University of Missouri -- Columbia

The Graduate School

Department of Anthropology

Individual Modernization and Pictorial Perception among the Baganda of Uganda

A Dissertation in Anthropology

by

Philip L. Kilbride

Submitted in Partial Fulfillment
of the Requirements for
the Degree of

Doctor of Philosophy

June, 1970

Michael C. Robbins Dissertation Supervisor

The undersigned, appointed by the Dean of the Graduate Faculty, have examined a thesis entitled

INDIVIDUAL MODERNIZATION AND PICTORIAL PERCEPTION AMONG THE BAGANDA OF UGANDA

presented by PHILIP LEROY KILBRIDE

a candidate for the degree of DOCTOR OF PHILOSOPHY

and hereby certify that in their opinion it is worthy of acceptance.

Michael C. Robbins

Richard G. Dull

Alvin Goldstein

Dr. Philip Leroy Kilbride
Doctor of Philosophy
University of Missouri - Columbia
June 2, 1970

INDIVIDUAL MODERNIZATION AND PICTORIAL PERCEPTION AMONG THE BAGANDA OF UGANDA

Philip L. Kilbride

Michael C. Robbins Dissertation Supervisor

ABSTRACT

This dissertation has attempted to examine individual modernization among the Baganda of Uganda. A distinction has been made between the phenomenal order of an individual's behavior and the ideational order, including his percepts, concepts, propositions and beliefs. The degree to which change in an individual's phenomenal behavior is linked with concomitant change in his covert ideational culture, specifically perception, was examined. Therefore, individuals varying in relative amounts of behavioral exposure to modernity were compared with regard to their relative ability to correctly perceive pictorial content, one form of symbolic, visual perception.

Past research has indicated that "modern man" probably possesses proficiency in symbolic, visual, perceptual skills since modern communicative media and behavioral settings are

grounded in literacy and pervaded by visual symbolic representation. Studies have also suggested that other sensory modalities may be more emphasized in traditional populations in Africa and elsewhere. In Buganda, traditional forms of communication and behavior do, in fact, largely emphasize verbal - auditory channels. With modernization, a new pattern of expressive behavior is emerging so that the more traditional emphasis on conversation, verbal art, and music is being supplemented by behavior of a more symbolic, visual nature. This study found that individuals having relatively more phenomenal exposure to modernity were able to more successfully decode symbolic visual information contained in pictures than more traditional individuals. The latter were relatively unsuccessful in decoding pictorial messages in both line-drawn pictures and in black and white and colored photographs containing familiar objects. This strongly suggests that many Baganda do indeed lack important pictorial perceptual skills, particularly those of a more symbolic nature.

This finding indicates that in Buganda change in an individual's phenomenal world is linked with change in his ideational culture or the development of a visual, symbolic "sensotype". More specifically, our results show that possessing a formal education, engaging in a modern occupation, reading magazines, and residing in a modern community are

particularly important phenomenal experiential factors related to success with pictures.

The major theoretical implication arising from these results is that pictorial perceptual skills are largely learned. A major methodological implication is that our assumption that the individual is the locus of both phenomenal and ideational culture and change lead us to collect empirical data from the same individual with regard to each kind of change. Therefore, methodological individualism as a research strategy resulted in the use of overlapping samples in our attempt to relate two independent phenomena to each other. The major practical implication is that efforts to communicate information in Buganda through visual symbolic media is likely to be unsuccessful since many Baganda experience difficulty in decoding pictorial messages. If successful communication is to be obtained it will probably be necessary to either teach individuals the necessary symbolic skills upon which the correct use of pictures depends or to redirect the communicative media itself so that information is communicated through non-visual sensory modalities. Finally, future research should be directed at empirically determining the degree to which traditional Baganda do possess perceptual elaboration in non-visual modalities. Tests of visual vs verbal learning would be particularly useful.

ACKNOWLEDGMENTS

I am indebted to the many people who have made possible the research reported in this dissertation. Appreciation is extended to the Wenner Gren Foundation of Anthropological Research whose financial assistance made possible my return to Uganda in 1969 for the continuation of my study of pictorial perception there. My greatest academic debt is to Dr. Michael C. Robbins, Associate Professor of Anthropology, University of Missouri, Columbia. He provided my first opportunity to do research in Uganda and has been a constant source of intellectual stimulation, particularly with regard to the research problem considered here. I am also thankful to the Makerere Institute of Social Research, Makerere University College, Kampala, Uganda, for their sponsorship of my research in Buganda.

Many Ugandans have provided indispensable assistance in the successful completion of this study. Particular thanks go to John Bukenya, Mere Kisekka, Vincent Matovu, and W. J. Okecho. I am also indebted to the hundreds of Baganda individuals who formally served as respondents and to the many others whose hospitality and companionship afforded me a better understanding of Kiganda culture.

Finally, I wish to thank my wife, Janet E. Kilbride, for her intellectual and emotional support both in the field and during data analysis. Without her help this dissertation could not have been written.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF TABLES

LIST OF TABLES (continued)

LIST OF FIGURES

CHAPTER I-

THEORETICAL BACKGROUND AND STATEMENT OF THE PROBLEM

Scope of the Present Study

The central purpose and overriding framework for this study is to discern certain psychological concomitants of socio-cultural change among the Baganda, an African population living in Uganda. Traditional psychocultural systems in Africa, like those in many other parts of the developing world, are being modified rapidly by the advance of modern technology, science, industrialization, communication media and education (cf. Spindler 1968:345). One of the most challenging tasks confronting contemporary researchers in Africa and elsewhere is the scientific study of individual modernization or the specific modes of individual adaptation to the advance of modern culture. Although there has been considerable research in Africa of an ethnographic nature, information on related psychological processes is meager. Levine in an extensive review of psychoculture research in Africa has observed that:

> There has probably been less research on socialization processes, the psychodynamics of cultural behavior, the application of projective techniques, personality and culture change, and culture and mental disorder in Africa than in any major continental area of the world (Levine 1961:48).[1]

---

[1] See Doob (1965a) for another review of psychocultural research in Africa and a similar statement concerning the relative paucity of research in this area.

It is hoped that this thesis will contribute to the relatively limited fund of psychocultural data available for Africa.

The present study tested several specific hypotheses regarding psychocultural change or individual modernization among the Baganda. Data were collected in Buganda in order to examine the degree to which the development of pictorial perceptual skills might be related to the relative degree of an individual's behavioral exposure to modernity. This chapter will review pertinent theoretical literature on both individual modernization and pictorial perception concluding with a statement of the hypotheses that were investigated. An ethnographic description of Buganda and the specific research sites where field work was undertaken will be presented in Chapter II. Chapter III will explicate the discovery procedures and present the results of the empirical testing of the hypotheses using multivariate correlational analysis. The concluding chapter will discuss some theoretical, methodological, and practical implications of the major findings and results.

Individual Modernization

Concern with the individual as the primary unit of analysis has appeared only recently in anthropological studies of modernization (e.g. DeVos and Hippler 1969). Most of the earlier work on cultural change (often referred to as "westernization" or "acculturation") has been primarily

concerned with identifying the cultural traits or customs exchanged in situations of inter-societal contact.[2] In these studies, emphasis was concentrated on superorganic level cultural phenomena with relatively little attention to individual change in the contact situation. Herskovits, for example, felt that:

> acculturation comprehends those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact with subsequent changes in the culture patterns of either or both groups (Herskovits 1938:10, emphasis mine).

While a considerable amount of research has been done on contact change at the social or superorganic cultural level, relatively few studies are available on individual change in the contact situation. Pioneering efforts, however, have been made in this area by, for example, Hallowell (1955) and Spindler and Goldschmidt (1952). Hallowell, working with Algonkian-speaking Indians in Northwestern North America, examined persistence and change in traditional personality structure by comparing relatively isolated with relatively exposed groups of Ojibwa (cf. Hallowell 1955). To measure levels of individual acculturation, Hallowell used such criteria as an individual's residence, occupation, ability to speak English, and relative participation in native ritual life. Personality change was measured by

---

[2] See Linton (Ed.) 1940, for a review of some of these earlier studies.

responses to Rorschach Ink Blots and other psychological instruments. Hallowell concluded that although many aboriginal personality traits persisted after exposure to western life, there was, with acculturation, some change in the direction of more overt aggression. He also found that females overall made better adjustments to change than did men.

Spindler and Goldschmidt, clearly following Hallowell's work, explicated their experimental research approach to individual change among Menomini Indians. Their problem consisted of:

> ...discovering the degree to which evidence of personality structure vary in relation to the observed variances in the more external and social aspects of the personnel of the group undergoing the acculturative process (Spindler and Goldschmidt 1952:77).

Social acculturation was measured by gathering information on individual differences in: amount of income; education; knowledge of Menomini language; religious affiliation, etc. They suggested that the Rorschach Test could be useful in measuring change in personality structure, which the authors expected would vary with relative individual social acculturation. Later, Goldschmidt and Edgerton (1961), also working with Menomini individuals who varied in relative amounts of social acculturation, found a tendency for values (e.g. economic, religious) to vary concomitantly with an individual's social acculturation.

More recently, Spindler has suggested that "reactive movements" or "those reactions to rapid change that sweep

through whole populations and particularly where radically divergent cultural systems confront each other" (1968:332) are instances of "psycholocultural adaptation" to rapid change. He indicated that reactive movements occur when individuals experience loss of identity through the destruction of traditional institutions and subsequently attempt to reestablish "cognitive control" by joining a reactive movement.[3] Spindler's analysis of reactive movements has been particularly influenced by Wallace's (1956) discussion of mazeway reorganization and Goodenough's (1963) analysis of identity change.

As indicated previously, psychocultural research in Africa has been comparatively meager (cf. Levine 1961). There have been, however, some studies, particularly by psychologists, which have focused on individual modernization. Among these studies were several investigations in Buganda. Using data collected from Baganda and other African populations (Luo and Zulu), Doob (1960) listed twenty-seven perceptual, cognitive, attitudinal, and affective changes which he felt resulted from an individual's exposure to modernity. These included: delayed goal gratification; increased frustration; more aggressiveness;

---

[3] Reactive movements include, for example, the Cargo Cult in Melanesia, Peyote cults in North America, and other similar revitalization movements (cf. Lanternari 1963).

increased accuracy in making subjective judgments of objective time intervals; and facility in abstracting.

Ainsworth (1959), working primarily with Baganda, secondary school students from four schools in Uganda, found that students in the most "modern" school (located nearest to urban Kampala) were less rigid in problem solving tasks as indicated by performance on the Einstellung Test. He concluded that modern programs of formal instruction inculcate self-discipline and individual responsibility which, in turn, probably lessen rigidity in problem solving. At the same time, students in the less modern schools were thought to be relatively more subject to traditional techniques of training where reliance on custom and ritual is stressed. This would probably provide ready-made solutions to problems and relatively more rigidity in problem solving.

Evans and Segall (1969), also working with Baganda students, found that Primary 5 students were able to successfully classify objects by both color and functional similarity. School children who were older than their classmates, unschooled children, and adults with minimal school experience did poorly, particularly when classifying by function. From these data, Evans and Segall concluded that "educational experience, rather than age is the critical factor underlying the development of conceptual functioning involving less obvious stimulus attributes" (1969:52).

In the present study, as in other studies of individual change, the unit of analysis was the individual and the psychological change he experiences in response to increased exposure to and participation in modern institutions and behavioral settings.

Phenomenal and Ideational Modernization

At the outset, an important distinction should be made between the "phenomenal" order of observable events and behavior and the "ideational" order composed of percepts, concepts, propositions, and beliefs. Goodenough writes:

> the phenomenal order is a property of the community as a material system of people, their surroundings, and their behavior. The ideational order is a property not of the community but of its members. It is their organisation of their experience within the phenomenal order, a product of cognitive and instrumental (habit formation) learning. The ideational order, unlike the statistical order, is nonmaterial, being composed of ideal forms as they exist in people's minds, propositions about their interrelationships, preference ratings regarding them, and recipes for their mutual ordering as means to desired ends (Goodenough 1964:11).

Our attention will focus on the degree to which change in an individual's overt behavior or phenomenal modernization (e.g. relative exposure to mass media, educational level, occupation) is linked to change in that same individual's ideational order, particularly his perception and cognition.

Since overt individual behavior is theoretically and operationally distinguished from covert individual cognition,

change in the former would not necessarily predict concomitant change in the latter. Goodenough for example states:

> Observers commonly make the mistake of assuming that observed changes in material, behavioral, or social artifacts and their arrangements in a community necessarily reflect a change in its member's culture, in their values, principles of action, and standards for getting things done (Goodenough 1966:268).

The problem, therefore, is to demonstrate empirically whether phenomenal change predicts or is linked with ideational change in contact situations.[4]

Graves (1967), for example, attempted to assess the degree to which Indian-Americans, Spanish-Americans, and Anglo-Americans differed with regard to relative behavioral participation in Anglo-American patterns and their concomitant psychocultural attributes. He examined the degree to which individuals of the first two groups manifested psychological change as they became more similar in behavior to the dominant Anglo population. Graves operationally defined the phenomenal order ("observable aspects of behavior") to include such things as: exposure to the beliefs and behavior of the dominant Anglo-American group as indicated by the amount of formal education a person has received; identification with the dominant Anglo culture, as indicated by such items as, for example, having

---

[4] See, for example, Chance 1965; Graves 1967; Inkles 1969; Robbins and Pollnac 1969; Rodgers and Gardner 1969; Rogers 1969, for research that has employed this distinction in culture studies in Africa and elsewhere.

a close Anglo friendship, belonging to a formal club or organization, and voting in the 1960 election; and access to Anglo culture, for example, by occupation (cf. Graves 1967:342). Graves demonstrated that those individuals who behaviorally changed toward the Anglo norm also tended to display Anglo psychological or ideational characteristics (e.g. "future" time perspective, a tendency to believe that one has personal control over one's fate, and individualistic equalitarian interpersonal norms). He concluded that "These data clearly support the proposition that in this community psychological acculturation does occur and can be demonstrated to accompany differences in more observable aspects of behavior" (1967:345).

Rodgers and Gardner have presented data from the Out Island Bahamas, West Indies, which indicated linked changes in behavior and values. Two communities were used in their study: a relatively "traditional" community where subsistence farming and fishing were dominant and a relatively "modern" community where wage labor and participation in a money economy had gradually replaced traditional subsistence activities. Because opportunities for employment were limited in the "exposed" (modern) community, jobs had become a scarce good and a locus for competition. A series of behavioral ramifications had resulted so that individual behavior in the modern community contrasted sharply with that of the traditional community.

Among these behavioral changes were:

(1) The exercise of secrecy;

(2) A reduction of the size of cooperating groups;

(3) The destruction of the equalitarian reciprocity system; and

(4) An increase in conflicts such as husband-wife strife and bar brawling (cf. Rodgers and Gardner (1969:22).

They also found that individuals from the exposed community tended overall to rank highly such "value adjectives" as responsible, successful, generous, and honest in contrast to friendly, mind-own-business, Christian, and agreeable, which were ranked highly in the traditional community. These authors stated:

> It was our contention, then, that the three values (friendly, mind-own-business, and agreeable) most necessary for the operation of the mutual dependence and reciprocity system would decline in importance in the developing community, where the importance of that system had also declined. Two additional values, responsible and successful, would seem related to the new patterns of individualistic economic maximization. . . (Rogers and Gardner 1969:29).

Therefore, they concluded that the value shifts of individuals from the modern community were linked to behavioral changes in that community.

Many studies have also demonstrated that phenomenal modernization tends to be linked with specific psychological or ideational changes (e.g. Doob 1960; Rogers 1969; Inkeles

1969). It has been noted that Doob proposed 27 psychological changes which seemingly occur as individuals become more modern. More recently, Rogers (1969), using data collected from modernizing individuals in India, Kenya, and Colombia, has described the emergence of similar psychological characteristics for each of these samples. Among these characteristics were increasing amounts of cosmopolitanism, innovativeness, and occupational achievement motive.

The present study represents another empirical test of the degree of concordance between phenomenal and ideational modernization. The next two sections will include a review of pertinent literature which relates directly to the kind of ideational reordering expected to be linked with individual phenomenal modernization in Buganda.

Modernization and Visual Symbolic Perceptual Skills

Proficiency in symbolic, visual skills should be related to phenomenal modernization since modern communicative media and behavioral settings are grounded in literacy and pervaded by visual, symbolic representation in printed matter, cinemas, televisions, etc. McLuhan (1962; 1964) proposes that "modern man" has become increasingly more dependent on symbolic visual perception, particularly since the advent of the printed word and massive popular consumption of written and pictorial messages. According to Marshall McLuhan, members of so-called "tribal societies" continue

to communicate primarily through a verbal media and consequently do not use symbolic visual skills to the same degree as members of modern society. McLuhan has stated that:

> civilization is built on literacy, because literacy is a uniform processing of a culture by a visual sense extended in space and in time by the alphabet. In tribal cultures, experience is arranged by a dominant auditory sense-life that replaces visual value (McLuhan 1964:88).

Ong also feels that modern technology has caused the ideational order to become largely visual. He has noted:

> a marked tendency of technologized man to think of actuality as something essentially picturable and to think of knowledge itself by analogy with visual activity to the exclusion, more or less, of other senses. Oral or nonwriting cultures tend much more to cast up actuality in comprehensive auditory terms, such as voice and harmony. Their "world" is not so markedly something spread out before the eyes as a "video"...(Ong 1969:634).

Many others (e.g. Biesheuvel 1942, 1953; Hall 1966, 1968; Wober 1966, 1967) agree with McLuhan and Ong that there is considerable cross-cultural variation in the elaboration of specific sensory modalities. Hall, for example, has stated:

> People from different cultures inhabit different sensory worlds...They not only structure space differently, but experience it differently because the sensorium is differently 'programmed' (Hall 1968:84).[5]

Evidence from Africa indicates that auditory - proprioceptual perception rather than symbolic, visual

---

[5] See also Hall 1966, Chapters 10 and 11.

perception might be relatively more elaborated there. In many African societies including the Baganda, traditional forms of communication and behavior largely emphasize auditory and proprioceptual modalities. Tonal languages, "talking drums", verbal elaboration in artistic expression (e.g. proverbs, folk tales, riddles) and the importance of speech in both daily and political life suggest that ideational structuring in these societies is likely to show auditory symbolic elaboration.[6] Furthermore, sophisticated patterns of dance and music described for many African populations (cf. Biesheuvel 1953), indicate that proprioceptual sensory perception might also be relatively elaborated there.

Scattered research in Africa has indicated that Africans often excel in auditory-proprioceptual abilities.[7] Roland Oliver (1932), for example, used the Seashore measures of musical talent and found that Kikuyu schoolboys in Kenya were superior to Americans of equivalent education in the perception of rhythm, time, and intensity. Geber (1958) and Kilbride et.al. (1970), working primarily with Baganda infants, have demonstrated relatively precocious sensory-motor development compared to European and American

---

[6] Abrahams (1967) and Albert (1964) present an extended description of verbal elaboration among African and African-derived populations.

[7] See particularly Biesheuvel 1943, 1952; and Wober 1966, 1967; for excellent reviews of this research.

norms. Geber reported that some infants only a few days old could keep their heads from falling back when being drawn up to a sitting position -- a feat that is normally attained by European infants about six weeks later. In addition, many infants could follow moving objects with their eyes and with rotation of their heads accompanying the pursuit. Kilbride et.al. (1970) suggested that Kiganda childrearing practices might be related to precocious infant development. For example, a Muganda mother usually picks-up her infant with her hands around his chest or solely by means of one of his shoulders, without supporting his head or back. This practice might necessitate the child's relatively rapid postural control.

Wober (1966) has recently suggested a potentially useful concept to account for cross-cultural differences in dominant sensory modalities, i.e. "the sensotype". Contrasting sensotypes tend to develop because prevailing patterns of childhood intake and proliferation of information from the various sense modalities differ according to culture. Modern individuals tend to develop a "visual" sensotype since visual material is the primary currency of communication in modern society. Wober also indicated that Africans tend to develop an "auditory-proprioceptual" sensotype concomitant with elaborate codes of verbal-auditory communication and with a relative deemphasis on the visually perceived coded material of written language.

The present study will focus on the degree to which the emergence of a visual sensotype is evident among Baganda with relatively more phenomenal modernization in comparison to those with less. That is, the degree to which relatively more modern individuals would more successfully perceive pictorial content was examined.

Factors Relating to Pictorial Perception

Pictorial representation of objects is conventional and symbolic in that a 3D subject is portrayed on a 2D surface. The real object or scene and its portrayal, however, share many basic characteristics so that the "optic array" from both stimuli are nearly similar. Gibson has written:

> A faithful picture is a delimited physical surface processed in such a way that it reflects or transmits a sheaf of light-rays to a given point which is the same as would be the sheaf of rays from the original to that point (Gibson 1954:14).

Elsewhere Gibson pointed out that a picture is an artificial optic array so that "the range of intensities in a natural array with good illumination exceeds the range of intensities coming from the best photographic transparency" (1960:222). Furthermore, pictures when viewed "normally" (that is, binocularly and not through an aperture), unlike natural scenes, are bounded and the sheaf of light-rays which stimulates the retina includes both light coming from the picture and surfaces external to the picture. He also emphasized that although pictures are artificial optic arrays,

realistic representation is possible because the eye responds primarily to the transitions and relations of an array which are probably constant between real scenes and their portrayal.

Although pictorial representation of objects and scenes is possible, the degree to which correct pictorial perception is due to learned experience is an interesting question. Hochberg (1962), for example, has reported that a nineteen-month-old baby, with no prior experience with pictures but having previous experience with selected objects, was able to identify these items represented in drawings and photographs. On the other hand, many anthropologists have observed that non-western peoples having no prior experience with pictures often fail to recognize objects in photographs. Herskovits (cited in Deregowski 1968:357) reported that a woman in Dutch Surinam failed to recognize her own son in a photograph, and he indicated that his finding was similar to that of anthropologists working elsewhere with persons who had never seen photographs.

These anecdotes have led in part to a growing interest in the scientific study of cross-cultural differences in

---

[8] Many studies using data collected in Africa offer tentative support for the proposition that culturally constituted experiences influence visual perception such as perception of movement (Allport and Pettigrew 1957); eidetic imagery (Doob 1964, 1965b, 1966); and perception of size (Munroe et.al. 1969).

space perception including investigations of pictorial perception (cf. Segall, et. al. 1966). Overall, these studies have suggested that several factors are related to successful perception of pictorial content. Each of these factors will now be discussed.

Formal Education. Most studies of pictorial perception in nonwestern societies have been conducted in Africa (see Hudson 1967, for a review of this literature). Although Nadel (1937), working in Nigeria, noted gross population differences in pictorial perception, the first systematic studies were undertaken in Nigeria by Doob (1961) and in South Africa by Hudson (1960). Doob (1961), working in a Fulani community in Northern Nigeria, tested twenty males differing in amounts of formal education on their ability to identify objects and events in eleven photographs and nine pen-and-ink drawings. Doob found that ability to correctly identify pictorial content was positively related to formal education although all subjects were able to correctly identify some of the photographs and drawings. Hudson (1960) found a difference in both pictorial object identification and pictorial depth perception between school-going Africans and Whites on the one hand and non-school-going Africans and whites on the other.[9] The school-going group consistently gave higher percentages of both correct identification of pictorial objects and the perception of

---

[9] See Figure 2 for the Hudson pictorial perception test.

such pictorial cues to depth as object size, perspective and superimposition. Since the non-school-going sample included both Africans and Whites with little or no formal education, Hudson concluded that their relatively poor performance was attributable to their lack of formal education, for it is primarily in the schools that the conventions of modern pictorial representation are learned and exposure to and experience with pictures obtained.

Researchers working in other parts of Africa and elsewhere have administered Hudson's Pictorial Perception Test and also found that formal education is related to successful performance. Deregowski (1968) reports that in his sample of Zambian respondents, domestic servants with little or no formal education were more often found to be two-dimensional perceivers than schoolboys. Kilbride et. al. (1968), working with 216 Baganda school children, who ranged in school standard from Primary 1 through Secondary 4, showed that the relative amount of pictorial perception of depth was directly related to an increase in amount of formal education. Kilbride and Robbins (1968), using responses of 523 Baganda school children and adults (both rural and urban), demonstrated a positive and significant relationship between the amount of reported formal education and the use of the linear perspective cue to depth perception. Later Kilbride (1968) compared Americans and Baganda and obtained the following results:

(1) Educated Americans (e.g. adults with at least some university education and university students) more consistently perceived pictorial content three-dimensionally than relatively uneducated Americans (e.g. housewives and university custodians with educational attainment in most cases less than high school);

(2) Relatively educated Baganda (e.g. adults with some university education, Secondary students, university students) more consistently perceived pictorial depth than relatively uneducated Americans.

These results were interpreted to mean that formal education, wherever found, is likely to be positively related to pictorial depth perception.

Modernization. Hudson (1962) has suggested that other experiences related to modernity (in addition to formal education) are also important. He observed that many Africans who had more formal education than Whites were still comparatively less able to interpret pictorial materials. White school children were more accurate than African school children of the same educational level and were frequently more accurate than university trained Africans. Hudson explained these results by noting that the homes of African children are notably lacking in reading materials, photographs, representational art and other cultural practices

probably related to the development of pictorial perceptual skills. The domestic exposure of White children to these practices and stimuli, particularly at an early age, might explain their relative success in correctly interpreting pictures. Hudson suggested, therefore, that relative isolation from modern culture may explain, in part, the comparatively large numbers of misidentifications and two-dimensional interpretations noted for his African and semi-literate White samples.

Kilbride and Robbins (1969) showed correct pictorial perception among the Baganda of Uganda to be related to an individual's relative amount of modernization. Urban respondents living in Kampala more consistently identified pictorial objects and used cues to depth than respondents from a relatively isolated rural parish. Individuals within the rural sample also differed with regard to performance on the Hudson Test. Generally, the more modern rural individuals (as measured by a multivariate modernization scale derived from social survey interview data) were more successful with pictures than the less modern. Dawson (1967), working in Sierra Leone, has also found that individuals with relatively more "modern" attitudes were overall more cognizant of pictorial depth cues when compared with individuals with relatively more "traditional" attitudes.

Childhood Socialization and Cognitive Style. Dawson 1967), working among the Mende and Temne of Sierra Leone,

found that individuals who had been more strictly trained in childhood were less psychologically differentiated and more "field-dependent" than individuals who had a more permissive upbringing in childhood. The latter were relatively more "field-independent" and were more successful than the former in perceiving depth in pictures when tested with Hudson's test. Dawson's findings, then indicate that certain cognitive and perceptual styles probably influence the ability to perceive depth in pictures.

Language. DuToit (1966) has suggested that for correct pictorial perception to occur, language vocabulary must include words (or other units) which signify the objects or cues represented in pictorial content. He indicated that Hudson's results might be attributable to linguistic differences between Africans and Whites and that the failure of non-school-going Africans to perceive the third dimension in pictorial space should not be surprising since Bantu languages do not have words such as "perspective".

Intelligence. Hudson (1960), Mundy-Castle (1966), and Dawson (1967) have suggested that intelligence might also be related to pictorial depth perception. Mundy-Castle, for example, mentioned that the only subject in his sample of Ghanaian school children to perceive depth in pictures was the daughter of a rural farmer who (on intelligence tests) scored more than two deviations above the mean for her age group. In another study (1960), he found that the White

illiterate sample used by Hudson performed poorly on intelligence tests.

In summary, then, these studies have identified several factors which probably predict the relative pictorial perceptual abilities of African and other populations -- namely, formal education and other forms of exposure to modernity; childhood socialization and cognitive style; language; and intelligence. With regard to pictorial perception, two separate abilities have been identified -- namely, pictorial object recognition and depth perception. Each of these abilities is enhanced by increased exposure to modernity, suggesting that experience or learning is important for both. The above studies also indicated that overall pictorial depth perception is probably more dependent on prior experience than is object identification (cf. Hudson 1960; and Deregowski 1968).

Statement of the Problem

Based on the theoretical and empirical material discussed in the present chapter, several specific hypotheses have been proposed and investigated. The basic assumptions upon which these hypotheses were based are:

(1) The phenomenal and ideational orders of the individual are separate but linked;

(2) Change in the phenomenal order precedes change in the ideational order; and

(3) Ideational, or psychocultural, change is adaptive.

The general hypothesis that was investigated is that: Among the Baganda, change in observable behavior should be linked with change in the ideational order particularly with respect to perception. Specifically it was predicted that:

(1) Phenomenal modernization would be positively and significantly correlated with an increased ability to correctly identify objects represented in pictures;

(2) Phenomenal modernization would be positively and significantly correlated with an increased cognizance of cues that indicate pictorial depth; and

(3) Pictorial depth perception would be more dependent on phenomenal modernization than would be pictorial object recognition.

Summary

In Chapter I, literature has been reviewed which is pertinent to the present study of individual modernization among the Baganda of Uganda. As in other studies of individual modernization, a distinction has been made between the phenomenal order of observable behavior and the ideational order of cognition and the degree to which change in the former is related to change in the latter. Cross-cultural studies of perception have suggested that in modern society a visual sensotype or pronounced visual structuring of the ideational order may be important. On the other hand, in traditional societies in Africa and elsewhere a kind of auditory-proprioceptive sensotype may probably be more important. Research on correct pictorial perception, one variety of symbolic visual perception, has indicated that phenomenal modernization is positively related to an individual's increased use of information contained in pictures. The present thesis, therefore, will attempt to determine the degree to which phenomenal modernization is linked with ideational modernization or the emergence of a visual sensotype as indicated by an individual's relative ability to correctly identify pictorial objects and to make use of pictorial cues to depth.

CHAPTER II

POPULATION AND RESEARCH SITES

Population: The Baganda[10]

The Baganda live along the northern and western shores of Lake Victoria in Uganda (see figure 1). Luganda has been placed in the central branch of the Niger-Congo language family and is spoken by approximately one million Baganda. The former Interlacustrine Kingdom of Buganda includes the urban and peri-urban area of Kampala, which has a population of about 200,000 people (cf. Southwold 1965:86) of which nearly one half are Baganda (cf. Parkin 1969:11). These figures indicate that although many Baganda are urbanized, most are rural peasant cultivators.

Traditional Kiganda tribal culture and social organization has been comprehensively described (e.g. Roscoe 1911; Mair 1933; M. Fallers 1960; Southwold 1965), and several descriptions of urban social life in Kampala have been published (e.g. Southall and Gutkind 1957; Parkin 1969). Although it is not known if Baganda and other African cultivators were truly

---

10 The following prefixes, when added to the stem "Ganda", alter its meaning thusly:
- mu - refers to one person;
- ba - refers to two or more persons (e.g. the tribe);
- bu - refers to the tribal region;
- lu - refers to the language; and
- ki - refers to nonhuman objects or to customs relating to the Baganda.

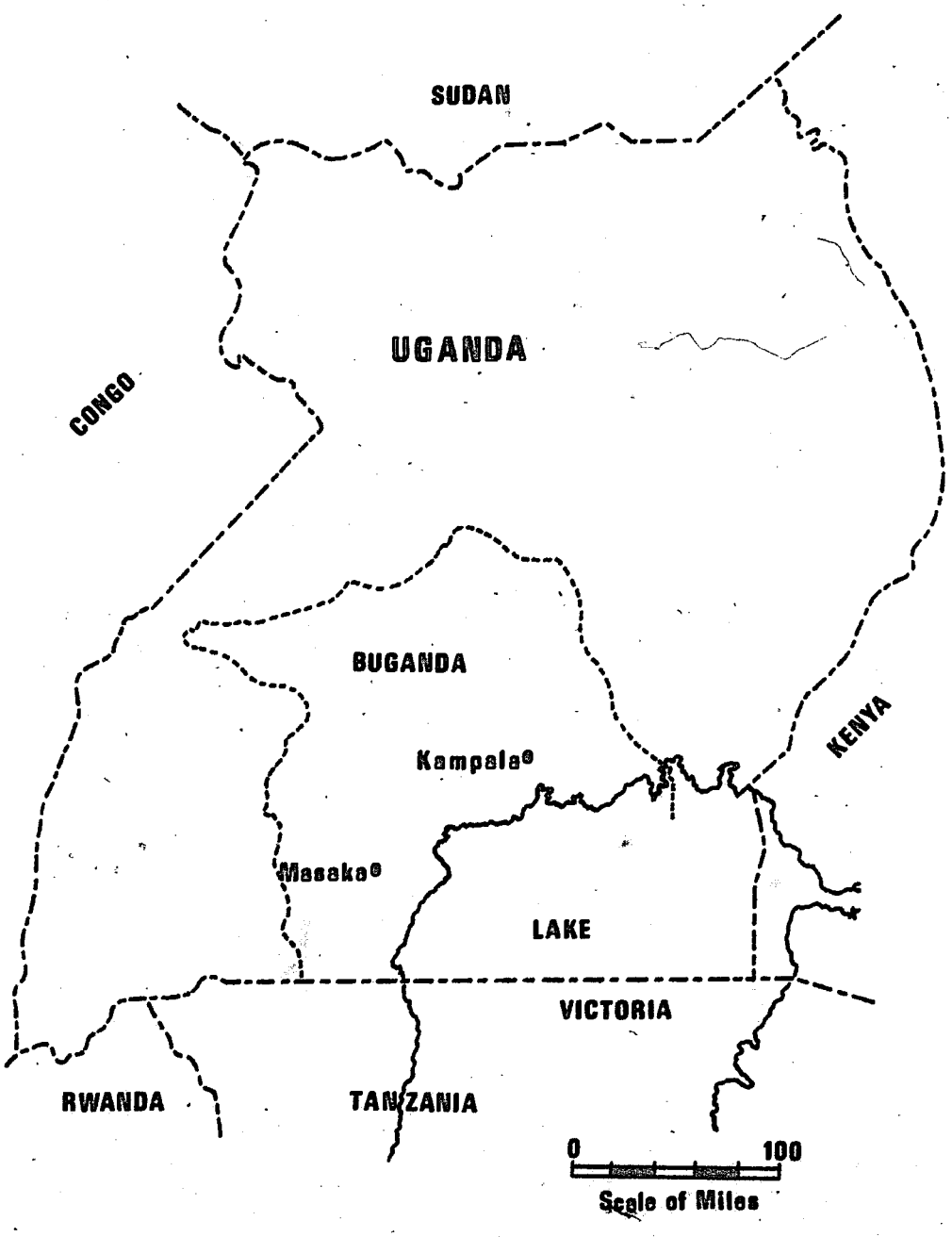


Figure 1. Map of the Buganda Region in Uganda.

"peasant" prior to European contact (cf. Fallers 1961a), it is clear that contemporary rural society conforms to the peasant model. That is, rural cultivators in Buganda repesent a kind of rural extension of a life style that is increasingly more patterned after modern urban-elite behavior.

Rural Research Site: Lusozi

All of the rural data reported in this thesis was collected among Baganda living in the parish of Lusozi (a pseudonym). Lusozi is located in the southwestern part of the former kingsom of Buganda approximately seventy-five miles southwest of Kampala and seven miles northeast of Masaka, a town of several thousand people. A small trade center lies intermediate between Lusozi and Masaka. Lake Victoria is about ten miles to the east and within visual distance of the community. Most residents of Lusozi are Baganda, but several other tribes live in this community and work for the Baganda as porters or herders, for example, the Bachiga, the Banyankole, and the Banyarwanda.

Although the parish is not a viable social unit, it is a political unit. Lusozi has a chief, who can be frequently seen riding about on his bicycle, visiting with parish residents, and in general keeping abreast of local gossip. He is responsible for tax collecting and sometimes informally arbitrates disputes arising over land use, theft, and

so forth. The parish is one of several such units which comprise a gombolola or sub-county. Several sub-counties, in turn, make up the saza or county of which there were probably ten or so in traditional Kiganda political structure. Unlike the parish chief, the gombolola chief, who lives in Lusozi, has little direct contact with the population. Instead, he delegates responsibility to lower level parish and village chiefs who do maintain direct and frequent contact with the people. The gombolola headquarters is, however, important in many aspects of local life. Court cases, for example, are heard there weekly, and many people attend to listen and discuss each case. A community center, whose construction was completed during our field stay in 1969, provides a physical locus and meeting place for several gombolola-wide voluntary associations, clubs, and special events. These include a craft club for women, which encourages the manufacturing of local crafts and continuation of other "traditional" activities such as Kiganda singing and dancing. Periodically shown at the community center are movies concerning such topics as health, modern farming techniques, etc.

The smallest territorial-political unit in Lusozi is the ekyalo or village. Each village has a chief, usually an older man, born and raised locally, but having little or no formal authority. Village chiefs, for example, usually accompany the parish chief or the sub-county police when

some conflict is reported in their village, but their role is usually that of mediator at best. One village chief, who is politically inactive, is thought by his constituents to be a Musezi or "night dancer" (a human being who travels about after dark eating dead bodies) and is feared by several people in his village.

The household is the basic socio-economic unit in Lusozi. Homes are usually dispersed along roads or paths and generally located amongst banana groves or gardens. Most homes practice small-scale agriculture of plantains (the staple) and a large number of other crops (e.g. potatoes, cassava, etc.), and many grow Robusta coffee as a cash crop. Males and females cooperate in land clearing; thereafter, females are primarily responsible for cultivation of subsistence crops, with males and porters being concerned with the growth and sale of cash crops. In addition to subsistence agriculture and cash cropping, part or full time specialties are practiced by many households. Quite frequently individuals are employed in the nearby trade center or in Masaka; while still others practice a trade in their homes or are employed in the local primary or secondary schools, hospital, or gombolola headquarters. Table 1 shows the major occupations by place of employment practiced by individuals in Lusozi.

Table 1. Monetary Occupations by Place of Employment

Lusozi	Trade Center or Masaka
Tea Grower	Gas Pump Attendent
Porter	Car Washer
Brewer	Office Boy
Hair Burner	Houseboy
Bark Cloth Maker	Housegirl
Carpenter	Houseguard
Midwife	Brick Layer
Tailor	Cook
Dukka Shop Owner	Car Machinist
	Petrol Supervisor
	Car or Truck Driver
	Nurse
	Doctor
Teacher	Teacher
Typist	Typist
Clerk	Clerk
Medical Helper	Medical Helper

Household composition in the parish is quite diverse. In 1967, Robbins and Kilbride conducted a social survey of 109 randomly selected households. This sample included 519 individuals or nearly one fourth of the parish population. Table 2 shows that "atomistic", "nuclear", and "expanded" households are all strongly represented in the sample. There were no reported cases of polygyny nor extended households in these sampled homes although a few cases are known. In table 3, age and sex distribution is presented for each household type.

It is in the home that the daily round of maintenance and social life unfolds; children and infants are cared for, gardens cultivated (most farms have three to five acres for farming), and visitors entertained. Heavy farm work is usually completed before the appearance of the noon sun, at which time food is prepared for use later in the day. In the afternoon women are seen visiting neighbors and friends, weaving mats and handbags, sewing (usually crocheting tablecloths and infants' dresses), or simply plaiting their hair. In the late afternoon and early evening, local bars bristle with conversation and social drinking, mostly by men returned from town or work although many women also frequent bars. Since about one third of the homes in our survey sample have porters who frequently perform a large part of the farming labor (usually the most difficult jobs of clearing the land and coffee picking), many males and females spend much time

away from the home visiting, marketing crops, going to trade centers and towns, or simply working at a full or part-time job.

Although most residents in Lusozi are rural peasant cultivators, household differences in the amount of land and wealth, occupation, and formal education have all contributed to intra-community social stratification.

Table 2. Frequency of Household Type in Lusozi

Household Type*	Number	Percentage of Sample
Atomistic	40	37%
Nuclear	33	30%
Expanded	36	33%
Total	109	100%

*An expanded household consists of a nuclear family and other people who are not members of that nuclear family. A nuclear household consists of a marital couple with or without their children. An atomistic household consists of individuals who do not form a nuclear or expanded family, such as lone women or men, fathers and their children, or mothers and their children (cf. Rodgers 1967:247).

Table 3. Age - Sex Distribution for each Household Category*

	Expanded				Nuclear				Atomistic			
	Male		Female		Male		Female		Male		Female	
Age	#	%	#	%	#	%	#	%	#	%	#	%
0 - 19	68	29.4	64	27.7	49	31.2	35	22.7	29	23.0	25	19.8
20 - 44	34	14.7	29	12.6	21	13.6	27	17.5	13	10.3	26	20.6
45+	20	8.6	16	6.9	14	9.1	9	5.8	11	8.7	22	17.4
Total	122	52.8	109	47.2	83	53.9	71	46.0	53	42.0	73	57.8

* Eight persons were excluded (two in expanded and six in atomistic households) from the total sample because data on age were unknown.

More than fifty percent of the adults responding to the social survey had some formal education (mean educational attainment for our sample was 3.36 years); some residents had finished secondary school and in a few cases, even university. A modern life style is practiced by those older residents having sufficient formal education and concomitant access to well-paying skilled or professional jobs and by those who own large mailo (one square mile) land estates and gain economic access by cash cropping (cf. Mafeje 1969). The modern material style of life of Lusozi's "rural elite" is clearly evident in their modern homes made of brick and cement and in their possession and use of automobiles, television sets, and so on. These individuals frequently travel widely in Uganda and elsewhere and participate in extensive personal networks which are frequently enhanced by living in Kampala for extended periods of time. The children of the elite families are, in turn, seemingly more modern than their parents. They have been raised in modern homes (unlike many older members of the elite), generally aspire to modern occupations, and overall seem less disposed than their parents to maintain traditional Kiganda customs. A third social category includes many younger individuals who have not been raised in elite homes and do not have a pronounced amount of formal education but who have, however, gained some economic access to modernity through some small entrepreneural activity (e.g. tailoring, operating a dukka or

small shop). These individuals participate in modern culture whenever possible and usually aspire to become more modern. Some, for example, have enrolled in "self-improvement", literacy, or university business extension courses.

Finally, some Baganda of all ages are somewhat marginal to both traditional and modern groups. Although these individuals are clearly more traditional than modern as indicated by, for example, their Kiganda material style of life, they remain somewhat aloof from full participation in community social behavior, generally preferring to associate with immigrant residents. These individuals frequently do not farm but gain a livelihood from some part-time activity such as wood cutting, running errands, working as porters, or engaging in illicit activities such as the brewing of alcoholic drinks or thievery.

Residents in Lusozi, like Baganda living elsewhere, have a rich expressive culture, particularly with regard to sophisticated forms of verbal art and a focus on music and dance. Tales, proverbs, riddles, and politico-historical myths are widely known and recited on innumerable occasions. In Buganda, we witnessed no formal occasions without speech-making. Men, and in some cases women, who are skilled at extemporaneous speech-making receive considerable prestige. The importance of conversation and verbal expression is socio-linguistically evident in the elaborate and lengthy

patterns of greeting and leave-taking which characterize the Baganda. It is not unusual, for example, for thirty minutes to elapse during recitation of the standardized salutations. A cultural focus on musical expression in Lusozi is quite prevalent. Fiddles, harps, several drums, shakers, and rattles are a few of the commonly played musical instruments. Daily, while walking through Lusozi, we have heard residents drumming or playing some other instrument, quite often as a diversion while drinking in a local bar or while watching men play omweso, a popular game of strategy. On more formal occasions, such as funerals or inheritance ceremonies, Kiganda drumming and singing in accompaniment to dancing can be heard for many miles around. The traditional dance, which is well-known by all Baganda, includes stereotyped hip and body movements to the accompaniment of drumming, singing, and clapping. Drumming is also used to warn of impending danger and to call parishoners to church.[11] While not everyone plays a musical instrument, virtually all residents can, and do, sing and dance with the exception of Balokole, conservative Christian Fundamentalists. The recent introduction of the radio and record player have added to an elaborate musical technology.[12]

---

[11]Most residents of Lusozi are either Catholic or Protestant (75%). Also, 15% are Moslem and 10% are "Pagan".

[12]See Robbins and Kilbride (N.D.) for a discussion of some social and psychological changes related to the adoption of these and other technological items by individuals living in Lusozi.

Unlike verbal and musical art forms, the plastic and graphic arts are not stressed in Lusozi. Margaret C. Fallers writes of traditional Kiganda artistic expression:

> There is a remarkable lack of representational decoration in Ganda work. No pictures or drawings exist; pots, baskets, shields, and bark cloth have rather pleasant essentially simple designs, but no representational decoration of any kind . . . There is a widespread interest in, and participation in music and simple dance in Buganda. There is a wide variety of instruments, and these play an important role in all funerals, weddings, and other important celebrations (Fallers 1960:44).

Furthermore, in a study which compared fifty-three African societies in the development of graphic and plastic art, eighteen "experts" ranked Kiganda art as "moderate low" or third on a four point index (cf. Wolfe 1969:4). Visual artistic expression consists of simple geometric designs appearing on baskets and mats. Several informants related to us that these designs have no meaning but are simply used for decorative purposes.

With modernization, a new pattern of expressive behavior is emerging. The more traditional emphasis on conversation, verbal art, and music is being supplemented and in some cases replaced by behavior of a more symbolic visual nature. Snoxall writes of contemporary Baganda:

> ... in daily dealings with the Baganda one cannot fail to be struck by the literacy of the people as a whole. There are for example numbers of vernacular newspapers for which there is considerable regular sale; there are hundreds and hundreds of letters written in the vernacular which find their way through the post stamped or unstamped, and which preserve the links of friendship between Baganda many hundreds of miles apart (Snoxall 1942:55).

In addition to reading printed matter in both Luganda and English, many individuals also attend the cinema in Masaka or more frequently at the local gombolola headquarters. Several more affluent residents own television sets, and many families own picture albums which are usually shown to guests or displayed for other special events. A few families own cameras as well. One man, in particular, enjoys taking photographs in his spare time, and while working in his store, sometimes makes and then sells photographs to his customers.

In general, possession and use of modern media varies with a person's social position. The relatively more educated and affluent individuals overall use them more than the more traditional. Many traditional individuals, however, do read printed matter, particularly in Luganda, and own a wide array of pictorial materials which are used primarily for decorative purposes. One man, for example, who speaks no English and is not literate possesses many pictorial items which are conspicuously displayed on the inside walls of his home. Table 4 shows the variety of pictorial materials that he owns.

Table 4. Inventory of Pictorial Materials owned by a Lusozi Peasant Farmer

Photographs (colored or black & white	Calendar Pictures	Polychrome Painting	Magazine or Calendar "cut outs"	Drinking Coaster
Informant as a young man	Pope Paul	School child and 2 men in a work scene	Gina Lolla-bridgida	black weight lifter
Informant with friends	Urban Scene		A Blonde Girl	
A Catholic Saint			A Black Girl	
Family friends from Europe and America			British Royal Family	
			Civet Cat	

Particularly evident are pictures cut from magazines and calendars. His home, like many other homes in Lusozi, contains several calendars which are quite old but useful for decorative purposes because thay are rich in pictorial representation. In addition to use as decorations, pictorial materials are also used to store valuable information. In Table 4, it can be seen that several photographs of the informant and family friends are present. The owner especially enjoys showing these photographs to visitors. At the same time, he requested that the researchers take a photograph of his dying wife so that he could have a pictorial remembrance of her.

In Lusozi, then, there is still a strong emphasis on verbal and musical forms of expression. With modernization, however, the more traditional patterns have been supplemented by behavior of a more symbolic, visual nature. Most residents have been exposed in one form or another to modern media and expressive behavior. Overall, however, individuals living in Lusozi are relatively traditional in comparison to individuals living in Kampala, which will be described next.

The Urban Research Site - Kampala

Adult Baganda living in Kampala were included in the present study to provide increased range of variation with regard to relative exposure to modernity. Kampala city conforms to the characteristic patterns observable in many

large urban settings. Paved streets lined with modern buildings and crowded with buses, cars, and pedestrians in modern attire present a striking contrast to the rural setting. Since the world of bureaucratic officialdom of the modern Uganda nation-state is found in Kampala, many urban Baganda are employed in modern professional or skilled occupations. Numerous commercial enterprises (e.g. department stores, restaurants, hotels) provide jobs for many other city-dwelling Baganda; therefore, urban Baganda overall have relatively greater access to and participate more fully in modern culture than rural Baganda.

In Kampala, modern communicative media are conspicuously present. Bookshops, camera shops, and radio and television shops, along with sidewalk magazine stands, are visible. Several movie theaters, including a drive-in cinema, are regularly attended by many urban residents. Pictures and photographs are also generally more evident in the urban than in the rural areas. Bars, restaurants, and other public places, for example, frequently contain photographs or wall-size murals. In the summer of 1969, many individuals were observed wearing shirts and dresses decorated with pictures of well-known dignitaries such as Pope Paul VI. Furthermore, urban residents are exposed to additional symbolic, visual stimuli in the form of advertisements on billboards and neon signs. Table 7 in Chapter III presents descriptive data with regard to ownership and use of modern communicative media

among urban, rural and school-going Baganda surveyed by the researcher. These data show that urban Baganda do, in fact, participate more fully in the newer visual, symbolic, phenomenal culture than rural respondents living in Lusozi.

The School Research Site

Students living in a rural boarding school were also included in the present study. The school setting includes modern buildings, a library, and weekly movies. The teaching staff is comprised of university educated Africans, Europeans, and American Peace Corp personnel. The program of instruction includes courses in art, geography, history, English, mathematics, chemistry, religion, etc. Although many of the students come from different parts of Uganda, many of them are Baganda. Most of the students have been raised in relatively modern homes as Table 7 shows. Their domestic environments are particularly rich in photographic materials. In comparison with residents from the rural and urban sites, students read more printed matter written in English. The students not only come from modern homes and participate in a modern institution, but they also aspire to attain modern occupations. Boys, for example, hope to become lawyers, doctors, teachers, and politicians. Many girls also indicated a preference for continuing their education beyond secondary school although some expected to become, for example, typists, or airline stewardesses upon

finishing secondary school. It was expected that the school site would provide the most modern individuals for comparative purposes.

Summary

This chapter has described the Baganda who comprised the population investigated in the present thesis. The Baganda are a rapidly modernizing society in Uganda, and individuals vary considerably with regard to relative participation in modern society. Data collected in a rural parish in Buganda indicates that considerable intra-community variation exists with regard to relative exposure to modernity. More specifically, many individuals continue to participate in traditional expressive patterns which emphasize verbal and musical expression while, at the same time, other residents are experiencing considerable behavioral exposure to modern, symbolic, visual media. Generally, such exposure is a function of social stratification within the community. Individuals from elite families and younger members of the community who have attained exposure to modernity through formal education and/or some entrepreneural activity have overall more exposure to the modern phenomenal order than do rural peasant cultivators. Although most Baganda are rural peasant cultivators, many Baganda are urbanized and many others are attending modern schools. Urban and school-going Baganda, in comparison to rural

Baganda have generally more access to printed matter, pictorial representation, and other forms of symbolic, visual media. Therefore, in addition to individuals from our rural research site, individuals from Kampala, and students were included in the present investigation of individual modernization in Buganda.

CHAPTER III

INDIVIDUAL MODERNIZATION IN BUGANDA

Middle Range Analysis

The approach to the study of individual modernization used in the present analysis attempted to establish correlations or links between conceptually distinct sets of empirical data. Middle range theory (e.g. Goodenough's distinction between the phenomenal and ideational conceptual orders) was used to order the data into distinct sets and to explain or predict potential links between each data set. This approach is similar to the work of, for example, Lerner (1958) and Rogers (1969) both of whom pursue a "middle range analysis" in their work on individual modernization. Work in the middle range eschews analysis of modernization by recourse to "grand" theory on the one hand and raw empiricism on the other hand where, for example, description, frequently without conceptual orientation, is the goal. In middle range analysis, the researcher postulates relationships which are empirically testable but which deal only with a rather limited particular type of behavior (cf. Rogers 1969: 42-48).

Following Rogers (1969), several essential terms will be used in the present analysis of modernization. Concepts are purposely abstract classes of somewhat general phenomena stated in their most basic terms. In this chapter, reference will be made to "formal education", "occupation","mass media

exposure", "pictorial depth perception", etc. It will be suggested that these concepts are all interrelated in the modernization process. Each concept will be empirically measured by reference to answers to direct questions or responses to picture test instruments. Responses will then be coded or scored as either "modern or traditional", "correct or incorrect", pictorial identification and so on. These empirical measures of concepts are similar to what Rogers (1969:47) labels operations. An additional term, dimension, will refer to any number of analytically interrelated concepts. Two dimensions have been postulated: a "phenomenal" modernization dimension and an "ideational" modernization dimension. Just as operations are empirical measures of concepts, the latter are in turn operationally defined as "belonging" to a specific dimension.

It should be noted that in the present investigation statistical analyses have been applied exclusively to operational data. Observed relationships between operations were then generalized to the conceptual and dimensional levels.

Procedures of Data Analysis

Statistical methods of data analysis have been used to discern patterned regularities within each dimension and to establish links between dimensions. The statistical approach followed is essentially multivariate and correlational. Three correlation procedures were used to discern interrelationships

and covariations between variables: Pearson's Product Moment Correlation, Spearman's Rank Order Correlation, and Factor Analysis. For a discussion of Pearson's Product Moment Correlation and Spearman's Rank Order Correlation see Guilford (1956) and Siegel (1956), respectively.

Factor analysis (see Rummel 1967) was selected to discern underlying patterns of covariation within each of the two modernization dimensions. Factor analysis addresses itself to the question, "What are the patterns of relationship between a number of empirical variables?" A factor is a general dimension that is found to recur in a number of empirical variables which share common variance and which, therefore, reflect a single dimension (a factor) causing the variables to associate with each other.

After factors have been elicited by factor analysis, the researcher must establish the "cause" or explain why some variables in a data set covary together or "belong" to the same factor. That is, each factor(s) needs to be identified and/or named. It was expected in the present study that factor analysis of operations in the phenomenal modernization dimension would yield one or more factors since individuals who are overall relatively more modern would probably give "modern" responses on many or all of the phenomenal operations. Individual responses to all or most of these operations, then, should covary together or belong to a common factor which could operationally

be labeled the phenomenal "modernization" factor. Similarly, a factor analysis of the pictorial responses would indicate which responses covary together, thus enabling one to identify underlying patterns of association or dimensions of pictorial perception.

The Independent Dimension: Phenomenal Modernization in Buganda

As was noted in Chapter II, the Baganda represent a population with considerable inter-societal variation with regard to relative exposure to and experience with modern culture. The Baganda have undergone rapid modernization beginning with contacts with Arabs and Europeans in the latter portion of the nineteenth century. Since that time socio-cultural change has been rapid and widespread. No aspect of Kiganda life remained unaffected by the forces of modernization (e.g. Fallers 1961b). Despite rapid and widespread diffusion of modern technology and social institutions in Buganda, there remains considerable intra-societal and inter-community variation vis-a-vis exposure, access and identification with modernity (Robbins et.al. 1969). That is, in rural Buganda one frequently observes in the same village individuals living in traditional thatched-roofed homes and garbed in traditional clothing (e.g. Busuuti and Kanzu) living in proximity to university education professionals. Ranging between these two extremes are considerable numbers of individuals displaying various amounts of behavioral participation in modern life.

With the expectation of linking pictorial skills to phenomenal experience, it was essential to first differentiate respondents along a dimension of individual phenomenal modernization. For this purpose a social survey interview consisting of 11 items was administered in conjunction with a picture test protocol to 197 Baganda (91 males, 106 females) living in Lusozi, in a rural boarding school, and in Kampala. It was necessary to include in the interview more than a single item since it was assumed that modernization cannot be adequately measured by a single variable or indicator.

> The modernization process is not unidimensional and therefore cannot be measured by a single criterion or index. . . Modernization should be viewed as a process involving the interaction of many factors, so that more than one aspect of an individual's behavior must be measured in order to determine his status on the modernization continuum . . . Therefore one must take a multivariate approach to operationalization (Rogers 1969:15).

Four criteria were considered in selecting each item:

(1) Face validity as a measure of behavioral phenomenological modernization;

(2) Theoretical expectation that each item would directly or indirectly indicate relative exposure to and experience with modern visually oriented communicative media;

(3) Comparative research which suggested that individual modernization includes broadly similar phenomena irrespective of place (e.g. Rogers 1969; Doob 1967; Inkeles 1969, etc.); and

(4) Past research among rural Baganda demonstrating the saliency of several items as useful indicators of individual modernization (cf. Robbins and Pollnac 1969; Kilbride and Robbins 1969; Robbins et. al. 1969).

The following eleven items were selected for social survey interview purposes. Each item has been operationally defined to measure relative participation in modern culture so that either a "modern" or "traditional" response is possible for each respondent on all items. It was further assumed that modern responses would indicate relatively more exposure to visual technology and culture than traditional responses. For each item a brief description is provided for the rationale of scoring each response as "modern" or "traditional" (see Table 5).

Item Number One: Residence. It was assumed that individuals living in urban Kampala, the physical locus of the introduction of modern institutions and material culture into Uganda, would be more modern than individuals living in rural Luzosi. Secondly, students in boarding school were assumed to be more modern than both urban and rural residents. It is primarily in the schools that modern culture and language (e.g. English) is stressed, the conventions of Western pictorial representation taught, and familiarity with pictorial content obtained. Other investigators have demonstrated the saliency of residence as an important factor causing psychological change in traditional society (e.g. Rogers 1969; Inkeles 1969).

Table 5. Individual Items Used to Construct Multivariate Modernization Index

Items Numbered	Response Ratings		
	Traditional	Intermediate	Modern
Residence (1)	rural	urban	school
Mass Media Exposure			
Television set (2)	absent		present
Camera (3)	absent		present
Radio (4)	absent		present
Photographs (5)	few		many
Attend Cinema (6)	never	occasionally	frequent
Total # of magazines and newspapers read(7)*	----	----	----
Total # of Luganda magazines and newspapers read(8)*	----	----	----
Total # of English magazines and newspapers read(9)*	----	----	----
Formal Education(10)*	----	----	----
Occupation (11)**	----	----	----

*Real numbers were used.

**See Table 6 for a listing of occupations within each occupational category and numerical modernization ratings of each category.

Items Two through Nine: Mass Media Exposure. Eight items were selected to measure relative exposure to modern mass media. Most of these items require the use of visual symbolic processes; therefore, possessing them was thought to be related to the development of visual perceptual skills.

Each respondent was asked to indicate if he owned a television set (#2), camera (#3), or radio (#4). A positive response was considered modern for each of these items. The number of photographs (#5) was also expected to vary directly with relative modernity, although many traditional people own them. Cinema attendance (#6) is an important modern recreational event. Kampala has several cinemas, including a "drive-in", and Masaka has one cinema. Schools and governmental agencies periodically show educational films for their constituents. Respondents were asked if they attended cinems "frequently", "occasionally", or "never". It was assumed that relatively frequent attendance would indicate a relatively more modern life style. Each respondent was also asked to name those magazines and newspapers (#7) that he regularly read. It was expected that a modern individual would purchase and read a greater number of those materials than a more traditional person. Furthermore, since several magazines and newspapers are available in English, the national language, it was expected that modern individuals would read comparatively more in this language. Therefore, reading materials were subdivided into two categories by language -- namely, number of magazines and newspapers read in Luganda (#8) and in English (#9). Other investigators (e.g. Doob 1961; Rogers 1969) provide evidence showing the importance of mass media as a factor related to psychocultural change in Africa and other developing areas.

Item Number Ten: Formal Education. Institutions of formal learning are present in increasing numbers in most modernizing nations. Many students of modernization (e.g. Inkeles 1969; Jahoda 1968) have noted that formal education in developing nations is the most important modern institution which produces behavioral and psychological change. Each respondent was, therefore, asked to report the number of years he had been to school. It was expected that relatively more past exposure to formal education would indicate a more modern life style.

Item Number Eleven: Occupation. In modernizing societies, having a modern job or occupation in addition to providing exposure also provides economic access to other aspects of modern culture and is, therefore, likely to be an important variable in predicting an individual's relative participation in modern culture. Inkeles (1969), for example, suggests that occupation, in addition to formal education and residence, is a key variable in "making men modern". In Buganda, the modern economy includes many new occupations that were unknown in traditional Kiganda society although many traditional occupations are still practised (See, for example, Fallers 1960, for a discussion of occupational variation among contemporary Baganda). Each respondent was asked to state his occupation. These occupations were then operationally classified, from least to most modern, into

traditional; unskilled and semi-skilled; nonprofessional, skilled labor; student; and professional categories. Table 6 presents the range of occupations within each of these five types. Table 7 presents summary descriptive data on the distribution of all of the above items by residence.

Analysis. Table 8 presents correlation coefficients between items used in the phenomenal modernization index. Squared multiple correlation coefficient values appear in the principal diagonal and are underscored. This value measures the percent of variation that can be accounted for or predicted for one item from all the others. A principal component factor analysis was performed. Only one unrotated factor was found which had an eigenvalue that exceeded unity (1.00). This factor was then orthogonally rotated to a varimax solution, and one rotated factor was found that accounted for 41% of the total variance. Table 9 shows the rotated factor matrix and loadings for each item. The emergence of a single factor indicated a tendency toward unidimensionality in the data or the presence of a single underlying pattern which accounted for much of the variance. This underlying pattern was labeled "phenomenal modernization" since a positive or relatively high score on each item had been scored as a "modern" response.

Factor scores were derived for each respondent (Rummel 1967:469). These scores are based on weighted responses

Table 6. Sample Occupational Index by Relative Modernization*

Occupational Categories				
Traditional(0)	Unskilled & Semiskilled(1)	Nonprofessional, Skilled Labor(2)	Student(3)	Professional(4)
farmer	urban unemployed	car machinist		librarian
housewife	pump attendant	petrol supervisor		nurse
rural unemployed	car washer	car or truck driver		newspaper editor
	tea worker	veterinary assistant		medical doctor
	office worker	typist		engineer
	domestic servant	electrician		teacher
	bar maid	dry cleaner		medical officer
	porter	clerk		
	guard	medical orderly		
	brewer	midwife		
	hair burner	tailor		
	brick layer	shop owner		
	cook	carpenter		
		builder		

*Occupational categories are ranked 0 - 4 or from less to more modern.

Table 7. Distribution of Items Used in the Phenomenal Modernization Index*

Item(No.)	Rural	Urban	School	Total Sample
Residence(1)	82	74	41	197
Own T.V. (2)	0	15	10	25
Own Camera(3)	4	17	21	42
Own Radio (4)	49	51	38	138
Mean # of Photo. on wall (5)	4	3	8	4
Attend Cinema(6)				
never	54	15	20	89
occasionally	22	30	15	67
frequently	6	29	6	41
Mean # of Mag. read (7)	1	2	2	2
Mag. read in Luganda(8)**				
yes	40	42	12	94
no	42	32	29	103
Mag. read in English(9)**				
yes	8	44	39	91
no	74	30	2	106
Mean yr. formal schooling(10)	4	9	10	7
Occupation(11)				
traditional	53	5	0	58
un-semiskill	12	24	0	36
nonprof.	15	29	0	44
student	--	--	41	41
professional	2	16	0	18

*Means have been rounded off to the nearest whole number.

**For purposes of analysis, the actual number read by each S was used.

Table 8. Correlation Coefficients between Phenomenal Modernization Items*

Items (No.)	1	2	3	4	5	6	7	8	9	10	11
Residence (1)	.603**										
T.V. Set (2)	.304	.255									
Camera (3)	.418	.360	.285								
Radio (4)	.257	.249	.286	.273							
Photos (5)	.269	.270	.248	.333	.186						
Cinema (6)	.469	.306	.249	.372	.166	.484					
# Mag. (7)	.524	.287	.321	.330	.230	.618	.786				
# Mag. Lug. (8)	-.112	-.058	-.100	.047	.042	.058	.343	.456			
# Mag. Eng. (9)	.667	.319	.412	.339	.227	.598	.757	-.110	.783		
Yrs. Educ. (10)	.492	.434	.417	.401	.269	.596	.658	.050	.686	.671	
Occupation (11)	.693	.382	.416	.418	.308	.539	.560	-.016	.651	.713	.680

*P at .05 level = .138; P at .01 level = .181.

**Squared multiple correlations are in the principal diagonal.

Table 9. Rotated Factor Pattern Matrix (Orthogonal Rotation)

Items (No.)	Factor (Phenomenal Modernization)
Residence (1)	.724
Television (2)	.466
Camera (3)	.518
Radio (4)	.480
Photos (5)	.361
Cinema (6)	.691
# Mag. (7)	.797
# Mag. Lug. (8)	.030
# Mag. Eng. (9)	.850
Yrs. Educ. (10)	.818
Occup. (11)	.818

since each item is more or less involved in the factor pattern. Each respondent was then ranked on his score or percent of involvement on the factor. Rankings were used to indicate the respondent's relative amount of phenomenal modernization. This dimension was then related to ideational modernization which will be discussed next.

Dependent Dimension: Ideational Modernization in Buganda

Visual perceptual and cognitive skills comprise part of the ideational level of human experience. As was pointed out above, modern culture is characterized by elaborate visual communicative media with relatively little auditory, tactile, and other sensory modalities stressed in communication. In modern culture, the ideational order itself tends to be largely visual in that a visual "sensotype" is present among modern individuals. Psychological modernization, then, is likely to be characterized by the appearance of a visual "sensotype" or increased availability of symbolic, visual skills such as those used in pictorial perception.

Two instruments were used to measure each individual's relative pictorial ability -- namely, the Hudson Pictorial Perception Test and the Kilbride Pictorial Perception Test. The Hudson test was selected to measure pictorial perceptual skills while the Kilbride test was developed primarily to determine the validity of the Hudson test. Discussion

of the Kilbride Pictorial Perception Test and the results of the validity test are presented in Appendix A. Because there was high agreement of subject responses on both picture tests, only data from the Hudson test need be reported in this chapter. Secondly, the Hudson test has been used elsewhere enabling the present analysis of results on this test to be of more general value than the Kilbride test which was developed specifically for Baganda respondents. A description of the Hudson Pictorial Perception Test will now be presented.

Hudson Pictorial Perception Test. The Hudson pictures are shown in Figure 2. These four pictorial representations contain a total of twelve test items:

Card one (items 1 - 7) contains six objects. Each subject was asked to identify each of these objects: the man (-),[13] the spear (1), the tree (2), the hill (3), the elephant (4), and the deer (5). Each subject was also asked, "Which animal is nearer to the man?" (6) and "Which animal is the man going to spear?" (7). A response "deer" to each was interpreted to mean use of an object size cue to pictorial depth. A response "elephant" was interpreted to mean no use of the depth cue.

Card two (item 8) contains the same objects as card one.

---

[13]This object was excluded from analysis in this chapter because all respondents correctly identified the man.

Each subject was asked, "Which animal is nearer to the man?" (8). A response "deer" was interpreted as use of a superimposition cue to depth while a response "elephant" indicated no use of such a cue.

Card three (items 9 - 10) contains a man, a spear, a tree, an elephant, a deer, and a road. Each subject was asked, "Which animal is nearer to the man?" (9) and to identify the road (10). Correct object identification and the response "deer" were interpreted to indicate use of a perspective cue to depth.

Card four (items 11 - 12) is similar to card three, with the exception of a less vertical representation of the road. Questions and scoring are similar to those for card three.

See Table 10 for a summary of the scoring procedure for the Hudson test.

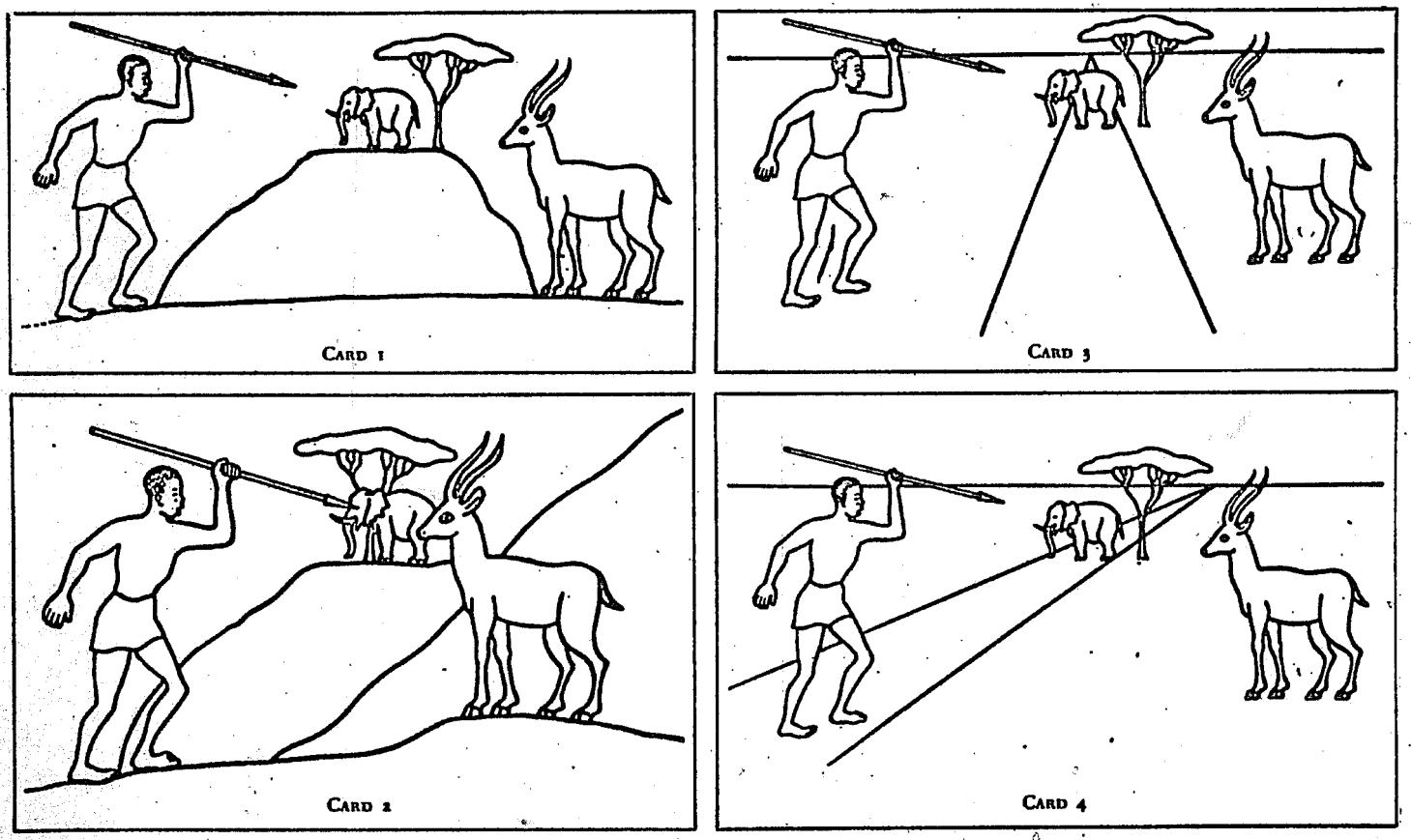


Figure 2. The Hudson Pictorial Perception Test

Table 10. Scoring Procedure for the Hudson Pictorial Perception Test

Response Number	Pictorial Perception Score	
	0 = Incorrect ID or 2D Response	1 = Correct ID or 3D Response
1	--------	spear
2	--------	tree
3	--------	hill
4	--------	elephant
5	--------	deer
6	elephant	deer
7	elephant	deer
8	elephant	deer
9	elephant	deer
10	--------	road
11	elephant	dear
12	--------	road

Collection of Data in Buganda

Data used in the present thesis was obtained during three months of field work in Buganda from June, 1969, through August, 1969, although a pilot study using the Hudson test was conducted during a six-month field stay in Buganda in 1967. Upon returning to Uganda in 1969, residence was reestablished in the rural Masaka area of Lusozi. A house was selected that was located near a combined school-hospital complex but within walking distance of several Kiganda villages. This location provided easy access to both students and non-school-going, adult Baganda. Living with the local population and participating in many of their activities afforded increased rapport leading to a reduction in tester - testee distance and a relaxed atmosphere during formal testing. A local bilingual girl was employed as a research assistant and testing was initiated soon after arriving in the community. Testing occurred in several locations including the investigator's home, the school, local homes, and in a nearby market. Each respondent was asked to respond to the social survey interview after which the Hudson and Kilbride pictorial tests were administered. All questioning and testing was in Luganda although the author, when testing in the local boarding school, was able to use English without the assistance of an interpreter. Several extended trips were

made to Kampala where, with the help of two Baganda, student research assistants, urban residents were tested. Table 11 shows by residence the number of Baganda who were tested in 1967 and in 1969.

Table 11. Total Number of Baganda Tested by Year and Residence

	Hudson Pictorial Perception Test				Kilbride Pictorial Perception Test			
Year	Rural	Urban	School	Total	Rural	Urban	School	Total
1967	189	118	216	523	---	---	---	0
1969	82	74	41	197	82	74	41	197
				720				197

Findings and Analysis. Table 12 shows that the number and percent of correct object identifications (items 1 - 5, 12) and three dimensional responses (items 6 - 11) are largest for the school population, intermediate for the urban population, and lowest for the rural population. Relatively higher frequencies of three dimensional responses by the two more modern groups and the strikingly low number of rural three-dimensional responses on all depth items show that pictorial depth perception is probably largely learned with increased phenomenal modernization. Overall, however, inter-sample differences on object identification are not particularly pronounced. The most frequent misidentifications for

items one through five are presented in Table 13. As was noted earlier, all 197 respondents irrespective of residence were able to correctly identify the man in card one. This finding, in addition to overall success regarding pictorial identification for each sample, suggests that perception of pictorial objects is less dependent on learning or modernization than is pictorial depth perception. Inability to identify some objects may be due in part to an inability to interpret relationships between objects represented in pictures -- a skill no doubt acquired after sufficient experience with pictorial representation. Some respondents, for example, identified the "tree" in card one as a "flower" although these same respondents had correctly identified the "elephant". It would follow from this latter correct identification that the flower "should be" a tree because of its relatively large size vis-a-vis the elephant.

Table 12. Number and Percent of Correct Responses on the Hudson Test by Residence

	Residence					
	Rural (N=82)		Urban (N=73)		School (N-42)	
Items	N	%	N	%	N	%
1	78	95	73	100	42	100
2	67	82	70	96	42	100
3	55	67	64	88	42	100
4	69	84	73	100	42	100
5	59	72	69	95	39	93
6	9	11	23	32*	19	45
7	3	4	28	40*	17	40
8	13	16	22	30	29	69
9	4	5	21	29*	19	45
10	5	6	35	49*	23	55
11	7	9	18	25	23	55
12	42	51	56	77	37	88

*Percentage figure has been adjusted to account for missing data.

Table 13. Range of Pictorial Misidentifications for Hudson Test Items

Item	(No.)	Range of Misidentifications
Spear	(1)	pencil
Tree	(2)	table, flower, boat
Hill	(3)	stone, plate, house, tree, lake
Elephant	(4)	hippopotamus, rhinoceros, cow, buffalo
Deer	(5)	horse, cow, goat
Road	(12)	steps, fence, bridge, hill, tree, pick, arrows, sea, sunrays, boat, wires, rope

Similar to the analysis of data in the phenomenal modernization dimension, the Hudson items were factor analyzed. Table 14 presents correlation coefficients between items on the Hudson Pictorial Perception Test. Squared multiple correlation coefficient values appear in the principal diagonal and are underscored. A principal component factor analysis was performed which yielded two factors with eigenvalues exceeding unity. These factors were then orthogonally rotated to a varimax solution and two factors were found which accounted for 21% and 15% of the total variance, respectively. Table 15 shows both factors and item loadings on each factor. Each item was then assigned to either factor on the basis of its relative loadings on both factors; that is, items 1 - 5 belong with factor 2 since they all load

highest on this factor relative to their loadings on factor 1. Similarly, items 6 - 11 belong on factor 1 since they, in turn, have their highest loadings on this factor. Item 12 has a "split" loading and cannot be clearly assigned to either factor.

This analysis suggests that two independent dimensions or underlying patterns are explaining variation in the Hudson data. Since all of the items belonging to factor 1 are pictorial depth responses, this factor was named the "pictorial depth perception factor". Similarly, since each item belonging to factor 2 is an object identification response, this factor was named the "pictorial identification factor". Twenty percent of the cumulative proportion of the total variance is explained by variation in the depth factor compared with 15% explained by variation in the identification factor. As expected, item 12 (the road on card four) belongs to both factors since its correct identification is clearly dependent on use of the linear perspective cue.

Factor scores were calculated for each respondent on both factors. Respondents were then ranked by their scores or their degree of involvement on each factor. These rankings were then used to indicate each respondent's relative amount of perception of pictorial depth and pictorial object identification, respectively. These two independent aspects of pictorial perception together

constitute what has been called "ideational modernization". In the next section, linkages will be examined between the phenomenal modernization dimension described in the previous section and each separate pattern of pictorial perception -- namely, pictorial depth perception and pictorial object identification.

Table 14 Correlation Coefficients for the Hudson Pictorial Test Items*

Correct Response	Item (No.)	1	2	3	4	5	6	7	8	9	10	11	12
Spear	(1)	.378											
Tree	(2)	.202	.211										
Hill	(3)	.269	.394	.314									
Elephant	(4)	.592	.213	.333	.417								
Deer	(5)	.164	.252	.320	.257	.184							
Deer	(6)	.060	.184	.217	.097	.156	.275						
Deer	(7)	-.064	.138	.178	.045	.152	.419	.321					
Deer	(8)	-.017	.187	.159	-.043	.040	.367	.390	.329				
Deer	(9)	-.017	.166	.121	.209	.188	.346	.385	.417	.369			
Road	(10)	.091	.187	.317	.135	.258	.325	.362	.284	.396	.396		
Deer	(11)	-.062	.179	.093	-.052	.092	.327	.373	.448	.512	.429	.398	
Road	(12)	.066	.139	.246	.170	.139	.120	.104	.171	.200	.403	.190	.202

*P at the .05 level = .138; P at the .01 level = .181.

Table 15. Rotated Factor Pattern Matrix (Orthogonal Rotation)

Correct Item Response (No.)		Factors: Depth Perception	Factors: Object Identification
Spear	(1)	-.130	.628
Tree	(2)	.235	.403
Hill	(3)	.224	.556
Elephant	(4)	-.072	.695
Deer	(5)	.187	.403
Deer	(6)	.526	.166
Deer	(7)	.592	.067
Deer	(8)	.607	.067
Deer	(9)	.649	.017
Road	(10)	.578	.292
Deer	(11)	.678	-.009
Road	(12)	.292	.265

Results: Correlation between Phenomenal and Ideational Modernization in Buganda

The Spearman Rank Order Correlation Coefficient was selected to determine the strength of association among relative rankings of respondents on the three factors discussed in the previous two sections.[14] Ranks were determined for each respondent on each factor by ranking from high to low each factor score. For each factor, then, 197 respondents were ranked so that their relative rankings could be compared across factors. After each respondent was ranked on all three factors, Spearman rank order correlation coefficients were computed to indicate the strength of association among the relative rankings on the factors.

Table 16 presents Spearman rank order correlation coefficients. These values clearly indicate that:

(1) Phenomenal modernization is positively and significantly related to pictorial depth perception (.58);

(2) Phenomenal modernization is positively and significantly related to correct pictorial object identification (.56);

---

[14]Intercorrelations of all items used in both scales can be found in Appendix B.

(3) Pictorial depth perception and correct pictorial object identification are positively and significantly related (.36);

(4) A stronger relationship obtains between phenomenal modernization and pictorial depth perception than between the former and correct pictorial object identification; and;

(5) The weakest relationship obtains between pictorial depth perception and correct pictorial object identification.

These results and their implications will be discussed in the next chapter.

Table 16 Spearman Rank Order Correlations among Phenomenal Modernization, Pictorial Depth Perception, and Object Identification*

	Depth Perception	Identification
Identification	0.360	
Modernization	0.583	0.556

*P at .05 level = .118; P at .01 level = .166.

Summary

Chapter III has presented a middle range analysis of individual modernization using empirical data collected among the Baganda of Uganda. Factor analysis of individual responses to a social survey interview containing items measuring relative phenomenal exposure to modern culture generated one factor which was named the "phenomenal modernization dimension". Factor analysis of the responses of these same individuals to the Hudson Pictorial Perception Test resulted in two factors which were named the "pictorial depth perception" and "pictorial object identification" factors. These two factors comprise what has been identified as the "ideational modernization dimension". A test of the degree of association between individual ranks on the three factors indicated that there is a positive and significant link between phenomenal and ideational modernization in that both pictorial depth perception and object identification are significantly related to phenomenal modernization.

CHAPTER IV

DISCUSSION

The data presented in the previous chapter provide empirical support for the hypotheses stated in Chapter I and overall indicate that:

(1) Among Baganda individuals studied in the present investigation, change in observable behavior (the phenomenal order) is linked with change in the ideational order, or the development of pictorial perceptual skills;

(2) Phenomenal modernization is related to an individual's increased ability to correctly identify objects represented in pictures;

(3) Phenomenal modernization is related in an individual's increased use of pictorial depth cues; and

(4) Correct pictorial object identification is less dependent on phenomenal modernization than is the use of pictorial depth cues.

Each of these findings will now be discussed.

Phenomenal Change and Ideational Change

The present analysis of individual modernization has indicated that change in the more overt behavior of an individual is related to change in his covert ideational structure. At the most abstract level, change in both orders,

or individual modernization, occurs in response to the development process. In Uganda, development or the national proliferation of modern technology, communication systems, occupations, etc. has caused a modification in the total Kiganda artifactual environment. This environmental modification, in turn, has resulted in new behavioral or artifactual experiences for many individuals and a concomitant shift in ideational culture for some. More specifically, a reasonable description of the change process suggested by the present study is that individuals are first exposed to modern symbolic visual media in schools, then in certain occupations, through the mass media, and so on. This is probably sequentially followed by increased use of visual symbolic cognitive skills although increased availability of these skills, in turn, is probably instrumentally related to an individual's increased behavioral exposure. For example, upon acquiring the ability to decode pictorial information, individuals might consciously seek out appropriate phenomenal experiences that require the use of symbolic visual skills such as purchasing magazines and photographs. Thus, one might assume that a feedback system exists between the phenomenal and ideational orders (cf. Graves 1967:347).

Although linkage between the phenomenal and ideational orders is supported by our results, the problem of causal direction has not been empirically measured. It is suggested, however, that the most reasonable way to explain concordance

between an individual's increased behavioral exposure to modernity and his increased use of visual symbolic skills is to assume causal priority for the former. It seems less reasonable to suggest that some "traditional" individuals possess visual symbolic skills and then become behaviorally more modern with regard to, for example, urban residence, acquiring a modern job, purchasing much printed matter, and so on. This viewpoint would not explain why some Baganda prior to relevant phenomenal experiences posses visual symbolic abilities while others do not. Even though causal priority has been given to phenomenal behavior, direction remains an open question which cannot be ultimately settled until longitudinal studies of the modernization process are undertaken (cf. Rodgers 1969).

Phenomenal Modernization and Pictorial Perception

The present study has provided additional empirical support for the proposition that phenomenal modernization is a major experiential factor in an individual's acquiring pictorial perceptual skills. Modernization in Buganda is related to both an individual's increased cognizance of cues which symbolically indicate pictorial depth and to his increased ability to correctly identify objects, particularly when identification depends, in part, upon perception of relationships between objects. When correct object identification, however, does not require symbolic or analytical

skills, modernization as an experiential factor is less important. All individuals, for example, were able to correctly identify the human figures appearing in both picture tests. Overall, then, among our Baganda sample the recognition of familiar objects appears to be unrelated to modernization or prior learning; whereas, pictorial skills of a more abstract symbolic cognitive nature are related to relevant learning experiences, for example, sufficient exposure to modern culture, particularly through the schools.

It was pointed out in Chapter I that formal education is probably one salient and important factor related to successful perception of pictorial stimuli. Several studies have also shown that more informal kinds of exposure to modernity are also important. Similarly, the present study found that in Buganda both formal education and informal factors were important in predicting an individual's success with pictures. Appendix B shows that several factors in addition to formal education were consistently related to successful performance on the Hudson Pictorial Perception Test -- namely:

(1) Residing in a comparatively modern community;

(2) Reading magazines, particularly those printed in English;

(3) Engaging in a relatively more modern occupation; and

(4) Attending the cinema.

A reasonable interpretation of the process by which an individual develops facility with pictures is that pictorial skills are first obtained in school and then used, by many individuals, in their work or leisure time activities. For some individuals, however, formal education per se is insufficient in the absence of subsequent exposure to visual symbolic media. It is doubtful that the development of pictorial skills is enhanced greatly by simply being exposed to visual media in the absence of formal education. Appendix B shows that merely having photographs in one's domestic environment may not be related to success on the Hudson test, particularly with regard to the use of depth cues. Therefore, it seems unlikely that simply being exposed to visual materials, in the absence of formal instruction in their correct use, is sufficient for the development of pictorial skills. It was also pointed out in Chapter I that language, intelligence, and cognitive style may be related to pictorial perception. DuToit (1966) indicated that language might be important since Bantu languages often lack elaboration in vocabulary related to pictorial representation. Some support for DuToit's suggestion has been found by the present investigator. Appendix B shows that reading magazines in English is strongly related to success on the Hudson test while reading magazines in Luganda is not consistently related to success, particularly with regard to the use of depth cues. This suggests that in Buganda knowledge of English is probably an important factor.

We turn now to a discussion of some of the implications arising from our central finding that phenomenal modernization in Buganda is related to the development of pictorial perceptual skills.

Implications: Theoretical

Basic to research on psychological functioning including perception is the controversy of "nativism versus empiricism;" that is, how much of what we see, think, and feel can be attributed to the functioning of intrinsic psychophysiological factors and how much is to be attributed to learning (see Segall et. al. 1966, for a discussion of the nativism-empiricism controversy particularly with regard to visual perception). Since human populations frequently differ according to what individuals are required to learn, by comparing each population's performance on selected perceptual tasks, a kind of "natural laboratory" exists for assessing the degree to which differential learning influences perception. If differential perception varies concomitantly with differences in culturally constituted learning, then it follows that the empiricist's position is considerably strengthened. The present study overall provides empirical support for the empiricist's position. It was found that the more traditional Baganda lack visual symbolic perceptual skills. This finding is not surprising since, until recently, Kiganda phenomenal culture emphasized other sensory modalities in communication and many aspects of daily life. On the

other hand, individuals living in the modern world where visual symbolic technology is dominant displayed a related visual sensory elaboration. Our evidence indicates that as Baganda individuals become more modern, a reordering of their sensory world occurs in the direction of modern men living elsewhere. Symbolic visual skills are used increasingly more by modern Baganda in comparison to more traditional Baganda. Therefore, it seems probable that sensory modality elaboration is largely plastic and essentially modifiable through relevant learning experiences such as those involved in phenomenal modernization. As pointed out in Chapter I, Doob (1960), Rogers (1969), Inkeles (1969), and others have indicated that modern individuals everywhere learn or acquire similar psychological attributes. Our study suggests that a visual sensotype is likely to be learned as individuals become more modern.

All Baganda individuals irrespective of their past exposure to pictorial materials were able to "see" objects in pictures and experienced no difficulty in correctly identifying familiar objects. This finding supports Hochberg's (1962) assertion that the recognition of familiar objects represented in pictures may be possible without learning or may in fact be "nativistic". However, since relatively more traditional Baganda do not perceive pictorial content when perception depends upon symbolic use of depth cues or cognizance of relationships between portrayed objects, these

skills are probably not available to individuals in the absence of sufficient prior experience with pictures. Therefore, both nativists' and empiricists' positions with regard to pictorial perception can be partially supported by our findings.

Implications: Methodological

Methodological individualism formed the basic strategy for the analysis of modernization in Buganda. By focusing on the individual at both the theoretical and empirical levels, it was possible to deduce from theory the most probable order of empirical data and to, in turn, relate data back to theory. That is, a constant feedback was maintained between theory and empirical data centering around the individual as the unit of analysis. Moreover, our assumption that the individual <u>is</u> the locus of both phenomenal and ideational culture and change directed us to collect empirical data from the <u>same</u> individual with regard to each kind of change. Consequently, phenomenal change was not measured on one sample of individuals and then related to ideational change in another group of individuals. Perhaps the greatest strength of methodological individualism is the increased likelihood that overlapping samples will be sought in data collection when two or more independent phenomena are being related to each other.

Considerable attention has centered around the availability of a psychological test for use in comparative research. Experience has indicated that most tests are

probably not "culture free" or even "culture fair". The Hudson test, however, appears to be relatively culture free. The instrument has now been administered with similar results in widely separated parts of the world both in Africa and elsewhere.[15] Individuals in all societies where the test has been used, consistently make two-dimensional judgments in the absence of exposure to modern phenomenal culture; whereas, three-dimensional judgments occur with modernization. A kind of psychic universal seems to exist with regard to pictorial perception, and the Hudson Pictorial Perception Test is a suitable instrument for its measurement.

This investigation has combined both anthropological and psychological approaches to the study of individual modernization in Buganda. When attention is directed upon the individual as he experiences psychological change in a nonwestern society, then collaboration between anthropology and psychology is likely to be beneficial (see Doob 1965). In this investigation, the primary testing instrument used was developed by a psychologist. Several other psychologists, in turn, had observed that individuals lacking exposure to modern culture performed differently on the test than did individuals who were more modern. Less modern environments were described by these psychologists as being, for example,

---

[15]The Hudson test has been administered in South Africa, Ghana, Sierra Leone, Zambia, Uganda, rural Pennsylvania, and among Seminole Indians living in Florida.

"pictureless" or "culturally isolated" (presumably from modern culture). It appeared to the anthropologist that more specific information with regard to background factors would be necessary to more completely interpret the role of culturally consituted experience in influencing responses to the Hudson test. Therefore, collaboration between anthropologists and psychologists seemed likely to be the most productive for the measurement of both the dependent dimension (pictorial perception) and the independent dimension ("background" factors).

Furthermore, methodological collaboration ensures that test instruments developed by psychologists will be modified, if necessary, to employ objects that are familiar and meaningful to the individuals being tested. In Appendix A, individual responses on the Hudson test were compared to responses on photographs containing more familiar content for the Baganda. These data indicated that the Hudson test is valid for measuring pictorial perceptual skills among the Baganda.

Implications: Practical

As indicated in Appendix A, the author examined the degree to which poor performance on the Hudson Pictorial Perception Test predicts poor performance on more commonly used pictorial materials (e.g. colored photographs). It was found that Baganda individuals who were unsuccessful on the Hudson test also did poorly when additional pictorial infor-

mation was made available to them. This strongly suggests that many Baganda do indeed lack important pictorial perceptual skills.[16]

In Uganda, however, like developing nations elsewhere, pictorial propaganda is commonly used to communicate information in schools, for marketing, for accident prevention, and in agricultural and political education. Our finding that many Baganda experience difficulty in decoding pictorial messages immediately suggests that efforts to communicate information to them through visual symbolic media is likely to be unsuccessful. If successful communication is to be obtained, it will probably be necessary to either teach the necessary symbolic skills upon which the correct use of pictures depends or to redirect the communicative media itself so that information is communicated through non-visual modalities. An extensive program of adult education, for example, wherein individuals are formally instructed in the correct use of pictures would no doubt be useful. Our data clearly indicate that pictorial perceptual skills can be learned subsequent to relevant experience, most

---

[16] The Hudson test's validity was investigated by two other researchers. Hudson (1960) found agreement in subject response between his test and a photograph. Deregowski found that two-dimensional perceivers on the Hudson test were able to construct three-dimensional models of objects which they had seen represented three-dimensionally in a black and white line-drawn picture. From this finding he concluded that, "It is probably illegitimate to extrapolate from Hudson's findings to all types of pictorial materials" (1968:203).

notably through formal education. The solution, therefore, is one of making available the opportunity to learn their use. If communication is to utilize already existing sensotypes, then more attention should be given to verbal-auditory channels. In this regard, radio propaganda would probably be more efficient than efforts to communicate information through printed matter, motion pictures, television, and so on.

A further implication arising from the relative unavailability of visual symbolic skills for Baganda individuals is that efforts to measure intelligence through the use of standard I.Q. tests might not be relevant. Cryns (1962) notes that Africans in comparison to Europeans generally do poorly on intelligence tests. He further notes, however, that virtually all of the tests require the manipulation of visual symbolic content. It seems probable, therefore, that poor performance on such tests is related to a weakly developed visual sensotype in many African populations rather than to a deficiency in "intelligence". Thus, if I.Q. tests are to be used in Uganda as a basis for testing the suitability of individuals for recruitment into industrial or other occupations, then it is unlikely that intelligence tests, which are essentially yardsticks of western intelligence, will be very useful. If intelligence tests are to be used, it would probably be necessary to devise appropriate tests which account for different sensory modality elaboration.

Biesheuvel (1953) has expressed the same opinion in suggesting that concepts of intelligence must account for cultural variation in "profile of abilities".

Implications: For Future Research

The investigator's study of pictorial perception among the Baganda has raised several questions which can only be satisfactorly answered by further research. The following points, in particular, merit future study in Buganda and elsewhere:

(1) Longitudinal data is needed in order to more completely measure the development of an individual's pictorial perceptual skills at specific key points in the modernization continuum. Individuals, for example, should be tested before and after exposure to formal education, entrance into a modern occupation, establishing an urban residence, and so on. In this way, preliminary statements based on cross sectional data can be verified. Furthermore, longitudinal research should be directed at discovering empirically whether phenomenal change, as we have assumed, does indeed precede ideational change;

(2) Each of the experiential factors found to be related to an individual's pictorial perceptual skills should be intensively investigated so that the relevant

aspect of each factor with regard to the learning of pictorial perceptual skills can be isolated;

(3) The relationship between pictorial perception and visual space perception should be investigated since failure to use cues may also be related to a more general lack of ability to use them in space perception;[17]

(4) The Hudson test and other picture tests could profitably be administered more widely in our own society to validate the assumption that "modern man" does indeed possess a visual symbolic sensotype. Preliminary work by the author suggests that many Americans do not correctly perceive pictorial content;

(5) There is considerable evidence which suggests that Baganda, particularly those who are less modern, probably have an auditory-proprioceptual sensotype. Research should be directed at measuring the degree to which Baganda excel on perceptual tests of both audition and proprioceptual behavior. Recent research by Kilbride et. al (1969) has indicated that Baganda infants are precocious in their sensory motor development. Moreover, possible linkages between phenomenal modernization and verbal, proprioceptual performance should be investigated. Tests of verbal vs. visual abilities would be particularly pertinent.

---

[17] Colin Turnbull (1962) presents tentative data which suggests that pygmies may not use the object size cue in their perception of spacial depth.

SUMMARY

This chapter has presented a discussion of the hypotheses investigated in this thesis. Change in observable behavior was found to be linked with change in the ideational order or the development of pictorial perceptual skills among Baganda individuals. The most salient phenomenal modernization factors related to pictorial perception were discussed. They included formal education in addition to other informal factors. The major informal factors found to be consistently related to successful pictorial perception were: residing in a modern community; reading magazines printed in English; engaging in a relatively more modern occupation; and attending the cinema. Pictorial perception was found to include two dimensions, namely -- pictorial object identification and depth perception, which were shown to be differentially related to the above experiential factors.

Implications arising from our findings were discussed and suggestions were made for future research. The major theoretical implication was that our data provides partial support for both the empiricists' and nativists' positions with regard to pictorial perception. Major methodoligical implications included support for: the methodological individualism strategy for the study of modernization; methodological collaboration between psychology and anthropology; and the likelihood that the Hudson Pictorial Perception Test is a "culture free" test. The major practical implication was that: successful communication in Buganda

may be enhanced by programs of adult education directed at teaching pictorial perceptual skills or the redirection of the communicative media itself to more effectively utilize already existing sensotypes. Finally, determination of the degree to which an auditory-proprioceptual sensotype is present in Buganda is an important matter for future research.

CHAPTER V

SUMMARY AND CONCLUSIONS

The present study examined individual modernization among the Baganda of Uganda. As in other studies of individual modernization, a distinction was made between the phenomenal order of observable behavior and the ideational order of cognition and the degree to which change in the former is related to change in the latter. Cross-cultural studies of perception suggested that in modern society a visual sensotype or pronounced visual structuring of the ideational order is important. On the other hand, in many traditional societies in Africa and elsewhere, auditory-proprioceptive sensory elaboration is probably more important. In Buganda traditional forms of communication and expressive patterns emphasize verbal and musical behavior. At the same time, there is a notable lack of visual, symbolic representation in art and other forms of material culture. Many modernizing Baganda, however, have experienced considerable behavioral exposure to modern, symbolic, visual media in the form of printed matter and pictorial representation. Therefore, the author investigated the degree to which phenomenal or behavioral modernization is linked with ideational modernization or the emergence of a visual sensotype as indicated by an individual's relative ability to correctly identify pictorial objects and to make use of pictorial cues to depth.

Factor analysis of individual responses to a social survey interview containing items measuring relative phenomenal exposure to modernity generated one factor which was named the phenomenal modernization dimension. Factor analysis of the responses of these same individuals to the Hudson Pictorial Perception Test resulted in two factors which were named the "pictorial depth perception" and the "pictorial object identification" factors. These two factors were labled the ideational modernization dimension. A test of the degree of association between individual ranks on the three factors indicated a positive and significant link between phenomenal and ideational modernization in that both pictorial depth perception and object identification were found to be significantly related to phenomenal modernization. Particularly important aspects of phenomenal modernization with regard to successful pictorial perception were found to include: possessing a formal education; residing in a modern community; engaging in a modern occupation, reading much printed matter; and attending the cinema.

These conclusions were considerably strengthened by our finding that an individual's response on the Hudson test correlated highly with his response on a photographic perception test containing more information (e.g. color), which the author constructed to include familiar objects and cues to depth similar to those contained in the Hudson test. It was concluded from these findings that modernizing individuals possess a generalized ability to decode pictorial information

from a variety of representational stimuli. On the other hand, relatively less modern individuals possess a general lack of pictorial perceptual ability irrespective of the nature of the pictorial representation.

BIBLIOGRAPHY

Abrahams, R. D.
1967 The shaping of folklore tradition in British West Indies. Journal of Inter-American Studies 9:456-480.

Ainsworth, L. H.
1959 Rigidity, stress, and acculturation. Journal of Social Psychology 49:131-136.

Albert, E. M.
1964 Rhetoric, logic, and poetics in Barundi; cultural patterning of speech behavior. American Anthropologist 66:35-55.

Allport, G. W., and T.F. Pettigrew
1957 Cultural influence on the perception of movement: The trapezoidal illusion among Zulus. Journal of Abnormal and Social Psychology 55:104-113.

Biesheuvel, S.
1942 African intelligence. Johannesburg, South African Institute of Race Relations.
1953 The study of African ability. African Studies 11:45-58, 105-117.

Chance, N. A.
1965 Acculturation, self-identification, and personality adjustment. American Anthroplogist 67:372-393.

Cryns, A.
1962 African intelligence: a critical survey of cross-cultural intelligence research in Africa south of the Sahara. Journal of Social Psychology 57:283-301.

Dawson, J. L. M.
1967 Cultural and physiological influences upon spatial-perceptual processes in West Africa. International Journal of Psychology 2:115-128, 171-185.

Deregowski, J. B.
1968 Pictorial recognition in subjects from a relatively pictureless environment. African Social Research 5:356-364.

Devos, G. A., and A. E. Hippler
1969 Cultural psychology: comparative studies of human behavior. In The Handbook of Social Psychology. G. Lindzey and E. Aronson, eds. London, Addison-Wesley Publishing Company.

Doob, L. W.
1960 Becoming more civilized. New Haven, Yale University Press.
1961 Communication in Africa. New Haven, Yale University Press.
1964 Eidetic images among the Ibo. Ethnology 3:357-363.
1965a Psychology. In The African World. R. A. Lystad, ed. New York, Frederich Praeger, Publishers.
1965b Exploring eidetic imagery among the Kamba of Central Kenya. Journal of Social Psychology 67:3-22.
1966 Eidetic imagery: A cross-cultural will-o'-the-wisp? Journal of Social Psychology 63:13-34.
1967 Scales for assaying psychological modernization in Africa. Public Opinion Quarterly 31:414-421.

DuToit, B. M.
1966 Pictorial depth perception and linguistic relativity. Psychologia Africana 11:51-63.

Evans, J. L., and M. H. Segall
1969 Learning to classify by color and by function: a study of concept-discovery by Ganda children. Journal of Social Psychology 77:35-53.

Fallers, L. A.
1961a Are African cultivators to be called "peasants?" Current Anthropology 2:108-110.
1961b Ideology and culture in Uganda nationalism. American Anthropologist 63:677-686.

Fallers, M. C.
1960 The Eastern Lacustrine Bantu. London, International African Institute.

Geber, M.
1958 The psycho-motor development of African children in the first year and the influence of maternal behavior. Journal of Social Psychology 47:185-195.

Gibson, J. J.
1954 A theory of pictorial perception. Audio-visual Communication Review 2:3-23.
1960 Pictures, perspective, and perception. Daedalus 89:216-227.

Goldschmidt, W., and R. B. Edgerton
1961 A picture technique for the study of values. American Anthropologist 63:26-48.

Goodenough, W. H.
1964 Introduction. In explorations in cultural anthropology. W. H. Goodenough, ed. New York, McGraw-Hill.
1966 Cooperation in change. New York, Russell Sage Foundation.

Graves, T. D.
1967 Psychological acculturation in a tri-ethnic community. Southwestern Journal of Anthropology 23:337-351.

Guilford, J. P.
1956 Foundamental statistics in psychology and education. New York, McGraw-Hill.

Hall, E. T.
1966 The hidden dimension. Garden City, Doubleday.
1968 Proxemics. Current Anthropology 9:83-109.

Hallowell, I. A.
1955 Culture and experience. Philadelphia, University of Pennsylvania Press.

Herskovits, M. J.
1938 Acculturation: the study of culture contact. New York, Augustin.

Hochberg, J.
1962 The psychophysics of pictorial perception. Audio-visual Communication Review 2:22-53.

Hudson, W.
1960 Pictorial depth perception in subcultural groups in Africa. Journal of Social Psychology 52:183-208.
1962 Pictorial perception and educational adaptation in Africa. Psychologia Africana 9:226-239.
1967 The study of the problem of pictorial perception among unacculturated groups. International Journal of Psychology 2:89-107.

Inkeles, A.
1969 Making men modern: on the causes and consequences of individual change in six developing contries. American Journal of Sociology 75:208-225

Jahoda, G.
1968 Some research problems in African education. Journal of Social Issues 24:161-175.

Kilbride, J. E., M. C. Robbins, and P. L. Kilbride
1970 The comparative motor development of Baganda, American white, and American black infants. American Anthropologist (in press).

Kilbride, P. L.
1968 A cross-cultural study of the influence of education on visual perceptual skills. paper presented at the Missouri Society of Sociology and Anthropology (mimiographed).

Kilbride, P. L., and M. C. Robbins
1968 Linear perspective, pictorial depth perception and education among the Baganda. Perceptual and Motor Skills 27:601-602.
1969 Pictorial depth perception and acculturation among the Baganda. American Anthropologist 71:293-301.

Kilbride, P. L., M. C. Robbins, and R. B. Freeman, Jr.
1968 Pictorial depth perception and education among Baganda school children. Perceptual and Motor Skills 26:1116-1118.

Lanternari, V.
1963 Religions of the oppressed; a study of modern messianic cults. New York, Knopf.

Lerner, D.
1958 The passing of traditional society: modernizing the middle east. New York Free Press.

Levine, R. A.
1961 Africa. In Psychological anthropology. F. L. K. Hsu, ed. Homewood, Illinois, Dorsey Press, Inc.

Linton, R. ed.
1940 Acculturation in seven American Indian tribes. New York, Appleton-Century Company.

Mafeje, A.
1969 Large scale farming in Buganda. In The anthropology of development in sub-Saharan Africa. D. Brokensha and M. Pearsall, eds. Lexington, The Society for Applied Anthropology.

Mair, L. P.
1934 An African people in the twentieth century. London, Routledge and Kegan Paul, Ltd.

McLuhan, M.
1962 The Gutenberg galaxy. Toronto, University of Toronto Press.
1964 Understanding media: the extensions of man. New York, New American Library.

Mundy-Castle, A. C.
1966 Pictorial depth perception in Ghanaian children. International Journal of Psychology 1:289-301.

Mundy-Castle, A. C., and G. K. Nelson
1960 Brain rhythms, personality and intelligence in a socially isolated community. Nature 185:484-485

Munroe, R. L., R. H. Munroe, and R. E. Daniels
1969 Effect of status and values on estimation of coin size in two East African societies. Journal of Social Psychology 77:25-35.

Nadel, S. F.
1937 A field experiment in racial psychology. British Journal of Psychology 28:195-211.

Oliver, R. A. C.
1932 The musical talents of natives of East Africa. British Journal of Psychology 22:333-343.

Ong, W. J.
1969 World as view and world as event. American Anthropologist 71:634-648.

Parkin, D.
1969 Neighbours and nationals in an African city ward. Berkeley, University of California Press.

Robbins, M. C., and R. B. Pollnac
1969 Drinking patterns and acculturation in rural Baganda. American Anthropologist 71:276-284.

Robbins, M. C., A. V. Williams, P. L. Kilbride, and R. B. Pollnac
1969 Factor analysis and case selection in complex societies: a Buganda example. Human Organization 28:227-234.

Robbins, M. C., and P. L. Kilbride
N.D. The role of microtechnology in a parish in rural Buganda. In Technological innovation and cultural change. H. R. Bernard and P. J. Pelto, eds. New York, MacMillan (forthcoming).

Rodgers, W. B.
1967 Household atomism and change in the Out Island Bahamas. Southwestern Journal of Anthropology 23:244-261.
1969 Developmental exposure and changing vocational preferences in the Out Island Bahamas. Human Organization 28:270-279.

Rodgers, W. B., and R. Gardner
1969 Linked changes in values and behavior in the Out Islahd Bahamas. American Anthropologist 79:21-35.

Rogers, E. M.
1969 Modernization among peasants. New York, Holt, Rinehart, Winston, Inc.

Roscoe, J.
1911 The Baganda. London, MacMillan and Company.

Rummel, R. J.
1967 Understanding factor analysis. Journal of Conflict Resolution 11:443-479.

Segall, M. H., D. T. Campbell, and M. J. Herskovits
1966 The influence of culture on visual perception. New York, The Bobbs-Merrill Company.

Seigel, S.
1965 Nonparametric statistics. New York, McGraw-Hill.

Snoxall, R. A.
1942 Ganda literature. African Studies 1:55-63.

Southall, A. W., and P. C. W. Gutkind
1956 Townsmen in the making. Kampala, Uganda, East African Institute of Social Research.

Southwold, M.
1965 The Ganda of Uganda. In Peoples of Africa. J. L. Gibbs, Jr., ed. New York, Holt, Rinehart and Winston, Inc.

Spindler G.
1968 Psychocultural adaptation. In the study of personality: an interdisciplinary appraisal. E. Norbeck, D. Price-williams and W. M. McCord, eds. New York, Holt, Rinehart and Winston, Inc.

Spindler, G. and W. Goldschmidt
1952 Experimental design in the study of culture change. Southwestern Journal of Anthropology 8:68-82.

Turnbull, C. M.
1962 The forest people. New York, Doubleday and Company Inc.

Wallace, A. F. C.
1956 Mazeway resynthesis: a biocultural theory of religious inspiration. Transactions of the New York Academy of Sciences 18:626-638.

Wober, M.
1966 Sensotypes. Journal of Social Psychology 70:181-189.
1967 Adapting Witkin's field independence theory to accommodate new information from Africa. British Journal of Psychology 70:181-189.

Wolfe, A. W.
1969 Social structural bases of art. Current Anthropology 10:3-28.

A P P E N D I C E S

APPENDIX A

Intercorrelations between Hudson Pictorial Perception Test and Kilbride Pictorial Perception Test

A preliminary analysis of 523 Hudson protocols collected among the Baganda in 1967 indicated that relative exposure to Western, symbolic, communicative media was positively related to correct performance on the Hudson test. That is, comparatively "traditional" Baganda made relatively more pictorial misidentifications and did not consistently perceive pictorial material in the third dimension. These findings suggested, but did not demonstrate, the possibility of a general lack of pictorial perceptual skills among the Baganda.

From these preliminary data based exclusively on black and white line-drawn stimuli (see Figure 2), several specific objectives for future research were formulated. A first consideration was the possibility that poor performance on the Hudson test was a function of the limited information present in the black and white line-drawn stimuli rather than of a general absence of pictorial skills. How might respondents perform if objects and depth cues similar to those used in the Hudson test were employed in stimuli containing more information? From a theoretical point of view, It was thought possible that an increase in pictorial information more nearly approximating the real world (as in a

colored photograph) might increase a subject's ability to make correct pictorial judgments. If agreement in responses across the Hudson test and other pictorial stimuli could be obtained then one could more reasonably conclude that the Hudson instrument is valid, that is, the test is measuring what it claims to measure and that the findings are not merely task-specific.

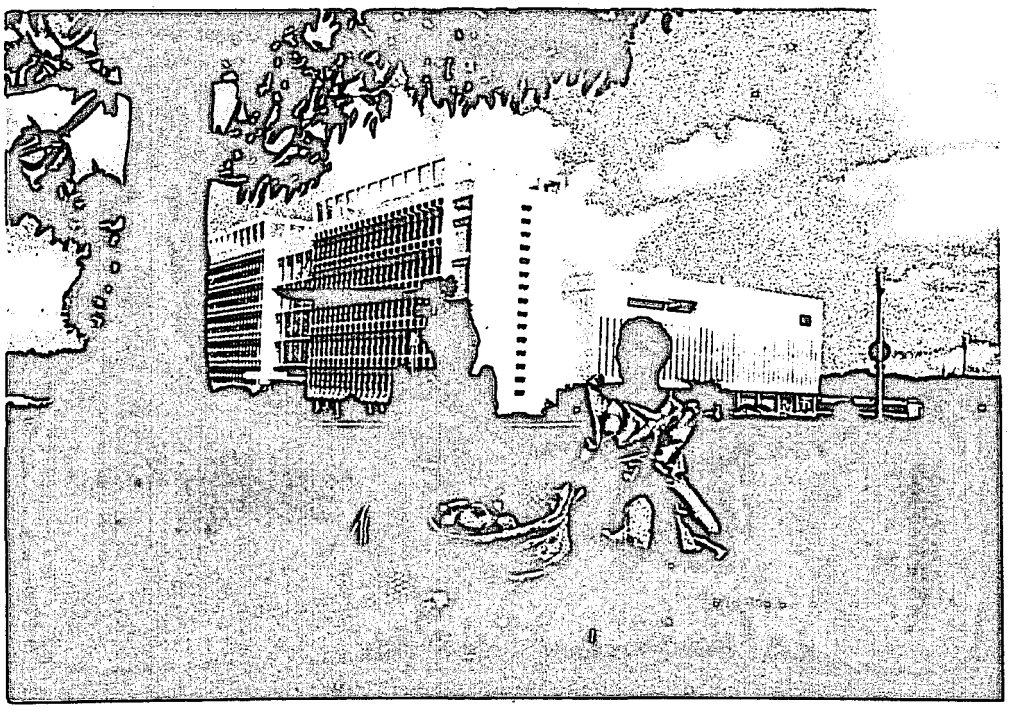
Secondly, there was the possibility that Baganda respondents might have been relatively unsuccessfull because of the somewhat unfamiliar content of the Hudson test. Although the Hudson instrument, does include, for example, an "African" hunter and two "African" animals (antelope and elephant), the Baganda are not hunters. By using more culturally appropriate pictorial scenes photographed in Buganda, it was thought that a further check on the Hudson test's validity could be made.

From a practical point of view it was also imperative that the validity of the Hudson results be established. Failure to correctly perceive all kinds of pictorial stimuli has important implications for communication in general, particularly in formal education where pictorial skills are a primary prerequisite to success in school work. For this reason, it was important to specify the extent to which other more commonly used pictorial materials (e.g., black and white and colored photographs; magazines) are perceived solely in two dimensions.

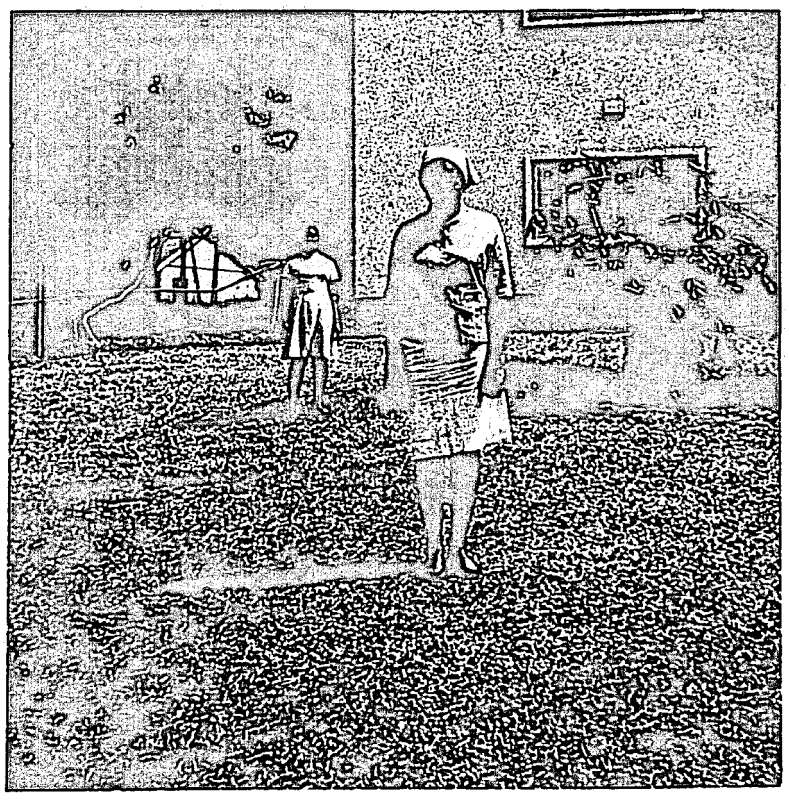
Therefore for both theoretical and practical reasons, it was necessary that the author test the validity of the Hudson instrument as a tool for predicting overall presence or absence of pictorial perceptual skills among the Baganda.

The Kilbride Pictorial Perception Test

With a Kodak Instamatic 300 camera, many black and white and colored photographs were taken of typical and familiar scenes in rural Masaka and in Kampala. Several colored "post cards" were also purchased for possible use in the testing. The final selection of pictures was based upon clarity, anticipated subject familiarity with content and presence of depth cues similar to those in the Hudson test (e.g., object size, perspective, and superimposition). Each test picture was mounted on a cardboard surface and covered for protection by transparent plastic (contact paper). Shown on the next few pages is each photograph used for testing and a brief description of its contents, along with the items selected for testing and the scoring procedures for each item. The Kilbride test items have been numbered for comparison with the Hudson items.

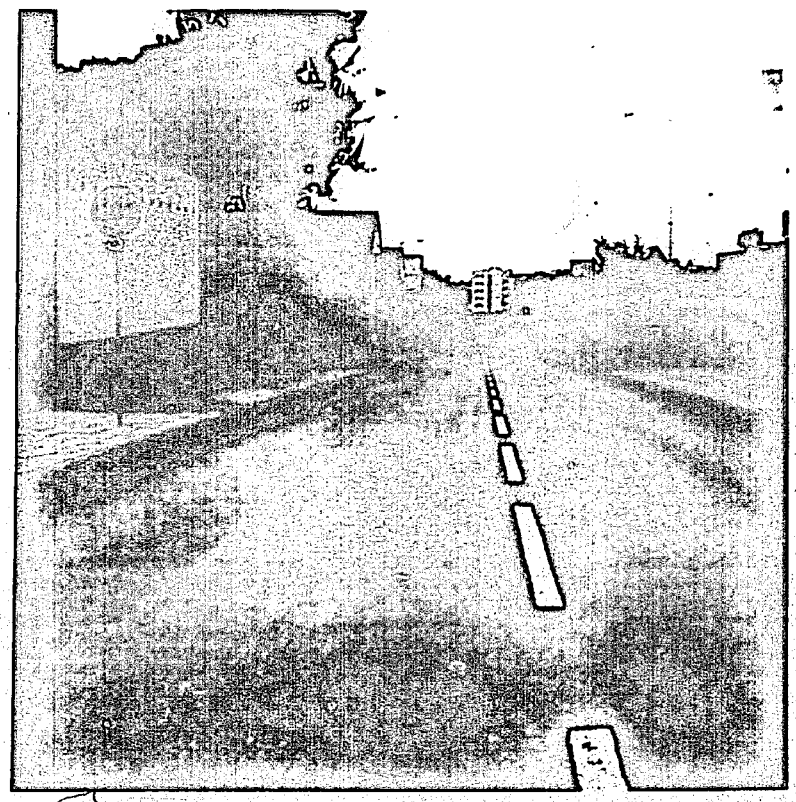


Picture 1. (items 14-19) An urban Kampala scene reproduced in color on a post card. Each subject was asked to identify the woman (appearing on the left), the building, the sky, and the pineapple. He was then asked, "Which is nearer to the tree -- building or woman?" A response "building" to this question was interpreted to mean no perception of pictorial depth, or no use of the superimposition cue although other cues to depth are also present in the form of texture gradient and color intensity. A response "woman" was interpreted as demonstrating perception of depth.



Picture 2. (item 20) A black and white photographic representation taken in Kampala of two urban women, a building, and a small tree. Each subject was asked, "Which woman is nearer to the tree?" A response which identifies the woman on the left (the smaller woman), or the woman in the "background" was scored as perception of depth, primarily through use of an object size cue.

Picture 3. (item 21) The same scene as in picture 2 but in color. Questions and scoring are identical to picture 2.



Pictures 4-5 (item 2). Eight photographs each containing a road represented in "perspective" were used (see above examples). Correct identification of the road for each picture indicates, in part, the use of a perspective cue to depth. Two roads and scenes taken in the Masaka area are rural, and two roads and scenes taken in Kampala are urban. Four pictures of the same scenes in color are also used. Correct identification of all roads was interpreted to mean use of a perspective cue to pictorial depth.

Table 17 shows for each item what is considered to be a correct identification and a three-dimensional response. The first 13 items are Hudson test responses (identification of the man has been included in the present analysis) and items 14-22 are Kilbride test responses.

Table 17. Scoring Procedures for the Kilbride Pictorial Perception Test

Test	Item Number	SCORE: Incorrect ID or 2D Response	SCORE: Correct ID or 3D Response
Hudson:	1	--	man
	2	--	spear
	3	--	tree
	4	--	hill
	5	--	elephant
	6	--	deer
	7	elephant	deer
	8	elephant	deer
	9	elephant	deer
	10	elephant	deer
	11	--	road
	12	elephant	deer
	13	--	road
Kilbride:	14	--	tree
	15	--	woman
	16	--	building
	17	--	sky
	18	--	pineapple
	19	building	woman
	20	"big" woman	"small" woman
	21	"big" woman	"small" woman
	22	less than all correct road ID	all correct road ID

Results. The Kilbride test was administered in conjunction with the Hudson test to 197 Baganda respondents. Table 18 presents the range of pictorial misidentifications on the Kilbride test. For all items, some individuals were unable to make any response, simply indicating that they "didn't know" (D.N.). There is similarity in the kind of misidentifications between the Hudson and Kilbride tests (see Table 13 for Hudson misidentifications). The roads on both tests, for example, were called hill, tent, house, ship, tree, or sky. Similarly, the tree on both tests was frequently identified as a flower. There was also agreement on both tests regarding correct identification of human objects. No respondent misidentified the Hudson test's "hunter" or the Kilbride test's "woman."

Table 18. Range of Misidentifications on the Kilbride Test

ITEMS	MISIDENTIFICATIONS
Tree	Flower, D.N.
Woman	None, D.N.
Building	Lake, D.N.
Sky	River, earth, water, D.N.
Pineapple	D.N.
Road(s)	Hill, Tent, House, Ship, Tree, Sky, Fish, Courtyard, Chimney, Flag, D.N.

Table 19 shows correlation coefficients between items on both tests. These values indicate a tendency for high agreement in responses across both tests. The results can be summarized as follows:

(1) There is a positive and significant relationship between the correct identification of the same object across tests (human figure, tree, and roads);

(2) There is a positive and significant relationship between all pictorial depth responses across tests (Hudson items 7-12 and Kilbride items 19-22);

(3) Correlation coefficients between correct object identification responses on the Kilbride test (items 14-18) and depth responses on the Hudson test (items 7-12) are generally low and not significant, indeed several values are negative; and

(4) Correlation coefficients between correct object identification responses on the Hudson test (items 1-6 and 13) and depth responses on the Kilbride test (items 19-22) show no consistent trend. For example, some relationships are positive and significant while others are negative and significant.

These results overall indicate convergent validity between tests. Individuals who misidentify objects and make no use of depth cues on the Hudson test also tend to misidentify objects and make no use of depth cues on the Kilbride test. Similarly, respondents who correctly identify

objects and are cognizant of depth cues are equally capable on both tests.

These results demonstrate that, at least in Buganda, the Hudson test is valid (e.g., it measures the presence or abscence of pictorial perceptual skills). Secondly, since the Hudson test contains only black and white line-drawn stimuli and the Kilbride test pictures include color, additional depth cues, and familiar objects, an increase in information does not influence subject response. (See Table 19 which also shows a highly positive relationship between items 20 and 21 -- both items are similar except the latter includes color).

Table 19. Correlation Coefficients between Hudson and Kilbride Picture Test Items*

Items (No.)**	1	2	3	4	5	6	7	8	9	10	11
Man (1)	1.000										
Spear (2)	.000	1.000									
Tree (3)	.000	.202	1.000								
Hill (4)	.000	.269	.394	1.000							
Elephant (5)	.000	.592	.213	.333	1.000						
Deer (6)	.000	.164	.252	.320	.257	1.000					
Deer (7)	.000	.058	.183	.214	.097	.156	1.000				
Deer (8)	.000	-.064	.139	.180	.045	.152	.428	1.000			
Deer (9)	.000	-.017	.189	.161	-.044	.038	.377	.388	1.000		
Deer (10)	.000	-.019	.167	.122	.030	.189	.346	.385	.416	1.000	
Road (11)	.000	.088	.183	.313	.133	.252	.327	.362	.278	.381	1.000
Deer (12)	.000	-.059	.182	.102	-.038	.104	.346	.391	.466	.526	.449
Road (13)	.000	.092	.136	.233	.149	.139	.088	.080	.151	.165	.370
Tree (14)	.000	.452	.347	.333	.507	.184	.082	.091	.037	.077	.126
Woman (15)	.705	.326	.000	.000	.268	.000	.000	.000	.000	.000	.000
Building (16)	-.023	.281	.568	.331	.327	.244	.083	.133	.167	.121	.161
Sky (17)	.000	.327	.433	.341	.405	.139	.195	.161	.107	.160	.250
Pineapple (18)	.000	.233	.217	.172	.173	.177	-.147	-.157	-.075	-.051	-.127
Woman (19)	-.035	.151	.277	.327	.164	.043	.267	.448	.388	.319	.422
Sm. Woman (20)	-.386	-.305	-.201	.142	-.236	.158	.510	.531	.409	.479	.417
Sm. Woman (21)	.000	.016	.234	.331	.192	.297	.468	.522	.262	.392	.402
Road (22)	-.017	.129	.539	.484	.196	.276	.405	.328	.382	.396	.403

* P at .05 level = .138; P at .01 level = .181.

** Zero correlation due to two constants -- man and woman.

Table 19. (continued)

Items (No.)**	12	13	14	15	16	17	18	19	20	21	22
Man (1)											
Spear (2)											
Tree (3)											
Hill (4)											
Elephant (5)											
Deer (6)											
Deer (7)											
Deer (8)											
Deer (9)											
Deer (10)											
Road (11)											
Deer (12)	1.000										
Road (13)	.170	1.000									
Tree (14)	.025	.072	1.000								
Woman (15)	.000	.000	.000	1.000							
Building(16)	.133	.119	.367	-.028	1.000						
Sky (17)	.191	.165	.405	.000	337	1.000					
Pineapple(18)	-.128	.093	.221	.453	.339	.372	1.000				
Woman (19)	.284	.244	.207	.077	.265	.278	.189	1.000			
Sm. Woman(20)	.399	.119	.147	.000	.173	.215	.119	.357	1.000		
Sm. Woman(21)	.312	.147	-.149	-.002	.147	.289	.155	.505	.555	1.000	
Road (22)	.392	.333	.244	.000	.307	.510	.247	.522	.393	.507	1.000

APPENDIX B

Relationship between Phenomenal Modernization Index Items and Hudson Pictorial Test Items

Table 20 presents correlation coefficient values for all twenty-three items used in the present study to measure phenomenal and ideational modernization in Buganda. These values indicate that the most consistant pattern of positive and significant relationships obtained between correct Hudson responses (items 1 - 12) and:

residence (13)

cinema attendance (18)

total number of magazines read (19)

total number of English magazines read (21)

education (22)

occupation (23)

These results show that the above six phenomenal items are the best predictors of overall success on the Hudson Pictorial Perception Test.

Table 20. Correlation Coefficients between Each Phenomenal Modernization Index Item and Hudson Picture Test Item*

Items (No.)**		1	2	3	4	5	6	7	8	9	10	11
Spear	(1)	1.000										
Tree	(2)	.202	1.000									
Hill	(3)	.269	.394	1.000								
Elephant	(4)	.592	.213	.333	1.000							
Deer	(5)	.164	.252	.320	.257	1.000						
Deer	(6)	.058	.183	.214	.097	.156	1.000					
Deer	(7)	-.064	.139	.180	.045	.152	.428	1.000				
Deer	(8)	-.017	.189	.161	-.044	.038	.377	.388	1.000			
Deer	(9)	-.019	.165	.118	.028	.187	.346	.384	.408	1.000		
Road	(10)	.090	.186	.315	.133	.254	.333	.351	.278	.381	1.000	
Deer	(11)	-.060	.183	.112	-.049	.096	.330	.374	.453	.500	.437	1.000
Road	(12)	.090	.155	.244	.189	.139	.126	.107	.173	.200	.396	.207
Residence	(13)	.175	.253	.351	.259	.276	.329	.348	.414	.376	.453	.405
T.V.	(14)	.081	.033	.160	.199	.152	.151	.117	.075	.186	.353	.248
Camera	(15)	.121	.170	.189	.056	.165	.120	.238	.170	.247	.259	.228
Radio	(16)	.118	.302	.256	.180	.095	.157	.217	.221	.090	.149	.221
Photos	(17)	.078	.164	.228	.126	.200	.056	.063	.073	.060	.045	.022
Cinema	(18)	-.075	.095	.292	.525	.361	.244	.229	.278	.163	.498	.258
Mag. Total	(19)	.163	.346	.281	.255	.373	.164	.181	.257	.248	.422	.251
Mag. Lug.	(20)	-.041	.381	.200	.259	.178	-.050	-.022	-.077	.006	-.061	-.105
Mag. Eng.	(21)	.060	.359	.339	.193	.282	.289	.301	.301	.268	.489	.359
Education	(22)	.219	.272	.426	.278	.282	.234	.228	.224	.281	.455	.273
Occupation	(23)	.340	.202	.338	.393	.262	-.295	.348	.290	.281	.430	.275

* P at .05 level = .138; P at .01 level = .181.

** Items 1 through 12 are Hudson items and items 13 through 23 are Phenomenal Modernization Index items.

Table 20. (continued)

Items	(No.)**	12	13	14	15	16	17	18	19	20	21	23	23
Spear	(1)												
Tree	(2)												
Hill	(3)												
Elephant	(4)												
Deer	(5)												
Deer	(6)												
Deer	(7)												
Deer	(8)												
Deer	(9)												
Road	(10)												
Deer	(11)												
Road	(12)	1.000											
Residence	(13)	.291	1.000										
T.V.	(14)	.191	.310	1.000									
Camera	(15)	.104	.426	.387	1.000								
Radio	(16)	.029	.253	.251	.271	1.000							
Photos	(17)	.104	.264	.271	.225	.332	1.000						
Cinema	(18)	.311	.451	.299	.303	.376	.168	1.000					
Mag. Total	(19)	.262	.508	.271	.328	.340	.233	.594	1.000				
Mag. Lug.	(20)	-.024	-.087	-.086	-.008	.082	.012	.005	.273	1.000			
Mag. Eng.	(21)	.246	.616	.349	.434	.277	.201	.538	.702	.031	1.000		
Education	(22)	.348	.475	.394	.411	.421	.286	.548	.644	.000	.480	1.000	
Occupation	(23)	.265	.552	.258	.280	.250	.204	.466	.430	.032	.421	.617	1.000

VITA

Personal:

Born: Springfield, Massachusetts September 5, 1942

Education:

B.S. Millersville State College, Millersville, Pennsylvania, 1964

M.A. The Pennsylvania State University, University Park, Pennsylvania, 1968

Academic Award:

National Defense Education Act Title IV Fellowship, 1965 - 1968

Teaching Positions:

Teaching Assistant in Anthropology, The Pennsylvania State University, 1964 - 1965

Assistant Instructor of Anthropology, University of Missouri - Columbia, 1968 - 1969

Assistant Professor of Anthropology, Bryn Mawr College, Bryn Mawr, Pennsylvania, 1970 -

Fields of Study:

Africa, Mesoamerica, Psychological Anthropology, Culture Change, Research Methods

Ethnographic Field Work:

Mexico - 1966

Uganda - 1967, 1969

Publications:

1968 Pictorial depth perception and education among Baganda school children. Perceptual and Motor Skills 26:1116-1118 (with M. C. Robbins and R. B. Freeman).

1968 Time estimation and acculturation among the Baganda. Perceptual and Motor Skills 26:1010 (with M. C. Robbins and J. M. Bukenya).

1968 Linear perspective, pictorial depth perception, and education among the Baganda. Perceptual and Motor Skills 27:601 - 602 (with M. C. Robbins).

1969 Pictorial depth perception and acculturation among the Baganda. The American Anthropologist 71:293-301 (with M. C. Robbins).

1969 Factor analysis and case selection in complex societies: A Buganda example. Human Organization 28:227-234 (with M. C. Robbins, A. V. williams, and R. B. Pollnac).

1970 The comparative motor development of Baganda, American white, and American black infants. The American Anthropologist (with J. E. Kilbride and M. C. Robbins) In press.

N.D. The role of microtechnology in a parish in rural Buganda. (with M. C. Robbins) In Technological Innovation and Cultural Change. H. R. Bernard and P. J. Pelto, eds. Macmillan Company, In press.