CULTURAL BACKGROUND AND BENDER VISUAL MOTOR GESTALT

TEST PERFORMANCE: COMPARISON OF THE PERFORMANCE OF

XHOSA AND WHITE SOUTH AFRICAN ADOLESCENTS USING

THE PASCAL-SUTTELL SCORING SYSTEM

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by

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ABSTRACT

The quality of the Bender-Gestalt performance of 22, normal,
white South African male adolescents and 22, normal, Xhosa
male adolescents, aged between 17 and 22 years, was investi-
gated.   The Pascal-Suttell scoring system was used.   The
mean score of the white adolescents was significantly below
that of the Xhosa adolescents.   It was found that while the
mean score of the Xhosa adolescents was within one standard
deviation of Pascal and Suttell's normative 'high school'
mean, the mean score of the white adolescents was below that
of the normative mean and not within one standard deviation
of the mean.   The results lend support to the findings that
Bender performance is related to cultural background.   It
is suggested that the Pascal-Suttell tables may be in need of
revision.   The advisability of standardising tables, which
are culture specific, for clinical use in the Southern African
context, is indicated.

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The ideas stimulating the research which culminated in the writing of this monograph, germinated at the commencement of the writer's clinical training at a State psychiatric hospital where he found himself working with in- and out-patients from various ethnic or cultural groups. It is the writer's estimate that while the hospital offered services to members of every racial group, the majority of the patients treated within the hospital, as out-patients and at the various town and rural clinics, were members of the Xhosa racial group.

In the usual routine work with these black patients, the writer noticed that the clinical staff often included in their battery of tests, the Bender Visual Motor Gestalt Test, together with the Pascal-Suttell scoring system (Pascal and Suttell, 1951). The Pascal-Suttell tables were then used to obtain a standard score from which various tentative conclusions were drawn.

Aware that the tables of norms developed by Pascal and Suttell are based almost exclusively on the Bender performance of white Americans over the age of 15 years, and thus within the age group in which further maturation of visual-motor skill is not expected, and having come across literature which suggested that Bender performance may be influenced by ethnicity or culture, the writer began to question whether the Bender test and the Pascal-Suttell normative scales could be used for comparative purposes with black patients. If it were shown that normal, i.e., non-patient, members of the Xhosa racial group who were over the age of 15

years performed differently to non-patient members of the white racial group of similar age when the Pascal-Suttell scoring system was used, the validity of using the normative tables would be in question.

The writer hence undertook to discover whether there was a difference in Bender performance of samples representative of normal white and Xhosa adolescents over the age of 15 years.

The Bender Visual Motor Gestalt Test (BVMGT) comprises nine geometrical designs consisting of dots, lines, angles and curves combined into numerous relationships. The designs are essentially quite simple, and each is presented on a card to the subject for him to copy on a piece of paper.

The test was originally developed by Dr Lauretta Bender in the early 1930's. She selected from Wertheimer's work on Gestalt functioning nine designs which she incorporated into a test for clinical use. She used the test, which taps visual-motor integration or functioning, to estimate intelligence in children and as a means to investigate schizophrenic reactions and organic disturbances (Billingslea, 1963). In 1938, Bender published the results of her studies in her monograph "A Visual Motor Gestalt Test and Its Clinical Use."

The Bender-Gestalt (B-G) or the Bender test, as it came to be

called, then developed as a popular tool amongst clinicians, and various administrations of the test with different scoring systems emerged in the forty years following the publication of Bender's original monograph. Various inspection methods of analysing Bender protocols, other than than of Bender's own system, emerged together with what are known as the objective scoring systems, including those of Pascal and Suttell (1951), Koppitz (1963), and Hain (1964). Koppitz (1963) developed her scoring system to measure skill and possible maturational lag in visual-motor perception in children. Recognising the effect of maturation on the performance of young children on the Bender test, Gerald Pascal and Barbara Suttell developed their scoring system primarily for adults, and cautioned against using it with young children (Pascal & Suttell, 1951).

The popularity of the Bender test is such that Hutt (1977) has concluded:

> Taken together the various forms of the Bender-Gestalt-Test now constitutes one of the most widely utilized methods in clinical assessment in this country [U S A]. They are also widely used throughout the world.(p. 19)

The Bender test in its various forms is commonly used to measure severity of psychopathology (Billingslea, 1963; Field, Bolton & Dana, 1982; Lacks, 1982) but has been used for other purposes, including the possibility of estimating intellectual capacity and functioning (Billingslea, 1963; Pascal and Suttell, 1951;

Peixotto, 1954); of assessing personality style, conflicts and
defence mechanisms (Billingslea, 1963; Hutt, 1977) and of
diagnosing the presence of brain damage (Bigler & Ehrfurth, 1981;
Butler, Coursey & Gatz, 1976; Eno & Deichmann, 1980).

Whether or not the Bender test can be used to diagnose the
condition of brain damage appears to have been a somewhat con-
troversial issue in the past. Some studies support the contention
while others are less favourable. A recurrent feature in the
recent literature is the conclusion that the Bender cannot be
used by itself to diagnose the condition of brain damage
(Bigler & Ehrfurth, 1981; Billingslea, 1963; Eno & Deichmann,
1980; Hutt, 1977). After reviewing the research since 1970
on the Bender test as an instrument for the diagnosis of brain
damage with children of normal intelligence, Eno and Deichmann
(1980) concluded:

> The Bender can serve as an effective screening
> instrument for the detection of gross cognitive
> disturbances ... Alone, the BVMGT, or for that
> matter any other psychometric instrument, can-
> not be used to diagnose the condition of brain
> damage. (p. 43)

The idea that the Bender test best serves as a screening in-
strument when clues for the possible presence of brain pathology
are sought and that it should be used, not in isolation, but in
a battery of tests, seems to be a recurrent feature of even more
recent studies (Lacks, 1982; Lacks & Storandt, 1982).

Pascal and Suttell (1951) developed their scoring system in the 1940's primarily to facilitate the comparison of Bender reproductions made by psychiatric patients and non-patients. They were particularly interested in whether a scoring system could be developed which would distinguish significantly between the reproductions of patients and non-patients. If so, the system could be used to screen for the presence of psychopathology.

Pascal and Suttell expected that they would find greater deviations from the Bender stimuli in those persons in whom "the attitude towards reality is most disturbed" (p. 8). They found that their studies corroborated this expectation. They state:

> In the populations tested by us, of normal intelligence and free from brain damage, the greatest number of deviations were found in psychotic subjects, fewer in psychoneurotic subjects and least in nonpatients.
>
> Deviations from B-G stimuli in our scoring system run from faithful reproductions with low scores to extremely deviant reproductions with very high scores. This continuum is correlated with a progression from less to greater psychological disturbance .(p. 8-9)

Pascal and Suttell believe that the score, being an indicator of ability to respond to the Bender stimuli, is an indicator of ability to respond adequately to stimuli in the environment, "which is sometimes referred to as a function of the ego" (p. 9). They then contend that the Bender score is an indicator of ego strength:

If, for the purposes of this discussion, we limit
our definition of ego functioning to the ability
to reproduce faithfully the B-G drawings as pre-
sented, then we may say that ego strength lies on
a continuum from very low to very high B-G scores.
This quantitative continuum may, then, in a very
limited way, be thought of as an aspect of ego
strength - the lower the score, the greater the
ego strength.(p. 9)

Pascal and Suttell developed their scoring system by comparing

the Bender reproductions of psychiatric and normal patients, and

listing the deviations which seemed to discriminate between the

groups.   On the basis of item analysis, or on the basis that

the deviation occurred only with psychiatric patients and rarely

with nonpatients, 105 of the original deviations were accepted.

Weights were then assigned to each deviation.

When standardizing the method, Pascal and Suttell found that

there was no practise effect on performance and "recommend the

use of the test wherever repeated performances on a psychomotor

task are required" (p. 18).   They also concluded that the scores

are not a function of drawing ability, of sex or of I.Q.   As

regards age, they found that the range within which age had

little effect on score was the ages 15 to 50 years.   As regards

education, Pascal and Suttell discovered a relationship between

education and Bender score.   They found there was a real differ-

ence between the scores of the two groups where the one group

had completed at least one year of high school education and

the other had completed one year or more of college.

Taking into consideration the effect of education, Pascal and Suttell then developed two tables which can be used for comparative purposes in clinical work with psychiatric patients. The tables give the standard score equivalent of the obtained raw score.

Use of the score sheet developed by Pascal and Suttell facilitates obtaining the raw score. On the score sheet, possible deviations for each design, together with their assigned weights, appear. Configuration scores, or scores which have to do with the performance on the test as a whole, also appear.

Each design, with the exception of design A which is not scored, is inspected to determine whether or not scorable deviations have been made by the subject. The scores are accumulated by design and are added to the configuration score. The total is the obtained raw score. By using the appropriate conversion table, a standard score is obtained. This is known as the Z-score.

Reviewing the 1950-61 research, Billingslea (1963) concluded that "the literature reveals it [the Pascal-Suttell system] to be the most widely used scoring system on the BG Test today" (p. 239). This contention is accepted by more recent researchers, including Butler, Coursey and Gatz (1976) and Hutt (1977).

The controversy over whether or not the Bender test can be used

to diagnose the condition of brain damage, certainly does not stem from any such claim made by Pascal and Suttell when they presented the results of their research in their book "The Bender-Gestalt Test"(1951).   Nowhere is it claimed by them that their scoring system will allow the diagnosis of brain damage to be made.   Aware of the limitations of their instrument, they comment:

> The Bender-Gestalt Test as we score it is
> a fallible instrument whose validity is
> based on fallible, very gross criteria. (p. 34)

Pascal and Suttell claimed that the essential use of their tool is to detect the presence of psychopathology.   As David Wright puts it in his foreword to their book:

> They [Pascal and Suttell] make it quite clear,
> I believe, that a test and a quantified
> system for scoring responses to it have been
> devised by which the presence and immediate
> severity of psychiatric disorder in a person
> of adult years frequently can be discovered,
> with rapidity and with a surprising measure
> of dependability. (Pascal & Suttell, 1951, p. v)

Pascal and Suttell recognised over 30 years ago that their test is best used as a screening device:

> In the absence of other precedures the test
> does considerably better than chance in its
> ability to screen out individuals who are
> apt to be psychiatrically ill.   We do,
> therefore, recommend its use as a screening
> device, providing its limitations are known.
> (p. 34)

How successfully the Pascal-Suttell system discriminates groups of patients with major psychiatric disturbances from non- patient groups, appears to have been a controversial issue in the years following the introduction of the system. Addington (1952), Swensen and Pascal (1953) and Lonstein (1954) found that the system successfully discriminated groups of patients displaying various types of psychopathology, from non-patient groups. On the other hand, studies by Tamkin (1957) and Tucker and Spielberg (1958) fail to support this point of view. However, after exhaustively covering the 1950-61 literature on the Bender test and the various scoring systems which had emerged, Billingslea (1963) concluded:

> The preceding survey seems to force the con-
> clusion that both Bender's inspection system
> and P&S's [Pascal and Suttell's] objective
> scoring system have stood the test of time,
> when the problem is to separate grossly the
> BG protocols reflecting major disturbances
> from those reflecting normal behaviour. (p. 240)

Hutt, writing 14 years later, draws the same conclusion. When presenting the historical development of his adaptation of the Bender-Gestalt test, he comments:

> [The] conclusions by Pascal and Suttell have
> stood the test of research quite well: as a
> rough measure of severity of general psycho-
> pathology the scale has demonstrated validity.
> (1977, p. 33)

In summary, the Bender test remains a popular clinical instru-

ment since the original test was developed by Lauretta Bender over 40 years ago. In its diverse variations of administration and scoring, the test is used with both adults and children as a projective test, as an instrument to estimate intellectual capacity, as a device to measure visual-motor maturation in children, as a screening instrument to detect the possible presence of brain damage and as a rough indicator of the presence and severity of psychopathology. Amongst the numerous scoring systems which have emerged in the last four decades, the Pascal-Suttell system stands out as a popular method by which the presence and severity of psychiatric illness in adults can frequently be discovered.

Recognising that the Pascal-Suttell method is one of the most widely used scoring systems today, the validity of using the system with adults outside of the population on which Pascal and Suttell developed their tables becomes an important issue. As the normative tables are based almost exclusively on the performance of white Americans (Butler et al, 1976; Pascal & Suttell, 1951) a more significant question is: 'Can the tables developed by Pascal and Suttell be used for comparative purposes with non-white subjects in the cross-cultural setting? If the norms are biased against other ethnic groups, the possibility of misdiagnosing patients from such groups certainly exists. If bias is found, the possibility of renorming the tables for local purposes should be considered by clinicians working in a cross-cultural setting.

The question whether or not the Bender test is a culture free test of visual-motor performance is by no means a new one. Over the last 30 years there has been some debate about whether differences in culture play a significant role in performance on this visual-motor task which involves the use of pencil and paper.

While 30 years ago the assumption existed that the Bender test was culture free because it comprises non-verbal stimuli (Peixotto, 1954), the contention today is that it cannot be assumed that the test is culture free simply because a minimum of language is necessary to accomplish the task. This is in accordance with the following statement by Money and Nurcombe (1974), on ability tests and cultural heritage:

> Attempts to build a culture free test of
> ability have focused ... on nonlinguistic
> tasks ....The fact that such tasks can be
> presented without language does not auto-
> matically guarantee, however, that they are
> culture free. (p. 298)

Numerous empirical studies with the Bender, involving matched samples from different cultural groups, indicate that perfor- mance on the Bender Visual Motor Gestalt Test is related to ethnicity or cultural background. Carlson (1966) compared the performance of black and white hospitalised schizophrenic patients matched on education and degree of impairment. Using the Pascal-Suttell method, he found that black subjects pro- duced significantly poorer reproductions. Marmorale and Brown

(1977), using the Koppitz scoring system, compared the developmental performance of 44 middle-class white, 47 non-middle-class Negro and 74 non-middle-class Puerto Rican children.   They found that the non-whites lagged and that the Negro group continued to score significantly below the white group when tested between the first and third grades.   Sattler and Gwynne (1982), using the Koppitz system in a comprehensive study which involved the testing of 1 938 black, Hispanic and white children, found that black children performed lower than white children at every age level and lower than Hispanic children at all except one age level.

Other studies, on the other hand, fail to support the contention that Bender performance is related to ethnicity or cultural background.   Taylor and Thweatt (1972) found that by the age of 11 or 12 years, there was no significant difference in the performance of Navajo and Caucasian children, although they found that the performance of six- and seven-year-old Navajo children lagged behind that of the Caucasian group.   Money and Nurcombe (1974) compared the mean scores of 76 Aboriginal children, aged between 10 and 15 years, with the Koppitz normative means and concluded that the Bender test scored by the Koppitz method is applicable to Aboriginal children.   They found that the mean scores of their samples were lower than the normative mean but still within one standard deviation of this mean.   Butler et al (1976), using the Pascal-Suttell and Hain scoring systems, administered the Bender to 72 black and white hospitalised

patients diagnosed as either brain damaged or psychiatric.
The subjects were matched by diagnosis, age, education and I.Q.
They concluded that the Bender did not discriminate against the
blacks.

The debate about whether or not the Bender is a culture free
test, insofar as ethnicity or culture influences performance,
is far from over.   The foregoing survey, however brief, forces
the conclusion that as long as studies indicating that perfor-
mance is related to ethnicity or culture continue to appear in
the scientific journals, psychologists in the cross-cultural
setting cannot assume that the test with the chosen scoring
system and its scale of norms can be used with confidence for
their local purposes.

It would appear that little attention has been given to the
reasons as to why performance on the test may be influenced by
culture.   Many of those who have found significant differences
in performance of various cultural groups, and who claim that
performance is related to cultural influence, offer few clues
as to how culture affects performance.   Carlson (1966),
attempting to account for the difference in performance between
his black and white hospitalised schizophrenic patients, suggests
that the black-white difference may be attributable to a lack
of early emphasis on activities requiring perceptual-motor
abilities in Black communities.   Karr (1982) investigated the
performance of 72 Sierra Leone West African children repre-

senting four subcultures of varying degrees of modernization.
After concluding that the study supports the findings that
Bender performance is related to cultural influences, Karr fails
to give a hypothesis of how culture influences performance. She
indicates, however, that length of exposure to contemporary tech-
nological society may be an important variable. Sattler and
Gwynne (1982) fail to offer any clues to account for the ethnic
differences which appeared when they tested 1 938 male and female
children. However, they state that possible reasons for the
lower performance of black children on the Bender have been
suggested. These include "slower perceptual-motor development,
delayed maturation ... limited perceptual-motor experience ...
and insufficient experience with the use of verbal mediation in
solving nonverbal tasks" (p. 69).

In an attempt to come to some understanding as to why culture
may influence performance on the Bender, a visual-motor task in-
volving the specific medium of pencil on paper, the approach
should perhaps be to look at other areas of cross-cultural
research on performance on tasks requiring visual-motor and
other skills. It is interesting to note that cross-cultural
research on tasks other than the Bender but involving percpe-
tual-motor skill, indicates that culture or ethnicity has been
found to influence performance on these tasks. Investigating
the rotation of the designs of the Minnesota Percepto-Diagnostic
Test by children between the ages of six and fourteen years
and representing four different cultural backgrounds

viz., English, French, Biligual and Canadian Indian, Blum and

Chagnon (1967) concluded that the degree of rotation manifested

in the subjects' reproductions was significantly affected by

differences in culture.

Similar studies of rotation of figures and shapes in the cross-

cultural setting are numerous and the conclusion of Blum and

Chagnon, is supported by more recent studies.   As Bentley (1980)

says:

> One of the recurrent features of pattern
> reproduction studies in the cross-cultural
> setting has been the higher frequency of
> orientation errors produced by non-western
> samples.(p. 8)

Bentley's own study, where the performance of Scottish and Bukusu

African subjects on the Pattern Completion Test was investigated,

confirms this finding.   Shapiro (1960) used the Kohs-type figures

of the Drawing Rotation Test on Central African and English subjects.

He found that his African subjects tended to rotate the figures

more than his white subjects.   Deregowski (1972) also investigated

the performance of Central African groups and concluded that they

experienced difficulty with the reproduction of orientation of

Kohs-type patterns.   Jahoda (1978) found that his Ghanaian

subjects were more likely than his Scottish subjects to regard

a pattern showing a 45° rotation from the stimulus line of

symmetry as being the same as the stimulus pattern.

An interesting study is reported by Serpell (1976).   Zambian
and English boys were asked to copy shapes by using thin strips
of wire and then with the use of pencil and paper.   He found
that the Zambian children were superior at copying the shapes
in wire while the English children were superior when using
the pencil on paper medium.

The fact that these studies almost exclusively involve the in-
struction to copy a stimulus by the manipulation of cards,
blocks, rods or pencil on paper is interesting when one bears
in mind that with the administration of the Bender test, subjects
are also required to copy a figure presented on a stimulus card
and to do so with the specific medium of pencil on paper.
Common elements of research involving the Bender test and other
pattern reproduction tasks in the cross-cultural setting thus
appear to include the instruction to copy a design, configuration
or pattern and the visual-motor activity involving the manipula-
tion of cards, rods or pencil on paper.   The third common element,
of course, is the series of independent studies in both fields
which conclude that culture or ethnicity influences performance
on these tasks.   With due consideration, one is encouraged to
believe that researchers who attempt to understand how culture
may influence Bender performance should consult with those in-
vestigating cultural influence on performance on other pattern
and figure reproduction tasks and vice versa.

The above introduction to the empirical study which is to follow

is summarised briefly below:

(a) The Bender Visual Motor Gestalt Test, which taps
visual-motor functioning, was originally developed
by Dr Lauretta Bender to estimate intelligence in
children and as a means to investigate schizophrenic
reactions and organic disturbances.

(b) Various administrations of the test, with different
scoring systems, emerged in the forty years follow-
ing the introduction of the test and it remains a
popular instrument in clinical assessment today.

(c) The test is used with both adults and children
for purposes including detecting the presence
and severity of psychopathology; estimating
intellectual capacity and functioning; assess-
ing personality style, conflicts and defences;
measuring visual-motor maturation and screen-
ing for the presence of brain damage.

(d) Recent literature indicates that the Bender test
cannot be used by itself to diagnose the condi-
tion of brain damage.

(e) The Pascal-Suttell system is perhaps the most
widely used scoring system for adults on the
Bender test today. With this system, the
presence and severity of psychiatric illness in
adults can frequently be discovered.

(f) A number of researchers in the cross-cultural
     setting contend that Bender performance is in-
     fluenced by culture.   Other researchers fail to
     support this contention.

(g) As long as studies indicating that performance is
     related to ethnicity or culture continue to appear
     in the scientific journals, psychologists in the
     cross-cultural setting cannot assume that the test
     with a chosen scoring system and its scale of norms
     can be used unhesitantly for their local purposes.

(h) Few clues are offered by researchers in the cross-
     cultural setting as to why culture may influence
     Bender performance.

(i) Cross-cultural research in other areas indicates
     that culture influences performance on other
     visual-motor tasks involving the copying of
     figures and patterns by the manipulation of cards,
     blocks, rods or pencil on paper.

(j) It was suggested that those who attempt to under-
     stand how culture may influence Bender performance
     should consult with those investigating cultural
     influence on performance on other pattern and
     figure reproduction tasks and vice versa.

The empirical study which follows attempts to explore Bender
performance within the South African cross-cultural setting.

As it cannot be assumed that cultural background has no influence on Bender performance, it was decided that the following questions were worthy of investigation:

(a) Are there differences in the Bender performance of normal white and Xhosa subjects of similar age and education level? and

(b) How will the performances of white and Xhosa subjects compare to that of Pascal and Suttell's normative sample of Americans aged between 15 and 50 years?

In the study which follows, it was decided for purely practical reasons, to select as subjects adolescents over the age of 15 years. A number of hypotheses were formulated.

As regards the first question, one hypothesis was formulated: In view of the fact that certain studies indicate that non-western groups produce a higher frequency of orientation errors on pattern reproduction tasks and that on the Pascal-Suttell scoring method of the Bender test errors of orientation or rotation deviations may account for a significant proportion of the total score, it was hypothesised that the mean raw score of a sample of normal Xhosa adolescents over the age of 15 years and who had at least one year of high school education would be significantly higher than that of a similar sample of white adolescents.

As regards the second question, two hypotheses were formulated:
Following the rationale of the first hypothesis and taking into
account the fact that the Pascal-Suttell norms are based almost
exclusively on the performance of white Americans aged between
15 and 50 years, it was hypothesised that the mean raw score of
the Xhosa sample would not fall within one standard deviation
of the normative mean.   On the other hand, it was hypothesised
that the mean raw score of the white sample would fall within
one standard deviation of the normative mean.

In order to exclude the possible influence of delayed visual-
motor maturation on performance, only those adolescents over
the age of 15 years were selected for this study.   In order
to exclude the possible influence of psychiatric illness on
performance, normal adolescents were selected.   Here 'normal
adolescents' refers to those adolescents who were not receiving
any form of psychiatric or psychological treatment at the time
when the Bender protocols were collected i.e., they were non-
patients.

One final note: The performance of the Xhosa subjects cannot
be considered as representative of the performance of other
black tribal groups.   Thus the study explores white-Xhosa
difference and not white-black difference.   The white and Xhosa
racial groups were selected as it is in the white-Xhosa cross-
cultural setting that the writer practises his clinical work.

METHOD

Subjects

The total number of subjects involved in the study was 44.
All the subjects were male and their ages ranged between 17
years, 0 months and 22 years, 0 months.

Twenty-two of the subjects were Xhosa and were randomly selected
from the registers of the final year classes of one of the black
high schools situated within the municipal area of Queenstown.
The subjects all lived within the defined urban area and attend-
ed the school as day-scholars. The majority of these subjects
came from a lower-middle to lower socio-economic background.
These subjects comprised the Xhosa sample.

The other twenty-two subjects were white and were randomly
selected from the registers of the final year classes of a
white high school located within the Queestown municipal area.
The subjects were enrolled as either day-scholars or boarders
and the majority of them came from a middle to upper-middle
socio-economic background. These subjects comprised the
white sample.

Before being accepted as suitable, the subjects were required to
state whether they were receiving any form of psychiatric or
psychological treatment. Here, 'treatment' included psychotrophic
medication, psychotherapy, counselling, etc. None of the subjects
reported that they were under any such form of treatment.

The description of the samples is given in Table 1.

Table 1 Description of Samples

Sample	N	Mean Age	Age Range
White	22	18yrs	17yrs.0mths. - 19yrs.0mths.
Xhosa	22	19yrs	17yrs.0mths. - 22yrs.0mths.
Total	44	18yrs.6mths.	17yrs.0mths. - 22yrs.0mths.

As Pascal and Suttell (1951) found that I.Q. did not influence the performance of their subjects, it was felt that as long as the samples were matched for level of education, assessment and matching for I.Q. was unnecessary.

Although only males were used in the study, it was felt that this was justified as Pascal and Suttell found that Bender performance is not influenced by the sex of the subject.

Procedure

The Bender Visual Motor Gestalt Test was administered individually to the subjects. The Pascal-Suttell procedure of administration and instructions were followed. As the Xhosa subjects were fluent in both Xhosa and English, the instructions to all subjects were presented in English.

The time taken for each subject to complete the task was recorded.

RESULTS

The Bender protocols were scored by the writer according to the Pascal-Suttell system. The mean raw scores on the Pascal-Suttell system were accepted for analysis in preference to the standard scores. Because the Pascal-Suttell standard score equivalents of the raw scores are based almost exclusively on white American norms, it seemed little would be gained for this study by trans-posing the raw scores to standard scores.

There was no significant difference in time taken by the subjects of the two samples to complete the task.

The first hypothesis concerned Xhosa-white difference in perfor-mance. Comparison between the mean raw scores achieved by the white and Xhosa samples revealed significant difference. As predicted, the Xhosa sample scored significantly higher than the white sample, t (27.25) = -5.30, p <.001.

Table 2 lists the mean number of deviations and the mean scores, together with the standard deviations for the two samples. Number of Deviations is the sum of design deviations and con-figuration deviations.

Table 2   Bender Test Performance : Xhosa and White Adolescents

Sample	Number of Deviations	Score		df	t
	M	M	SD		
White	3.14	5.95	3.36	27.25	-5.30[*]
Xhosa	6.86	16.40	8.61		

* p <.001.

The second hypothesis, that the mean raw score of the Xhosa sample would not fall within one standard deviation of the normative mean, was not supported. It was found that the mean score of the Xhosa sample did, in fact, fall within one standard deviation of the mean of the 'high school' sample of Pascal and Suttell.

According to Pascal and Suttell, the mean raw score of their adults whose ages ranged between 15 and 50 years and who had at least one year of high school education was 18.0, with a standard deviation of 9.4 (1951, p. 19). The mean raw score of Pascal and Suttell's male subjects whose ages ranged between 15 and 19 years was 19.8 (p. 18). The mean raw score of the Xhosa sample was 16.4, which, though below that of the normative mean, is still within one standard deviation of the mean.

The third hypothesis, that the mean raw score of the white sample would fall within one standard deviation of the normative mean, was not supported. It was found that the mean score of the white sample, 5.95, was below that of the normative mean and did not fall within one standard deviation of the normative mean.

An analysis of the composition of the number of deviations scored by the two samples is presented in Table A of the Appendix.

The Appendix also includes the following tables:

Table B lists the deviations common to the white and Xhosa samples;

Table C lists the deviations exclusive to the white sample;
Table D lists the deviations exclusive to the Xhosa sample.

DISCUSSION

The hypothesis that the mean score of the Xhosa adolescents
would be significantly higher than that of the white adolescents
was supported.

In an attempt to account for the difference in performance,
attention should first of all focus on the original rationale
for the hypothesis.   The rationale was that as certain studies
indicate that non-western groups produce a higher frequency of
orientation errors on pattern reproduction tasks, one may expect
that members of the Xhosa ethnic group will score higher than
members of the white South African racial group on the Bender
test when the Pascal-Suttell scoring system is used, as this
system scores for errors of orientation or rotation deviations.
Yet if one studies Tables B, C and D of the Appendix, it be-
comes evident that the contention that the Xhosa subjects
would make significantly more rotation deviations is incorrect.
In fact, no rotation deviations were made by the Xhosa subjects
when performing the task.   On the other hand, rotation deviations
made by the white subjects accounted for 1.4% of their total
number of deviations.

It would seem that in attempting to account for the difference
in performance, other variables will have to be considered.

Possible difference in level of intellectual functioning or
I.Q. is not considered an important variable which may account
for the difference in performance between the two samples.
While I.Q. was not assessed, all the subjects were in their
final high school year and none of them were repeating the
year.   If there is a difference in mean I.Q. of the samples,
it is believed that the difference would not be such that Bender
performance would be significantly influenced.

Possible difference in quality of school education may account
for the difference in performance of the two samples.   This
is in accordance with the following statement of Serpell (1977):

> We know that the quality of school education
> varies dramatically from one school to another
> and we cannot discount the possibility that
> the crosscultural differences which remain
> after 'controlling for level of education'
> are still the result of differences in the
> specific education received. (p. 77)

However, as both groups of adolescents were in the final school
year and as Pascal and Suttell found that significant difference
in performance was generally confined to the two groups of
those subjects who had at least one year of high school education
and those who had at least one year of college education, quality
of education received by the subjects involved in this study
may not be a particularly important variable in need of considera-
tion.

It is suggested here that the difference in performance is
related to difference in degree of early emphasis placed on
visual-motor activities by the communities to which the white
and Xhosa adolesents belong.   More specifically, it is argued
that in the Xhosa community there is a general lack of early
emphasis on activities enhancing the development of the visual-
motor skills required for the accurate reproduction of patterns
and figures using pencil and paper.

It is the expressed opinion of the principal and of a number
of teachers of the school from which the Xhosa adolescents were
selected, that activities known to encourage the development of
such skills, and common in the homes of white children, are
rarely performed in Xhosa homes.   While the parents of white
children encourage activities such as drawing, writing,
colouring-in and puzzle-building, materials for such activities
are rarely supplied by Xhosa parents to their children.   As
a result, such basic skills as how to grasp a pencil and how
to manipulate a pair of scissors are rarely developed before
the Xhosa child begins to attend school.   When interviewed,
the principal of the school in which the Xhosa adolescents were
enrolled, stated that 1 - 2% of Xhosa children know how to
write before they begin their school education.   On the other
hand, the principal of the white attended school expressed his
belief that the majority of white children have developed basic
writing skills before they begin their formal schooling.

In an attempt to account for the difference in degree of early emphasis on visual-motor activities involving the medium of pencil on paper made by the white and Xhosa communities to which the adolescent samples belong, consideration should be given to both the difference in socio-economic class of the communities and to level of general awareness of the developmental value of such activities for children.

The Xhosa adolescents came from a lower-middle to lower socio-economic background while the white adolescents belonged to a middle to upper-middle socio-economic class. It is possible that a general lack of finance prevents the Xhosa parents from purchasing materials and educational toys which are known to enhance the development of visual-motor skill in young children.

Yet discussion with a number of Xhosa teachers and parents indicates that the lack of early emphasis on such acitivities is more a function of the fact that the vast majority of the parents of Xhosa children simply do not see the need for such material and activities.

Traditionally, the Xhosa people are a rural, subsistence culture engaged in the rearing of sheep, goats and cattle, and the planting of crops which yield enough to provide for one season. Beadwork, weaving with grass or wool, pottery and the carving of ornaments are traditional pastimes of children. As one of the Xhosa teachers said, "Colour-in

books and puzzles are foreign to us."

However, the urbanized Xhosa people, of which the adolescents
used in this study are a sample, find themselves in the position
where the traditional pastimes which encourage the development
of specific visual-motor skills are no longer practised.   Until
such stage that the child starts attending school where he is
trained to develop the skills necessary to read and write, he
is not afforded the early opportunities which promote the early
development of visual-motor skill which is required for Bender
performance.

Thus it seems that the difference in performance of the white
and Xhosa adolescents is not so much a function of socio-
economic factors but of difference in cultural background.
The idea that degree of early emphasis on activities requiring
visual-motor skill may account for the difference in Bender
performance of cultural groups is in accordance with that of
Carlson (1966).

In summary, it would appear that the results of the present
study lend further support to the findings of Carlson (1960),
Marmorale and Brown (1977, Karr (1982), and Sattler and
Gwynne (1982) that Bender performance is related to cultural
background.

As the subjects in the present study were normal, i.e. non-

patients, one has to consider what can be expected when the performances of matched samples of white and Xhosa psycho-neurotic and psychotic patients are compared. One would presume that there would be a difference in the performances and that this difference would be significant.

The question one then has to ask is 'Can Pascal and Suttell's normative table for those who have at least one year of high school education be used for comparative purposes with members of the Xhosa racial group who are over the age of 15 years and who have at least one year of high school education, when the purpose is to screen for the presence and severity of psychopathology?'

The second hypothesis, that the mean score of the Xhosa sample would not fall within one standard deviation of the normative mean, was not supported. The results show that the mean score of Xhosa sample was below that of the normative mean but still within one standard deviation of the mean.

The rationale of the hypothesis was that the Xhosa subjects would make a greater number of rotation deviations than the white subjects and as the normative sample of Pascal and Suttell was comprised almost exclusively of white Americans it could be expected that the mean score of the Xhosa sample would not fall within one standard deviation of the normative mean.

Yet, as shown earlier, the Xhosa subjects did not execute one
rotation deviation and their performance was, in fact, better
than that of Pascal and Suttell's sample.

On the basis of this result, one is encouraged to believe that
the Pascal-Suttell normative table for those who have at least
one year of high school education may be used for cross-cultural
purposes with those members of the Xhosa ethnic group over the
age of 15 years and who have at least one year of high school
education.   One is encouraged to believe that the derived
standard score may be accepted as an indicator of severity of
psychopathology in patients belonging to this population group.

Yet as the Pascal-Suttell norms were developed over 30 years
ago, to what extent can the norms be accepted as representative
of the performance of American adults today?

If one considers the fact that the third hypothesis was not
supported and that the mean of the white sample was below that
of the American normative mean and not within one standard
deviation of this mean, what comes to mind is not so much the
idea that white South Africans have superior visual-motor
skill than Americans when it comes to copying the Bender designs,
but the idea that the Pascal-Suttell normative mean cannot be
accepted as an indicator of how a sample of normal American
adults would perform if the Bender test was administered to
them today.

It is suggested here that the superior performance of the white
subjects over the American normative sample may be attributable
to certain technological and sociological developments which
have taken place over the 30 odd years since the original
research of Pascal and Suttell.

If one considers such factors as the development of computers
and computerised machinery, the introduction of more sophisti-
cated technical apparatus such as calculators, the increased
production and distribution of educational toys and the recent
take-off of T.V. games - all equipment which, when used, brings
into play visual-motor functioning - it seems reasonable to
believe that the visual-motor skills of the population who
make use of such equipment will be further enhanced over time.
The opinion here is that in this country, that population
comprises largely of whites.

It is the writer's opinion that sociological developments in
this country too may have encouraged the development of more
integrated visual-motor and other skills. An increasingly
competitive society demands greater performance from those
who wish to compete. If one focuses on the modern system of
school education, the standards and demands required of the
children are higher than what they were 30 years ago. Mathematics,
physics and science, for instance, are being taught to children
at a younger age.

Competitive society in this country, where, in the writer's opinion, the black, Coloured and Asian people are being given greater opportunity to compete on the job market and where the cost of living has been characterised by a marked increase in recent years, encourages more white women to enter the ranks of the employed in order to uphold their white standard of living. The popularity of crèches and nursery schools appears to have burgeoned in the last ten years and so an increasing number of toddlers find themselves being taught how to grasp a crayon and being encouraged to draw and write. Their older siblings often find themselves being pushed by their parents to improve their performance at school or university in order that they may be in a better position to compete when they enter the job market where they meet members of the other racial groups.

In summary, technological and sociological factors may explain the indicated superior performance of the white subjects over that of Pascal and Suttell's American subjects whose visual-motor skills were investigated over 30 years ago.

As the mean score of the white South African sample is below that of the normative mean and does not fall within one standard deviation of this mean, it is suggested that use of the Pascal-Suttell normative tables for the purpose of estimating the severity of psychopathology with white South African patients may no longer be appropriate. The desirability of

developing normative tables based on the performance of white
South Africans for local clinical purposes is indicated.   All
things considered, further studies following the lines of the
present research are called for.

Secondly, while one is encouraged to believe that the Pascal-
Suttell tables can be used for cross-cultural purposes with
Xhosa patients, the usefulness of the tables now appears ques-
tionable.   The desirability of standardising the tables for
members of the Xhosa ethnic group is indicated.   Again further
research along the lines of the present study appears necessary.

Before any conclusions are made, it would be worthwhile to
consider in what ways the method of this study can be improved
upon should a similar project be undertaken in the future.

First of all, as the samples were relatively small and comprised
of subjects whose ages ranged between 17 and 22 years, it would
be an improvement if future researchers selected larger samples.
Although Pascal and Suttell (1951) found that age had little
effect on performance, their normative sample comprised of
subjects between the ages of 15 and 50 years.   In order to make
more accurate statements about how the performances of white
South African or Xhosa adults compare to that of Pascal and
Suttell's American sample, future samples should include
subjects whose ages range between 15 and 50 years and not only
between 17 and 22 years.

Secondly, it is believed that the criteria for selecting "normal" subjects can be improved upon. In the present study, those who declared that they were not receiving any form of psychiatric or psychological treatment were accepted as 'normal' or non-patient members of the population. Yet as certain studies "suggest a fairly sizable proportion of the "normal" population is in need of psychiatric assistance and therefore possible psychiatric patients" (Pascal and Suttell, 1951, p. 20), it is possible that the present samples were not truly representative of the normal population. In order to reduce, as far as possible, the potential influence of psychiatric illness on Bender performance, more adequate screening methods in the selection of subjects is considered necessary.

Thirdly, it is suggested that future researchers should ensure that the Bender protocols are scored by more than one scorer. Although the writer has experience with using the Pascal-Suttell scoring system, has carefully studied the Scoring Manual in Pascal and Suttell's 'The Bender Gestalt Test' (1951) and has faithfully consulted the illustrative designs when in doubt whether to score for deviation or not, it is believed that in order to eliminate the influence of the subjective element of the scoring system, the Bender protocols should be scored by at least two experienced scorers.

CONCLUSION

Although small subject samples were used in this study, the results lend support to the findings that Bender performance is related to cultural background.

The findings also suggest that the Pascal-Suttell tables for the conversion of raw scores to standard scores may be in need of revision and may no longer be appropriate for use in the South African cross-cultural setting for the purpose of screening for the presence and immediate severity of psychopathology. The findings indicate the advisability of developing separate normative tables, based on the performance of white and Xhosa samples, for clinical use in the white-Xhosa Southern African context.

Caution should be exercised in generalising these findings to Xhosa people living in isolated rural environments and to other black tribal groups found in Southern Africa. The development of separate tables for each racial and tribal group, as well as for each sub-culture within these groups, may be necessary.

Should the standardisation of the tables ever be undertaken, it would be wise to take cognisance of any work that has been done by other researchers and organizations such as the Chamber of Mines who make use of visual-motor tests in their employee selection procedures.

Recognition of the present findings may be the first step in
approaching the advisability of standardising the tables for
local purposes.   Future research projects following the lines
of the present study, but using more adequate samples are
considered necessary.

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APPENDIX

TABLE A   Number of Design and Configuration Deviations and

Total Number of Deviations: White and Xhosa Samples.

Sample	Number Design Deviations	Number Configuration Deviations	Total Number Deviations
White	62	7	69
Xhosa	148	3	151

TABLE B   Common Deviations : White and Xhosa samples

Design and Type of Deviation	% of Total Number of Deviations	
	White	Xhosa
Design 1		
Wavy line	1.7	2.0
Dot, dash, circles	2.9	0.7
Design 2		
Wavy line	7.2	7.9
Design 3		
Asymmetry	1.4	4.0
Dot, dash, circles	2.9	0.7
Number of dots	2.9	0.7
Workover	2.9	0.7
Design 4		
Asymmetry of curve	2.9	4.0
Break in curve	1.4	0.7
Curve not centre	14.5	8.6
Design 5		
Extension joins dots	11.6	7.9
Design 6		
Double line	10.1	10.6
Design 7		
Angles extra	2.9	6.0
Double line	10.1	2.6
Tremor	1.4	1.3
Design 8		
Double line	7.2	11.9
Tremor	2.9	0.7
Configuration		
Placement of Design A	2.9	0.7
Order	4.3	0.7

TABLE C   Deviations Exclusive to White Sample

Sample	Design and Type of Deviation	% of Total Number of Deviations
White	Design 4 Guide lines	1.4
	Design 5 Rotation	1.4
	Configuration Overlap	2.9

TABLE D   Deviations Exclusive to Xhosa Sample

Sample	Design and Type of Deviation	% of Total Number of Deviations
Xhosa	**Design 1**	
	No. of dots	0.7
	Workover	2.0
	Design 2	
	Dash or dots	0.7
	Shape of Circles	2.0
	Circles missing,	
	extra	1.3
	Deviation in	
	slant	2.0
	Design 3	
	Circles	0.7
	Design 4	
	Curls	1.3
	Curve Rotation	0.7
	Tremor	0.7
	Design 5	
	Dot, dash, circles	1.3
	Design 6	
	Asymmetry	6.0
	Angles	2.6
	Design 7	
	Distortion	0.7
	Design 8	
	Angles extra	4.0
	Angles missing	0.7
	Configuration	
	Relative size	0.7