

Cross-cultural research on cognitive development in infancy and early childhood: an overview of methods and research.

Abstract

In the present article, the author attempts to cover the most conspicuous studies and research in the area of cognitive development in infancy and early childhood across cultures, in the last thirty years or so. Studies of infants' attention and perception, object permanence and cognitive functioning, in general, in early childhood are discussed in relation to theoretical and methodological backgrounds (Piagetian studies, psychometric tests).

In so doing, the author points out all through the paper, the complexity of multicultural research in terms of the difficulty of implementing research hypotheses, which may or may not be conclusive on dimensions of cognitive development.

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ملخص

تهدف هذه الدراسة إلى إظهار أهم الكتابات في مجال التطور المعرفي (الذكاء) لدى الطفولة الأولى و الثانية في الدراسات المنجزة خلال الثلاثين سنة الماضية. إن البحوث في مجال الإنتباه، و الإستيعاب، و ديمومة الشيء في الذاكرة و توظيف الذكاء بصفة عامة هي الموضوعات التي تم التطرق إليها في إطار منهجي و نظري (دراسات بياجيه مثلا).
غير أن هذه المحاولة تريد إظهار مدى تعقد البحث في مجال علم النفس المتعدد الثقافات و مدى صعوبة تطبيق الفرضيات في ميدان نمو الذكاء.

It has often been pointed out, in numerous cross-cultural studies, that a researcher applying a western cross-cultural methodology to other cultures, needs a large amount of decentration, but until then western researchers and developmentalists are in a situation of a traveller who has a map of New York and finds his way through Shanghai ! (1).

More than twenty years ago, Dasen and associates (1,2) in a series of influential studies on cross-cultural contributions of piagetian research introduced the view that «cross-cultural psychology enables us to test the hypotheses and theories established on limited and homogeneous populations. Too much of psychology is only the psychology of rats and first year students» (1). The situation did not change much, in the 1990 s, although a considerable refinement in the techniques and procedures of investigation of perceptual development and face recognition and other competencies, in the western child

essentially (language and intelligence) have been brought about in the late 80s and early 90s (3,4,5).

Dasen remarks characteristically draw attention to the difficulties, which are facing the researchers using Euro-American cross-cultural methods to analyse the characteristic thought patterns of individuals belonging to cultures other than the Euro-American culture. These difficulties are magnified when it comes to analysing children's emerging cognitive capacities in diverse cross-cultural settings. In the following sections, cross-cultural studies of infants behaviour, and cognitive development in children in the years immediately after the end of infancy, are discussed, starting by cross-cultural assessment of infant behaviour in the early months, or the psychometric tests of infant development (6, 7) which are directly relevant to later mental abilities (it is often hypothesized that patterns of motor behaviour are often correlated with early behavioral skills-grasping, manipulating-, we will examine the hypothesis that specific precocity and child care practices will speed up general cognitive development).

The cultural variables (child-care practices, parental beliefs and values which provide a 'niche' in which the baby develops) are pointed out in relation to milestones of development. A number of studies emphasizing the commonality-and also the differences- of the sequence and timing of cognitive development are discussed throughout the part on mental development and patterns of infants attention. An emphasis is put on piagetian studies of early childhood in cross-cultural settings, these studies being so far the most common in contemporary developmental research, though other directions in cross-cultural research, and especially in infancy research, have been pointed out in the first sections (psychometric tests, patterns of infants attention). As it is expected, a discussion of theoretical and methodological issues in cross-cultural research on infancy and early childhood, and problems and difficulties associated with such type of research, is included and can be felt throughout the paper. Thus the last section discusses the main issues and researches and relates between them. This section serves as the critical standpoint of the whole paper.

I- Cross-cultural studies of mental development in infancy

1) Theoretical and methodological background

In the past twenty years or so, the dominant trends in cross-cultural psychology tend to take into account the characteristics of the ecology/culture interaction. E.C. Triandis (8) who has been thinking along these lines describes these trends as « systems approach », « in which characteristics of the ecology /culture modify aspects of the persons raised in them, who in response to particular attributes of situations, emit particular responses, which in turn change the ecology and the culture » (p. 38).

For Triandis, such frameworks have universal structures, but the variables « acquire culture specific meanings in different ecologies » (ibid. p.38). He hypothesizes, one might say in a neo-Malthusian way, that the greater the abundance of resources in a particular ecology (resources, such as time, status, information, money, good services) the more will parents be accepting of their children (8). And the specificity of a culture will imprint a particular organisation or combination of these resources.

One of the most important shifts of emphasis in these trends of cross-cultural psychology of the two last decades, was toward testing western theories (Piaget's

theory, in particular) in many cultures (1, 2, 9- 12).

The aim of these studies was the exploration of the culture/person interaction, using multivariate measurements due to the specificity of the various types of cultures interacting with their subjects. In the domain of cognitive development, Dasen (1) adapting the Flavell and Wohlwill model of performance proposed a third « probability » to the two described by Flavell and Wohlwill (13), and which are:

- 1) The probability that the child has the necessary competence to do a given task.
- 2) The probability that the task will elicit the skills of the child engaged in action.

Dasen's third probability is that the operation involved in a given task is connected with a given cultural milieu. In other words, the child's performance is function of his particular capacity (competence) in the particular situation (performance) and in the particular culture. (C.f. Dasen's training programs, p.7 of this paper). As the child grows older, these three features change in relative importance.

However, as it will be shown in the following sections, piagetian cross-cultural research is not without problems, and important ones.

The major methodological problems, which arise, are due to the fact that most of the investigators doing comparative (research) studies do not belong to the cultures under study. We will emphasize, in the course of our discussion, that an inadequate knowledge of the child's language and culture, and the use of unfamiliar (for the child) standardized procedures (which even for European children has some disadvantages) do threaten the validity of the comparative research in question. On theoretical grounds, a theory of cognition that « focuses only on within culture tests of thought cannot be found. Such a theory might be found if it includes an analysis of the interaction between a range of cultural contexts and individual cognitions» (14). Sameroff transactional model of development draws attention to the fact that investigators, in whichever cultural context, are not observing 'absolute phenomena' but rather « phenomena existing in a particular setting » (14).

2) Psychometric tests of infant development

In the past, various scales of measurement of infant development have been used (Bayley's motor and mental development (6); Brazelton's Neonatal Behavior Assessment Scale (7); Gesell' Scales (15)). The aim of these assessments was to find a general measure for mental and motor development (Bayley, Gesell). Higher scores on these scales indicate presumably more maturity in the infants assessed, this holds equally within cross-cultural comparisons. Earlier evaluations have led some researchers to claim an early general precocity in the mental and motor development of infants from sub-saharan Africa (16-21).

Super (22) argues strongly against the use of such psychobiological terms as « maturity » qua « precocity », his own findings were contradicting the hypothetical evidence for 'neuro-logical precocity' in African newborns; the evidence is equally rare for different levels of general maturity in different cultural groups. In Super (23), the findings were that sub-saharan African infants sit and walk earlier than American and European babies. The main reason for this "precocity" is that, in the case of Kypsigi (Kenyan), infants are trained to sit and walk earlier (long before they attain one year).

Reports of early care are of great interest in the comparative research, they provide different opportunities and support for the use of the existing cognitive apparatus.

In Super and Harkness (24), patterns of infant development (sleep-walk cycles) and caretaking patterns in infants, in rural Africa (Kenya) were reported. In the early months Kenyan and American babies have approximately the same sleep-walk cycles (4 hours on the average), but after the fourth month American babies have longer bouts (averaging 8 hours and corresponding to adult patterns of sleep) than their Kenyan counterparts. This is explained by caretaking patterns in Kenya where mothers often carry their babies in sling when going to or doing work. As long as the babies are not too active, the productivity of the mothers is independent of the sleep-awake cycles. Besides this, other members of the family are often in charge of the baby when the mother is sleeping, and the baby awake.

Leiderman *et al.* (25) were among the first to document on a firm empirical basis, environmental-performance correlation, and their findings concerning motor development associate high economic and educational status of the parents with superior performance; in addition, infants attended by more than one caretaker have, presumably, higher scores on the Bayley mental tests.

Kilbride and Kilbride (26) have related specific patterns of mental development in Ugandan babies to their social and psychological environment. In a longitudinal sample, they demonstrated empirical correspondence between the pattern of specific precocity and child care practices (e.g. being frequently in the supine position is an advantage related to grasping and manipulative behavior).

Although there are still some studies in the Kilbrides vein (27), in which there is an attempt to correlate the pattern of specific precocity and child care practices particular to a culture, or a correlation between patterns of motor behaviour and early behavioral skills (e.g. grasping, manipulating), it is rather hard, as Super (22) pointed out, to find evidence for the assumption that some cultural groups show more rapid general cognitive development than others.

In general, the various descriptions of the psychological core underlying tests of infant intelligence emphasize either sensorimotor alertness (28) or psychobiological intactness and maturity (29). For certain researchers (30), the intellectual nature of motor manipulations starts early in the first year of life, and that the old motor-mental dichotomy is inappropriate at that time.

However contemporary research in the area presented evidence against a unitary factor in infant mental tests (31) and research using traditional tests of infant development was consequently less and less certain about grouping infant test items into scales or factors.

Moreover, a child's theory of mind, dealing with most of the child's early competencies is, in spite of some remarkable advances in developmental psychology with recent research attempting to integrate, in one mould, various approaches to cognitive, social and emotional development converging to a general conception of the «competent infant» (3, 32, 33), still a wishful thinking.

There are still many unexplored questions about mental development; it is hoped that cross-cultural studies can contribute significantly to our knowledge of infants' capabilities.

3) Piagetian studies of infancy

Piagetian studies of the development of intelligence from infancy onward, with particular reference to the growing understanding of physical existence and space are at the origin of three closely related sets of assessment procedures: the Albert Einstein Scales of Sensori motor Development (34, 35), the Casati-Lezine tests (36) and the scales developed by Uzgiris and Hunt (37).

These tests are used in non-western samples and in general they replicated the Euro-American sequence of developmental steps. Unlike the psychometric approach, the theoretically based Piagetian studies require universals of a basic logical sequence of developmental steps. However, even in these studies, several minor variations in the pattern of development can be identified, bearing a rough correspondence with infants cultural environment.

Dasen *et al.* (1,38) reported on infants of 5 to 31 months from a rural agricultural village of Baoule People (Ivory Coast). They found that Baoulé babies proceeded through a series of behaviors that indicate intellectual development similar to that observed in Genevan infants, and replicated in France by Lezine, Stambak and Casati (39), and this includes, for example, the exploratory manipulations of a matchbox. If French and Baoulé infants reach a number of cognitive milestones at approximately the same age (tasks concerning prehension, exploration and object permanence), they nonetheless differ in the average age of passing particular test items. Baoulé infants were advanced by one month or two, in the use of instrument or combination of two objects (pulling a string, or using a stick to retrieve an objet), but were equally found to be behind the French norms in one or two unrelated items, but this was not clearly explained.

Konner (40,41), using the Einstein scales found that the Kung infants (Botswana, infants of ! kung San hunter-gatherers) go through the same sequences as European babies (grasping was occurring at about the same ages as the Corman-Escalona (35) sample. The Kung infants started about 2-3 weeks earlier than New York babies in more complex behaviors involving mutual regulation of schemata (e.g. visually guided reaching). Konner relates this result to the physical and social stimulation and opportunities provided by frequent vertical posture.

Kopp, Khoka and Sigman (42), using Piagetian tests in India found that New Delhi infants (9-12 months) performed less well than American subjects on the use of tools in some tasks (use of cloth support and attached strings to obtain an object). The Indian infants were described as being held 'constantly' and thus being at a disadvantage in operating in the horizontal plane, compared to babies in Los Angeles who are more frequently prone. One is curious, however, about the exact difference in horizontal experience since other reports on cross-cultural samples state that the babies are also free to explore, even if they are often carried.

Some investigations (43,44) showed that African samples of infants (Lusaka) are advanced in prehension compared to the Americans; other observations of infants's play behaviour (45-47) indicate that prehension skills develop slowly with, however, no quantitative data.

These piagetian studies have as a major theme the commonality of sequence and timing of cognitive developement, this being related to the exploration of physical reality and the interactive construction of relevant schemata. The only reported differences were associated with the testing situation which can be a very different

experience for children - in the case of African (38) and Indian babies (42) - reared in the traditional manner.

As to the hypothetical large differences in development, caution is needed in interpreting the delays reported in studies of object permanence, the infants being probably easily discouraged and less assertive during testing. Thus, Dasen *et al.* (38), Kopp *et al.* (42), Goldberg (44) commented on the difficulties in maintaining the infants interests in tasks of object permanence. Some investigators report delays in test performance (up to two years) (Hunt *et al.* in Iran (48); Paraskevopoulos & Hunt in Greece (49)). Home reared infants in Athens are reported to have a delay of 6 months behind American babies, in complex test items related to object permanence, however, as the authors themselves pointed out, there are as many environmental and cultural differences which overlap with the test results that it is difficult to come to a conclusion. (these biases and the confounding cultural variables are discussed in our next section). Mayan infants are reported (50) to achieve object permanence about 3 months later than American subjects (51).

In general, Piagetian Cross-cultural research showed, in the last thirty years, that children may or may not pass through the Piagetian stages of cognitive development, and some reserchers even questioned the accuracy of Piaget's estimates at which particular accomplishments can first be made.

4) Patterns of infants attention

This discussion of cross-cultural studies of cognitive development in infancy would be incomplete without some remarks on infants attention.

It is hypothesized, in western psychology, that toward the end of the first year (after 7 or 8 months) infants frequently display greater attention to a variety of discrepant events than they did when they were six or seven months old (50). Discrepant events share either salient dimensions or salient aspects of pattern with the acquired schema. For example, a representation of a human face must have, for the 2 months old, a pair of eyes if it is to be regarded as discrepant from the normal face, because stimuli with a face-like appearance but without eyes are not given much attention. At twelve months of age, this cognitive schema has changed, and a human face without eyes is probably treated as a transformation on a human face.

If representations of human faces are shown to infants and children from 4 and 36 months, attention is prolonged at the 4 months, lower at 8 months, and it increases through the second and third year (52). This developmental function is often a U-shaped relation between age and fixation time, with a trough around seven to nine months. The U-shaped function is reported to hold not only for North American children but also for rural Mexican (53) and Guatemalan children as well (54).

Some investigations (55) have attempted to compare between diverse cross-cultural studies of infants' attention to facial masks, and drew hypothetical lines in relation to age and attention to human face (curvilinear relationship of age & attention to human face).

Infant's attention to facial masks in as diverse settings as America, Mexico, Guatemala, Africa and Japan, were compared. It is however very difficult to compare such findings, the investigators using different procedures and detail of reporting (some plot the average first visual fixation over multiple representations, others plot the total fixation). Moreover, Super (55) does not mention the controversy over whether the

relation of attention to discrepant events is 'linear' or 'curvilinear', i.e, whether the relation between the amount of change, physical or informational (contour, orientation of dimension, curvature, number and size of elements, line,) are examples of physical change and sustained attention after initial orientation is linear or curvilinear.

Recent research in the area of face recognition proved to be more cautious when it comes to generalisations about within/between races differences (5). In a book which can be considered somehow a state of the art about developmental trends in face processing by young children, Young and Ellis (4) come to the conclusion that it is a matter of learning to extract facial invariants to recognize classes of faces within a given race, and that this learning does not transfer to classes of faces of other races of which we have little or no experience.

In matters of environmental stimulation, Kagan, Kearsly and Zelazo (50) found some evidence for differences in the emergence of the ability to activate hypotheses about discrepancy among three groups of Guatemalan infants varying in the amount of stimulation and experience they receive. It is reported that in one isolated village, infants who spend most of their first year in small windowless hut and are rarely spoken to have delays of 2-3 months in object permanence, stranger anxiety, separation distress and some other cognitive landmarks. Kagan et al pointed out that all these phenomena occur at the same time as in America, despite the marked variation in environmental stimulation, indicating the same critical developments in active memory retrieval.

II- Cognitive development in early childhood: Piagetian cross-cultural research.

The basic assumption underlying classical Piagetian research (by 'classical' we mean the Piagetian inspired research carried out before the sixties) is that the basic achievements observed in Genevan children would be universal. In other words, the forms the child/environment interaction (whatever the child's 'milieu' may be) might take are characteristic of 'homo-sapiens'.

The empirical studies which have shown, since then, differences in performance of Piagetian tasks have led recent researchers and reviewers of Piagetian cross-cultural research (1,10), to distinguish cognitive competence and cognitive performance, this latter, in Dasen's own words « may or may not reflect the competence for the operations which the task is supposed to measure » (1).

It is assumed in Dasen (56), Inhelder et al. (57), Bovet (12), Greenfield (58), that competence, in particular for the concrete operational structure, must be universal. To ascertain this, Dasen and associates offer a strategy to distinguish between competence and performance, this strategy was applied in cross-cultural research in the form of training procedures expressed through Piaget's theory of the interaction necessary to allow for development. The goal for these researchers was to determine the extent to which training can instill competence, this capacity being assessed through levels of performance in pre and post-tests, in specific tasks. Dasen et al. (10) who have conducted a training study with large samples of Baoule (Ivory Coast) children, seem to have obtained evidence for learning during the training sessions. The training was believed to actually «trigger» an already existing competence, or in a way, to 'change' the basic competence of the children, in which case a transfer of this newly acquired

competence to other operational tasks is possible. A note of caution, however, must be said about this universalist hypothesis. One might conduct, cross-culturally numerous studies of performance variability, account for it systematically, and infer about cognitive competence, and subsequently propose models for competence-performance distinction (1,10), it remains, nonetheless, difficult to verify the assumption that competence variables are universal, and are accessible to measurement, this last capacity being an ideal against which the actual cognitive capacities in specific situations (or the performance) of the child work. The cognitive competence, as far as Piagetian theory and research are concerned, has always been described as representing an end-state toward which the actual performance tends, and for that matter, when one speaks about the measurement of the cognitive competence of a child, one is in fact, measuring his performance (which might reflect the beginning, the transitional or perhaps the final state of a cognitive structure) in dealing with tasks.

In our discussion of infant development in cross-cultural settings we have rather indifferently used «cross-cultural» research and methodology for aspects of comparative child development. For greater clarity of the exposition of dimensions of multicultural research, we need to distinguish between the methodology of cross-cultural research in general and comparative child development in particular. In comparative child development, the focus is on the dynamics of individual cognitive, affective and motor development rather than on the origin of enduring social patterns (anthropologically speaking) (27). The investigators in these studies will use «naturally occurring culture and/or class related differences in child rearing patterns as a way of increasing variation in his or her subject population» and equally, these studies «may be used to test the replicability of findings discovered in one culture and presumed to be universal» (27).

On the other hand, as to the methodology, in multicultural research, the recognition by the investigator of the social and cultural roots of the subject matter of his inquiry, must be stressed, this will be likely to improve greatly his chances at perceiving another culture (59). Things are different if the researcher (s) belong (s) to the local culture under study. It has been stressed some time ago (60) that when interpreting children's rate of cognitive development in cultures other than the Euro-American culture, the researcher must have a thorough knowledge of the local culture and language. He could, in all probabilities, have better results (as to the performance of the children) if he belongs to the same ethnic, cultural background, which provides the setting (60).

The results of certain comparative studies done by researchers of the same culture and language as the children under investigation, (61-63) show that Indian (American Indian) and African children's performance on tasks is the same as that of European children, and they reach at about the same age the stage of concrete operations.

Few cross-cultural investigations, working in a Piagetian framework, have adopted what Cole *et al.* (64) suggested more than twenty years ago, on the need to revise one's methodological arsenal, and perhaps one's attitude and expectancy, if it appears that the subjects behave unreasonably. In other words, if our sample of subjects failed to achieve certain tasks corresponding to specific cognitive abilities which they are assumed to have attained (conservation of weight, for example, at ages 10 and 11 years,

as in Dasen (9) study), one ought not only to retest the children, but equally to test additional samples, to determine precisely the causes of the failure.

Children of different cultures develop the same underlying cognitive processes (cognitive universals) described in Piagetian terms, which allow them to assimilate, and accommodate to, specific physical and socio-cultural environments. This is the idea developed by R. Nyiti (60) and Kamara and Easley (61).

Most of the Piagetian comparative research has used «between groups» designs, from an experimental methodological point of view, these do not allow for 'within-groups' cultural and cognitive variability. The within-stage variability, traditionally referred to as the 'horizontal decalage' (or the existence of displacements within one period, and which has brought the known controversy about the concept of 'stage' in Piaget's theorizing) was not predicted, and Piagetian researchers (61,63) have sought to account for this in terms of a performance variability due to experimental artifact, and that cognitive competence must be universal (65).

CONCLUSION

Multicultural research is so diverse and so complex that it is not easy to conclude, as one would have hoped to, with a sweeping view of methods and approaches used in the three or four last decades by researchers in the area to characterize infants and young children's competencies within and between races. However, we can always point out some recurring problems and difficulties which arise when it comes to apply already established hypotheses and research designs to cross-cultural data.

One difficulty in attempting to apply a multicultural design is in the observation and interpretation of the interrelationships of biological and environmental factors and their influence on child development. This is even harder when the cultural setting is different (from a Euro-American cultural setting). The variability provided by different cultures if, in a way, it does jeopardize the already established hypotheses, it nonetheless allows for the study of diversified individual differences (and attempts in this sense are few). But to use a multicultural design one must know sufficiently about the culture under investigation to fully appreciate it and secondly to «know enough about factors that affect infant behavior to collect adequate data» (59).

As to the Piagetian studies of infant cognition shall we conclude that the cognitive structures described by Piaget are universal (as the works of Kamara & Easley (61) and Nyiti (63) suggest)? The nature of the operations and the realities in which they develop are terribly complex to warrant such a conclusion. And as pertinently remarked a group of researchers (66) we are perhaps «still asking very complex questions in oversimplified form, and are using overly simplistic models and statistical analyses in trying to deal with terribly complicated problems». More than twenty years after, this last remark is still a characteristic of the actual state of the art.

In most aspects of infant and child development western approaches are still at a stage of generating hypotheses. The picture is further complicated when it comes to apply these approaches and theories to cross-cultural settings.

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