

HIV/AIDS, LITERACY AND HEALTH COMMUNICATION

A study on the comprehension of visual symbolism in educational documents produced for people with limited reading skills *Adelia Carstens*

In the literature regarding the use of pictures to communicate verbally and visually with less skilled readers, a number of recurring problems are mentioned. These include problems relating to the interpretation of depth perspective, making sense of representations of unseen objects, finding the main meaning amidst visual noise, problems of ambiguity or incomprehensibility arising from clashes between cultural models and popular/Western models, and interpreting a range of symbolic meanings. This article reports on a qualitative research project undertaken to determine how well low-literate adults understand visual symbolism in educational documents that deal with HIV/AIDS. Individual interviews were conducted to find out how effective the messages were when conveyed by three types of stills, namely symbolic-analogical, symbolic-abstract and indexical pictures. The findings were generally consistent with those of earlier studies. However, the research also yielded rich data on the mismatch between the responsive capacity of low-literate African viewers/readers, and design perspectives based on Western cultural models and the use of visual styles associated with popular mass media.

1 INTRODUCTION

This article reports on a qualitative research project¹ undertaken among urban speakers of African languages with limited reading skills. The purpose of the research was to test low-literate South Africans' comprehension of potentially problematic visual symbols featured in public awareness documents about HIV/AIDS. In the next section (2), the intricate relationship between HIV/AIDS, literacy and health communication is expounded. Section 3 provides an overview of the problems frequently mentioned in the literature in connection with how visually and verbally low-skilled people interpret pictures. Thereafter, in section 4, the focus of the research project is described and justified. An adapted version of Hoffmann's (2000) semiotic typology, which serves as a framework for the analysis, is discussed briefly in section 5. Section 6 outlines the research methodology, followed by a discussion of the findings in section 7, an interpretation of the results in section 8, and concluding remarks in section 9.

2 THE PROBLEM: HIV/AIDS, LITERACY AND HEALTH COMMUNICATION

Effective communication is the backbone of health promotion and disease prevention. People need to understand health information in order to be able to apply it to their own behaviour. According to Plimpton and Root (1994:86), most health information in the United States of America is

written for a reading level beyond tenth grade comprehension, and 30 to 50 percent of the target audience cannot read at this level. The South African situation is more unfavourable. Even the most basic instructional materials regarding health issues (including HIV and AIDS) display a readability level of just below 60, which is equivalent to Grade 9 (Carstens & Snyman 2003), and more than 70 percent of the South African population has only marginal reading skills: 30 percent is functionally illiterate and the other 40 percent has limited skills (Carstens in press; Project Literacy 2004).

The most important socioeconomic correlate of good health in adult populations is probably the number of years of schooling that have been completed (Grosse & Auffrey 1989:281). The most poorly educated adults, those with the lowest literacy levels, suffer the highest rates of morbidity and mortality from chronic diseases and conditions (Rudd, Moeykens & Colton 1999; Plimpton & Root 1994; NWGLH 1998). The fact that people cannot understand the information necessary to change harmful behaviours and improve their health would seem to be an important factor in this equation.

Thus, given a situation in which almost two thirds of the population cannot read well, health and literacy are correlated, and health promotion materials are too difficult to understand, one may ask what strategies can be used to

convey important health information. The answer has often been sought in the use of visual media. In health campaigns across the world pictures are used where the written word fails to communicate effectively – usually to supplement or extend oral instructions. Doak, Doak and Root (1996:91-92) provide the following rationale for using visuals in communication with poor readers:

- Visuals are especially important for health education reasons, since complex concepts can be understood more easily through visual presentation.
- People's emotions are easily stimulated through the visual sense, and this increases the speed with which they respond to messages.

According to these authors, research on the use of visuals in materials produced for audiences in developing countries supports the value of incorporating visuals in health education materials (Doak et al 1996:92). An uncritical acceptance of this statement is, however, problematic. It cannot be taken for granted that people who cannot read, are able to interpret visual communication and that they can learn from pictures what they cannot learn from words. Hoffmann (2000:43) echoes this scepticism when he contends:

Although they may have had some exposure to pictures, they are often not acquainted with symbolic forms of presentation and the associated formal thought operations.

Communicators working in the field of health education are seldom aware of the problems visually low-skilled viewers experience (Colle & Glass 1986:159; Hoffmann 2000:2). The following section provides an overview of the problems generally mentioned in the literature regarding pictorial communication with low-literates.

3 COMPREHENSION OF PICTURE BY LOW-LITERATE AUDIENCES: FREQUENTLY MENTIONED PROBLEMS

During the 1970s, confidence in the effectiveness of pictures was shaken with the publication and dissemination of the results of picture comprehension tests administered to illiterates (Fuglesang 1973). However, very little empirical work on pictorial processing by low-literates has been done since (Hoffmann 2000:136), and almost all the studies that have been undertaken lack a purposeful theoretical orientation. Moreover, it is clear that the researchers find it difficult to orient themselves in the wealth of details, and the often-contradictory findings.

Despite the lack of systematic research, the following difficulties that low-literate viewers experience with picture comprehension recur in the literature on the effectiveness of visuals in developing countries.

3.1 Unnecessary background detail

In contrast with skilled readers, who systematically scan a visual to find the central meaning and quickly identify principal features, low-literates' eyes tend to wander about the page without finding the central focus (Doak et al 1996:93; Linney 1995:23). Too much detail, too many figures or objects or a busy background, for example (Doak et al 1996:103), may cause the unskilled viewer to miss the central focus of the visual, or to focus on the wrong detail (Ausburn & Ausburn 1983:113; Doak et al 1996:93; PATH 2002:2), thereby missing the main point that is being communicated. However, despite the emphasis in the literature on keeping visuals

simple (NCI 1994), pages cluttered with too many graphic devices are still frequently found.

3.2 Divergent knowledge systems and cultural backgrounds

Tripp-Reimer and Afifi (1989:613) emphasise the fact that health behaviour is largely patterned by culture. Socio-cultural and demographic variables (including ethnic group, gender, dress, social customs, and physical environment) may influence the acceptability of a message, decrease motivation to read (Tomaselli & Tomaselli 1984; Doak et al 1996:99), and hinder comprehension if the visual fails to evoke a schema against which to interpret the new information.

If the mental schema or knowledge system underlying the picture is not compatible with the indigenous knowledge system of the recipient, comprehension may suffer. Cornwall (1992) researched the ineffectiveness of standard Western pictures and diagrams of reproductive anatomy in Zimbabwe. Ineffectiveness seemed to stem from the fact that these visuals instantiated the Western medical model of reproductive anatomy, and did not reflect the folk models of the indigenous peoples. Bradley (1995:11) furthermore mentions that the representation of quantities is problematic. She claims that pie charts are not universally understood, especially in countries where pies are not part of the cuisine. Although similar circular forms can be found in the cooking of most countries, for example *chapattis* in India, they are not sliced into portions for distribution but torn by an individual to accompany less solid food.

3.3 Representation of perspective

PATH (2002:2) emphasises that low-skilled viewers experience problems comprehending the pictorial conventions of depth perspective. If viewers experience problems with linear perspective (e.g., the lines of a road converging towards the horizon), depth perception on the basis of the relative size of objects (e.g., similar objects decreasing in size as they

recede towards the horizon), and occlusion (superposition and overlapping of objects), the message may be misunderstood. Misunderstanding may arise from the fact that objects are not recognised, relationships between objects are not comprehended, or the fact that the picture does not reflect real-life experience (which may have an impact on believability). The research by Holmes in Kenya and Hudson in South Africa is quoted by Linney (1995:23 - 24) to support this assumption. Hudson's respondents were, for instance, unable to interpret the size of an object as an indication of its distance from the artist/reference point. Bradley's (1995:74) conclusion on the basis of evidence such as this is that there are both graphic and environmental conventions that need to be learnt before 'realistic' pictures can be understood without someone having to explain them.

The extent to which aspects of depth perception cause comprehension problems for low-literate people in general (in other words, not only people who have been isolated in rural villages and have had almost no exposure to visual materials) has not received research attention recently. It is thus debatable whether this aspect of pictures should indeed be a matter of concern for materials developers. Messaris (1994:13) is convinced that 'in the case of depth perception it would be hard to argue that the informational cues typically used by more experienced viewers constitute an arbitrary, exclusively pictorial set of conventions'.

3.4 Pictorial symbols

Vocabulary of mass media symbols

It has repeatedly been claimed in the literature that people who are unused to reading pictures interpret visual symbols literally, and find it difficult to understand visual renderings of abstract ideas. One of the reasons given is that low-literate people often lack a vocabulary of symbols that literate people may have acquired through growing up with comic books, magazines and greeting cards (Linney 1995:24). According to PATH (2002:2) people may not know that a heart indicates

love, for instance, and an eight-sided red sign indicates a need to stop. Pictorial symbols such as crosses, ticks and arrows also seem to pose problems for the pictorially inexperienced. Some of these symbols may be misunderstood if they have different meanings for different cultural groups (PATH 2002:2), or because they are ambiguous. Kress and Van Leeuwen (1996:61-70) mention the various functions of arrows in pictures, namely to indicate movement, influence/impact or direction; and to select a source (pointing out a specific detail). The literature on pictorial aids for low-literate audiences is not unanimous regarding the success of using arrows to focus readers' attention on specific detail. Colle and Glass (1986:161) warn against the use of arrows to point out a specific part of a picture since 'it may be that the arrow is perceived as part of the subject matter in the picture'. Doak et al (1996:103; 106), on the other hand, advise the materials designer to use cues (such as arrows, a splash of colour, underlining, circling, and magnification) to direct the eyes to important points.

Cartoon style pictorial conventions

According to Colle and Glass (1986:161), '[t]he intended message may not be interpreted if the viewer is unaccustomed to the cartoon style or finds it inappropriate for serious subject matter'. Doak et al (1996:95) warn explicitly against the use of 'child-like imagery to try to simplify complex concepts'. Firstly, the inappropriateness of the style may cause readers to discard the entire message because they think it is meant for children, and secondly, the use of metaphor demands inferencing beyond the skills of the readers, who will probably interpret the information literally. Plimpton and Root (1994:86) mention 'cartooning body parts' as one of the six main problems frequently encountered in typical health materials.

Under the rubric 'comic devices', Colle and Glass (1986:161) mention thought balloons and animated characters as problematic for low-literate users. Whereas the visually literate

understand the difference between a cartoon speech balloon and a thought balloon (PATH 2002:2), namely that the one represents speech and the other cognition, the visually inexperienced may not.

Another convention derived from the comic style that may cause misunderstanding, owing partially to its ambiguity and partially to unfamiliarity, is the use of lines for purposes such as:

- *Indicating a person seeing an object*
Visually inexperienced 'lookers' will easily interpret a dotted line from a woman's eyes to an apple on a table as 'a woman seeing an apple', while the low-literate individual might see a stick coming from the apple that pokes a woman in the eye (PATH 2002:2).
- *Indicating movement*
Lines or a blur often accentuate movement. If lines are not interpreted as a device depicting motion, they may be perceived as part of the person or object, thus hindering object recognition (Colle & Glass 1986).
- *Indicating the emission of air, sound, steam, heat, etc.*
Hoffmann (2000:142) quotes the example of a coughing boy where low-literates interpreted the lines that symbolise the forcing of air out of the lungs and mouth with a harsh sound, to be a swarm of gnats.

3.5 Picture sequences

Visually unskilled persons generally experience difficulty understanding groups and sequences of pictures (Linney 1995:23-25). In the case of single picture frames composed of different objects, low-literates can usually identify the parts, but may not be able to put them together and interpret the situation as a whole (Haaland 1984).

Picture sequences are challenging in various ways. Inexperienced viewers do not necessarily look at a series of pictures from left to right. Moreover, they tend to decode pictures in a series one by one, because they do not assume that

there is any connection between them. Visually low-skilled people find it particularly difficult to comprehend cause and effect, and the passage of time in a series of pictures, even though these relations are fundamental for making sense of events in everyday life (at least from a Western perspective – AC) (Colle & Glass 1986:161; Hoffmann 2000:95; 142). The explanation provided by Hoffmann (2000:134) is that non-literate persons do not have very precise and accurate notions of cause-effect chains and of their length. The explanation he gives seems to be in tandem with his definition of the African world-view, namely that 'their conceptions are determined more strongly by undifferentiated notions of general complexity, a more cosmic world view in which all elements are linked causally, whereby specific cause-effect pathways cannot be traced exactly'.

3.6 Pictures featuring unseen objects

Objects are described as 'unseen' when they are obscured, internal, or invisible. Colle and Glass (1986:161) refer to examples such as the internal organs of a human being, the internal parts or working of an object, or subject matter that is not directly observable. Such entities can be portrayed artistically or photographically with close-up or a magnifying lens. A case in point is a magnified image of the HI virus.

Enhancing or increasing the dimensions of an object may cause problems for low-literate viewers. The enlarged object may, for instance, not be identifiable or believable because it is out of proportion with what the viewer has experienced. Dudley and Haaland (1993:37) quote the classic example of a health worker in Africa who showed a picture of an enlarged fly to explain how flies are a threat to health. The people walked out after the presentation with smiles of relief, saying 'We don't have a problem, because our flies are just very small'.

4 RESEARCH FOCUS

The research project detailed in this article concentrates on pictorial symbols as this category easily serves as an umbrella for including a large number of image types that have proven to be problematic for low-literate and visually inexperienced audiences (Colle & Glass 1986; Doak et al 1996; Hoffmann 2000; Linney 1995; PATH 2002). The decision was strengthened by evidence from exploratory interviews by doctoral student Lilian Birir with ABET students employed by the South African National Defence Force at the Waterkloof Airbase in Pretoria. For the purpose of categorisation and description, Hoffmann's (2000) semiotic classification of still pictures was chosen because it provided the researcher with a useful descriptive framework within which pictorial language could be treated both as a sign system and as a communicative vehicle equal to verbal language in various respects.

5 TYPES OF STILL PICTURES: A SEMIOTIC PERSPECTIVE

Hoffmann (2000:62) departs from the Peircean tripartite distinction between symbols, icons, and indexes. Here, in the case of symbolic signs there is an arbitrary relationship between the sign and its meaning (e.g., words in language). Iconic signs are direct representations of real-world concepts (e.g., drawings, paintings or photographs); and indexes are signs that call up the meanings of their sources (e.g., smoke as a sign of fire).

Hoffmann (2000:85) divides two-dimensional still images into three basic categories, namely iconic, symbolic-analogical and symbolic-abstract. Symbolic and indexical images, which form part of the Peircean typology, are excluded by Hoffmann on the premise that symbolic is a characteristic of 'any type of visual that is linked to a generally accepted convention for representation', and indexical pictures 'create the minimum of interpretation difficulties' (Hoffmann 2000:62-63). In this

article, iconic pictures will only be discussed to define the category symbolic-analogical, and 'symbolic' will be used as a superordinate label under which symbolic-analogical and symbolic-abstract pictures are subsumed. Indexical pictures will be treated as a separate category because certain types of indexical pictures have been found to be problematic for visually unskilled readers.

5.1 Iconic pictures

Iconic representations are normally used for depicting the external shape of concrete objects such as people, animals, plants, houses, food, and utensils. If viewers are familiar with an object, and the visual style does not introduce visual noise, this type of still picture should not cause problems of comprehension (cf. Spain 1987:89, 112; Hoffmann 2000:136). Apparently, low-literates only have problems recognizing unknown objects, and well-known objects depicted in a way that contradicts their experience (Hoffmann 2000:140). With reference to unknown objects, Hoffmann refers to a picture of a tortoise identified by Kenyans in rural areas of the country partly as a snake (because of its head), and partly as an elephant (because of its feet). In connection with a portrayal that clashes with viewers' experience, Shaw (1969) mentions the example of a goat that was not recognised because it was depicted with its tail hanging down, while the people to whom the picture was presented knew that goats' tails point horizontally or upwards.

Hoffmann's claim that iconic still pictures are non-problematic in general, is consistent with the view of Paul Messaris, one of the leading scholars in visual studies. According to Messaris (1994:10), 'previous experience is not a prerequisite for the interpretation of outline drawings, black-and-white photographs, sketches, or stick figures – to name only four kinds of pictures'. Messaris (1994:13) contends that the following general process of how the brain 'translates' the retinal image into a mental representation of identifiable objects in three-dimensional space is universally valid (also for

the visually inexperienced):

1. *Visual information is transmitted from the retina to the brain via a two-dimensional array of light and colour values in order to detect the outlines of objects and the edges of surfaces. This results in a mental representation that can be thought of as corresponding to an outline drawing.*
2. *Assigning depth to the various parts of the outline by calculating distances between the viewer and each part of the scene.*
3. *Identification of the object by means of the outlines and matching them against a 'dictionary of object structures' in the brain's memory.*

For Messaris (1994:13) these principles suggest that our ability to perceive and comprehend such incomplete images as sketches and stick figures may be an extension of an everyday, real-life perceptual skill rather than something we have to learn with specific reference to pictorial conventions. Therefore, sketches and other incomplete images should not greatly curtail the ability of inexperienced viewers to identify objects in pictures, and many pictorial conventions that may at first glance seem unrealistic, appear to be interpretable on the basis of any viewer's real-world visual skills.

In the light of this evidence from researchers working in both the developed and developing world, it was decided not to include purely iconic pictures in the framework of problematic picture types. However, aspects of iconicity will be invoked when describing the problematic picture types and in the analysis of responses.

5.2 Pictures with symbolic elements

Following Gralki (1985), Hoffmann (2000:8) distinguishes two types of pictures with a partially or completely symbolic content, namely *symbolic-analogical*, and *symbolic-abstract*. These types of pictures are not pictorial reproductions of visual entities in the real world. Some kind of cognitive transformation, based on academic or cultural knowledge, is

needed to connect them to their intended meanings.

Symbolic-analogical pictures

Symbolic-analogical pictures constitute a hybrid category between symbolic and iconic. These signs mostly work symbolically, meaning that their use is fixed by convention, yet there is a vestige of iconicity in the representation, since some structural or functional resemblance to the object represented is preserved. This category contains all the various types of diagrams that people use to convey abstract concepts, such as quantities, relationships or processes, as well as pictograms and pictorial metaphors that instantiate processes and complex concepts. Examples include, for instance, a schematic representation of a clock to represent time in general, a smiley face to represent happiness or friendship, and a schematic representation of the heart to represent love or cardiovascular health. In these cases, visualisation is used as 'a means to promote better recognition and more intuitive and instantaneous comprehension' (Hoffmann 2000:85).

Symbolic-abstract pictures

Symbolic-abstract representations are images that are fixed purely by convention. Hoffmann (2000:85) characterises them by saying that with these images 'there is a constant tendency to cross the line into the field of written representation'. Figures, formulae, tables, mathematical symbols (e.g., the conventionalised symbols for equation, addition, subtraction, multiplication, and division), and logical notation (e.g., an arrow to signify entailment) are examples of signs that are closer to written signs than pictorial signs.

Despite the fact that signets and logos may have originally been iconic or symbolic-analogical, Hoffmann categorises them as symbolic-abstract once they have become the standard symbols for companies (e.g., the Mercedes star), products (the international wool mark), or organisations (e.g., the five Olympic rings, the International Red Cross).

Speech balloons and thought balloons are not accommodat-

ed in Hoffmann's semiotic typology, yet one could assume that they belong to the category 'symbolic-abstract', since there is no direct resemblance between form and meaning, and since their meanings are only fixed by convention.

Graphemes with fixed, conventional meanings that present unseen or non-concrete objects (e.g., lines to indicate movement, sound, light or heat, blurring to indicate movement, a white spot to indicate light reflection) are not mentioned explicitly by Hoffmann. These parts of still pictures are difficult to categorise. They seem to be positioned on a continuum, somewhere between symbolic-analogical and symbolic-abstract, depending on the correlation between visual representation and conceptual representation. I would argue that a line between a person's eye and an object indicating 'seeing and recognising' is symbolic-abstract, whereas a white spot on an object indicating light reflection is symbolic-analogical. A clear distinction is, however, not crucial for the current research.

5.3 Indexical pictures

Indexical pictures display a sign-source relationship between the visual representation and the concept referred to. In the real world smoke is an index of fire. In pictures a facial expression, a gesture, or a posture may be used as an index of a particular emotion; an emaciated body could instantiate a person with AIDS, and a well could indicate a water source. The extent to which indexical pictures present interpretation problems for low-literate readers may depend on universal characteristics of embodiment, cultural conventions, and familiarity with the context.

6 RESEARCH METHODOLOGY

6.1 Research design

As stated in the introduction of this article, the purpose of this research was to learn more about whether and how low-literate South Africans understand aspects of visual

symbolism in public awareness documents about HIV/AIDS. The research design is therefore essentially qualitative and descriptive.

6.2 Respondents

Thirty-five low-literate speakers of eight African languages, between the ages of 22 and 55 years, were interviewed individually by the researcher. An incentive of R20 per respondent was offered.

The literacy levels of the respondents were determined on the basis of self-reports regarding years of formal schooling. Five of the initial 35 records could not be used, since the literacy levels of the respondents were above Grade 8. Eight years of schooling was set as the upper limit, because it is regulated by law that learners who have passed Grade 9 may leave school and start tertiary training. A supporting justification was that persons with less than nine years of schooling are regarded (in terms of the categories defined by Project Literacy 2004) as only marginally literate.

The sampling method was both convenient and purposive, as the researcher relied on personal acquaintances to identify and recruit respondents who satisfied the literacy requirement. Fourteen respondents were interviewed at the house of Ms Elsie Mahlangu at Pumula in KwaMhlanga. Ten respondents were recruited by Ms Jemina Setumu, a domestic worker in the Constantia Park suburb of Pretoria and were interviewed at the researcher's house. Eleven respondents (domestic workers and gardeners) were recruited via the network of a faith-based therapy centre in Waterkloof Glen (Pretoria), and interviewed in the homes of their employers. The gender imbalance (25 females and 5 males) is due to the sampling method, and the fact that males were hesitant to participate in individual interviews conducted by a female researcher on a semi-taboo topic.

The following matrix summarises the socio-demographic profile of the respondents:

Table 1: **Socio-democratic profile**

Age	Years of formal schooling	Gender	Occupation	Home language
Mean 41.5	Mean 6.5	Female 25 Male 5	Domestic workers 16 Unemployed 7 Gardeners 4 Cleaners 3	IsiZulu 9 IsiNdebele 7 Sepedi 7 Sesotho 3 Setswana 1 Siswati 1 Xitsonga 1 IsiXhosa 1

6.3 Materials

The materials for the project consisted of a compilation of fourteen pictures from various public information documents on HIV/AIDS that were collected from educational and public health care facilities (clinics, hospitals, schools) in and around Pretoria during the period 1999-2004. The pictures were scanned and arranged in a narrative sequence that could be characterised as 'the story of AIDS'. Pictures regarding the following topics were included: talking about sex and pregnancy; talking about sex and protection against HIV/AIDS; postponing sexual debut; HIV/AIDS and pregnancy; negotiating condom use; HIV-testing; HIV testing and counselling; regular exercise; getting rest; healthy and unhealthy food choices (lunch); prohibition of smoking and alcohol use; and taking antiretroviral medicines according to schedule.

The choice of a narrative sequence was based on the rationale that pictures are very seldom used and interpreted as stand alones, that is without explanatory text or verbal instruction. It was further argued that a chronological narrative would coincide with the most basic illness narrative which, according to Hawkins (1990), is composed of the time before the onset of the illness; the onset of the illness; and the resolution of the crisis.

The selection of pictures from different documents resulted

in a stylistically heterogeneous instrument, representing the following visual styles: black and white semi-realistic line drawings; coloured, cartoon-style line-drawings; coloured, realistic line drawings with background detail; silhouette; coloured, semi-realistic line drawings without background detail; shaded colour drawings without background detail; and shaded colour drawing with background detail.

6.4 Structure of the interviews

The researcher started each interview by introducing herself, asking the name of the respondent, and establishing the preferred language for the interview. In cases where the respondent was not conversant with English or Afrikaans, an interpreter was used. Different interpreters were used in KwaMhlanga and in Pretoria.

After the introduction each respondent was briefed regarding the purpose of the research, namely to assist the researcher in finding out whether the pictures were 'good' or 'bad'. Interviewees were informed that their responses would be tape-recorded anonymously, that their participation was voluntary, and that they were entitled to withdraw their participation at any stage during the research process. Respondents were asked verbally for their consent to use the data and to proceed with the interview. Only one respondent preferred not to participate, and the interview was subsequently terminated.

After obtaining informed consent, the socio-demographic details of the respondent were noted, including age, occupation, years of formal schooling, mother tongue, and gender. To ensure that all the respondents had sufficient factual knowledge to interpret the pictures, it was decided to first engage in a semi-structured conversation about the topics dealt with in the picture story, following the same chronology. During this pre-interview conversation, the researcher asked questions, confirmed correct answers, and provided correct information where the respondent did not know the answer or held erroneous beliefs. Respondents were invited to ask questions, and to comment on any of the issues raised.

The subsequent interviews were semi-structured, but respondents were invited to make additional comments that could assist the researcher in establishing the quality and the acceptability of the pictures. Respondents were prompted to comment on particular aspects of the visual if they had not referred to these issues in the initial response.

6.5 Data-analysis

After each interview, the responses were typed on a data sheet, and after all the interviews had been conducted, the answers were transferred to templates for each question. Codes were assigned to salient categories of answers to facilitate a measure of generalisation.

7 DISCUSSION OF FINDINGS

7.1 Pictures 1-3

The black and white line drawings were selected for two reasons. Firstly, to find out whether visually unskilled readers would interpret the thought and speech balloons correctly; and secondly to establish whether they would be able to handle pictorial complexity (e.g., to relate and make sense of picture elements referring to concrete objects and processes of thought and speech).



1



2



3

1, 2 and 3 (Edwards 2000)

More than three quarters of the respondents (respectively 24, 20 and 24 out of the 30 respondents) correctly identified the characters in the main pictures of these line drawings; and 84.4 percent (22, 26 and 28) identified the objects in the thought balloons/speech balloon correctly (where 'correctly' means 'in a purely iconic way'). The majority seemed to have no difficulty in recognising iconic line drawings of objects with which they were familiar. Only three respondents did not recognize the condom in picture 2, and three identified the condom incorrectly: two thought that it was a pipe and one identified it as a flag.

However, a significant number of respondents had some difficulty in grasping the compositional meanings of these pictures, where compositionality is either present in a particular picture unit, such as a speech/thought balloon, or holds between a main picture and the content of the thought/speech balloon. Owing to the relative simplicity of picture 2 it was not surprising that two thirds (19) of the respondents correctly related the condom in the speech balloon to the main picture. Moreover, 20 respondents identified the main message as a father talking to his son about safe sex. Although verbs of instruction occurred frequently in the responses to picture 2, namely *teach* (1); *tell* (7); *instruct* (1); *talk* (10); *say* (2) only one respondent labelled the speech balloon as such, when prompted.

In picture 1, only four respondents were able to construct a compositional meaning for the picture in the thought balloon (e.g., 'If a man and a woman have intercourse, they can have a baby'). None of the respondents mentioned anything about the girl learning, knowing, thinking about or being taught these facts. Moreover, only one respondent was able to assign the correct meaning to the abstract symbols + and =, when prompted. Four respondents replied that the + indicated a clinic or a hospital.

Picture 3 proved to be even more challenging. This could have been due to the complexity of the thought balloon and the indexical nature of the picture, where the clothes on the floor are indexical representations of sex. The responses were as follows:

- Eight respondents interpreted the bed completely literally (i.e., as 'a bed').
- Seventeen related it to having sex.
- Eleven realised that the intercourse was in some way inappropriate. However, only five gave the correct interpretation, namely that they are too young to have sex. Other answers included: they had unsafe sex/sex without a condom (4); they will get AIDS if they have sex (1); they did not talk about sex (1).
- Only nine identified the cross as a symbol of prohibition.

In both pictures 1 and 3 only one respondent (the same

person), used the word *think* in her responses, which suggested that she might know the shape of a thought balloon. However, when prompted, she could not label the shape.

7.2 Pictures 4 and 5

These coloured cartoon pictures were included to elicit responses to certain symbolic-analogical elements, namely the hearts and the monster. Recognition of the couple as a boyfriend and a girlfriend in picture 4, and a husband and wife in picture 5, were not problematic for any of the 30 respondents. However, as in the previous three pictures, the speech balloon and the thought balloon presented problems – the latter more so than the former. Although none of the respondents explicitly referred to the elliptic shape in picture 4 as a speech balloon, nine of them used a verb of speaking to describe the relation between the main picture and the picture in the speech balloon. However, only five attributed the speech to the girl: two responded that the girl was *telling* the boy something, and two answered that she was *saying* something to the boy. The other five identified bi-directional communication by making use of the pronoun *they* and the verbs *discuss* (1), *say* (1) and *talk* (4). None of the respondents identified the thought balloon in picture 5 positively, although two used the verb *think* in their description of what the characters were doing.

The most problematic aspects of the two pictures proved to be the interpretation of the pictorial metaphors: the hearts in picture 4 and the monster in picture 5. Only 10 respondents recognised the hearts around the boy's head correctly. However, out of these 10, four respondents interpreted the meaning as thinking deeply or having trouble. Ten respondents indicated that they did not know what the red objects meant, and the other 10 gave erroneous interpretations, including 'the condom of the woman' (2); 'lips' (1); 'sick' (1); 'screaming' (1); and 'signs of happiness'.

In picture 5, 18 respondents (60 percent) noticed that the



4



5

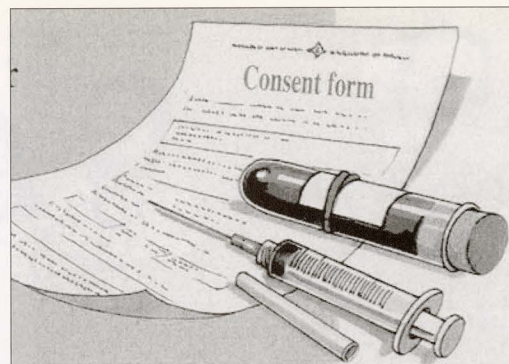
4 and 5 (National AIDS Programme s.a.)

woman was pregnant. However, only nine respondents (30 percent) recognised the red monster in the thought balloon as a representation of disease ('HIV', 'a germ', a 'bacterium', a 'virus' or an 'illness'). Eleven respondents indicated that they did not know, and six responded that it was the baby in the mother's 'stomach'. None of the respondents was able to appropriately relate the content of the thought balloon to the main picture, that is: 'a mother who is pregnant, and who is worried by the thought that she might be HIV positive'.

Although few respondents focused on totally irrelevant detail, it was nonetheless a matter of concern that one respondent identified all the cartoon characters in pictures 4 and 5 as having AIDS. When asked to explain her answer, she responded: 'Just look at how thin their necks are'.

7.3 Pictures 6a and 6b

Pictures 6a and 6b were placed adjacent to each other in the test material, and after responding to 6a, respondents were asked to explain the message in 6b in relation to 6a.



6a

Picture 6a was included to trigger responses related to the indexical relationship between the test tube and syringe, and the HIV test. Picture 6b was supposed to trigger responses that related the postures in the silhouette to the typical emotional reaction when discovering one's status as HIV positive, and the comforting response that can be expected from a sympathetic person such as a health worker.

In 6a the syringe (labelled by the majority as 'an injection') was identified by 86,6 percent of the respondents (26). However, only a third of them (11) related the picture as a whole in an indexical way to the HIV test. From the remaining 19, who neither recognised the test tube with blood, nor related the picture to the HIV test, nine did not recognise the test tube with blood at all. The other responses included 'pills' (4), 'a man's thing' (2), 'vaccine' (1), 'the things you put on your lips' (1), 'a condom' (1).

In general, respondents did not experience any problems in recognising the main participants in picture 6b as being an adult male and an adult female (96,6 percent). Twenty-one (80,7 percent) attributed emotional distress (pain, sadness, crying, worry) to the male person, and 10 saw the woman as someone providing emotional support, but only seven identified her as a health worker (doctor, nurse or counsellor).



6b

6a and 6b (SoulCity/Khomanani 2004)

A surprising 27 respondents (90 percent) interpreted the main message as having something to do with the outcome of the HIV test.

7.4 Pictures 7a and 7b

Picture 7a was selected to test low-literate readers' interpretation of lines as representations of movement, as well as to find out whether they would relate playing soccer to regular exercise for those who are HIV positive. Picture 7b was included to establish whether they would understand the picture of the woman reclining in the chair and reading a book as an instruction that seropositive people should relax on a regular basis.

Twelve respondents interpreted picture 7a in a purely literal sense, as a man playing with a ball or a man playing soccer. Fourteen respondents provided an answer at a further level of abstraction, and said that the man was exercising. However, only four interpreted the message of the picture as an instruction to exercise regularly if one is HIV positive. A third of the respondents (10) interpreted the picture as representing a completely healthy individual, ascribing their



7a

7b

7a and 7b (Gauteng Provincial Government 1999)

interpretation to the fact that he 'looked healthy'.

In order to establish to what extent low-literate people understood pictorial conventions that depict unseen concepts, such as movement, they were prompted about the meaning of the curvy line stretching from a location at the back of the man's leg to the foot that kicks the ball. Only five respondents interpreted the meaning of the line as showing movement of an object (the foot and/or the ball) from one spatial location to another. Two respondents said that they thought it represented the dust generated by the kicking. Other responses included 'I don't know' (8) as well as associations with power, strength, and health (6).

The interpretation of 7b was comparable in that twelve respondents (40 percent) interpreted the picture in a purely iconic way, namely as a woman sitting on a couch, reading a book. Sixteen respondents abstracted away from the purely literal, and described the action as 'studying' or 'learning about HIV'. Only two respondents related reading to relaxing, and not one person came up with an interpretation related to the necessity of relaxation for people who are HIV positive.



8a and 8b (Tshwane City Council s.a.)

7.5 Pictures 8a and 8b

Pictures 8a and 8b were selected to establish whether symbolic-abstract visual elements would be recognised if they formed part of the background of a picture, whether their meanings would be integrated compositionally, and whether these meanings would be translated into instructional messages concerning HIV and AIDS. In picture 8a a third of the respondents (10) interpreted the food items purely literally. They simply named the bread and soda. Eighteen respondents identified the foods, and recognised that they were not healthy choices. However, even when prompted, only 13 of them pointed out the red cross on which the food is superimposed, as the source of their answers. The other five replied that they 'just knew' the answer; in other words they based their answers on prior knowledge. Only two respondents related the prohibition to a healthy lifestyle for those who are HIV positive.

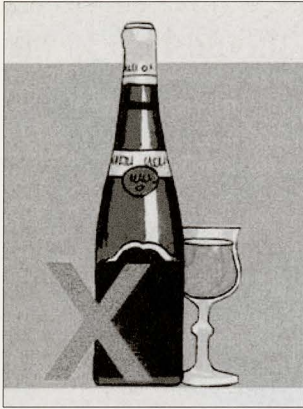
The responses to picture 8b were comparable. Seven respondents identified the bread, cheese, and orange only literally, and 22 recognised that it was a healthy choice. However, only 13 indicated the green tick behind the food as

the source of this answer. As in 8a, only one related healthy eating as an imperative for HIV positive people.

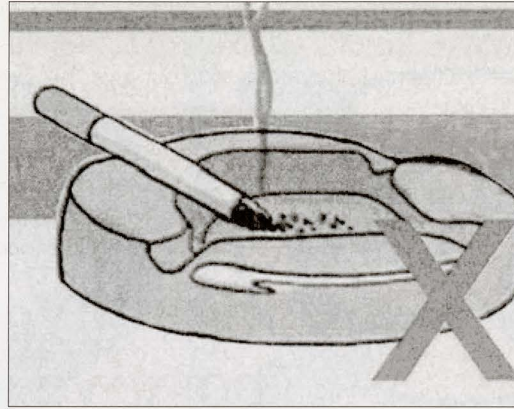
7.6 Pictures 9a and 9b

These pictures were included to establish whether prohibition, indicated by the superposition of a red cross on an object, would be interpreted correctly, and connected to living with HIV/AIDS. According to the results of a pilot study conducted by Birir among ABET students at the Waterkloof Airbase in Pretoria during July 2004, these pictures were not understood. Her respondents either did not notice the cross to the side of the picture, or could not integrate its meaning with that of the main picture (wine bottle or ash tray). Birir's findings were contradicted, however, by the current research. Twenty-three respondents said that the use of liquor was forbidden or 'not good', and 22 (73,3 percent) indicated the red cross in support of their answers (the colour red seemed to be a very strong indicator of danger). However, only one respondent related the non-use of alcohol to HIV or AIDS.

The responses to picture 9b were predictably similar. Twen-



9a



9b



10 (SoulCity/Khomanani 2004)

9a and 9b (SoulCity/Khomanani 2004)

ty-three respondents answered that smoking was forbidden, indicating the cross as the source of the answer; but none related the picture to HIV status.

7.7 Picture 10

Picture 10 was selected to establish whether the respondents could interpret the meaning of the clock in relation to the main picture. Two thirds of the respondents interpreted the content of the main picture in a purely iconic way, namely as a woman/girl who is drinking pills/medicine (with water). Only seven respondents referred to the pills as medicine to relieve the symptoms of AIDS (i.e., medicine that helps to boost the immune system). It may be assumed that more of them actually understood the pills to be antiretrovirals, but regarded this as shared knowledge in the interview context. This assumption is based on the fact that 20 of the respondents explicitly related the clock to taking the medicine at the same time every day – an aspect of the usage instructions that was discussed during the pre-interview briefing. Only four referred to the time on the clock purely literally in terms of the time indicated (2 pm). Five respondents (with a mean of two years of formal schooling), were distracted by background detail (the two

boys) when assigning meaning to the picture as a whole.

8 INTERPRETATION OF THE RESULTS

8.1 Symbolic-analogical pictures

The standard advice for designing educational materials to be used in development contexts is that they must be pre-tested. It is particularly important to test materials containing symbolic-analogical visuals, as they may be imbued with culture-dependent metaphorical meanings. In the case of picture 4, the researcher did not anticipate that the hearts surrounding the boy's head would cause interpretation problems. It was taken for granted that the romantic meaning of red hearts has been popularised sufficiently by mass media such as cartoons and greeting cards. However, certain responses showed that lack of exposure to popular mass media, and the influence of language-supported cultural meanings could have caused interference. The hypothesis about the influence of language-supported cultural meanings is not too far-fetched in view of the fact that five respondents answered that the hearts meant the boy

is 'thinking deeply' or 'having trouble', which could in turn be related to most African languages having an expression that contains the word *heart* referring to thinking. According to Sponono Mahlangu, a practitioner from the Ndebele dictionary project at the University of Pretoria (2004) the Sepedi expression *o bolela ka pelo*, and the IsiZulu expression *ukhuluma ngenhliziyo*, literally mean 'to talk with the heart', but actually mean 'to worry'. Although the number of respondents who mentioned this meaning was relatively small, this result suggests that pictures in documents need to be controlled for language-specific and culturally embedded meanings.

Cultural meanings also seemed to play a role in the interpretation of picture 5, where only a third of the respondents recognised the red monster (as a symbol of HIV or AIDS) in the thought balloon. According to Mahlangu (2004), speakers of African languages do not have a unified way of metaphorising AIDS. In IsiNdebele, for instance, AIDS is viewed as a big, prehistoric animal, which has been lexicalised as *isilwani*. In Mahlangu's opinion it would be extremely difficult to use one single metaphorical symbol that could trigger the meaning of AIDS for speakers of all the African languages.

Moreover, in picture 7b the intended meaning was at odds with the message understood by the majority of the respondents. Whereas sitting casually and reading a book symbolises relaxation in Western cultures, people from African cultures will most probably understand it to symbolise 'academic effort'. This is, in fact, the interpretation more than half of the respondents gave. Only two respondents related reading to relaxation. According to Mahlangu (2004), an acceptable image of a relaxing person would be someone reclining in a chair, with his/her legs crossed. However, to make sure that the message comes across unambiguously, research needs to be done on the bodily metaphors of relaxation among the different cultures in South Africa.

8.2 Symbolic-abstract pictures

Thought balloons and speech balloons are two of the symbolic-abstract conventions that are poorly understood by visually unskilled readers, and they should be omitted from visual instructions for low-literate people. In pictures 1 and 3 only one respondent used the word *think* in his response, and although verbs of instruction occur 21 times in the responses to picture 2, the respondents could have arrived at this interpretation on the basis of prior knowledge plus the other available visual cues, such as the father's mouth, opened as if he is speaking. Another characteristic of the cartoon style that seems to be poorly understood is the use of certain conventions to depict unseen concepts, such as movement. For instance, in picture 7a only five respondents interpreted the meaning of the line as showing movement of an object (the foot and/or the ball) from one spatial location to another. However, none of the respondents regarded the line as part of an object or person in the picture – a finding that is contradictory to previous findings, namely that lines depicting movement are interpreted as part of an object.

Symbols such as crosses and ticks were noticed and interpreted correctly if they were highlighted by making use of colour, and if they were clearly visible. A red cross superimposed on an object was recognised by approximately 75 percent of the respondents as a sign of prohibition (compare the responses to pictures 9a and 9b). However, if the abstract symbol was included as part of the background, recognition dropped by about a third. Less than half of the respondents (43 percent) recognised the cross and the tick in pictures 8a and 8b. The complexity of a picture also seems to reduce the probability that an abstract-symbolic visual will be recognised and correctly interpreted. In picture 3, only a third of the respondents identified and correctly interpreted the cross that is superimposed on the thought balloon. The cognitive load seems to increase when abstract symbols are combined in a kind of formula.

Mathematical symbols seem to present major problems. Only one respondent could name the symbols + and = in the thought balloon of picture 1, and was able to give an acceptable interpretation of the content. A compounding factor might have been that the symbols in the balloon are not used in the normal mathematical sense, but in an analogical way: The symbol + is used as a synonym for the word *and*, meaning 'unite' rather than 'sum of', and the symbol = means 'is the product of', rather than 'equals'. Another possible reason why the + was not interpreted as a mathematical symbol, is that it is strongly associated with health care facilities in the context of HIV/AIDS.

8.3 Indexical pictures

Hoffmann (2000:63) claims that indexical pictures cause the minimum of interpretation difficulties, yet the results obtained from this research project suggest otherwise. In picture 3 only about half of the respondents related the bed and the clothes lying on the floor to having sex; in picture 6a only a third of the respondents related the syringe and the test tube to the HIV test. On the other hand, approximately two thirds of the respondents deduced from the posture of the male person in 6b that he is suffering some kind of emotional distress as an outcome of the HIV test. Even in picture 5, where five respondents said that the two parents were angry, instead of sad, the meaning they assigned would not cause total misinterpretation because it indicates an unpleasant emotional reaction to being pregnant and possibly HIV positive.

The fact that certain indexical pictures were interpreted correctly, whereas others were problematic, may be ascribed to the cognitive reality of 'embodied meaning', as opposed to relationships not mediated by contextual knowledge or human embodiment. The connection between sadness, worry, and distress on the one hand, and a head buried in a person's hands or a distraught face, can be inferred more easily than the relationship between a syringe and a test

tube with blood, and a test to establish one's HIV status, without suggesting the action mediating between the two.

9 CONCLUDING REMARKS

In general, the findings of the project are consistent with those of earlier research studies. The findings confirmed that people with limited reading skills experience problems interpreting symbolic-abstract representations associated with a cartoon style, such as speech balloons and thought balloons. The findings confirmed that they also experience problems interpreting representations associated with systems of formal logic, such as plusses, minuses and equals signs, as well as crosses and ticks in cases where these contribute to the overall meaning of a complex visual or constitute the background of a picture. Using symbols of this nature in a transferred sense compounded the problems. As far as symbolic-analogical pictures are concerned, the findings showed that ambiguity and culturally encoded meanings interfere with interpretation if they clash with meanings associated with popular mass media. Furthermore, the findings pointed out that disembodied indexical representations that require a large amount of contextual knowledge to establish the link between visual index and real-world source are problematic.

In addition to understanding particular symbolic aspects of visuals, the findings provided evidence that low-literate viewers have difficulty in establishing links between the elements of complex pictures, particularly if the elements portray both concrete entities (such as objects) and more abstract processes, such as thought and speech. Moreover, low-literate viewers tend to focus on the literal (iconic) meanings of objects, and easily lose sight of the big picture or overall theme. This suggests that perhaps more cues should be included in education materials to keep the viewer focused on the main theme, for example, using an AIDS ribbon on the clothes of a person who looks healthy but should be interpreted as a person with HIV.

Although the outcome of this research project provided some guidelines regarding the do's and don'ts for the incorporation of visuals in instructional materials on HIV/AIDS, pre-testing among members of the target audience remains the only sure way of determining the effectiveness of materials. Moore et al (1990:307) summarise the importance of pre-testing and involving the target audience throughout the process of developing health materials as follows:

Continuous pretesting and revision – from the time staff recognize a potential need for print materials, through the development of text and illustrations and the production of the final piece itself – are crucial if the materials are to be accurate as well as understood, accepted and used by the target audience.

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References

- Ausburn, F & Ausburn, J. 1983. Visual analysis skills among two populations in Papua New Guinea. *Educational Communication and Technology* 31(2):112-122.
- Birir, L. 2004. D.Phil. student, supervised by the author of this article. Personal conversation. 19 July.
- Bradley, SM. 1995. *How people use pictures. An annotated bibliography*. London: International Institute for Environment and Development & the British Council.
- Carstens, A & Snyman, M. 2003. How effective is the Department of Health's leaflet on *HIV/AIDS Counselling* for low-literate South Africans? *Tydskrif vir Nederlands en Afrikaans* (Journal for Dutch and Afrikaans) 10(1):112-136.
- Carstens, A. In press. Tailoring print materials to match literacy levels – a challenge for document designers and practitioners in adult literacy. *Language Matters* 35(2).
- Colle, R & Glass, S. 1986. Pictorial conventions in development communication in developing countries. *Media in Education and Development*. December:159-162.
- Cornwall, A. 1992. Body mapping in health. *RRA Notes* 16:69-76. London: International Institute of Environment and Development.
- Doak, CC, Doak, LG & Root, JH. 1996. *Teaching patients with low literacy skills*. Philadelphia: Lippincott.
- Dudley, E & Haaland, A. 1993. *Communicating building for safety*. Cambridge: Cambridge Architectural Research.
- Edwards, DN. 2000. *Ubungani. A parent guide for life skills, sexuality and HIV/AIDS Education*. Commissioned by the Department of Health. Pretoria: Government Printer.
- Fuglesang, A. 1970. Picture style preference. *OVAC Bulletin* 22:46-48.
- Gauteng Provincial Department. 1999. *HIV/AIDS workplace programme*. Human Performance Systems.
- Gralki, HO. 1985. Framework of visualization, in *Participatory approaches for cooperative group events – introduction and examples of application*, G. Ulrich & U Krappitz. Feldafing: DSE:61-64.
- Grosse, N & Auffrey, C. 1989. Literacy and health status in developing countries. *Annual Review of Public Health* 10:281-297.
- Haaland, A. 1984. *Pretesting communication materials. With special emphasis on child health and nutrition education. A manual for trainers and supervisors*. UNICEF.
- Hawkins, AH. 1990. A change of heart: the paradigm of regeneration in medical and religious narrative. *Perspectives in Biology and Medicine* 33:547-559.
- Hoffmann, V. 2000. *Picture supported communication in Africa*. Weikersheim: Margraf.
- Kress, G & Van Leeuwen, T. 2000. *Reading images. The grammar of visual design*. London: Routledge.
- Linney, B. 1995. *Pictures, people and power*. Hong Kong. MacMillan.
- Mahlangu, S. 2004. Lexicographer, Isindebele Dictionary Project. Personal interview. 15 November.
- Messararis, P. 1994. *Visual literacy. Image, mind and reality*. Boulder, Col.:Westview.
- Moore, MB, Sørensen, M & Adebajo, CF. 1990. Illustrated print materials for health and family planning education. *World Health Forum* 11:302-307.
- NCI (National Cancer Institute). 1994. Clear & simple. Developing effective print materials for low-literate readers. [O]. Available: http://oc.nci.nih.gov/services/Clear_and_Simple/HOME.HTM
- NWGLH (National Work Group on Literacy and Health). 1989. Communication with patients who have limited literacy skills. *Journal of Family Practice* 46(2):168-176.
- PATH (Program for Appropriate Technology in Health). 2002. *Developing materials on HIV/AIDS/STIs for low-literate audiences*. [O]. Available: <http://www.fhi.org/en/HIVAIDS/Publications/manualsguidebooks/lowliteracyguide.htm>
- Plimpton, S & Root, J. 1991. Materials and strategies that work in low literacy health communication.
- Project Literacy. 2004. *Education Statistics*. [O]. Available: <http://www.projectliteracy.org.za/education.htm>
- Rudd, RE, Moeykens, BA, & Colton, TC. 1999. Health and literacy. A review of medical and public health literature. *Annual Review of Adult Learning and Literacy*. New York: Jossey-Bass. [O]. Available: www.cete.org/acve/docs/pab00016.pdf
- Shaw, B. 1969. *Visual symbols survey. report on the recognition of drawing in Kenya*. London: Centre for Educational Development Overseas.
- SoulCity/Khomamani. 2004. *HIV and AIDS treatment*.
- Spain, S. 1987. Improving visual comprehension in nonliterate. *Media Asia* 14(2):89-112.
- Tshwane City Council. S.a. *The Healthy Diet Plan*. Premos Graphics.
- Tomaselli, KG & Tomaselli, R. 1984. Media graphics as an interventionist strategy. *Information Design Journal* 4(2):99-117.
- Tripp-Reimer, T & Afifi, LA. 1989. Cross-cultural perspectives on patient teaching. *Nursing Clinics of North America* 24(3):613-619.