THE COGNITIVE VARIATION OF SEMANTIC STRUCTURES

Prakash Mondal

ROUTLEDGE

The Cognitive Variation of Semantic Structures

This book explores the cognitive constraints and principles of variation in structures of linguistic meaning across languages. It unifies cognitive-semantic representations with formal-semantic representations to make a unique contribution to the study of typological generalizations and universals in natural language semantics. This unified approach not only helps reveal why semantic structures have the observed variation they have but also sheds light on the compelling cognitive and formal regularities and patterns in the variation of linguistic semantics. The book also advances the general principles of a cognitively oriented semantic typology.

Lucid and topical, the book will be an indispensable resource for students and researchers of language typology, linguistics, cognitive linguistics and semantics. It will also be of interest to theoretical linguists of both cognitivist and formalist schools.

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Maya, who exudes limitless energy for everything

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Preface

This book is about variation in meanings in human language. Language typology is about variation in the expression of structure, meaning and sounds in languages. So, this book has to say something about language typology. The first thing that strikes us when we examine the world of languages is that there are so many languages on this planet and languages do vary in their structure, form and meanings. While we know much about the existing variation in structure and form in natural languages, not much is known about the existing and possible variation in linguistic meanings. This book aims to fill exactly this gap. Since meanings in language are abstractions—they cannot be observed, they can be decoded and understood from linguistic expressions of form in terms of structure and sounds. If this is the case, any variation in meanings will have to be extracted from differences in form as they are expressed in terms of structure and sounds. This is exactly what the book will also do. At this juncture, one may wonder how linguistic meaning is to be conceptualized so that its variation can be studied in systematic ways. Linguistic meanings have different kinds of facets and properties. They have both formal-logical and conceptual properties. That is, linguistic meanings have certain regular formal/mathematical aspects and they also reflect patterns of representation, conceptualizations and ideas in the mind. This book will formulate a system of representations that can integrate these two apparently divergent aspects of linguistic meanings. Once this is done, all variation in linguistic meanings can then be described and also explained by making reference to the specific properties of the unified form of representation for linguistic meanings. This is what the book attempts to do, after clarifying the relationship between structures of linguistic meaning and mental structures that can be generalized over such structures of meaning. Interestingly, even though each language may have a unique system of structures of meaning expressed via linguistic forms, languages show recurrent patterns even within variation in linguistic meaning. This warrants an explanation.

This book argues that there are some deep fundamental cognitive principles and constraints on the patterns of variation in linguistic meaning across languages. These principles and constraints may, of course, arise from language use and learning. The generalizations that can be derived from the examination of variation in linguistic meanings described in formal-conceptual

terms help anchor them in the system of cognitive principles and constraints. Some of these cognitive principles and constraints turn out to be restricted to human language and some of these emanate from general properties, processes and organizational structures of human cognition. The predictive power of these cognitive principles and constraints helps connect typological generalizations on variation in linguistic meaning to hard organizational and representational constraints of human cognition. The upshot of it all is that variation in linguistic meaning and in language in general cannot be dissociated from mental structures and representations.

With this in the backdrop, this book will offer insights into the variation in linguistic meanings across languages from a cognitive perspective. Hence, we may talk about cognitive variation in the structures of meaning in cross-linguistic terms. There is thematic continuity among the chapters, as the arguments for a cognitive basis of cross-linguistic variation in linguistic meanings are built up and then typological generalizations from the formulations of a unified system of semantic representation are drawn up and help uncover the underlying cognitive constraints. Readers may need to see how the flow of argumentation is gradually built up, but may simply extract the essence of the main generalizations and skip the deluge of typological data in parts of Chapters 4 and 5 if they wish to. As Chapter 6 simplifies these generalizations by bringing them to bear upon cognitive constraints, readers can reconnect their understanding with the typological insights offered. Some parts of the book may sound slightly technical, although every effort has been made to make the contents intelligible to a wide audience. Language typologists of all stripes, semanticists of all brands, theoretical linguists of all persuasions and cognitive scientists in general are invited to see what the book offers. Laypeople can also read the book, albeit by being guided by a rudimentary understanding of language variation.

Finally, I leave it to readers to decide how they can make use of the ideas contained in this book.

Prakash Mondal
Hyderabad, August 17, 2023

Acknowledgments

This book couldn't have materialized without the invigoratingly constructive criticism of Tista Bagchi who pointed out a lacuna in the treatment of semantic phenomena in one of my previous works. It is she who made me reflect on the tensions between formal semantics and conceptual/cognitive semantics for a long time. This led me to work out formulations that can integrate the properties of semantic representation in the two apparently divergent frameworks and then to deploy the unified system of representations for explorations into semantic variation across languages. I'm immensely indebted to her for this. My undergraduate and graduate students also deserve thanks for raising countless questions on issues that are orthogonal to the ones investigated in the current book.

I owe special gratefulness to my editors Shashank Sinha and Anvitaa Bajaj for helping pulling off the project. Finally, I express my eternal gratitude to my wife, Jolly. This book couldn't have been completed without her boundless support, patience, love and care.

1 Introduction

Human language has patterns of meaning that are linked to forms in certain ways. While forms of expression in natural language do vary widely, the meanings mapped onto forms have certain recurrent patterns, of course, superimposed on the structural constituents of linguistic forms. While variation in linguistic forms gives us insights into the nature of the limits of the formal encoding of meanings, variation in meanings themselves can tell us about the limits and possibilities of linguistic meanings that can be encoded by forms of linguistic expression. It is worthwhile to understand that when we focus on variation in linguistic forms, we usually fix the meaning or *function* of the given forms of expression. For instance, when we aim to check and find out the variation in the linguistic form of passives across languages, the function of passives—what passives, as opposed to actives, mean—is fixed as something given. This has been the usual typological practice. In fact, much of typological research has been conducted along this line. In contrast, when we aim to find out variation in linguistic meanings, we can do so not by simply fixing the forms of linguistic expression against which the diversity of meanings can be checked and examined, but by looking at variation in meaning systematically mapped onto patterns of linguistic expressions of form across languages. Thus, for example, we may try to see how the linguistic meaning of possession varies across languages, but this can be done only by examining the correlates of linguistic form associated with those points of variation in meanings. This helps us see that the latter is a more challenging enterprise, as the wide diversity of linguistic forms of expression makes them unsuited to cross-linguistic comparison when they are taken to be the starting points or factors of the said comparison (Croft *forthcoming*).

This book will attempt to make explorations into the nature and form of semantic variation, by taking on this challenge. Since there is a wide range of strategies for expressing meanings in linguistic form across languages and these morphosyntactic devices in themselves cannot act as standard markers or points of comparison, the strategy adopted and followed in this book has been to come up with a restrictive set of generalizations that naturally follow and derive from the nature of semantic representations and then to find out the corresponding variation in (clusters of) linguistic forms associated with those generalizations. Crucial to this task is the form of semantic

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representations from which the typologically relevant generalizations can be derived. To that end, a unified form of semantic representations that can integrate both formal/mathematical and cognitive/conceptual aspects of linguistic meaning has been formulated. The properties of the unified form of semantic representations lend themselves to the derivation of a restrictive set of generalizations on semantic variation. At this point, it needs to be recognized that such generalizations cannot be completely language-specific. Rather, they are deeply underwritten and governed by cognitive processes and constraints on such processes. Hence, it is also pivotal to look for the underlying cognitive motivations buttressing generalizations on semantic variation that automatically derive from the unified structure of semantic representations. This is so because semantic universals, which are basically constraints on variation, are ultimately a result of the need to reduce the cognitive complexity of form-meaning mappings in natural language (see Culicover 2021: 52). This largely holds true of the kind of universals proposed and explored by Greenberg (1966). On the proposal of this book, generalizations on semantic variation deriving from the unified form of semantic representations are such that they help constitute and so arrive at more fundamental cognitive principles and constraints underlying and also cross-connecting those generalizations. In this sense, this proposal lines up with the conception of 'cognitive universals,' as distinguished from 'social universals' which are nothing but a diverse ensemble of linguistic forms of expression that map onto meanings (Culicover 2021).

From another perspective, this book aims to fill a lacuna. While a lot of work in standard typological descriptions has been done on the syntactic and morphological universals that are essentially constraints on the variation syntax and word formation exhibit in their regularities across languages, not much has been done to capture the constraints on the variation of semantic regularities across languages. The proposed book aims to trace the structural properties of semantic variation in natural language, that is, variation in linguistic meanings to certain well-designated principles of the conceptual/cognitive organization of language. Importantly, the book proposes to do this by unifying the formal properties of linguistic meaning (as in formal semantics) with the cognitive properties (as in cognitive/conceptual semantics). Thus, this book aims to advance the general principles of a cognitively oriented account of structural variation in linguistic meaning by providing a detailed description of the cognitive principles and constraints of variation on language in general.

With this in mind, we may now lay out the broad map of what this book aims to cover. Since the central aim of the book is to explore what cognitive constraints exist behind different kinds of semantic structures across languages, a firmer cognitive basis for semantic typology would be provided (see Bohnemeyer 2021). This does not, of course, mean that an attempt would be made to furnish an exhaustive typological overview of semantic structures across diverse language families. Rather, an attempt would be made

to describe and capture cognitive constraints behind semantic variation in the context of certain well-known semantic phenomena such as negation, polarity, plurality, modality and tense. It is not a descriptive typology of semantic structures that this book will actually flesh out, primarily because the aim is not merely typological. It is believed that any cognitive constraints underlying semantic variation that may be formulated in the context of certain well-known semantic phenomena will eventually complement an adequate typological description of semantic structures. This would not only strengthen semantic typology but also project deep insights into the nature of language variation.

The central goal of the book is thus to make explorations into the nature and form of the cognitive principles that impose constraints on the variation of semantic structures across languages. Therefore, it will be shown that cognitive universals may also have explanatory efficacy in typological description and generalizations without, of course, embracing any innately specified principles of whatever character. This way the system of cognitive principles can act as a bridge between phenomenological universals or typical typological generalizations and the abstract linguistic system that can be described in formal or axiomatic terms. This can help link typological descriptions to the nature of the linguistic system, which is often not achieved in linguistic theorizing. In attempting to achieve this, the present book will weave together threads from cognitive semantics (in the broader context of cognitive linguistics), language typology, linguistic theory, formal semantics, psycholinguistics and also from disciplines such as philosophy and computer science. The arguments for the cognitive principles of semantic variation will become clearer as we proceed to spell out the form of unified representations for semantic structures that can turn out to be easily amenable to the description of semantic variation in cognitive terms. The logical organization of natural language will thus be shown to be consonant with the cognitive organization of linguistic structures. A number of well-known semantic phenomena will be recast from the perspective offered by the harmony to be established between the logical organization of natural language and the cognitive organization of linguistic structures. The presentation will not attempt a comprehensive analysis of each semantic phenomenon in strictly linguistic terms; rather, each will be presented at a depth that admits of appropriate typological consequences to be drawn. Fundamentally, the book is intended for language typologists, theoretical linguists (especially semanticists), cognitive linguists, cognitive scientists of all persuasions and, of course, anybody else who may care about the nature of language variation and its link to cognition.

Against this backdrop, we may now sketch out the structure of the book as the threads of thinking are developed over the next chapters and woven together to form a unified tapestry. The next chapter (that is, Chapter 2) will mark the distinction between semantic structures and cognitive structures/representations in the context of different theoretical perspectives on language

typology and language variation. Further, the exploration of typologically relevant semantic generalizations supported by well-designated principles of our conceptual/cognitive organization will also be contextualized against the background of tensions between cognitive universals and phenomenological universals. Chapter 3 will flesh out a cognitive/conceptual account of formal properties of semantic structures by offering to unify aspects of cognitive semantics with facets of formal semantics. A unified representation capturing the essential ingredients of both cognitive semantics and formal semantics will be sketched out. Semantic structures laid out in terms of these representations will thus help anchor an account of cognitive constraints behind semantic variation in the logical structure of natural language. Chapter 4 will look at negation, negative polarity and negative concord across languages to figure out typologically relevant semantic generalizations deriving from the unified representations as formulated in Chapter 3. The goal is to capture as wide a range of generalizations lending to cognitive constraints as possible for semantic variation. For better readability, the theme of semantic variation in cross-linguistic terms will be explored further in Chapter 5 and the phenomena of modality, tense (in relation to aspect, wherever necessary) and plurality will be examined in order to ferret out typological generalizations on semantic variation framed in formal-cognitive terms in these domains. Although an exhaustive typological analysis would not be attempted, the hope is that a wide range of semantic generalizations and cognitive constraints can possibly predict certain patterns of language variation that have not been discovered but may eventually be found out. Since these generalizations reflect characteristics that are not going to be absolutely universal, interesting results from the formal predictions can be easily made. Chapter 6 will reflect on the formal-cognitive and typological consequences that may follow from the generalizations formulated for an ensemble of semantic phenomena within and across languages. It may also be hoped that this will help reveal the limits of the biological basis of language variation. Finally, Chapter 7 will offer concluding remarks on the insights gained from the whole exercise and some programmatic suggestions for future avenues of research.

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2 Semantic Structures and Linguistic Universals

Languages vary widely, and so do linguistic structures across languages. The variation of linguistic structures becomes evident when one uses or encounters more than one language. Linguistic structures can vary along several dimensions. These dimensions include sounds, words, syntax and meanings. This book will explore the variation in linguistic meanings, that is, in semantic structures as expressed in natural languages. The perspective here is eminently typological. But this typology is not simply going to be a typology of semantic structures across languages. Since semantic structures are indicative of, and also reflect, significant properties of cognitive representations, the typology can be befittingly construed as the one concerned with the variation in cognitive structures and representations as expressed in natural languages. Now it may be apparent that a typology of cognitive structures and representations expressed in natural languages is what we need to describe when the interest is in explorations into the available range of variation of cognitive structures and representations in natural languages. This would not be quite adequate, as the book will aim to show. Interesting though a mere typology of cognitive structures and representations in natural languages may be, this is bound to turn out to be a taxonomic description of differences and similarities of cognitive structures and representations in natural languages. In other words, if the desired typology is merely a statement of the similarities and dissimilarities in the cognitive structures and representations encoded in natural languages in terms of certain well-designated semantic specifications, the ultimate result is surely not going to be of great theoretical value, for an account of the cognitive variation in natural languages in terms of some unifying general principles and constraints seems necessary. A systematic account of the observed variation in terms of some principles is desirable in research on linguistic variation of whatever sort (Comrie 2001). It is this account that can tell us a lot about why semantic structures have the observed variation. Equipped with this account, we can perhaps begin to understand the compelling cognitive or formal regularities and patterns in the variation of linguistic semantics. Further, we can also ask questions about the envelope of this variation. Such an account may eventually help explicate the relationship between the underlying cognitive or formal principles and

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the existing (and maybe possible) range of their variation or uniformity in semantic structures.

At this juncture, it may seem that this is parallel to the *parametric* model of grammar as espoused by Chomsky (1981) and subsequently elaborated on in Baker (2001). The reason is that the parametric model of grammar also postulates that natural languages vary across certain linguistic parameters that can be set to Boolean values (yes or no/1 or 0). Thus, it is hypothesized that specific choices among the options left open in the biological endowment for language (also known as Universal Grammar) allow for a finite number of essentially different human languages (Chomsky 1997). The crucial point is that these linguistic parameters define syntactic variation at a gross level. For instance, the *null subject parameter* is set to 1, while it is set to 0 in Romance languages such as Spanish and Italian and many others. The biological endowment for language designating the incipient stage of language development in humans is supposed to have linguistic *principles* that do not vary and parameters that define syntactic variation. Most significantly, the parametric model of grammar as originally conceived attempts to tap into the macro-level variation in syntactic structures, and not all of syntactic variation let alone semantic variation is captured by this model (see Newmeyer 2004). In some cases, variation is so specific and arbitrary that capturing such variation through different conceptions of parameters (restricted to heads, or categories of heads, or even to functional categories) becomes a descriptive strategy, having nothing whatsoever to do with biological predispositions as part of Universal Grammar (UG) (see Culicover 2021: 45). Besides, as these parameters are thought to be biologically available at birth, an arbitrarily large number of such abstract linguistic parameters will all have to be pushed into the genome, while these parametric variations can be learned through externally mediated experiences in a linguistic environment (see Boeckx and Leivada 2013). It is clear that these linguistic parameters of variation are not cognitive because they are pre-given as choices to be fixed in one way or other. In contrast, we are interested in exploring the typological variation of semantic structures as they reflect or evince differences and uniformity in cognitive representations across languages. Semantic structures reflect properties of cognitive structures and representations in a special way. Semantic structures help specify and also constitute natural language meanings. Insofar as linguistic meanings are closely linked to thoughts, concepts, mental representations and ideas, semantic structures can reliably indicate the nature and form of the cognitive structures that support thoughts, concepts and ideas. Taken in this sense, cognitive structures ride on semantic structures and semantic structures ultimately ride on syntactic expressions. Any variation in the specific representational properties of cognitive structures across languages will thus transitively piggyback on constrained variations in syntactic structures. Hence the notion of semantic structures apt to be deployed for the explorations into their cognitive-representational properties needs to be fleshed out first. This is what we shall turn to now.

2.1 Semantic Structures and Cognitive Structures

Semantic structures encode those conceptual relations that can be read off from syntactic structures. In other words, structural relations in syntax give rise to certain conceptual relations at the level of linguistic meanings and the structuring of these meanings constitutes semantic structures. In this sense, word meanings cannot be strictly excluded from semantic structures because syntax operates even at the level of single words, especially in the domain of interactions of word structure and syntax, that is, in the domain of morpho-syntax. Besides, there are morphologically rich languages such as Turkish, Tamil, Finnish, Tagalog, etc. wherein the word-internal structure reflects syntactic structuring as well. Thus, semantic structures are defined by those conceptual relations either at *intra*-lexical or at *inter*-lexical levels that can be reliably individuated in well-designated patterns of syntactic structures. Patterns of syntactic structures can be well-designated *if and when* syntactic structures are defined in terms of constituent structure or some sort of head-dependent relations. In this way, the patterns of syntactic structures that are the basis for the constitution of semantic structures are general enough. Both constituency-based structural relations and head-dependent relations (especially for discontinuous expressions in natural language) can thus characterize well-designated patterns of syntactic structures. Against this backdrop, the notion of cognitive structures can be characterized. Cognitive structures are a well-motivated set of abstractions or generalizations from semantic structures within and across natural languages. Cognitive structures specify *representational* properties of conceptualization, perception, thoughts or thinking structures, reasoning, feelings/affect, etc. that can capture or form the *regularities* over semantic structures. If, for example, some semantic structures vary across languages in terms of how *actors* (the participant in a process specified in the verb that causes or triggers actions either volitionally or accidentally) relate to *undergoers* (the entity that undergoes the effects of the actions initiated, or is somehow affected, by the actor at any stage), the relevant cognitive structures must be more abstract generalizations from the diversity that is found at the level of semantic structures. This can be illustrated with the help of the following examples from English and Yimas (a language spoken in Papua New Guinea).

(1) I walked.
(2) I am bored.
(3) I melted the butter.
(4) The butter melted.

Here the subject 'I' is the actor in (1–3), but the subject of (4), that is, 'the butter' is the undergoer. This shows that we can have semantic structures specified by the relations: **P**(Actor), **P**(Undergoer) and **P**(Actor, Undergoer), where P is a predicative relation that can be specified either by a verb (such as 'walked' or 'melted') or a verb complex (such as 'be bored'). The semantic structures relating actors to undergoers can be very different in a language

like Yimas where the notions of subject and object do not actually help identify the actors and undergoers (Foley 1993), as shown in the examples below.

Yimas:

(5) ama- wa- t
1SG **S**- go-PERF
'I went.'

(6) ama- na- karŋkra- n
1SG **S** - DEF- tired-PRES
'I am tired.'

(7) pu- ka- tay
3PL **U**- 1SG **A** see
'I saw them.'

(8) pu- ŋa- tay
3PL **A**- 1SG **U** see
'They saw me.'

(9) ta- ka- wa- t
NEG- 1SG **S** - go- PERF
'I didn't go.'

(SG = singular; PL = plural; PRES = present tense; DEF = definite; PERF = perfective; NEG = negation; S = subject; A = actor; U = undergoer)

The only participant of an intransitive verb is marked in a special way in Yimas for the first-person singular form through the prefix *ama-* in (5–6), whereas the first-person singular form in the transitive form is different as it is *ka-* in (7) and *ŋa-* in (8). That is why the participant in (5–6) is characterized as being different from that in (7) by Dixon (1979) who has called it S (= subject), while the participant marked by *ka-* in (7) is the typical A (= actor). Interestingly, the S participant in (9), which involves negation, is realized by a prefix form (that is, *ka-*) used for actors, and hence A = S in (9). Also, the undergoer participant in (7) is marked in the same way as the actor participant in (8)—the same form *pu-* can be found for in both cases. It is thus noteworthy that *ama-* and *ka-* are dual forms in Yimas for the same type of linguistic structure, that is, constructions with intransitive verbs. Now we can spell out the relevant semantic structures by specifying them through the relations: **P**(Actor), **P**(Subject[1]) and **P**(Actor, Undergoer), where P is a predicative relation specified by the respective verb forms. The differences in semantic structures between English and Yimas are quite clear. While English permits **P**(Actor) and **P**(Undergoer) most frequently in sentences with intransitive verbs, Yimas can have an alternative **P**(Subject) besides allowing for the typical **P**(Actor). What is significant here is that these distinctions can collapse into fewer representations at the level of cognitive structures. While the distinctions between actors and Dixon's 'subjects' may seem relevant to semantic structures that derive from specifications of grammaticalized semantic roles, they may not be that relevant at the level of cognitive structures. Although the A participant can be equivalent to the S participant,

as (7) and (9) above and also the following example (that is, example (10) when juxtaposed with (8)) show, there is clear evidence in (5–7) that Yimas makes a grammaticalized distinction between typical actors and 'subjects.'

(10) pu- wa- tay
3PL **S**- go- PERF
'They went.'

But the import of this distinction may not be clearly transparent to cognitive structures that capture *only* representational regularities of conceptualization, perception, thoughts or thinking structures. That is so because these regularities have to be maximally general with respect to semantic structures across languages. While cognitive structures *can* be tied to language-specific semantic structures, cognitive structures transcend the boundaries of language-specific semantic structures. This is what makes translation and the acquisition or learning of multiple languages viable. This is exactly what makes it possible for schematic cognitive structures to be more nuanced and fine-tuned to specific properties and facets of language-specific semantic structures so that more general cognitive structures can be molded into, or accommodate, more specific cognitive structures. This can be illustrated with one example. Coming back to the discussion of distinctions relevant to semantic structures, we also observe that the semantic role of the undergoer as the only participant of intransitive verbs (as in (4)) is distinguished from the semantic role of actors in constructions with intransitive verbs (as in (1–2)). But this distinction may also remain *underspecified* in cognitive structures so that the only participant of intransitive verbs can assume the actor role or the undegoer role, depending on the appropriate linguistic contexts. On the basis of these considerations, we may propose the following schematic generalizations for cognitive structures as apposite to the linguistic structures in (1–10).

(11) **R1**(Z)
(12) **R2**(X, Y)

Here, an R stands for a relation that a verb (or a verb form, either simple or complex) specifies. It may also be noted that this R can be cognitively enriched or loaded in the sense that alternative ways of framing or conceptualization would be possible for a particular verb meaning. Thus, for example, if R1 = 'walk,' the relation specified by 'walk' can be conceptualized not just by 'move forward by using feet' but also by scores of other ways of conceptual framing such as 'move with feet,' 'move forward but never having both feet off the ground at once,' etc. That is, any R can be specified in the mind in whatever manner that fits the conceptualization of the verb concerned. There is no *a priori* restriction by way of the stipulation of a unique form of any R in the mind. Now Z is the only term/argument of a unary relation R1, whereas X and Y are two terms/arguments of the binary relation R2. While

Z as the *only* focal or salient participant, much like Langacker's *trajector* (1987, 1999), can encompass actors, Dixon's 'subjects' and undergoers in unary predicate relations, X in R2 is the typical actor and Y is the typical undergoer. From this, it follows that Z in R1 can be equivalent to Y in certain linguistic structures as it can also be equivalent to X. The participants X and Y in R2 can be thought to be akin to Langacker's *trajector* and *landmark,* respectively, because in his formulation a trajector as the most perceptually salient entity moves, or is located against, a background called a landmark. A landmark helps a trajector to be individuated and recognized and, if necessary, evoked in more than one instance. From this, it is compellingly clear that X, Y and Z are all underspecified enough to assume the forms of specific semantic roles in semantic structures. Out of all the three variables, Z is the most schematic or general participant that can encompass both X and Y in particular semantic structures. In this way, cognitive structures become abstractions from semantic structures. The abstractness of cognitive structures can also be shown by means of a number of other examples of *experiencer-experience* constructions from certain languages. The description of non-voluntary or involuntary experiences is marked in Kalam (another language from Papua New Guinea) through a specific sequence of participant roles (Pawley 1987, 1993): experiencer + experience+ predicate—an experiencer is a more specific class of actors that experience some condition as an experience. The following examples (taken from Pawley (1993)) are illustrative enough.

Kalam:

(13) tob-yp ywwt g-p
foot-my pain act-PERF:3SG
'My foot hurts.' (literally 'Pain acts on my foot.')

(14) yp swk ow-p
me laughter come-PERF:3SG
'I felt like laughing.' (literally 'Laughter came to me.')

(15) Yalk dsn nwp jak-p
Yalk beard him grow-PERF:3SG
'Yalk has (grown) a beard.' (literally 'Beard grows on Yalk.')

The semantic structures specific to this language are characterized by their sensitivity to differences between externally visible conditions such as blisters, beard, sores, etc. and internal sensations such as pain, itching, etc. (Pawley 1993). While externally recognizable experiences are expressed as *formations* on the experiencer, internal sensations *act* on the experiencer. This is evident in (13–15) above as laughter and beard form on the experiencer (in (14–15)) but pain acts on the experiencer (in (13)). Since the experience itself is the logical subject in each example above, the relevant semantic structures can be specified this way: $\mathbf{P}_{F}$(Experience, Experiencer) and $\mathbf{P}_{A}$(Experience, Experiencer), where P designates the predicate concerned whose arguments