Part I

Introduction and methods

1   Theory and research questions

Introduction

"Put the knife to the north side of the plate, and the fork south!" To many read-
ers of this book, this motherly instruction to her child will seem rather bizarre.
Why not right and left of the plate? Because this mother is using a "geocentric"
frame of spatial reference (FoR) instead of an egocentric one; in other words,
she is using a large-scale orientation system (such as cardinal directions, but
there are others) to talk about small-scale table-top space inside a room.[1] While
it is possible to do this in English, it is hardly ever done and comes across as
strange. In some other languages, however, like Balinese, Hindi or Nepali, it
would not sound strange at all; in fact, it is standard practice, and could be
heard by any child old enough to set the table.

How do children learn to use a geocentric FoR? This question has never
been addressed in mainstream developmental psychology, because a geocen-
tric FoR is quite unfamiliar to Western children and psychologists alike. They
may use a geocentric frame when navigating in a North American city laid out
in a grid pattern, or on interstate highways, or when map reading, but not when
talking about the location of objects inside a house. Yet many of the children
in Bali, in India or in Nepal where we carried out our research (and in several
other locations world-wide studied by Levinson, 2003, and his colleagues) use
a geocentric FoR with ease. In this book we explore how they do this when
they speak as well as when they perform non-verbal cognitive tasks (such as
remembering locations and directions), and how these skills develop with age.
We also look at the socio-cultural contexts in which this learning takes place,
and we explore the ecological, cultural, social, and linguistic conditions that
favor the use of a geocentric FoR.

Because this study is about child development in interaction with culture in
its broadest sense, it is part of "cultural psychology"; because we examine this

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[1]   According to Freundschuh's (2000, p. 129) typology, we are dealing with "manipulable object
space", as opposed to non-manipulable object space (which requires locomotion to view all
parts), environment space, geographic, panoramic or map space.

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in several locations, it is also a comparative study, and hence is part of "cross-cultural psychology." The latter is inherently multidisciplinary, and draws heavily on anthropology, in this case cognitive anthropology in particular. The research deals with language and cognition, and examines these with a developmental perspective; therefore, linguistics is also relevant (although we do not claim to be experts in this field), and of course developmental psychology, and especially cross-cultural human development.

Before looking at the geocentric FoR in particular, we start with a small survey of research on "culture and cognitive development" and its main conclusions, and propose a theoretical framework that we believe to be most suitable for this type of research.

General "culture and cognition" issues

"How does culture influence the way we think?" is a very old question. "How do culture and mind make up each other?" is its current reformulation. Are there cognitive processes that are common to all humankind, in other words, universal? And at what level does cultural diversity play a role? These are some questions that have accompanied both of us throughout our careers, and we have had several opportunities not only to contribute our own empirical research, but also to review (cross-)cultural research findings. Dasen initially concentrated on cross-cultural Piagetian psychology in early summary papers (Dasen, 1972; Dasen & Heron, 1981) and two books of readings on "Culture and cognition" (Berry & Dasen, 1974; Dasen, 1977), followed by wider and more recent surveys in sections of two textbooks of cross-cultural psychology (Berry, Poortinga, Segall, & Dasen, 2002; Segall, Dasen, Berry, & Poortinga, 1999). Maynard (2008) provides a look back over four decades of this field. Mishra has reviewed research on culture and cognition in two handbooks (Mishra, 1997, 2001) as well as in the context of his own research in India (Mishra, Sinha, & Berry, 1996). Together, we have examined the prospects of cross-cultural developmental psychology in the (ethnocentrically Western) "new millennium" (Dasen & Mishra, 2000), the cognitive impact of schooling (Mishra & Dasen, 2004), and methodological issues of combining anthropology and psychology (Mishra & Dasen, 2007). We do not intend to repeat here this material in any detail, but only to raise a few issues that are directly relevant to the study at hand.

The first major question is whether there are cultural differences in basic cognitive processes, or whether these are universal. The controversy is still current, although it is not new. Advocates of "great divide" theories (see Segall *et al.*, 1999, p. 132) have usually made an opposition between Western and non-Western thinking, under different labels: civilized vs. primitive, literate vs. illiterate, abstract vs. concrete, etc. Lévy-Bruhl (1910), for example, characterized

Table 1.1. *Western vs. Asian thought according to Nisbett (2003)*

Western (Analytic)	Asian (Holistic)
Focus on object and its attributes	Focus on field in which the object is located
Use attributes to categorize	Relationship between object and field
Use universal laws about categories to control events	Absence of universal laws, means control is difficult
Laws are deterministic and linear	No tradition of formal logic; reliance on experiential knowledge
Use formal logic	Dialectical approach: the middle way

thought "in inferior societies" as "pre-logical." According to him, "primitives perceive nothing in the same way as we do" (1910, p. 10). Under the attacks of anthropologists like Boas and Malinowski, who advocated both cultural relativism and the "psychic unity of mankind," Lévy-Bruhl (1949) reconsidered his statement somewhat and wrote "I should have said: primitives perceive nothing *exactly* in the same way as we do" (p. 245).

While the vocabulary become more politically correct, several "great divide" theories emerged during the twentieth century, the most recent one being linked to the bandwagon of cross-cultural psychology, namely the opposition between individualism and collectivism (see Kagitçibasi, 1997; Kim, Triandis, Kagitçibasi, Choi, & Yoon, 1994; Triandis, 1995). The proponent of this modern version of a basic dichotomy is Richard Nisbett (2003) who opposes Western and Asian thought: "Two utterly different approaches to the world have maintained themselves for thousands of years. These approaches include profoundly different social relations, views about the nature of the world, and characteristic thought processes" (Nisbett, 2003, p. xx). His theory is summarized in Table 1.1.

Nisbett and his colleagues support their claim with a large number of experiments usually involving United States Americans and Chinese or Japanese informants, with Asian-Americans showing intermediate results. They conclude: "The research shows that there are indeed dramatic differences in the nature of Asian and European thought processes" (Nisbett, 2003, p. xviii).

We shall come back shortly to how we would interpret these results somewhat differently.

Another recurrent trend is to attribute cognitive differences to "racial" or genetic factors. In this case, the theories usually assume that the differences are not qualitative but quantitative: for example, "intelligence" measured as IQ (intelligence quotient) derived from standardized psychometric tests. An early example is Porteus (1917, 1937) who peddled his maze test all over the globe and placed societies in hierarchical order according to their performance,

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interpreting the "results" with evolutionary innuendos. More recent examples
are Jensen (1969), Eysenck (1971, 1988), Herrnstein and Murray (1994), and
Rushton (1995). Quite obviously, we do not share these views (for a rebuttal,
see Segall *et al.*, 1999, pp. 137ff).

Note that both of these paradigms claim to find important differences
in cognition, but they interpret them in opposite ways. The former defines
qualitative differences, and the question remains open whether these are
interpreted in a judgmental form or not, in other words, whether they have
ethnocentric or even racist connotations or not. Even Lévy-Bruhl did not
see pre-logical thought as a-logical or anti-logical, nor even as a stage prior
to logical thought (despite the prefix *pre-*), but simply as a totally different
worldview. In some ways, it is an extreme form of cultural relativism. The
second paradigm partakes of what Berry *et al.* (2002, p. 324) have called an
"absolutist" orientation: cognitive processes are assumed as universal and
measurable with standardized instruments without taking cultural and con-
textual variables into account; quantitative differences are therefore attrib-
uted to biological factors.

Everything we know from cross-cultural research on cognition, that of
others and our own, including what will be presented in this book, leads us to
disagree with both of these extreme paradigms, and to advocate an intermedi-
ate position.

Opposed to the two paradigms claiming qualitative or quantitative differ-
ences in cognition, are claims to the universality of cognitive processes, includ-
ing those measured by standardized (although usually translated and adapted)
tests such as the (Wechsler Intelligence Scale for Children (WISC). Georgas,
Weiss, van de Vijver, and Saklofske (2003) make such a claim on the basis
of a comparative analysis of normative data across sixteen (mainly Western)
countries. The basic idea is first to check the structural equivalence across
the samples with factor analysis and other statistical techniques; once this is
done and proves successful, any remaining country variations can be studied
against the background of this commonality. Georgas *et al.* provide convin-
cing data for "a remarkable similarity in factor structure across these countries.
The factor equivalence suggests cognitive universality in the WISC-III across
these cultures" (p. 289). One problem with the conclusion of "universality" in
this study is the sampling: all the samples come from highly literate, indus-
trialized and fairly affluent countries. What about the rest of the world, the
"majority world"?[2] The authors attribute the (fairly small) country differences

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[2] The "majority world" is a phrase coined by Kagitçibasi (2007) to refer to the non-Western
world, which is ignored in most psychological research even though it represents the majority of
the world's population. Dasen and Akkari (2008) have used it to point to a similar ethnocentrism
in educational research.

to "educational factors." However, because the samples were not selected purposely according to some theoretical scheme, this explanation remains rather unsatisfactory. Furthermore, the procedure cannot deal with possibly different definitions of intelligence, since it imposes one particular sampling of skills to define IQ.[3]

It will have become obvious that we also have some reservations with regard to this approach, which leans towards absolutism and tends to disregard cultural variability, or at least considers it as less interesting than the demonstration of core universal processes. It is what Poortinga, van de Vijver, Joe, and van de Koppel (1987) have called "peeling the onion called culture," which, in the extreme, amounts to throwing the baby out with the bath water. So, from our point of view, it is important and interesting to document both universality and cultural differences, and neither of these can be assumed ahead of time, but have to be empirically demonstrated. This is why we need comparative cross-cultural research. As long as we confine our study to one single society, be it Euro-American or any other (as so-called "indigenous" psychology would typically do – cf. Berry, Irvine, & Hunt, 1988; Heelas & Lock, 1981; Kim & Berry, 1993; Kim, Yang, & Hwang, 2006), we logically cannot find out what is common to two or more societies, let alone demonstrate universality. Hence what we need is culturally sensitive research (such as advocated by cultural or indigenous psychologies, or by ethnography or anthropology), but in a culture comparative design. This is what we set out to demonstrate in this book.

Regarding empirical results concerning cross-cultural research on cognition, one summary conclusion we agree with was formulated by Cole, Gay, Glick, and Sharp (1971, p. 233): "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."

In other words, basic cognitive processes are indeed universal, i.e. they are potentially available, at least as an underlying competence, to all normal humans. However, the way they are used or combined, the contents and contexts to which they are applied, vary widely. What do we mean by "basic" cognitive processes? Classifying, remembering and forgetting, solving problems and making inferences, and reasoning logically, for example by using syllogisms, are classical examples. For each of these, research by Cole and his colleagues in Liberia, Mexico and elsewhere, and by many other researchers, points to the fact that the basic process exists in all populations, but that these processes can take different forms.

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[3] For a study reporting a culturally specific African definition of intelligence, see Dasen, Dembélé, Ettien, Kabran, Kamagate, Koffi, and N'Guessan (1985), summarized in Dasen (1984). Later comparative research in a rural area of Switzerland confirmed these findings (Fournier, Schurmans, & Dasen, 1999; Schurmans & Dasen, 1992).

Take classifying, the way information is simplified to make it more man-
ageable, a basic process without which language itself would be impossible.
When we think of a "chair" as a piece of furniture to sit on, we can include a
vast number of different objects under that same category. But in some soci-
eties, chairs don't exist; one sits on stools, or on carpets, or on the ground.
Never mind, what exists everywhere is the basic process of classification, of
using a prototype or best example for a noun category. Yet classification can
take different forms. One form that is particularly valued in the Western world,
and fostered by formal schooling, is taxonomic classification, i.e. classifying
into subordinate categories: chairs and stools and tables are all furniture. This
choice is opposed to functional grouping; for example, instead of putting the
knife with the machete because they are cutting tools, and the cassava with the
yam because they are root vegetables, the knife is grouped with the cassava,
because it is used to cut the tubers.

In mainstream developmental psychology, taxonomic classification is con-
sidered as more "advanced" than functional grouping, because it is found in
older (and hence more schooled) children. However, there are now several stud-
ies that show that in many contexts, functional grouping is the preferred mode
(e.g. Berteaux, 2007; Troadec, 1999) even for adults (Wassmann & Dasen,
1994a). Ciborowski (1980) reports an anecdote from the studies by Cole and
his colleagues in Liberia. On a sorting task, the majority of adult Kpelle sys-
tematically produced functional groupings. When one of the researchers probed
for reasons for the groupings, his informants said that this was the clever way
to do it. "Acting on a hunch, Glick asked a subject to do the classification task
as a stupid Kpelle person might do it. The result was dramatic. Under the new
instructions, the subject produced a perfect taxonomic grouping" (Ciborowski,
1980, p. 283).

Whether this story is true or has to be taken with a grain of salt, the implica-
tion is that the Kpelle informants had at their disposal several ways of solving
the task. Choosing one or the other may be dependent on circumstances, on
how the informant interprets the instructions and gives meaning to the task, or
on previous experience with similar situations, the familiarity with the testing
materials, and so on. In other words, it is not the absence or existence of the
cognitive process that is at stake, but whether and how it is applied.

In his studies of cognitive development according to Piaget's theory, Dasen
(1984; Dasen & Heron, 1981) came to a similar conclusion. By using training
techniques, Dasen and his colleagues (Dasen, Lavallée, & Retschitzki, 1979;
Dasen, Ngini, & Lavallée, 1979) found that after the age of 12, children who
apparently could not solve Piagetian tasks at the concrete operational level
could do so after a very short training sequence, suggesting that they had the
underlying competence for this type of reasoning, but did not use it spontane-
ously in the testing situation (i.e. at the performance level). This leads to the

conclusion that concrete operational reasoning is a universal at the competence
level, cultural differences being found in the way this competence is actual-
ized in particular settings. This is not to deny that there may also be cultural
differences in the rhythms of development (i.e. the age at which particular
stages occur), under the influence of the value attributed to each conceptual
area in each society. For example, there is a more rapid development of spatial
concepts in hunting and gathering societies, and of quantitative concepts in
sedentary, agricultural societies (Dasen, 1975).

Another illustrative example is syllogistic reasoning. An early cross-cultural
study was carried out in Central Asia (Uzbekistan and Kirghizistan) in the
1930s by Luria and Vygotsky, although it came to public attention in English
only much later (Luria, 1976). The researchers presented illiterate adults with
problems of the following type:

> In the north, where there is snow all year, the bears are white;
> Novaya Zemlya is in the far north;
> What color are the bears there?

Illiterate peasants typically said: "How should I know what color the bear was?
I haven't been in the north. You should ask people who travel. We always speak
only of what we see; we don't talk about what we haven't seen."

After one year of literacy training, the same adults had no problem answer-
ing the syllogism in the expected way. Luria (1976) concluded that literacy
produced new reasoning processes, namely hypothetico-deductive or "theor-
etic" logical reasoning.

Scribner (1979) found similar results in Liberia when comparing illiter-
ate and literate adults, except that she also presented syllogisms that corre-
sponded to the informants' daily life. On those, they had no problem using
syllogisms according to the rules of logic. For syllogisms with unfamiliar
or hypothetical content, on the other hand, they either refused to answer, or
changed the premises to suit personal experience and knowledge, which is
what Scribner called the "empiric" mode. She concluded that verbal logical
problems are a special genre, a style of discourse, that is frequently used in
school, which explains why the "theoretic" mode is common among schooled
informants; the willingness to engage in this style does not reflect a different
form of thought, but the habit of applying a common form of logical reason-
ing to a new context.

A preference for this empiric mode has also been found by Schliemann and
Acioly (1989) in adults with limited schooling in Brazil. As part of a larger
study, twenty lottery bookies (with levels of schooling from zero to eleven
years) were given permutation problems with different (familiar and unfamil-
iar) content. For example: "Find out all the possible ways to arrange the let-
ters A, B, C, and D" or "the letters in the word *casa*." All informants were

equally efficient in solving permutation of numbers problems at work, but the unschooled group refused to attempt to solve the unfamiliar problems. For example Felix, a bookie with no schooling, gave the following answer to the problem with the word *casa*:

F: This one is worse because I don't know how to read.
E: But you don't have to read. (Repeats problem)
F: This one is too complicated because to read is more difficult than to deal with numbers.
E: What if you do it like this: The C stands for number 1, the A for 2, S for 3, A for 2? Couldn't you do it?
F: No, because one thing is different from the other. (Schliemann & Acioly, 1989, p. 206)

This informant does not lack the cognitive process to solve permutation problems with numbers in the context of his job, when he sells lottery tickets, but refuses to transfer this skill to the context of letters, which he considers foreign to him because he cannot read and write. The process exists, but the situation in which it is applied has to be familiar and meaningful: a typical example of the empiric mode.

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) although there are indications that it is Western-type schooling and not literacy per se that is effective (Berry & Bennett, 1991; Scribner & Cole, 1981).

Nisbett (2003) considers the theoretic mode to be a Western inheritance from early Greek philosophy. He reports that, independently of educational level, East Asians (in this case, Koreans) "are more likely to set logic aside in favour of typicality and plausibility of conclusions. They are also more likely to set logic aside in favour of the desirability of conclusions" (p. 171). However, Nisbett's interpretation is similar to that of Scribner, namely that this is not a difference in the *capacity* for logical thinking: "There is no question of this difference being due to the Korean participants being less capable of performing logical operations than the American participants. Koreans and Americans made an equal number of errors on the purely abstract syllogisms" (p. 170).

If it is not a difference in the capacity for cognitive processes, it is a difference in cognitive styles.

Cognitive styles

What do we mean by cognitive styles? They 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.

We believe that we can usefully reinterpret many of the cross-cultural findings in terms of cognitive styles. For example, the fact that the universal competence for concrete operations is actualized or not in terms of performance on particular Piagetian tasks, or Scribner's empiric vs. theoretic mode, functional vs. taxonomic classification, and also the Asian vs. Western modes of thought can all be interpreted in terms of cognitive style. Nisbett (2003) would no doubt disagree, since he writes that "the research shows that there are indeed dramatic differences in the *nature* of Asian and European *thought processes*" (p. xviii, our emphasis). In fact, Nisbett's own colleagues are more moderate in this respect. The following quote could easily be interpreted in terms of cognitive styles: "Although both systems of thought are in principle cognitively available to all normal adult humans, cultural experiences may encourage reliance on one system at the expense of another, giving rise to systematic cultural differences. These differences in cognitive orientations are believed to be rooted in the different social worlds of East Asians and Westerners today" (Norenzayan, Choi, & Peng, 2007, p. 578).

Riding (2001, 2002; see also Dörnyei, 2005, pp. 128–129) subsumes a series of cognitive style theories in the contrast between holists 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), on the basis of Witkin's (1978; Witkin, Dyk, Faterson, Goodenough, & Karp, 1962) theory. 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 a single element out of a complex figure quickly. Witkin's theory also links psychological differentiation to child-rearing patterns and to differential brain functioning.