestry. They use conflicting prototypes of forest but try to convince the other by explicating them and negotiating the category of *natural*. Their argument concerns a picture of a stand of red pines. It shows mature, straight, clean stems with some undergrowth but no tree crowns. Extract VI below is preceded by a passage in which F says that the forest is unnatural because it looks planted and managed.

#### Extract VI

- M: oh they are planted for sure [pause] but if you ever seen a mature natural forest of softwoods they look planted as well [pause] they naturally thin themselves to a point where they look like a plantation [pause] that's where plantations spacing all come from [pause] but yeah as far as a mix of [pause] an equal mix of hardwoods I suppose you could say it's a not typical [pause]
- F: like it might look typical in another hundred years but I don't think it does in this picture [pause]
- M: [filler] [pause] have you ever seen a [pause] an area that's been burned over
- F: yeah
- M: natural forest fire
- F: yeah
- M: have you ever seen what comes back if there's a pine stand there in the first place
- F: [pro-filler]
- M: well a hundred thousands stems of pine per hectare [pause] you want see anything in that but pine until it's mature [pause]
- F: but I don't think that's a typical forest either [pause]
- M: that's natural
- F: it's natural but I don't think it's typical of
- M: yeah [pause] now depending where you are if this is New Brunswick it's it would I would be inclined to say it's not typical cause there isn't big stands natural stands of red pine in New Brunswick [pause]

The relevant picture is often denoted as managed forest by Canadian subjects. Large and mature stands of red pine are not common views in N.B. They do not grow naturally in N.B., but they did a hundred years ago. A forestry student would know that coniferous forests thin themselves to an extent that they finally look very much like managed forest. However, this knowledge is simply not as relevant to biologists who see correlations between nature, deciduous forest, and biodiversity. The reduction of biomass is an indication of unnatural interference; if nature is left undisturbed, biodiversity follows. In contrast, when focusing on trees, especially coniferous ones, forests appear to and may grow naturally

irrespective of biodiversity. Consequently, the concept of nature is highly ambiguous and controversial but it is still very important to many Canadian subjects when constructing the category of a typical forest. Negotiations must therefore be made whenever there are conflicting prototypes of forest involved.

In discourse, prototypes of forest function very much like perspectives; prototypes of forest govern lexical choices and categorisations. Therefore, we should turn to people's prototypes to explain their reasoning. At the same time, discursive judgements must also be sensitive to contrasting and conflicting prototypes. When people agree or disagree, they must negotiate categories and learn to draw new distinctions. In this way, conflicting prototypes and perspectives come to inform discursive reasoning. However, total explications of conflicting prototypes are not possible. It would demand a God's eye point of view, i.e. knowledge of all prototypes. Explications are rather formed with respect to counter arguments.

## 6. METAPHORICAL REASONING

"... informal reasoning-why need not exhibit much of the linearity characteristic of formal argument. There may be pointing to this thing and that, followed by a claimed inference, with no explicit line of argument connecting the features pointed to with the inference drawn. When this proves persuasive, as it often does, the things pointed to have apparently been sufficient to prompt the inference, but not in any explicitly reasoned fashion." (Margolis, 1987: 92)

In logic, propositions are true or false depending on "correct" attributions of properties to things. Attributes and things are presupposed in the use of categories, i.e. statements do not, must not, change or transform categories. The law of the excluded middle states that things are either in certain ways, or they are not. To a certain extent, presupposed categories make good sense, random ones would create total confusion, but it is an idealisation of natural discourse. We do change categories and attributions over time and experience. In various environments and contexts, people construct categories that fit the present purposes, but this more dynamic view on cognition is not possible if categories are treated in terms of a finite number of units in a closed system, e.g. when dealing with pure lexical, logical or formal analysis of categories, (cf. Billig, 1987:95–100).

In everyday and informal contexts, patterns of reasoning are often inconsistent. In contrast, rational, logical, and formal reasoning excludes contradictions in any form. Even if there are good reasons for consistent reasoning, (e.g. "principles of co-operation" in Grice, 1975), people in everyday contexts must in some way deal with conflicting perspectives and experiences. Metaphors would seem to answer these situations. Paul Ricoeur's (1977:247–8) defines metaphor in terms statements that involve both a

proposition and its negation; *it is not, it is*. The explanation is that metaphors involve multiple references. Discrepant contexts are brought together and metaphors account for that. For example, when the N.B. forestry students denoted Swedish forests in terms of parks, they were not being very co-operative with respect to the Swedish forestry law. They used the metaphor of park to adapt to the Swedish prototype of forest, a strange and inconsistent prototype to them.

The metaphorical aspect of a statement is the tensions and conflicts involved in saying that different things are the same, (Ricoeur, *ibid.*). For example, forests and communities are to many biologists real ecosystems. *Species live together in mutual relationships and life is ordered according to functions of productions and re-production*. When stating that the forest is a community, there is a tension; there are two older categories and prototypes, forests and communities, but the statement concerns a single prototype, even if more restricted to experts. Consequently, the tensions arise because metaphors play upon conflicting prototypes, but stress only one. When *the forest is a community*, it is a natural space, but it is not wilderness in the sense of uncontrolled land and/or growth. At the same time, the order of life in the forest community is not based on a legal system. Biologists focus rather on ecosystems or natural selection. The relevant order can neither be induced nor deduced from the categories of forest and community. The prototype of forest communities is distinct from both prototypical forests and communities but in discourse, they are all brought together. Metaphorical reasoning is not consistent in stressing both differences and similarities at the same time but it is consistent in taking conflicting perspectives into account. When the Swedish forest industry denotes the forest in terms of *a factory*, they know about alternative ways of management and conflicting perspectives. When they advertise the Swedish forest in terms of *a green factory*, they try to enforce their prototype at the expense of competing ones, e.g. the green biodiversified forest. It is not linear reasoning because it alludes to several point of views; *it is not, it is*. If their perspective was given by Mother Nature, they would neither advertise, nor use metaphors.

"What makes a powerful metaphor, ..., is the tensions between the model working very well on some particular points but in general being wholly inapt." (Margolis, 1987: 305)

The urban prototype of forest often manifest itself as a definition rather than as a metaphor, i.e. *the forest is a natural place where trees grow*. The prototype separates humans and forest. The urban view sees forest beyond culture in being part of nature. It corresponds to real geographical differences between cities and natural areas. The difference between definitions and metaphors is just a matter of the extent to which statements address conflicting prototypes. The definition above does take on a metaphorical quality when alluding to an opposition between nature

and culture. To many urban people, the forest is also a sanctuary; *mature and high pine trees form the pillars of a sacred temple. The forest is a higher form of being because trees are the biggest, tallest, and oldest form of life and life is a sacred thing. It is wrong to destroy such places because their restful silence gives peace to the soul.* The recreational value of forests opposes the separation between culture and forests. *Treasures, factories, and supplies* also stress in various ways human activities in forests. In this way, metaphorical reasoning depends on conflicting contexts of reasoning, on both differences and similarities.

The main trend in cognitive linguistics and anthropology is to treat metaphors as means of transforming categories by way of analogy and/or similarity, cf. Fernandez (1991), Sweetzer (1990), Givón (1989), Lakoff (1987). One problem with this view is that analogies and similarities keep a system of categories basically intact, i.e. the system lacks the potential of creating new categories, (Keysar and Glucksberg, 1992:653). However, an even more serious problem, but a problem that presupposes a more dynamic treatment of categories, is the neglect of conflicting prototypes and perspectives, i.e. conflicting contexts of reasoning. For example, in biology and forestry texts, one can find a metaphor of *a machine that uses solar energy to produce biomass*. As an analogy, the metaphor would be treated as involving an attribution that changes the mental or subjective meaning of forests, but one assumes that the category of forest is continuous from context to context. However, considering attempts in modern forestry and biology to *repair and restore forests by designing them according to how ecosystems work*, the metaphor actually corresponds to a prototype of forest rather than a single category. Both Swedish and Canadian forest management has for a long time focused on lumber without caring for *the web of mutual dependencies in nature*. A machine is to be distinguished from this disconnected view of resources because the forest is a functional unit. If there were no conflicting perspectives, the forest would be a machine by default.

No doubt, there are, and have been, many different opinions on the exact nature of the metaphorical process. Metaphorical statements have been treated in semantic terms of “mappings,” (Lakoff, 1987), “inferences,” (Levinson, 1983; Sperber and Wilson, 1987), “comparisons” and “interactions,” (Black, 1979; Cohen, 1979), “similes,” (Basso, 1976), “metonymy,” (Eco, 1985; Sapir, 1977), “semantic break-downs,” (Sperber, 1975), “implicatures,” (Strecker, 1988), and “new categorisations,” (Keysar and Glucksberg, 1992). Despite this variety, these semantic views do neglect or underplay conflicting patterns of reasoning. None of the theories address everyday contexts of reasoning and negotiations of

categories. This is especially strange when dealing with controversial statements like metaphors.

Without a context of conflicting prototypes, metaphors of forest do not make sense. If there were no conflicting prototypes, we would not have to be metaphorical; there would just be single perspectives present in discourse and concepts would denote them in a formal and rational manner. Statements of uncontroversial prototypes form definitions rather than metaphors, e.g. *forest as nature and trees*. It is the need to establish common ground in everyday discourse that makes common prototypes the general case. Despite the shortage of proper metaphors, there are still traces of prototype constructions, implicit metaphors. The constructive quality of categories and prototypes becomes clearer if we put implicit metaphors together. For example, when foresters state that *the forest is a resource*, the prototype is not very explicit and we do not sense a metaphor. However, when considering the way in which the forest is measured and treated, e.g. *there are volumes of lumber to be managed*, we are better equipped to sense the prototype involved. The whole forest is understood in terms of lumber subject to economic planning and control, not as an area of natural growth. In contrast to the implicit metaphor, when foresters state that *the forest is a lumber factory*, people outside the forestry sector surely sense a metaphor, contrasting prototypes, but for the forester him-/herself, it may simply be an analogy, i.e. the prototype is established by convention in forestry. In contrast, when environmentalists want to give civil rights to animals and plants, foresters experience metaphorical confusion. Consequently, there is a sense in which all statements may be metaphorical: if there are conflicting prototypes and perspectives involved, statements oscillate between discrepant contexts of reasoning.

## 7. CONCLUSIONS

In everyday discourse, we cannot expect proper metaphors to be prominent; we do not spend much time formalising conflicting prototypes. In poetry, the construction of conflicting meanings has been made into a form of art. However, our much more general inclinations towards prosaic and ritual discourse indicate a more conventional attitude. Still, negotiations must be made whenever conflicting perspectives meet in discourse. It is in these conflicting contexts of reasoning that metaphorical reasoning becomes important. A metaphorical judgement needs not take the explicit form of a definition, i.e. a proper metaphor, but can be quite harmless. For example, when foresters say that *forests produce lumber*, they are not saying something highly controversial. Still, the tensions between different values and prototypes are there.

Metaphors and prototypes must be derived from the contexts in which we construct them because they emerge from activities in real environments, not solely from abstract definitions. Conflicting prototypes result in competing lexical conventions and only the contexts of construction resolve the ambiguities without eliminating the controversies. A good strategy in discourse analysis of metaphorical reasoning is to focus on conflicting statements and definitions because conflicting prototypes support them. A final example, a recurrent theme in political contexts in both Sweden and Canada is the conflict between the demands of natural resources and the natural conditions of ecosystems. We want to process our resources in accordance with our goals, but ecosystems follow natural laws and restrain our actions. The conflicting prototypes of forest correspond to the ideas of a free market and the law.

## APPENDIX I.

### Statistics of Prototype Judgements

The variables are explained below.

<b>Picture and Description</b>	<b>AJ</b>	<b>DJ</b>
1. deciduous forest, leafy, dense	3.25	1.0
2. deciduous forest, leafy, spaced	3.79	1.0
3. deciduous forest, path in the middle	3.79	0.81
4. deciduous forest, pond in foreground	4.02	0.57
5. deciduous forest, dry river bed, spaced	5.33	0.90
6. coniferous forest, dark, pond in back	6.15	0.43
7. coniferous forest, straight pines	6.27	0.90
8. apple orchard	7.90	0.05
9. coniferous forest, clearing in the middle	8.31	0.24
10. tangled wood, thin branches	8.5	0.05
11. young pine plantation	9.17	0.05
12. clear-cut, trees in far back	11.52	0.0

AJ (aesthetic judgement): mean value of aesthetic judgements across all individuals.

DJ (discursive judgement): the proportion of subjects who in pairs jointly judged the picture as representing typical forest.

Correlation between AJ and DJ:  $S = 0.93$

The mean values 6.5 and 0.5 would correspond to arbitrary judgement of beauty and arbitrary judgement of typicality respectively. The Pearson product-moment correlation is based on 50 aesthetic judgements and 21 discursive judgements of typicality; 21 pairs equal 42 participants. 10 subjects were excluded from analysis of aesthetic value because of 4 failures in registration and because of time limits. The subjects were to complete aesthetic judgements in 15 minutes to proceed with the main task of co-ordinated judgements of typicality. 9 pairs were unable to complete the main task because of conflicts.

## APPENDIX II.

Transcription codes	Explanation
= followed by =	turn taking without interruption of speech
[?]	unclear sound, word, or phrase
[pause]	short pause in speech, max. 2 sec.
[filler]	filled pause
[pro-filler]	sounds that support statement
[con-filler]	sounds that undermine statement
[giggle]	max. 2 sec.

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