Chapter for B. R. Kar (Ed.), *Cognition and brain development*. Washington, DC: APA. In press. For discussion only. Please do not quote without consulting author.

Cultural differences in cognitive styles
Pierre R. Dasen, University of Geneva
and
Ramesh C. Mishra, Banaras Hindu University

Abstract
This chapter starts with the “integrated theoretical framework” for the cross-cultural study of behavioural development, which uses an eco-cultural perspective, and shows that child development occurs in the micro-system of a “developmental niche” consisting of the physical and social contexts in which the child lives, educational practices, and parental ethnotheories. The latter are linked to values and cosmologies at the cultural level of the macro-system, such as religious beliefs and practices. Enculturation and socialization are the main processes of cultural transmission, while acculturation also has to be taken into account.

The second part then presents a review of the cross-cultural literature on culture and cognition, from which we conclude that cultural differences occur in cognitive styles rather than in the presence or absence of particular cognitive processes.

These two theoretical propositions are then illustrated with examples drawn from our research on the development of spatial language and cognition, in particular results from Bali, Indonesia. For example, the likelihood of choosing a geocentric frame of spatial reference is found to be higher in rural, more traditional children who speak Balinese rather than urban, more acculturated children choosing Bahasa Indonesian (a language that favors an egocentric frame). The general conclusion of our research program is phrased in terms of an egocentric vs. geocentric cognitive style. We show supportive evidence from the study of geocentric language and cognition, and discuss the counter-example of results in Switzerland (Geneva), where children did not use a geocentric frame at any time.
An integrated theoretical framework for the cross-cultural study of human development

As part of the goal of developing a more universal developmental psychology, one of us (Dasen, 2003, 2008) has attempted to combine various theoretical frameworks encountered over the years, and found useful in a variety of contexts. This framework was previously presented at a D. Sinha memorial lecture in Allahabad. An updated version is presented in Figure 1.

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At the center of the framework is the individual child, with his or her particular set of inherited and acquired dispositions. Surrounding the child, there is the micro-context in which development occurs, also called the “developmental niche” (a framework first formulated by Super and Harkness, 1997), which has three components:

1) the settings, or physical and social contexts in which the child lives;
2) the customs, or culturally-determined rearing and educational practices;
3) the psychological characteristics of the caretakers, including the (explicit and implicit) parental ethnotheories of child development.

The developmental niche is a system in which the component parts interact and function in coordinated fashion. Typically there is consonance among the elements of the niche, especially under conditions of stability in the society, but sometimes there are also inconsistencies, especially under the impact of social change and acculturation. Moreover, it is an open system where each component is linked with other aspects of the more general environment. The latter is represented in the outer circle of the macro-system, which includes the ecological and socio-historical contexts to which each society adapts both biologically and culturally. This part of the framework comes from the eco-cultural model John Berry has developed over the years, and which we have used for our textbooks of cross-cultural psychology (Berry, Poortinga, Segall, & Dasen, 2002; Segall, Dasen, Berry, & Poortinga, 1999). It is also akin to Bronfenbrenner’s (1979) ecological systems theory. Note that interactions are postulated between every level of the framework, not only between adjacent sectors.
The processes that link the phenomena at the group level to those at the individual level are shown in the meso-system. Among these, as educators, we are most interested in the processes of cultural transmission, notably enculturation and socialisation. In fact, this is how we define education, not only as schooling but as the totality of cultural transmission (Dasen, 2008). However, all societies are now in contact with each others in a globalised world (Akkari & Dasen, 2008), so processes of acculturation are also important.

Note that D. Sinha (1982) had presented an “ecological map of the child”, which is entirely compatible with this framework. In the macro-context, Sinha includes institutional settings such as caste and class, and general services and amenities, which no doubt reflects the particularities of Indian society.

The integrated framework shows a direct link between parental ethnotheories at the level of the developmental niche, and, in the macro-system, cosmology and cultural belief systems, in particular religious practices. There is a hierarchical system, starting from isolated parental ideas to more integrated ethnotheories and then to the overarching elements of culture. Most of the time, there is coherence in this system, as stated above, and these cultural belief systems have interesting implications for educational practices (see for example Harkness & Super, 1996; Super & Harkness, 1997).

Culture and cognitive development: towards cognitive styles

An extensive research program on culture and cognition, based mainly on adapting laboratory experiments to make them culturally more appropriate, was carried out by Cole, Gay, Glick and Sharp (1971) in Liberia, Mexico and the United States (for a review, see Segall et al., 1999). The authors came to the following conclusion: “Cultural differences in cognition reside more in the situations to which particular cognitive processes are applied than in the existence of a process in one cultural group and its absence in another” (Cole et al., 1971, p. 233). This conclusion came as a surprise to many, the common understanding being that illiterates, for example, lacked some of the cognitive processes sponsored by schooling or literacy (see below).

We agree fully with this conclusion, although in a slight reformulation: “Cultural differences in cognition reside more in cognitive styles than in the existence of a process in one cultural group and its absence in another” (Dasen & Mishra, 2010, pp.13-14). We speak of a cognitive style when a set of cognitive processes are all potentially available, but some are preferentially used rather than others. An important aspect of cognitive styles
is that there is no value judgment attached, i.e. it is not inherently “better” to choose one style rather than another. This “choice” may of course be quite unconscious, and is influenced by many individual and eco-cultural variables.

Cognitive styles

Cognitive styles can be defined as “an individual’s preferred and habitual modes of perceiving, remembering, organising, processing, and representing information” (Dörnyei, 2005, p. 125), or even more generally as “one’s preferred way of processing information and dealing with tasks” (Zhang & Sternberg, 2006, p.3). We are in the presence of a cognitive style when different individuals (or different groups) react differently to a cognitive problem (task, test, experiment, etc.) in some systematic way even though they have the same underlying cognitive capacity or competence. They “choose” to react in this particular way under the influence of a variety of factors such as their age, gender, previous experience, socialization, etc. Of course, this is not necessarily a conscious “choice”; it is in fact more likely to be unconscious, linked to habits, customs or preferred values – in other words, to “culture”. An important aspect of cognitive styles is that there is no judgmental aspect to this choice. It is not inherently “better” or “more advanced” to react one way or another.

Riding (2002) analyses a series of cognitive style theories as reflecting a contrast between wholists and analytics. The former see a situation as a whole and appreciate the total context, the latter see a situation as a collection of parts. This typology includes what is probably the best known cognitive style, field-dependence vs. field-independence (FDI), also called psychological differentiation, on the basis of Witkin’s (1978) theory. Field-independent individuals tend to be more analytic, and produce judgements independently of their (visual or social) surroundings; field-dependent individuals are more influenced by the latter, and more global in their perception. This is a dimension on which people can be positioned anywhere, but there is evidence for coherence, so that people who tend to be on the field-independent side will show analytical cognitive functioning and will not be easily influenced by social opinion, and those who are field-dependent function globally and show social empathy. Analytical cognition is marked, for example, by the ability to pick out quickly a single element out of a complex figure. Witkin’s theory also links psychological differentiation to child-rearing patterns and to differential brain functioning.

Psychological differentiation is the only cognitive style that has led to extensive cross-cultural research, notably by Berry (1976) and his colleagues. Some of the early findings
were reviewed by Witkin and Berry (1975) and more recent research by Mishra, Sinha and Berry (1996). Berry (1976) found a strong eco-cultural factor when studying FDI cross-culturally across a wide range of societies: members of nomadic hunting and gathering societies tend to be more field independent than members of sedentary societies living from subsistence agriculture. However, FDI was also found to be influenced by acculturation, probably because of test-taking familiarity linked to education or employment in the ‘modern’ sector.

Mishra, Sinha and Berry (1996) studied parents and children of the Birhor (a nomadic hunter-gatherer group), Asur (recent settlers pursuing a mixed economy of hunting-gathering and agriculture), and Oraon (long-standing agriculturists) tribal cultural groups in the state of Bihar (now Jharkhand) in India. In each group, both low and highly acculturated individuals were included. Parents’ emphases for compliance or self-assertion during socialization were assessed through a combination of observation, interview and testing. The results provided evidence for the existence of "cognitive styles", which could be reliably related to ecological, cultural and acculturation characteristics of the groups. It was also possible to predict the cognitive style of children and adults on the basis of variables like parental helping and feedback. Similar results have been obtained in another study carried out with children of hunting-gathering, agricultural and wage earning samples of the Tharu culture in the Himalayan region of India (K. Mishra, 1998).

Dasen, Berry, and Witkin (1979) have argued for a value free interpretation of cognitive styles (and even cognitive development more generally) in the context of cross-cultural studies. To be field-independent is not inherently better than being field dependent, although it is what tends to be valued in many situations. Psychological differentiation also increases with age, which may unavoidably give it the connotation of being more advanced. However, someone who is more field dependent has more empathy, more social skills, can fit in better with a group, and see things in a more holistic fashion. Note the similarities to Nisbett’s (2003) Asian mode of thinking, or to collectivism as opposed to individualism (Kagitçibasi, 1997).

Although there are similarities between cognitive styles and learning styles, the two areas of research are somewhat different. Dörnyei (2005) defined the latter as “an individual’s natural, habitual, and preferred way(s) of absorbing, processing, and retaining new information and skills” (p.121). There has been much debate in educational research on the subject, the assumption being that the way information is being presented to learners should match their learning styles. However, a recent review of the literature has not revealed any sound scientific demonstration of this relationship (Pashler, McDaniel,
Rohrer, & Bjork, 2009). Dörnyei (2005, p.126) remarks: “Although the theoretical basis of cognitive styles is more solid than that of learning styles, even cognitive styles have been subject to a lot of criticism, which never allowed for the concept to take a substantial place in mainstream cognitive psychology”. While these problems cannot be denied, we still think that the concept is useful in the interpretation of cross-cultural data on cognition.

Dörnyei (2005) makes a further distinction between styles and strategies. The former are considered to be fairly fixed for an individual, and may even have a physiological basis, while the latter are learned and less stable across time and situations. Also, styles operate without individual awareness, whereas strategies involve a conscious choice of alternatives (Dörnyei, 2005; Sternberg & Grigorenko, 2001).

Cognitive styles in cross-cultural research

Beyond cross-cultural research on Witkin's psychological differentiation, the concept of cognitive style is beginning to take roots in cross-cultural cognitive psychology. Berteaux (2010), for example, uses it to interpret his findings on modes of classification in the French speaking islands in the Indian Ocean. He found that the (French inspired) school system considers only taxonomic classification, while the local cognitive style favours functional classification schemes. Troadec (2011) uses the concept explicitly in his review of research on culture and cognition.

There are also many findings in cross-cultural research on cognition that can be reinterpreted as reflecting cognitive styles, even if the authors themselves have not used this concept explicitly. Nisbett’s (2003) typology of holistic Asian vs. analytic Western thought is a good example. Another example comes from Tapé’s (1994) research in Côte d’Ivoire. He starts with analysing the African traditional cosmology in which mankind is part of nature, as opposed to the Western conception (exemplified by Christian religion, but also by Islam) in which mankind is above nature and is thus allowed to conquer and control it. This leads to two types of reasoning, global and symbolic on the one hand, based on experience and geared to explaining the final goal of events, analytical and experimental on the other hand, geared to explaining causal effects.

In the empirical parts, Tapé presented schooled and unschooled informants with a number of Piaget’s tasks of formal operational reasoning. In one of these the person has to determine which variables (length, section, thickness, material, weight put at the end, etc.) influence the flexibility of rods. To carry out a proper experiment, one has to test one factor at a time, keeping all others constant. While about a third of the (14 to 16 year old) school children could perform the task, illiterate adults basically refused to deal with it, or
gave answers based on past experience. Tapé (1994) formulates this in terms of a plural model of intelligence. According to this model, each individual in every culture has at his or her disposal at least two ways of dealing with information with the help of two forms of intelligence: the analogical mode for a global, immediate processing, which is economical but lacks precision, and the conceptual mode for an analytical, precise but costly processing. Culture, through the impact of schooling and the contexts of learning can value one mode rather than the other.

Most relevant is the research carried out by Scribner (1979) in Liberia on syllogistic reasoning. What she found was that illiterate adults could use this form of logic perfectly well, but would only apply it to premises in line with their social reality; if the premises were unfamiliar, they would either change them to fit reality, or refuse to answer. Scribner called this the empiric mode, as opposed to the so-called theoretic mode of schooled informants, who accept to reason with any, even unfamiliar premises. In school, pupils get a lot of practice of dealing with unfamiliar and even hypothetical situations. Schooling does not produce new cognitive processes, but provides the training to generalize (transfer) existing processes to a wide range of situations. In other words, it produces a theoretic cognitive style. A preference for the theoretic mode may be brought about by schooling because most activities in school are decontextualized, or possibly by literacy, because writing and reading imply a double abstraction from reality (Goody & Watt, 1963). However there are indications that it is Western type schooling and not literacy per se that is effective (Berry & Bennett, 1991; Scribner & Cole, 1981).

This empiric cognitive style has been found also by Schliemann and Acioly (1989) among adult lottery ticket sellers in Recife, Brazil. While they could all deal very efficiently with probabilities linked to a combination of numbers, as part of their job, those who were illiterate or had little schooling absolutely refused to answer a transfer task, in which they were requested to say in how many ways one could combine letters such as C, A, S and A. They would say: “I cannot do this, since I cannot read”. They stuck to this refusal even when prompted to replace the letters by numbers.

We are now also ready to re-interpret some of our own previous research findings in terms of cognitive styles. For example, research on sensori-motor intelligence in West Africa (Dasen, Inhelder, Lavallée & Retschitzki, 1978) basically found that the sequence of sub-stages in early cognitive development was indeed universal, but some babies did show what we would now call a different style. The babies, sitting on their mother’s lap, were presented with an interesting object set on the table in front of them, too far to be
reached directly. The babies cognitive stage is determined by the way they are able to use a tool, such as a plastic rake or a ruler, to reach for the object and slide it towards them.

The children in the Baoulé sample were able to do this very well, and on the average in advance by several weeks compared to French norms. However, some babies, instead of using one of the instruments offered, pushed their mother’s arm towards the object. This use of a social object is akin to what Greenfield, Keller, Fuligni, & Maynard (2003) are calling an “interdependant developmental path”.

In middle childhood, Dasen and his team studied another aspect of Piaget’s theory in Côte d’Ivoire and in Kenya, the development of concrete operations. In one study among the Baoulé, 19 Piagetian tasks were used in three domains of thinking: conservation, elementary logic and space in a study with 47 children aged 8 and 9 years (Dasen, 1984). The contents of the tasks were partly adapted so as to be familiar to village children, and the testing was performed in the local language. A principal component factor analysis showed a three factor structure in accordance with Piaget’s theory, clearly differentiating spatial reasoning and conservation, with the tasks of elementary logic loading mainly on a third factor but also partly on the two others in accordance with task demands. This indication of structural equivalence (cf. Fischer & Fontaine, 2011) supports the universality of the structure of concrete operational thinking.

Together with research in Australia and Canada, the results in Côte d’Ivoire and Kenya also showed variations in the rate of development of different conceptual areas, according to which concepts are more valued in any given environment. For example, nomadic hunting and gathering people value spatial concepts more than quantification, while agriculture, because goods are stored, exchanged and sold, seems to be linked to a more rapid development of concepts of conservation (Dasen, 1975a; see also Segall et al., 1999). In an eco-cultural perspective, these results are not surprising. Obviously, people value and foster those concepts and skills that are adaptive, and this is reflected in child development.

Several studies using so-called operational training techniques were also carried out (Inhelder, Sinclair, & Bovet, 1974): children are given the opportunity to discover a concept through handling objects (similar to test materials) and interacting with the experimenter. Of course they are never told the “right” answer, which would be uninteresting, but they are challenged in their pre-operational thinking, and induced to discover the various dimensions of a task. After initially training the conservation of liquids with 10 to 14 years old Inuit children (Dasen, 1975b), training procedures for conservation, class inclusion and horizontality were used among 7 to 14 years old Baoulé children in Côte d’Ivoire (Dasen,
Lavallée, & Retschitzki, 1979; Lavallée & Dasen, 1980), and with 12 to 14 years old Kikuyu children in Kenya (Dasen, Ngini, & Lavallée, 1979). The results showed a statistically significant training effect in each training group for each concept. In most cases where there was initially a “time lag” (an apparently slow development of a particular concept), training was sufficient to reduce or completely eliminate these lags. We found that training in one concept would generalize to other concepts, either in the same domain (e.g. training conservation of liquids to conservation of number or substance) or across domains (conservation to class inclusion and vice-versa, but not to horizontality).

In some cases, training was very fast with the older children (12-14 years), leading to the conclusion that these children must have had the competence for the concept being tested, but were initially unable to display this in their performance on the task. The training situation helped them to “actualize” their underlying competence.

We conclude from this very brief summary of some of our own results (but we know of no other research, in Africa or elsewhere, that contradicts this), that Piaget's theory of sensori-motor intelligence and concrete operations is indeed universal at the structural level¹. What we mean by this is that the sub-stages described by Piaget, and the type of reasoning these represent, are found everywhere and in the same succession. On the other hand, there are cultural differences in the speed of development of particular concepts, depending on whether these are valued and fostered or not in any particular setting. These differences can be compensated by appropriate operational training procedures, which shows that they are not permanent but in fact quite malleable. In some cases, children have the underlying competence for a particular concept, but cannot display it without some help.

These conclusions have important implications for teachers. They can assume that all children² have the possibility to acquire all basic cognitive processes, even though some children, depending on their socio-cultural background and previous experiences, may not necessarily be able to use them spontaneously in school tasks. The challenge for teachers and caretakers is to find the appropriate ways to help these children to either actualize their underlying competence, or to discover and acquire the relevant concepts through interactions with their physical and social surroundings.

¹ The conclusions about Piaget's stage of formal operations are controversial. Most research shows that formal schooling at the secondary level is necessary (but not sufficient) for this type of reasoning to develop; however there may be an artefact, in so far as the assessment tasks are very school like. There are a few studies that found formal operations in out of school situations (but see Nunes, Schliemann & Carraher, 1993; Retschitzki, 1989). Tapé's (1994) research is also relevant.

² This of course means all « normal » children ; in every population there are individual differences, and some children with disabilities to which this conclusion may not apply.
Other research on everyday cognition (reviewed in Segall et al., 1999; see also Schliemann, Carraher, & Ceci, 1997), particularly on ethnomathematics (Dasen, Gajardo, & Ngeng, 2005; Nunes, Schliemann, & Carraher, 1993; Saxe, 1991), shows that mathematical procedures acquired outside of school can be quite sophisticated, but they tend to be restricted to specific contexts, i.e. transfer to unfamiliar situations may be limited. Implications for teachers are that they should not only look for the knowledge children bring to school and value this knowledge even if it is different from what is usually taught at school, but they should also actively train the pupils to apply their knowledge to a large set of contents.

We think that the general conclusion of cultural differences residing in cognitive styles is also true for the processes of spatial cognition, and in particular for the “choice” of a spatial frame of reference (FoR) between the egocentric and the geocentric frames. This will be the topic of the second part of this chapter.

Geocentric spatial language and cognition

The design and methods of the extensive research project that we have been carrying out over the last decade (Dasen & Mishra, 2010), are summarized by Mishra and Dasen (this volume). For the purpose of this chapter, we will mention a few results from our research in Bali, which illustrate both the integrated theoretical framework of human development and cognitive styles. More detailed results from Bali are available in Dasen and Mishra (2010). In Bali, a geocentric orientation system is used when speaking the local language, Balinese, which has two orthogonal axes, one opposing upstream to downstream (or “to the mountain/to the sea”), kaja and kelod, and the transverse, kauh and kangin, which are notoriously difficult to translate (cf. Wassmann & Dasen, 1998). Much of Balinese culture is linked to this orientation system, which is also prominent in many aspects of daily life. In Bali, however, schooling occurs in the official Bahasa Indonesian, which favours egocentric spatial references (left, right, front, back) and uses cardinal directions as an orientation system.

Figure 2 presents the average number of items on one of the language elicitation tasks, Perspectives, in which geocentric (G), egocentric (E) or intrinsic\(^3\) (I) language is used, as well as how many of the geocentric items are correct (G+), in three language groups. In Bali, it so happened that, while being tested in Balinese, some (18%) of the

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\(^3\) Intrinsic language is defined for the purposes of this research as referring one object to another, with terms such as “near, next to, before, etc.”, i.e. it relates to what Piaget called topological space.
children preferred to speak Indonesian systematically, others (28%) used a mix of Balinese and Indonesian, while the third group used only Balinese. This was the case of 71% of the children in the village, and 29% of those in the city. Note that all Balinese children are bilinguals, since teaching occurs only in Indonesian; the difference between the language groups is one of preference.

Figure 2 illustrates the impact of bi-lingualism with Indonesian: While geocentric language is the only one used by children who speak Balinese, even as young as age 4, those speaking Indonesian use more E and I up to age 8, and start switching to G only after that age. The results of the mixed group are intermediate, but closer to the Balinese speaking group.

It therefore seems that bilingualism with a language that favours an egocentric FoR has a strong impact, reducing the choice of the geocentric frame in children up to age 10, after which they all conform to the local adult norm, even when they speak Indonesian. Before age 10, the children preferring Indonesian use more egocentric and intrinsic language, while the Balinese speakers never use any of these language categories, even at an early age.

In our study in Bali, bilingualism occurred as a sort of (useful) accident in our design, which means that this variable is not pure, but is linked to other socio-cultural and ecological variables. For example, the children who prefer to speak Indonesian tend to be from the higher SES families in the city. In the structural equation model (Figure 3), preferring to speak Balinese defines a virtual variable “traditional culture”, together with the knowledge of the Balinese orientation system, a variable which is also linked to ecology (village vs. city) and to SES. It is this cluster that determines the likelihood of using G language or G encoding, rather than the separate components.

Our results in Bali contrast with those of another study of bilingualism we carried out in Kathmandu, Nepal, where the sampling was purposely organised to contrast children schooled in Nepali or in English (see Mishra and Dasen, this volume). A similar conformity
to the adult norm was found in the older age group, but not the impact of bilingualism at younger ages. The structural equation model also contains a “traditional culture” virtual variable, but its impact on G language and encoding is very different (non-existent or even negative). The reasons for this discrepancy are discussed by Dasen and Mishra (2010) and Mishra and Dasen (this volume).

Figure 4 presents the proportion of geocentric encoding on the nonverbal encoding tasks in the two main locations of our study in Bali (a small city in the North of the island and a village nearby).

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Figure 4 shows the impact of ecology, with more geocentric encoding in the rural locations. This is, of course, an eco-cultural variable, reflecting the closeness to Balinese traditional culture, or, one might say, the opposite of acculturation to outside influences. The figure also shows that results can be quite different with different task situations; notably, in all of our studies, we found that one task, called Steve’s Maze, produces systematically more egocentric encoding. In this task, the children are asked to remember the shape of a path, which is much easier to encode iconically than linguistically. Task specificity is an argument in favour of cognitive style: Individuals choose to apply one type of frame in one situation, but another type in another situation, even though these were designed to be structurally similar.

Task specificity is also illustrated through a change in procedures on the same task. For example, on the Animals task, the format initially used in most studies was to align three animals in a row, looking right or left in a sequence of five items. We then added a fourth animal placed at right angle from the three, and we added two items with a 90° instead of a 180° rotation (cf. Mishra and Dasen, this volume). The new procedure obviously represents a much more stringent measure of geocentric encoding, eliminating, in particular, the possible confusion between intrinsic (e.g. three animals aligned with the table’s edge) and geocentric encoding. The impact of such a change of procedure is illustrated in Figure 5 for the Geneva sample.

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When only three animals are used, there seems to be an average of about 20% of geocentric encoding, i.e. about one item out of five. Contrary of what we found in the other locations of our study, in Geneva there is no age trend (the variations are non-significant). When the more stringent procedure is used, the percent of geocentric encoding becomes zero. In other words, in Geneva, there is no geocentric encoding (just as there is no geocentric language being used at any age).

This complete absence of a geocentric FoR is a challenge to our interpretation in terms of cognitive styles: We seem to have a complete absence of a particular cognitive process! Nevertheless, we argue that even in Geneva, this frame can be used, albeit in a different context, in particular when travelling for longer distances. What never occurs is that geocentric references are carried inside and used for table-space. Also, recent research by Troadec (2009) with French children shows that these can be trained to use larger outside references such as landmarks.

**Discussion**

While we have chosen here only a very few examples out of the complete project (Dasen & Mishra, 2010, Mishra & Dasen, this volume), they illustrate our overarching theoretical frameworks, that of the eco-cultural framework and that of cultural differences in cognitive styles. As to the latter, it is obvious that the children in Bali possess both frames of spatial references, the egocentric and the geocentric ones (and, for the latter, two forms of it, the traditional Balinese one, and the cardinal directions linked to Bahasa Indonesian). The overall preference, in this context, is obviously the geocentric frame, but depending on various eco-cultural variables, the egocentric one also comes into play. For example, children who live in the city rather than in the village, and those who prefer to speak Bahasa Indonesian, choose egocentric language and egocentric encoding up to half the time until age 9, while village children prefer geocentric language exclusively as early as age 4. The latter also prefer geocentric encoding from early on, at least one of the tasks, Chips; task specificity is in itself an illustration of the functioning of a cognitive style.

The limits of a cognitive style interpretation are illustrated with the results from Geneva, where geocentric language and encoding are absent in daily behaviour and on the tasks used in this research. We keep the interpretation of cognitive style on the
assumption that even Western children could, in the right circumstances, and certainly when given the necessary training, switch to a geocentric frame.

The results also illustrate the framework presented in Figure 1. The developing child, in Bali for example, is surrounded by a developmental niche which, through enculturation and socialization, fosters the choice of a geocentric frame through language and various cultural practices, some of which are linked to religion, and hence have a strong ideological aspect. This is also illustrated in the results in Varanasi reported by Mishra and Dasen (this volume). Hence, this development obviously occurs within a wider eco-cultural context. Acculturation, or culture change, is illustrated through the impact of bilingualism, and in the urban-rural contrast. Language is an important part of cultural transmission, but contrary to Levinson’s (2003) affirmation of strong linguistic relativism, it is only one aspect of the overall eco-cultural framework.

References


Figure 1: An integrated theoretical framework for cross-cultural human development
Figure 2: Spontaneous language on Perspectives in three language groups in Bali.
Fit statistics:
$\text{CMIN} = 6.114 \text{ df} = 10 \quad p = .806$
$\text{RMSEA} = 0 \quad \text{GFI} = .99 \quad \text{CFI} = 1 \quad \text{TLI} = 1.025$

Knowledge = Knowledge of Balinese orientation system inside;
Balinese vs. Indonesian = Language spoken at home and on our tests;
G language and G encoding = Princals summary object scores.

Figure 3: Amos structural equation model for Bali
Figure 4: R-A gradients (proportion of geocentric encoding) on three tasks by location in Bali, Indonesia.
Figure 5: R-A gradients (proportion of geocentric encoding) on Animals tasks, with change in procedures, in Geneva, Switzerland