

# Development of Geocentric Spatial Language and Cognition: An Eco-cultural Perspective. Pierre R. Dasen and Ramesh C. Mishra

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The monograph by Dasen and Mishra is a welcome addition to the burgeoning interdisciplinary research on Cognition, in general and development, in particular combining Psychology and Anthropology.

The book is divided into four parts: (1) Introduction and Methods, (2) Results, (3) Additional Studies, and (4) Conclusions. The first part contains three chapters focusing on general theoretical background and research questions as well as the methods used and the settings in which the studies were performed. The second part presents the results from studies conducted at various locations including Bali, Varanasi, Katmandu, Panditpur and Geneva. Each chapter focuses on the study conducted at a particular location defined by a specific set of eco-cultural factors.

The third part contains five chapters that discuss additional studies investigating different aspects associated with the development of spatial language and cognition. Chapter ten discusses spatial language addressed to children. Chapter eleven discusses the role of geocentric gestures and chapter twelve explores spatial organization schemes. Given the recent emphasis on brain mechanisms underlying cognition, chapter thirteen discusses some neurophysiological correlates of geocentric space. The last chapter in the third part discusses the phenomenon of dead reckoning and results on dead reckoning. The final part presents conclusions derived from these multiple set of studies conducted at different locations.

Information about the instructions, questionnaires, coding schemes, examples of spatial language in each location, and extracts from school manuals from the sites are presented in Appendices.

Studies of culture and cognition have recently emphasized differences between east and west (Nisbett 2003). The monograph goes a long way in theorizing about cultural factors affecting cognition that goes beyond simply demonstrating differences between cultures. Dasen and Mishra argue for differences in cognitive styles rather than arguing for the presence or absence of a particular cognitive process in a given culture.

The studies are based on a broad ecocultural framework pioneered by Berry and developed by many psychologists including the authors themselves over their careers. Their studies on spatial cognition development have been based on this overarching framework emphasizing multiple bidirectional influences between the child and the cultural context in which a child grows. They discuss the research background focusing on the studies done using the framework and theories of Piaget and the anthropological linguistics work of Steve Levinson and colleagues on spatial cognition. The focus of the studies is on the frames of reference used in spatial tasks and language. Dasen and Mishra discuss three frames of reference, which they discuss as intrinsic, egocentric and geocentric frames.

Studies on the development of frames of reference indicate the universal early development of topological space and the authors discuss the conflicting results on the possible order of development of the other two frames pointing to the possibility of the development of a specific frame based on the cultural context. The studies presented in the monograph have to be understood in the context of

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research by Levinson and colleagues on different frames in different languages. Levinson concludes in favor of linguistic relativism, the hypothesis that cognition is critically dependent on language. The authors in turn favor a milder form of relativism in which language is one factor but other factors play an equally important role in the development of cognition in general and spatial cognition in particular.

The authors discuss the main empirical findings on spatial cognition both on adults as well as children. The monograph focuses on a set of research questions including the relationship between spatial language and encoding, development of frames especially the geocentric frame of reference, influence of eco-cultural factors, and links to other cognitive processes. These questions have led the authors to the development of specific studies in chosen locations in which the geocentric frame of reference are in use and taught to children as well as locations in which it is not in use and not taught to children.

The authors have used multiple tasks in investigating the research questions mentioned earlier and these tasks are discussed in detail in chapter two. The nature of the spatial language use and encoding cannot be understood without understanding the ecological and cultural variables. This is aided by the discussion of each individual location in chapter three and the spatial language used in those locations.

The main part of the book is section two in which all the results from the major studies are presented in terms of the locations in which the studies were performed. This is appropriate given that the purpose of the studies is to understand the factors involved in each setting rather than simply demonstrating the difference between the dependent variables in different settings. The authors discuss the results from each task in detail and present the rationale for the changes made to specific tasks over the years. These enlighten us about the way tasks are developed especially in real life settings and bring out some of the problems involved in doing cross-cultural research in field settings.

In addition to inferential statistics, the authors have performed structural equation modeling to understand the way different factors affect each other and the results from those analyses using AMOS is presented at the end of each chapter except the first chapter that discusses the pilot studies in Bali, India and Nepal and the last chapter discussing results from Geneva. The most salient outcome of the structural equation models is the lack of a causal link between G-language and G-encoding resulting in the authors questioning the strong form of linguistic relativism proposed by Levinson and colleagues based on their work on spatial cognition. The results are adequately described using a large number of tables and figures. There is very little to criticize here except that the presence of error bars would have helped the reader in getting a better idea of the

variability in the measures used in the different studies. The main results indicate that the use of a specific frame of reference is dependent on the task and the geocentric frame of reference is in considerable use in terms of both language and encoding in cultures in Bali, India and Nepal. Factors like type of schooling (such as Sanskrit schooling) play a critical role and point to the importance of such variables for many other cognitive processes.

Additional studies investigating other questions are discussed in Part III. The results on spatial language use point to early use of such language by mothers to children. Gestures play an important role and the authors find evidence for the use of gestures very early for geocentric frame of reference. The authors also present their results on different spatial organization scheme used by children. They find evidence for the preponderance of quadrant-based schemes compared to other schemes in Bali, Nepal and India in comparison to Geneva.

The authors discuss their studies on neurophysiological correlates of geocentric space in the context of hemispheric dominance. While hemispheric dominance is important, understanding the neural mechanisms underlying spatial language and encoding especially for the geocentric FoR would be important. This is clearly outside the scope of the current studies and I do hope future studies would explore this issue using methodologies like EEG and fMRI. In the final chapter in Part III, the authors discuss their findings on geocentric dead reckoning. It is clear further research is needed to parse out the various factors that affect dead reckoning.

The final part discusses the main findings and their implications. The results are discussed using the framework of cognitive styles and I find it appealing in light of the results from the studies discussed in the monograph. The use of the notion of cognitive styles brings out the adaptability of the use of different cognitive processes available to an individual depending on the task and cultural setting. The monograph clearly succeeds in bringing out the role of various factors other than language including ecology and cultural factors like acculturation. The authors end with a discussion on the links between geocentric FoR and other cognitive processes. I would strongly recommend the book to those who want to use cognitive experimental research in a field setting for answering theoretically motivated research questions on culture and cognition. I hope more such studies are performed in India and other countries and this book will be a valuable resource in achieving this aim.

## Reference

- Nisbett, R. E. (2003). *The geography of thought: How asians and westerners think differently, and why*. New York: Free Press.