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A Comparison of an Identified Gifted Group and Two Nonidentified Gifted Groups of a South African Population on Six Creativity Measures.

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A research report Submitted to the faculty of Education, University of the Witwatersrand, in partial fulfillment of the requirements for the Degree of Master of Education (Educational Psychology)

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DECLARATION

I declare that this research is my own work. It is being submitted for the Degree of master of education (Educational Psychology) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

Signed:



LOUISE H. JOHNSON

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CHAPTER 1

Introduction

What is giftedness? What does it include and why is it important? These are questions that have puzzled theoreticians and researchers for many years. Great advances have been made since the begining of the 20th Century and it is now acknowledged that a person may be gifted in many ways, Khatena (1978a). According to Khatena:

> An important breakthrough came when we realised that in trying to identify intelligence and give it a number value like I.Q. we were not talking of raw intelligence, but of potential expressed through experience about the world gained with and without the use of words.(page 13)

Today most practitioners accept that the term "gifted" is multifarious and includes among other things students who are intellectually superior as well as students who are outstanding in the fine and performing arts. Karnes, Chauvin and Trant (1985) also found that leadership qualities often go together with giftedness. Presently it is accepted that creativity is also an integral part of giftedness and accordingly tests to measure an expanded view of giftedness have been developed. There has been a proliferation in the development of creativity tests as well.

Statement of the Problem

The present study was undertaken as part of a worldwide study (Khatena, 1985) involving approximately twenty countries, which was designed to identify creative and talented individuals in areas of art, music and leadership.

The present study was also undertaken to validate recent tests of creativity developed by Khatena, Torrance and Morse (1985) and to identify creative talent using a South African population. The specific problem for the present study was to compare both self-report of creative behaviour and creative performance on six measures of creativity for an identified, and a nonidentified, gifted student population.

The Specific Hypotheses To Be Investigated

The following hypotheses were formulated:

1. Identified gifted children and adolescents, receiving an enrichment programme, would score higher in both the four self-report measures of creativity as well as the two performance scales of creativity, than nonidentified gifted children and adolescents.
2. The two groups of nonidentified gifted children and adolescents will not differ significantly from one another on the measures of creativity used.
3. A significant correlation between the scores attained on the four self-report measures of creativity and on the two performance measures of creativity will be obtained for the three groups studied. For example, if one group attained high scores on the four self-report measures they will produce correspondingly high scores on the two performance measures.

Justification of the Study

In Johannesburg there are various programmes which are run to enhance the education of the gifted child. The major programmes are those run by the Transvaal Education Department (T.E.D) and the Schmerenbeck Gifted Centre.

The criterion for being placed in the T.E.D. gifted programme is that of teacher recommendation, while Schmerenbeck demands an I.Q. score over 130. Research has shown (Torrance 1980) that certain kinds of giftedness or creativity, however, are not easily identified in the classroom. For example, these children are not always those who achieve outstanding academic results while their behaviour can also be perceived negatively by their teachers. Consequently their chances of being selected to participate in enrichment programmes are minimal.

Furthermore, I.Q. tests as a single measure do not reflect creativity and in actual fact very high I.Q. scores i.e. over 120, have the least correlation between creativity and intelligence (Guilford 1967, cited in Gowan 1971). Thus it would seem that there are many children who would not qualify for either the T.E.D. or Schmerenbeck programmes but who could greatly benefit from such programmes of enrichment. Especially in the changing South African socio-political environment it is vital that gifted and talented children of all racial and cultural groups be identified so that they can be nurtured in order that their gifts and talents can be used to cope with the challenging times that are ahead. Programmes for the gifted often stress the development and nurturing of creativity as being a very important area in the education of the gifted.

The present research study undertook to investigate differences in creativity between a group of identified gifted students and two groups of nonidentified gifted students. It is conceivable that students from the nonidentified gifted groups may indeed possess attributes of giftedness and creativity which have been overlooked.

The present study also validated the recent creativity scales designed by Khatena, Torrance and Morse (1985, 1973) on a South African population as no known research using these measures had previously been carried out. From this perspective the study will generate benchmark data.

Assumptions of the Study

For the purpose of this research certain assumptions have been made. They are:

a) That giftedness and creativity can be measured

b) That although giftedness and creativity are correlates of each other each construct can be measured separately

c) That giftedness and creativity reside equally in both male and female students as well as in cross-cultural populations.

Limitations of the Study

It was found that a number of limitations are inherent in the present study. A major limitation is that the instruments used were not previously validated on a South African population. Consequently, the results of this study can not be generalised and must be interpreted with caution. A second limitation was due to the use of English in all of the scales except for the Sounds and Images scale. For a number of the subjects English is their second language and these subjects may have had difficulty in understanding some of the questions on the self-report questionnaires and they also may have been placed at a disadvantage when responding to the Onomatopoeia and Images scale as the words for this measure are also in English. A final limitation is that although the teachers who administered the measures to the Indian students were trained in test administration the results of the returned questionnaires for the Indian schools indicated missing data for a number of subjects.

Consequently, the standardisation of test administration for all subjects must be questioned. For the reasons given above some of the findings of the present study may be suspect.

Definition of Terms

1. An Identified Gifted Population is defined as those individuals who have achieved a score above 130 on a standardised I.Q. measure, the subjects therefore represent a homogeneous population.

2. A Nonidentified gifted population is defined as a population which may indeed contain some single members who may be gifted, but the population of subjects as such has not been identified as gifted and is regarded as a heterogeneous group with respect to giftedness.

3. Creativity is defined in this study as a high score as rated by three American experts on the following measures:
    1. Something about myself
    2. What kind of person are you?
    3. Khatena-Morse Multitalent Perception Inventory A
    4. Khatena-Morse Multitalent Perception Inventory B
    5. Sounds and Images
    6. Onomatopoeia and Images

CHAPTER 2

Literature Review

Historical Background

Historically, the recognition of gifted children has been acknowledged since the time of Confucius. Dr Mary Waddington, a British educator of the gifted, says that Confucius was the first philosopher to believe that gifted children should be searched for and their abilities developed. In China these "divine" children were sought out because it was believed that they were portents of national prosperity and that they should be found and encouraged for the good of all. Even in ancient China experiments were conducted to compare those gifted children who were allowed to leave home in order to receive enrichment, as well as having the stimulus of meeting other gifted children, with those who were not allowed to do so. It was found that those talented children who did not receive special attention lost their special ability and did not develop any further. Plato, in ancient Greece, urged the Greeks to seek out their "Children of gold" whatever their socio-economic background. These children were sought for their potential contribution to society.

Torrance (1984) explains that Buddhists have for centuries used a kind of creativity test to select gifted candidates for training. The ancient Chinese and Japanese used to have their candidates create poems on such topics as 'plum blossoms in the moonlight' in order to identify the geniuses among them. Although Western societies have often been ambivalent towards the identification and development of creative talent, patrons and sponsors of creative talent in the early days of Italy, Greece and old France recognised such a need.

Much later in the West, the research spotlight turned towards the development of measures which were designed to identify those individuals who could be considered to be intellectually gifted. This has not been an easy task as there have been, and still are, problems regarding precise definitions and terminology.

Khatena (1978) states that Alfred Binet, in 1905, was given the task of finding some way to identify those children who could benefit from schooling as opposed to those who could not. He devised an instrument to measure those characteristics or mental abilities which he considered to be indicative of general intelligence. These included one's ability to understand, reason and judge, how persistent and adaptable one could be, and one's ability to be self critical. Binet also postulated that if children performed at the same level as their age group then they could be considered to be of average intelligence. If they performed at a level higher than their age group they would be considered to be gifted.

A decade later Terman (1916) working at Stanford University, expanded Binet's concept and developed the notion of Intelligence Quotient or I.Q. He adopted Binet's test for use with American children and called it the Stanford-Binet test. This was found to be a very good predictor of school performance and for picking out the strengths and weaknesses in a child's mental functioning. Another American psychologist, David Wechsler (1966, cited in Khatena 1978), defined intelligence as "the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal efficiently with his environment " (page 7).

Recent Trends

Programmes for gifted children have traditionally focused on the academically or intellectually talented student, as these qualifications appear in I.Q. scores achieved on tests such as the Stanford-Binet or Weschler scales. High intelligence is usually defined in gifted programmes as an I.Q. score of 130 or more. This attitude has increasingly come under attack by those who believe that creativity is also a function of intelligence, and people who believe that they can demonstrate that I.Q. tests do not measure it (Trentham and Hall, 1987). Such advances stress that I.Q. tests measure convergent or singular correct responses while creativity measures, by contrast, evaluate divergent abilities (Mitchell, 1988).

The shift in gifted-child research from studies involving children with high I.Q. to studies of the creative process itself began in 1950. This shift dated from Guilford's (1950) presidential address to the American Psychological Association. In that address he challenged investigators to understand creativity. Keating (1980) reports that Guilford suggested that an important unanalysed component of creativity was divergent thinking, the mind's activity when there is no set solution, and perhaps no well defined problem. Divergent thinking contrasted with more traditional problem-solving or convergent thinking (Runco, 1987). Torrance (1977) and others responded to the challenge and during the 1950's and 1960's there was an upsurge in research into creativity and creative thinking and particularly into divergent thinking, which came to be identified as equivalent to creativity itself. Whether divergent thinking is the sum of creativity is a moot point and Keating (1980) feels that it should be seen as a crucial component of creativity, but only one among many such components. He proposes a model for expanding and clarifying the nature of creativity:

> It has four components in a vaguely temporal sequence: 1) the individual must have thorough familiarity with the accumulated base of knowledge and experience in whatever field he/she is working; 2) the individual must not be rigidly tied to that knowledge base that new conceptualizations are blocked, that is, he/she should entertain and generate new ideas easily; 3) the individual must have adequate critical skills to separate promising from unpromising avenues, since not all ideas can be pursued simultaneously; 4) the individual must have adequate communication skills, so there is a production to be evaluated in a social context - that is outside the individual. (Keating, 1980, page 59)

During the ensuing years, inclusion of the creatively gifted in programme definitions for gifted education has been widespread (Torrance, 1980). In order to locate the creatively gifted there has been much research on the nature of the relationship between creativity and intelligence (Brown and Yakimowski, 1987). Most of the literature concentrates on one of several different themes: 1) that there is no correlation between them; 2) that there is an ambiguous somewhat overlapping correlation; and 3) that there is a definite but low correlation. This latter view is the most popular (Shouksmith, 1962; Yamamoto, 1965; Lesher, 1973; cited in Rekdal, 1977). Many researchers (e.g. Rossiman & Horn, 1972; Schubert, 1973; etc. cited in Rekdal, 1977) have postulated that intelligence is a necessary but not a sufficient condition for creativity. Most evidence of the relationship between degrees of creativity and intelligence support the notion of an average I.Q. as more highly correlated with creative achievement than any other group. Guilford, 1959 (cited in

Gowan and Torrance, 1967) suggests that 120 is the I.Q. level above which creativity and intelligence are least likely to be correlated. Although the research is divided, a prevailing view is that there may be a correlation between giftedness and creativity, especially if one adopts a multifarious concept of giftedness. The problem of defining giftedness, however, appears to be a "timeless problem" according to Carroll and Laming (1974). There is still no universally acceptable definition of giftedness and there is still much disagreement about what actual talents and abilities constitute giftedness. Guilford (1959, 1967, cited in Carroll and Laming, 1974) postulated as many as 120 different intellectual abilities, so devising measures to identify the various types of abilities has been extremely difficult. Children may be gifted in one area, but not in another and they may demonstrate their giftedness in many different ways. This is particularly important in assessing disadvantaged gifted students who may be weak in some areas, but extremely adept in others (Krippner, 1983; Draper, 1980; Bruch, 1974).

Whereas the gifted were originally seen as those who had achieved excellence in one of the professions (Anastasi, 1958; Cox, 1926, cited in Carroll and Laming, 1974) or those who scored above some point on an I.Q. scale the definition then broadened to include those who excelled in art and music and the I.Q. qualification was dropped (Taylor, 1984). Some researchers have used a child's position on the normal distribution curve as an indication of giftedness, while others include creativity as one of the criteria in its definition. So the emphasis has changed from looking only at children with high I.Q. scores to searching for the creative child (Khatena, 1981). The definition that intelligence plus creativity equals giftedness is the one that is currently popular among researchers who have been writing about the child with creative potential or with superior originality. These children are seen to be the future problem solvers and innovators.

Havighurst (1958, cited in Carroll and Laming, 1974) has defined the gifted child as "one who shows consistently remarkable performance in any worth-while line of human endeavour" (page 86). This movement away from measuring intelligence as the only or prime factor determining performance was reinforced when the U.S Congress passed a bill in 1969 providing for better identification procedures and education for the gifted. Gowan (1971) defined creativity in terms of interactive process rather than in terms of trait theory and says that what is needed is a definition that is operational in scope and is founded on differential behaviour. He defines a gifted child as "one who has the potential to develop creativity" (page 242). By using this definition he links giftedness to the development of creative process and in so doing challenges educationists to stimulate the talents of the child to their maximum (Lowery, 1982). Khatena (1973) states that there are many definitions of creativity, but that they are all rather narrow in intent and not inclusive enough. He is, however, enthusiastic about the amount of research being done and the breakthroughs that have occurred in the field.

The present view of giftedness is reinforced by Renzulli (1982) who discounts the belief that giftedness can be identified by the top 3 to 5 percent of the normal distribution curve. He says that giftedness and I.Q. are not the same thing and that I.Q tests do not measure all of the many factors that result in intelligent or gifted behaviour. Renzulli (1982) furthermore discounts the view that the gifted are a fixed population that can always be preselected for special services. This practice of preselection closes the door to all other children who show outstanding abilities in a different area but who do not fit into the preselected group. These youngsters may then be refused any special programme assistance at all.

Renzulli (1982) also postulates two types of giftedness which he calls "school-house giftedness" and "creative and productive giftedness" and says that they are equally important. He believes that there is usually some interaction between the two types of giftedness and that special programmes should make appropriate provisions for encouraging both types as well as encouraging their interaction. Schoolhouse giftedness is test-taking or lesson-learning giftedness and is easily measured by I.Q. or other cognitive ability tests and is thus used most often for selecting students for entrance to special programmes. These abilitites are most valued in traditional school-learning situations and high-scorers on I.Q. tests often get high marks at school. Nevertheless, these measures do not account for all the children who excel at school. Many students who fall below the 3 to 5 percent in measured ability have demonstrated their ability to do high level work. To deny these students the opportunity to work at an advanced level would be disastrous in terms of their development. Renzulli (1982) also argues that schools should make provision for children who are gifted in the creative/productive area and that there should be measures to assess these children so that they could be encouraged to be "firsthand inquirers". He quotes research (Helson and Crutchfield, 1970; Bloom, 1963; Marston, 1971; Hoyt, 1965) that demonstrates that success in the adult world is only moderately correlated with traditional assessments of academic success.

Therefore, if it is not possible to account for high levels of creative/productive giftedness by using I.Q. or ability scores, what other factors must be taken into account? Renzulli (1982) indicates that creativity and task commitment are equally important characteristics in the making of a gifted person. It is Renzulli's contention that an identification process that includes these students must be devised for enrichment programmes, even if this means including students below the top 5 percent. Renzulli (1982) concludes his article with the statement that "The greatest gift of all is the person's

desire to create and produce. It is what we as teachers do to help stimulate and fulfil this desire that ultimately will determine if we are really worthy of being called teachers of the gifted" (page 14).

Rimm (1984) and Davis and Rimm (1977) postulate a characteristic approach in that they believe that behavioural characteristics are predictive of creativity. But, although this approach has been well documented, schools have rarely used this information for identification of, or programming for, gifted children. They state that by using a characteristics approach some students who exhibit poor academic performance, discipline problems, and creative behaviours which are not valued in the classroom, would be identified and thus nurtured. It is also important to be sure that the identification process matches the goals of the particular gifted programme. As most gifted programmes nowadays include creative and productive thinking, it is vital that some creativity measure be included in the identification process.

Sternberg (1982) says that current literature on the gifted distinguishes between intelligence and creativity, but that there is more involved than distinguishing between convergent and divergent thinking. He puts forward the theory that there is at least one other dimension which separates the two. He calls this "entrenchment" and "nonentrenchment".By entrenchment he means something that is a natural part of a person's everyday experience and by nonentrenchment he means something which is strange or unnatural. This dimension can be found both in tasks and concepts. Intelligence tests include entrenched tasks and concepts, while creativity tests usually include tasks and sometimes concepts which are nonentrenched. He feels that whereas what we consider to be intelligent or gifted behaviour often includes non-entrenchment this is not measured by intelligence tests.

Therefore these tests should require more of the flexible and novel kinds of thinking that are currently measured by creativity tests while at the same time maintaining the emphasis on analytic skills. In this way it would be possible to find those students who can see old things in new ways that will provide insights that will advance our knowledge and enhance our development (Rimm, Davis, Bien, 1982). Recently Osche (1989) has put forward the proposal that strong motivation and ambient values have a pertinent bearing on the flowering of creative achievement. She also postulates the theory that a certain amount of stress is often seen in the lives of eminent achievers although not all distressed children become creative.

SUMMARY

Despite the theoretical and research endeavours to define and explain the relationship between giftedness, creativity, and intelligence as described above, there are still huge gaps in our knowledge. Although the literature remains divided and there is presently a paucity of research studies a case can be made that giftedness and creativity are correlated. Since I.Q. measures do not tap into creative abilities it can be inferred that large numbers of talented people are being overlooked, when choosing children and adolescents for enrichment programmes.

The present research addressed some of these issues and attempted to increase our understanding of this relationship. In the process, we have endeavoured to obtain benchmark attributes of the creative child in the South African context which transcend racial and ethnic boundaries. In the present context of change in our society, we feel that the early identification of gifted children and the nurturing of their talents is essential.

CHAPTER 3

Research procedures

Description of the population

The sample comprised three groups of school going pupils. The first group were from the Schmerenbeck Gifted Centre. There were 83 subjects in this group and they ranged in age from nine to sixteen years and were both male (N = 54) and female (N = 29). Of this number 81 were White and 2 were Indian. The second group was from Woodmead school. There were 224 subjects in this group. They ranged in age from twelve to twenty-one years and were both male (N = 116) and female (N = 108). They included White (N = 99), Black (N = 78), Indian (N =61) and Coloured (N = 6) subjects. The third group were from the Indian schools and there were 257 subjects in this group. They ranged in age from nine to seventeen years and were both male (N = 126) and female (N = 131). They included all Indian subjects. Although the medium of instruction in all three groups was English, for many of the Indian and Black subjects, English is their second language. All subjects voluntarily participated in this study.

Instrumentation

Six instruments were used in this investigation:

1. Something about myself
2. What kind of person are you?
3. Khatena-Morse Multitalent Perception Inventory A
4. Khatena-Morse Multitalent Perception Inventory B
5. Sounds and Images
6. Onomatopoeia and Images

'Something about myself' and 'What kind of person are you?' comprise the Khatena-Torrance Creative Perception Inventory (1985). The Khatena-Morse Multitalent Perception Inventory (1985) is made up of Khatena-Morse Multitalent Perception Inventory A and B. Sounds and Images and Onomatopoeia and Images make up Thinking Creatively with Sounds and Words (Khatena and Torrance, 1973).

Khatena-Torrance Creative Perception Inventory (K T C P I)

Something About Myself (SAM) and What Kind of Person Are You? (WKOPAY) are both tests of creative self-perceptions, although they are measures of relatively different dimensions of the creative personality and should be regarded as separate tests in a battery rather than as sub-tests within a single test.

SAM

This instrument takes the form of a creativity checklist and is based on the rationale that:

> creativity is reflected in the personality characteristics of the individual, in the kind of thinking strategies he employs, and in the products that emerge as a result of his creative strivings (Khatena, 1971, page 626).

The measure is made up of 50 items which can be easily administered and scored and which yields an index of creative personality. Khatena (1971) reports that interscorer reliability was found to be very high - a Pearson r of .99 ($P < .01$) was obtained. In another study on the internal consistency

of the checklist r's of .85 , .79 and .68 were found. The validity was also reported by Khatena (1971) to be significant. Rekdal (1977) reports that although all of the correlations of validity are significant, they are not highly significant, and he concludes that additional research is needed. He views the results as promising and says that SAM may be useful as a screening device in locating creative individuals.

WKOPAY

This instrument takes the form of a forced-choice format which requires the respondant to make difficult choices between items which are purposely either both desirable or both undesirable. There are 50 items which make up the measure and it is based on the rationale that "the individual has a psychological self, whose structures have incorporated creative and non-creative ways of behaving". (Khatena, 1977, page 517). This measure is used to present verbal stimuli which encourage the individual's disposition or motivation to function in creative ways.

Khatena and Torrance (1976) in their instruction manual quote a very high inter-scorer reliability i.e. a Pearson Product-moment correlation coefficient of .99 ($P < .01$) was found. On the test-retest method r's ranging from .71 - .97 ($P < .01$) were obtained. They also report that validity evidence is highly supportive of WKOPAY as a measure of creative self-perceptions and also that scores on this instrument are significantly related to the ability to produce original images and write original stories (Halpin, Payne, Elliot,1974). Rekdal (1977) however questions the correlational validity of WKOPAY as he has found that when correlated with OI the correlations were low (.37 and .48).

Khatena-Morse Multitalent Perception Inventory A and B (KMMPIA and B)

This instrument takes the form of a creativity checklist and is a self-report instrument. It consists of two alternate forms, A and B, each having 50 items and was designed to assess talent in the four broad areas of art, music, creativity and leadership. According to Khatena and Morse (1987) preliminary estimates show that reliability is high. Validity is not as high but appears adequate. They say that at this time KMMPI is promising as a brief screening device for creativity. Reliability and validity studies are still being carried out.

Thinking Creatively with Sounds and Words.

This instrument is composed of two independant tests, Sounds and Images (SI) and Onomatopoeia and Images (OI). They are similar in that they both use auditory stimuli to elicit responses which can be assessed to evaluate the originality of the response on the basis of statistical infrequency. The responses are awarded credits from 0 to 4 with 4 for the most original response. This instrument presents both sound and word stimuli and free associate conditions which are used to bring about the production of original responses. SI presents stimuli in the form of sound sets while OI presents stimuli in the form of onomatopoeic words. SI presents three repetitions of a group of four recorded audio effects which are interspersed with narrated instructions which "in effect force the listener to reject commonplace associations for free-wheeling and imaginative ideas." (Khatena and Torrance, 1973, page 8). In addition to using sound sets SI also uses special techniques to encourage progressive warm-up, to make divergent thinking legitimate, to provide freedom from the threat of evaluation, to invite regression and to aid in the departure from inhibiting sound sets.

OI presents four repetitions of a list of five words which are read by the narrator on a prerecorded audiotape. Each word is followed by a 30 second pause and after the first, second and third readings of the complete list the narrator encourages the subjects to be more creative. Both tests have certain built-in conditions that assist the listener in allowing the imagination freedom to create original images. Both tests also use the same concept of originality. Responses are considered to be original if they "occur infrequently, that is if they are uncommon responses, the production of which requires creative strength" (Khatena and Torrance, 1973, page 9). Originality can also be seen as "the power of the imagination to break away from perceptual set so as to restructure or structure new ideas, thoughts and feelings into novel and meaningful associative bonds." (page 28)

On SI Khatena and Torrance (1973) have reported interscorer reliability coefficients ranging from .88 to .97. In another study they reported split-half reliability coefficients of .88, .90 and .91. They also report significant validity scores and quote numerous studies to confirm these findings.

On OI Khatena and Torrance (1973) quote interscorer reliability coefficients ranging from .95 to .99. They again quote numerous studies in support of the significant validity scores which they obtained.

Testing Procedures

The data for this study were collected during 1986. The six measures were administered during one and a half to two hour sessions. All the measures were administered at one sitting on site at the three respective venues.

The session was introduced in a non-threatening manner and the following explanation was given by the testers to the subjects:

> "You are going to be given a chance to see how creative you are and in how many different ways. This is a fun exercise and you should let your imagination be your guide."

The subjects were then directed to look at their answer sheets and fill in the required information. Explicit instructions were given for each of the measures at the appropriate time and these were read aloud by the tester. Any questions were then answered. A two hour time limit was imposed on the completion of the six instrument test battery. If subjects had any questions about the self-report measures during the testing session they could ask for help and the tester would attend to them. No help was given during the administration of the SI and OI tests which are the creative performance measures as this might have been construed as coaching thereby contaminating the results.

Data Analysis Methodology

Creative Performance Measures

On the SI and OI test the responses of each subject were rated by three expert raters at Mississippi State University. They are experts in the field of creativity and look for unusual, not habitual responses. Scorer reliability was established in the processing of the data.

Analysis of Data

Creative Self-perception Measures

The responses to the four measures of creative self-perception were computer analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive Statistics were provided and the level of significance was set at .05.

CHAPTER 4

Analysis of Data

The results of the study are outlined in nine tables. In the first table the reliability coefficients of the six creativity scales, SAM, WKOPAY, KMMPIA, KMMPIB, SI and OI are presented. The means and standard deviations on these scales are presented in Table 2. These are for the three different groups Schmerenbeck, Woodmead and the Indian schools, that were studied. Two-way Analysis of Variance (ANOVA) summary tables are presented in Tables 3 - 8, each showing the significance, if any, of the main effects of group and sex and their interaction. To aid in the interpretation of the ANOVA tables, interactional graphs are presented in Appendix A. The intercorrelation matrix of the creativity scales and age is presented in Table 9.

Table 1 presents the coefficient alpha reliability coefficients for each of the six creativity scales:

Table 1

Coefficient alpha reliability coefficients for the Six Creativity Measures.

Creativity Scale	Student Group			
	Schmerenbeck	Woodmead	Indian	All pupil groups combined
SAM	0.73	0.68	0.74	0.77
WKOPAY	0.52	0.65	0.55	0.66
KMMPIA	0.88	0.86	0.87	0.88
KMMPIB	0.90	0.88	0.89	0.90
SI	0.63	0.61	0.59	0.81
OI	0.78	0.77	0.77	0.91

According to Table 1 the coefficient alpha reliabilities of the SAM, KMMPIA, KMMPIB and OI scales are satisfactory. The reliabilities of the WKOPAY and SI scales are, however, low which indicates the presence of error variance and internal inconsistency among the items within each of these two scales. For the SI scale, the discrepancy between the reliability coefficient for the combined group (0.81) versus the reliability coefficients for the separate sub-groups (Schmerenbeck: 0.63; Woodmead: 0.61; and the Indian schools: 0.59) is due to the range of scores for the combined group (2-48) being much greater than that of each of the separate sub-groups (Schmerenbeck: 12-45; Woodmead: 14-48; and the Indian schools: 2-37). The discrepancy between the reliability coefficients for the combined group versus the separate sub-groups on the OI scale may be similarly explained. These data as presented in Table 1 indicate the internal reliability of the six measures used.

Table 2 presents descriptive data and performance scores for the three population groups studied.

Table 2

Performance on the Six Creativity Measures for Schmerenbeck, Woodmead and the Indian school pupils

Measure	Schmerenbeck			Woodmead			Indian		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
1. SAM	83	35.55	5.82	223	31.48	5.94	257	32.96	6.36
2. WKOPAY	83	29.36	4.88	224	26.79	5.87	257	24.71	5.20
3.KMMPI-A	83	34.61	8.64	224	29.65	8.75	256	31.92	8.86
4. KMMPI-B	83	33.39	9.56	222	27.68	9.60	256	30.01	9.54
5. SI	81	27.01	7.58	220	37.05	7.59	150	19.81	6.89
6. OI	79	37.92	14.06	221	53.17	15.60	154	16.81	9.79

According to the data in Table 2 there is a consistent rank order for the schools for the performance of school pupils on SAM, KMMPIA and KMMPIB. The mean scores for Schmerenbeck (SAM mean = 35.55 ; S.D. = 5.82; KMMPIA mean 34.61 ; SD = 8.64; KMMPIB mean = 33.39 ; SD = 9.56) are consistently the highest scores followed by the performance on the same measures for the Indian schools (SAM mean = 32.96; SD = 6.36; KMMPIA mean = 31.92; SD = 8.86; KMMPIB mean = 30.01; SD = 9.54) and then followed by the performance of pupils at Woodmead (SAM mean = 31.48 ; SD = 5.94; KMMPIA mean = 29.65; SD = 8.75; KMMPIB mean = 27.68 ; SD = 9.60)

For WKOPAY the performance for Schmerenbeck pupils (mean = 29.36 ; SD = 4.88) is once again the highest, although the performance for Woodmead (mean = 26.79; SD = 5.87) is marginally higher than that for the Indian schools (mean = 24.71 ; SD = 5.20). The trend however is altered in the case of the SI and OI creativity tests where the performance for Woodmead (SI mean = 37.05 ; SD = 7.59; OI mean = 53.17 ; SD = 15.60) is consistently higher than the performance for Schmerenbeck (SI mean = 27.01 ; SD = 7.58 ; OI mean = 37.92 ; SD = 14.06). The scores for Schmerenbeck are higher than the performance for the Indian schools (SI mean = 19.81; SD = 6.89; OI mean = 16.81 : SD = 9.79)

In Tables 3 - 8 two-way Analysis of Variance (ANOVA) summary tables for each of the Six Creativity Measures are presented showing the significance of the main effects of group and sex and their interactional effects.

Table 3

The effects of school, sex, and their interaction on SAM

Source of variation	df	ms(mean square)	F
School	2	531.90	14.26***
Sex	1	81.27	2.18
School & Sex	2	50.61	1.36
Residual	557	37.31	
	P < .001***		

Table 4

The effects of school, sex, and their interaction on WKOPAY

Source of variation	df	ms	F
School	2	714.41	24.11***
Sex	1	17.71	0.60
School & Sex	2	4.93	0.17
Residual	558	29.63	
	P < .001***		

Table 5

The effects of school, sex, and their interaction on KMMPIA

Source of variation	df	ms	F
School	2	809.27	10.52***
Sex	1	4.51	0.06
School & Sex	2	189.60	2.47
Residual	557	76.90	
	P < .001***		

Table 6

The effects of school, sex, and their interaction on KMMPIB

Source of variation	df	ms	F
School	2	1000.31	11.01***
Sex	1	32.94	0.36
School & Sex	2	308.53	3.39*
Residual	555	90.85	

P < .05* P < .001***

Table 7

The effects of school, sex, and their interaction on SI

Source of variation	df	ms	F
School	2	13561.86	253.49***
Sex	1	82.31	1.54
School & Sex	2	196.1	3.67*
Residual	445	53.5	

P < .05* P < .001***

Table 8

The effects of school, sex, and their interaction on OI

Source of variation	df	ms	F
School	2	60020.09	329.91***
Sex	1	20.72	0.11
School & Sex	2	1044.72	5.74**
Residual	448	181.93	

P < .01** P < .001***

The results of the Analysis of Variance (ANOVA) tables (tables 3 - 8) are discussed in terms of the means and standard deviations of the three groups. The interaction effects in the ANOVA tables are presented graphically in Figures 1a - 1f (see Appendix A)

For each of the six measures considered the main effect of school is highly significant ($P < .0001$; df = 2). The mean scores for the groups on each scale are presented in Table 2. The main effect of sex is not significant for any of the six scales. Only in the case of the KMMPIB scale, the SI scale, and the OI scale is the interaction effect of group and sex significant (the P value for the smallest observed ratio $P < .05$; df =2). The results of the ANOVA tables must be examined together with the graphs of the interaction effects (see Appendix A). In Tables 3 - 8 the effects of school were found to be significant on all six creativity measures with the interactional effect of school X sex significant for 3 of the creativity measures.

Although the results of the ANOVA tables show the main effect of sex to be nonsignificant the interaction graphs (see Appendix A) reveal differences between the sexes when considering the three groups separately for each scale. In the case of the Schmerenbeck respondants the girls have consistently higher mean scores than the boys while in the case of the Indian schools' respondants the girls have lower mean scores than the boys in all the scales except for the SAM scale where the difference is marginal. No consistent trend for sex differences can be discerned for the Woodmead respondents where the differences between girls and boys were sufficiently small as to be attributed to error.

These differences in the rank order of the sexes have produced the significant group X sex interactions in the case of KMMPIB, SI, and OI scales. The trend of the mean scores on the KMMPIA scale is similar to that of the KMMPIB scale mean score, yielding a significant interaction at the 10% alpha level ($F = 2.47$; $P < 0.1$).

This table presents the intercorrelation matrix of the Six Creativity Measures as well as age.

Table 9

	SAM	WKOPAY	KMMPIA	KMMPIB	SI	OI	AGE
SAM	1						
WKOPAY	0.34***	1					
KMMPIA	0.73***	0.25***	1				
KMMPIB	0.72***	0.24***	0.89***	1			
SI	0.11*	0.24***	0.07	0.06	1		
OI	0.10*	0.28***	0.11**	0.09*	0.77***	1	
AGE	-0.07	0.17***	-0.13***	-0.13***	0.61***	0.61***	1

$P < .05$* $P < .01$** $P < .001$***

The results on the SAM scales are significantly correlated with the scores on all the other creativity scales. However only in the cases of the KMMPIA and the KMMPIB scales are these correlations meaningfully high ($r = 0.73$ $P < .001$ and $r = 0.72$; $P < .001$). Where over 50% of the variance is shared between the SAM scale and the KMMPIB scale. Although significant, the correlation between the SAM scale and the WKOPAY scale ($r = 0.34$; $P < .001$) indicates that there is only 12% shared variance, while the

significant correlations between the SAM scale and the SI and OI scales ($r = 0.11$; $P < 0.05$; $r = 0.10$; $P < .01$) indicate only 1% shared variance. Age is significantly correlated with all the scales except for the SAM scale. The correlation coefficients between age and KMMPIA and age and KMMPIB are both negative ($r = -0.13$; $P < .001$) for each of these scales, although indicating less than 2% common variance. The correlations between age and WKOPAY, SI and OI are all positive. Once again the correlation in the case of age and WKOPAY is significant ($r = 0.17$; P .001) though low with less than 3% common variance. The magnitude of the correlations are much greater between age and SI and age and OI ($r = 0.61$; $P < .001$) for both scales, yielding almost 40% (37%) explained variance.

SUMMARY OF RESULTS

In Table 1 the reliability coefficients (coefficient alpha) are satisfactory for SAM, KMMPIA, KMMPIB and OI. WKOPAY and SI are low for each of the three groups considered. In Table 2 it is shown that the mean scores for Schmerenbeck are consistently higher than the mean scores for Woodmead and the Indian schools on the self-report scales namely SAM, WKOPAY, KMMPIA and KMMPIB. Woodmead and the Indian schools change position on these scales. The trend changes in the case of the SI and the OI scales where Woodmead's mean scores are consistently higher than those of Schmerenbeck which in turn are consistently higher than those of the Indian schools.

The results of the Analysis of Variance (ANOVA) tables (Tables 3 - 8) together with the means and standard deviations of the three groups show there to be significant differences among the groups as well as significant sex X group interactions where the association between gender and creativity differs according to group.

In Table 9 the intercorrelation matrix for the six creativity scales indicate significant correlations among all pairs of the creativity scales except for KMMPIA and SI and KMMPIB and SI. However, the only correlations where the coefficient of determination is meaningfully high are those between SAM and KMMPIA, SAM and KMMPIB, KMMPIA and KMMPIB, and SI and OI. When age is correlated with each of the creativity scales, correlations are positive and highest with the SI and OI scales while the pattern of the age correlations with the other scales is unclear ranging from zero to low, though significant, correlations.

As Neake and Liebert (1975) state:" With larger sample sizes, smaller correlation coefficients will achieve statistical significance. With a larger sample the test for statistical significance is more powerful in the sense that smaller values of r will achieve statistical significance. But with very large sample sizes, we encounter the problem that very small r's, although statistically significant, may have little practical significance."(page 136).

CHAPTER 5

SUMMARY

The present study explored the differences in creativity among three groups comprising students from the Schmerenbeck Gifted Centre, Woodmead School, and the Indian Schools. The study involved 564 subjects who comprised a school going population. There were 296 males and 268 females in the sample. The cross-cultural groups comprised White, Black, Indian and Coloured subjects. The administration of the measures was done on site during 1986. Subjects were required to complete six creativity instruments. Four of the instruments were creative self-perception instruments while the remaining two were creative performance instruments. The four self-report measures were computer analysed while the two performance measures were scored by a panel of three creativity experts. The level of significance was established at .05 for each test.

Implications of the Study

Hypothesis 1 stated that identified gifted children and adolescents, receiving an enrichment programme, would score higher, in both the four self-report measures of creativity as well as in the two performance measures of creativity, than nonidentified gifted children and adolescents. This hypothesis was only partially supported as it was found that although the Schmerenbeck students scored higher than both the Indian schools and Woodmead on the four self- report creativity measures they did not score the highest on the SI and OI measures of creative performance. (See Table 2)

Hypothesis 2 stated that the scores for the two groups of nonidentified gifted children and adolescents will not differ significantly from one another on the measures of creativity used. This hypothesis was again only partially

supported as it was found that although there was no great difference in the mean scores between Woodmead and the Indian schools on the four self-report measures (as shown in Table 2) there were large differences on the SI and OI measures (as shown in Table 2).

Hypothesis 3 stated that there would be a significant correlation between the scores attained on the four self-report measures of creativity and on the two creative performance measures for each of the three groups studied. This hypothesis failed to be supported as it was found that although the Schmerenbeck pupils obtained the highest mean scores on the self-report measures they did not score the highest mean scores on the two performance measures (see Table 2). It was also found that although the Woodmead students obtained the lowest mean scores on all the self-report measures except for WKOPAY, they attained the highest mean scores on the two creative performance measures (See Table 2). Another factor was that although the Indian students obtained the lowest mean scores on the two creative performance measures they obtained higher mean scores than Woodmead on the self-report measures except for WKOPAY (See Table 2).

The results of the present study do not mirror much of the research quoted by Khatena and Torrance. This study found the reliability of WKOPAY to be questionable and therefore all the correlations involving WKOPAY are suspect. It could be that as this measure was constructed with English speaking Americans in mind, it does not apply to a South African population composed of multi-cultural groups. The reliability of the SI was also found to be low while SI and OI were found to have different reliabilities.

This study also found that there was a consistent rank order for three of the self-report measures, namely SAM, KMMPIA and KMMPIB. Schmerenbeck pupils were found to have the highest mean scores of the three groups although they did not have the highest mean scores on the creative performance measures SI and OI. Woodmead was found to have the highest mean scores on the creative performance measures. It is possible that the Schmerenbeck students perceive themselves to be creative due to the fact that they are aware of their special abilities as they are part of an enrichment programme. Therefore they will score higher on the self-report measures. It has also been found by many researchers that IQ tests are not valid predictors of creative performance and selection to the Schmerenbeck programme relies on IQ results. The actual Schmerenbeck programme stresses creative ability and divergent thinking but no measures to assess creativity are used in the selection process.

It is possible that the typically used cognitive measures may not identify students who are gifted in creativity, leadership and other areas. It is also true that most of the cognitive measures, and indeed some of the creativity measures, are culturally biased and do not tap the abilities of culturally different or disadvantaged students. In the present South African situation it is important that talented children and adolescents from all racial and cultural groups be identified and nurtured so that their contributions are not lost. It is therefore important not to overlook students who may be gifted in particular areas but cannot meet the predominant standard of admission to gifted programmes on the basis of cognitive measures.

As previously stated in the results there were significant differences among the three groups as well as significant sex X group interactions where the association between gender and creativity differs according to group (See Table 3 - 8 and Appendix A). It could be that the emotional and cultural environments from which the subjects came has influenced their results on the various creativity measures. Researchers have found that the values which are favoured in a particular group often influences the way in which the members of the group behave.

Woodmead school is known to have an open-minded environment where the pupils are encouraged to think independently and to use their initiative wherever possible. This atmosphere may have contributed to their scoring the highest mean scores on the SI and OI measures. Conversely the Indian schools have a very authoritarian outlook and students are expected to conform and do what they are told to do without questioning the teacher. This attitude may have contributed to their obtaining the lowest mean scores on the creative performance measures. Although the Schmerenbeck Centre encourages independant thinking and creativity, many of the children come from T.E.D. schools where initiative is neither favoured nor rewarded.

Although the results of the ANOVA tables (See Table 3 - 8) show that the main effect of sex is nonsignifcant, when considered together with the interaction graphs (See Appendix A) differences within each group can be observed. Among the Indian schools the girls have lower mean scores than the boys in all of the creativity measures except for SAM. It could be that Indian girls are given less freedom and are more restricted than the boys thereby contributing to the difference in their scores. At Woodmead girls and boys are treated as equal and their scores show only marginal differences among the sexes. Among the Schmerenbeck subjects the girls had consistently higher mean scores than the boys. This may be because girls are encouraged to be creative while boys are encouraged to get involved in sport and other

interests. The present study seemed to find that there are two underlying dimensions to be found in the six creativity measures which were studied. The one is tapped by SAM, WKOPAY, KMMPIA and KMMPIB although WKOPAY hardly features, while the other is tapped by SI and OI.

The results of this study are interesting in that the thrust of gifted-child education in South Africa is still concentrated on high IQ scores and academic achievement and has not really expanded to include the creative child. The goal of gifted-child education should be to provide novel, challenging and educationally relevant material to all students, regardless of ability, on a reasonably regular basis. For academically bright students this would require special programming but all students should be encouraged creatively to develop to their full potential.

Recommendations for Future Research

The present study raised a number of questions which need to be examined in future research. Of prime importance is the development of creativity measures that are validated on a South African population and which cater for the various language groups. If there were such creativity measures the scope of gifted-education could be broadened to include creative children and adolescents. Another area for research is that of examining the influence of school environment on developing the creative potential of pupils. It would also be interesting to examine the differences in creativity among girls and boys among the four main population groups. Finally, more research should be carried out to find out how children and adolescents view themselves regarding their creative efforts and if there are cultural differences which come into play.

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INTERACTION GRAPHS

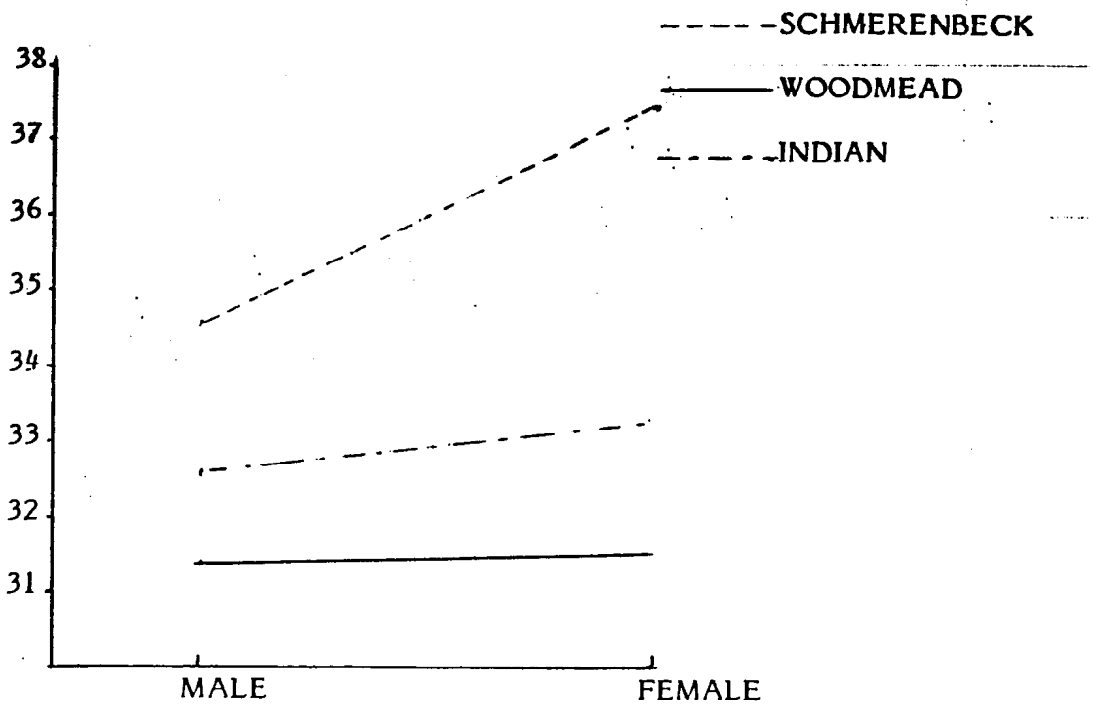


Figure 1a: Graph of the mean scores on the SAM scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

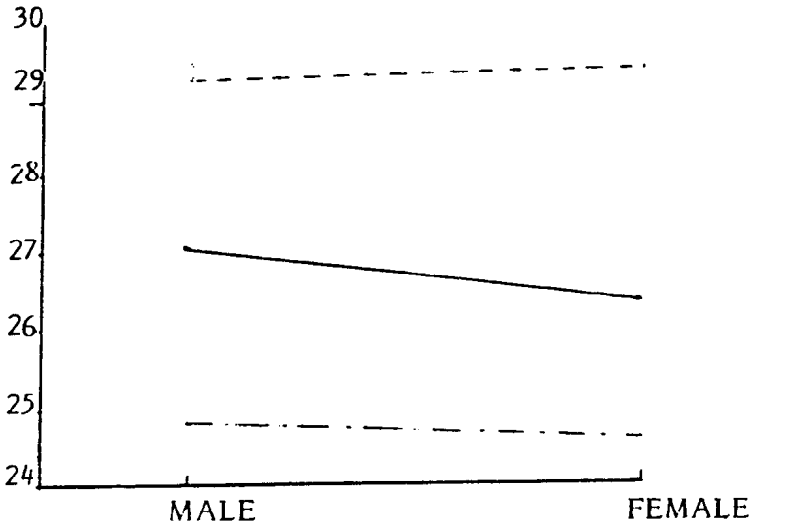


Figure 1b: Graph of the mean scores on the WKOPAY scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

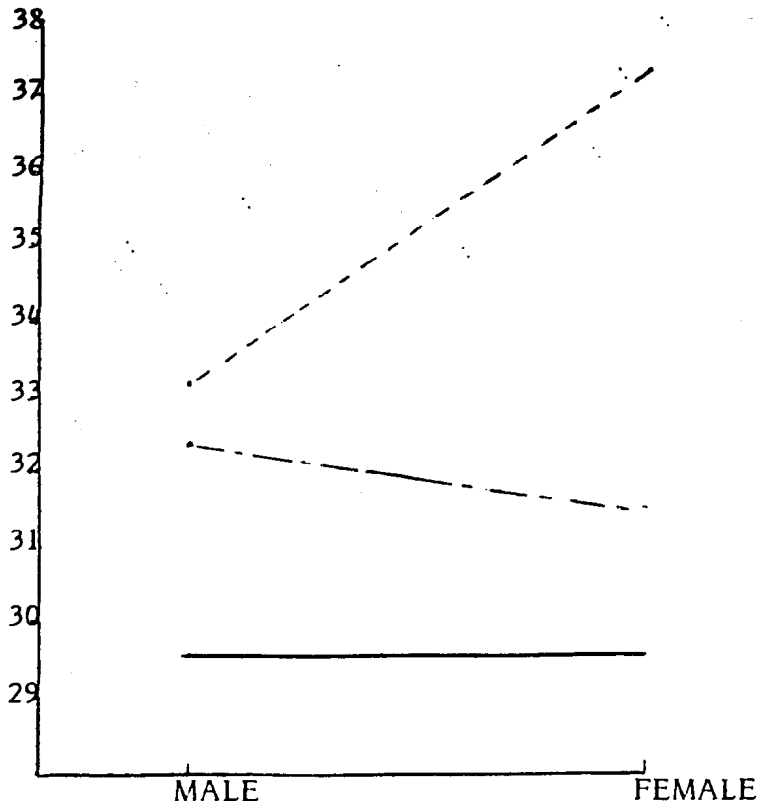


Figure 1c: Graph of the mean scores on the KMMPIA scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

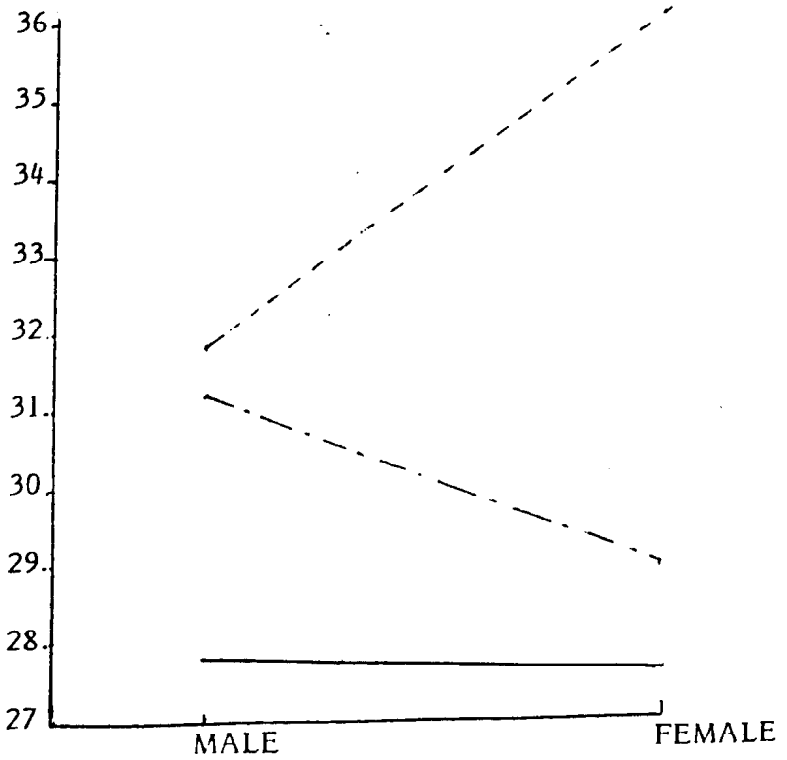


Figure 1d: Graph of the mean scores on the KMMPIB scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

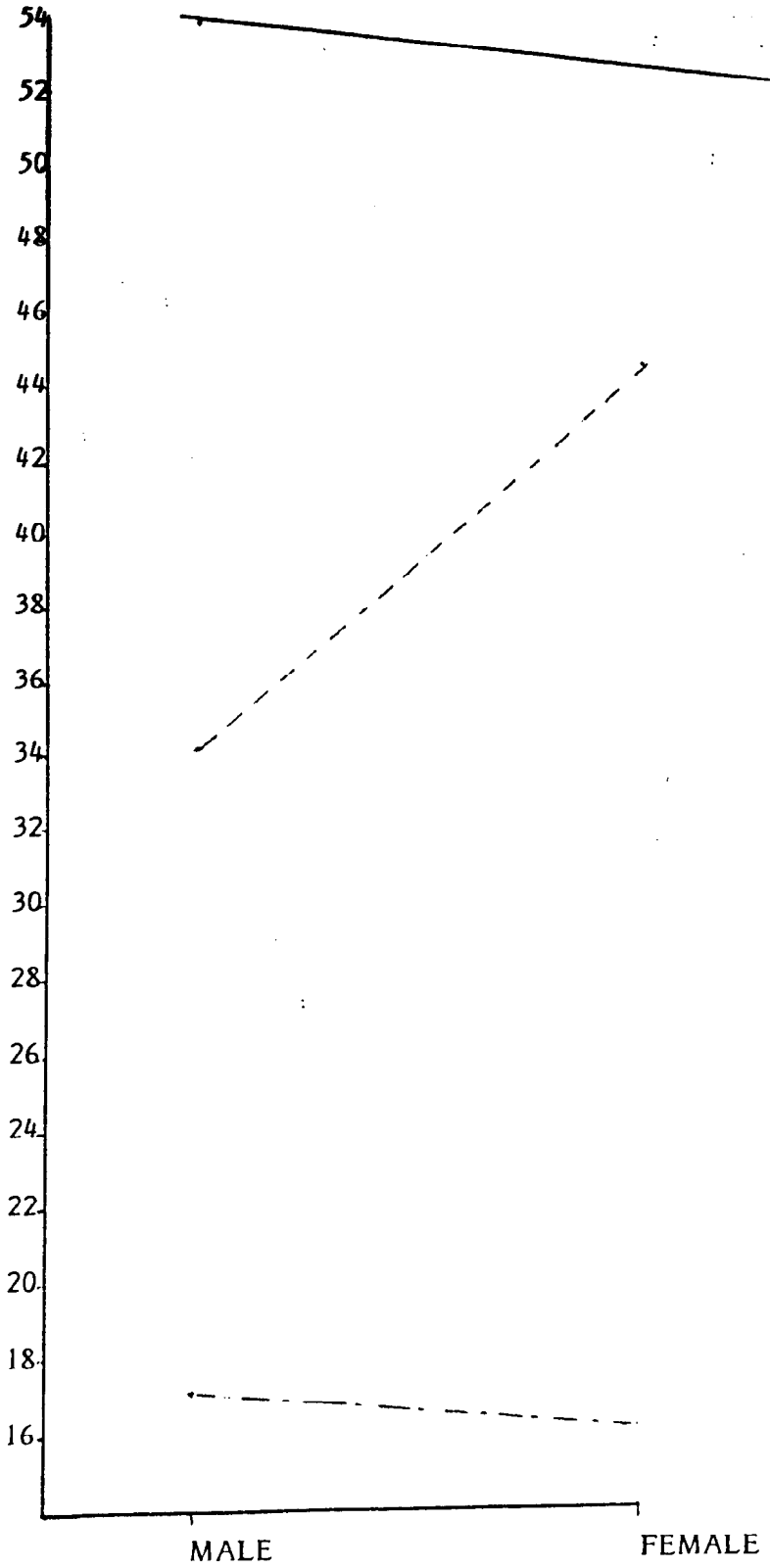


Figure 1e: Graph of the mean scores on the OI scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

INTERACTION GRAPHS

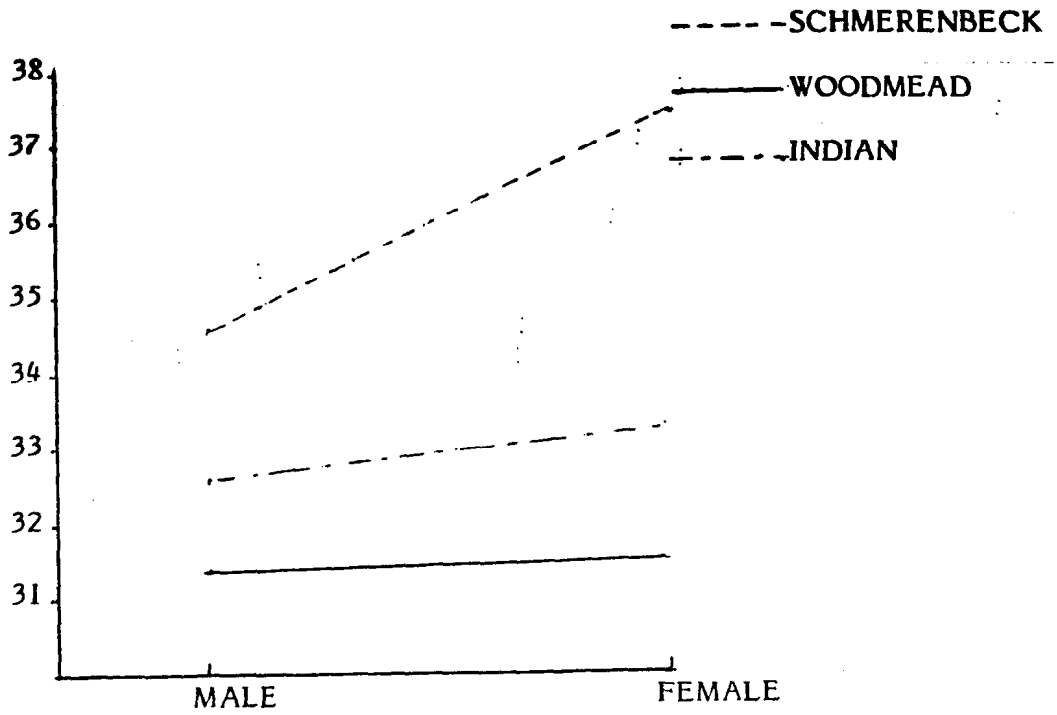


Figure 1a: Graph of the mean scores on the SAM scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

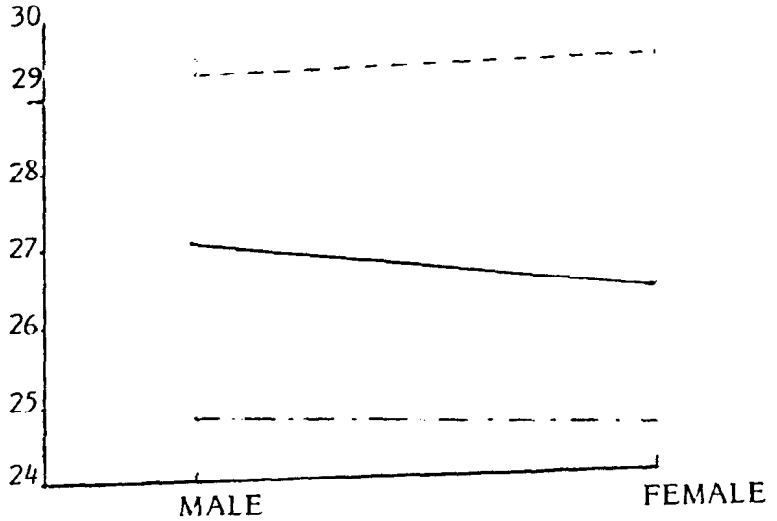


Figure 1b: Graph of the mean scores on the WKOPAY scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

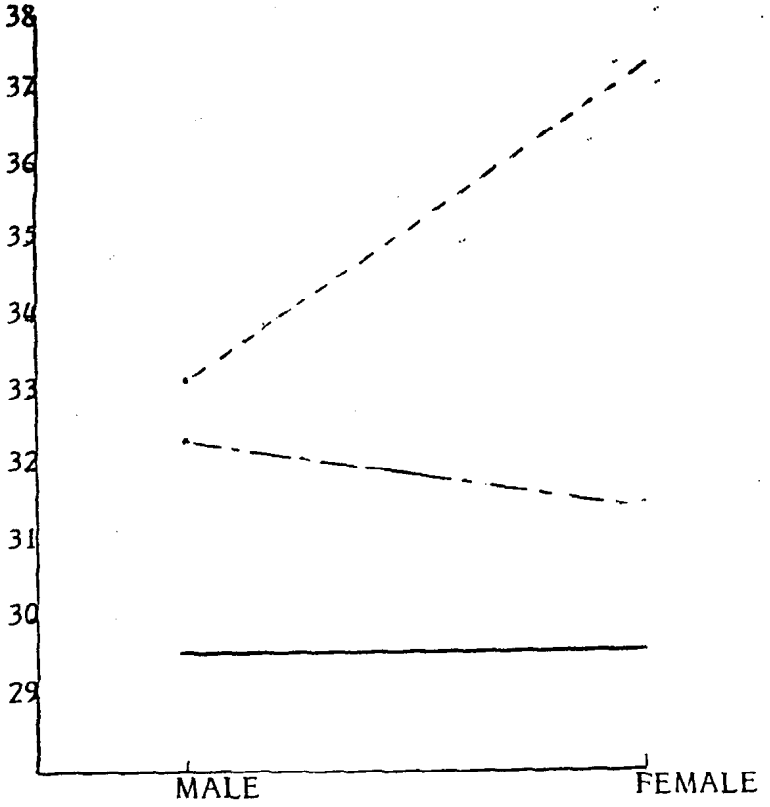


Figure 1c: Graph of the mean scores on the KMMPIA scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

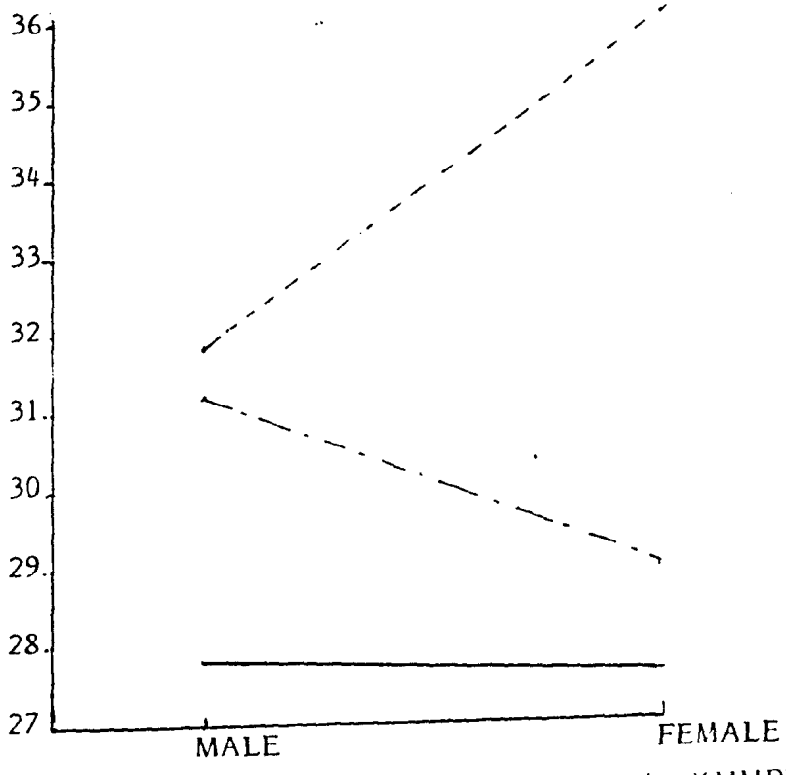


Figure 1d: Graph of the mean scores on the KMMPIB scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

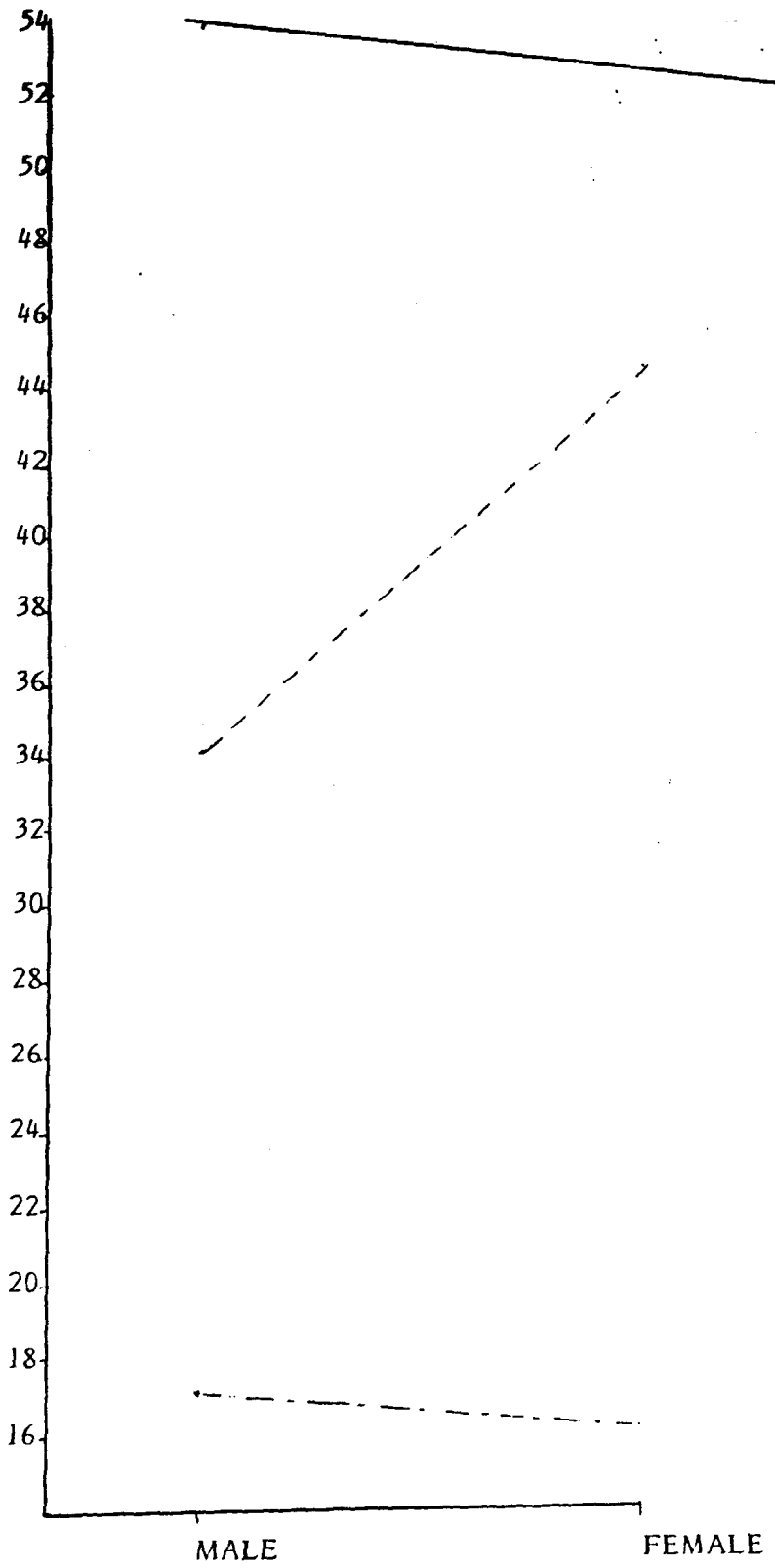


Figure 1e: Graph of the mean scores on the OI scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.

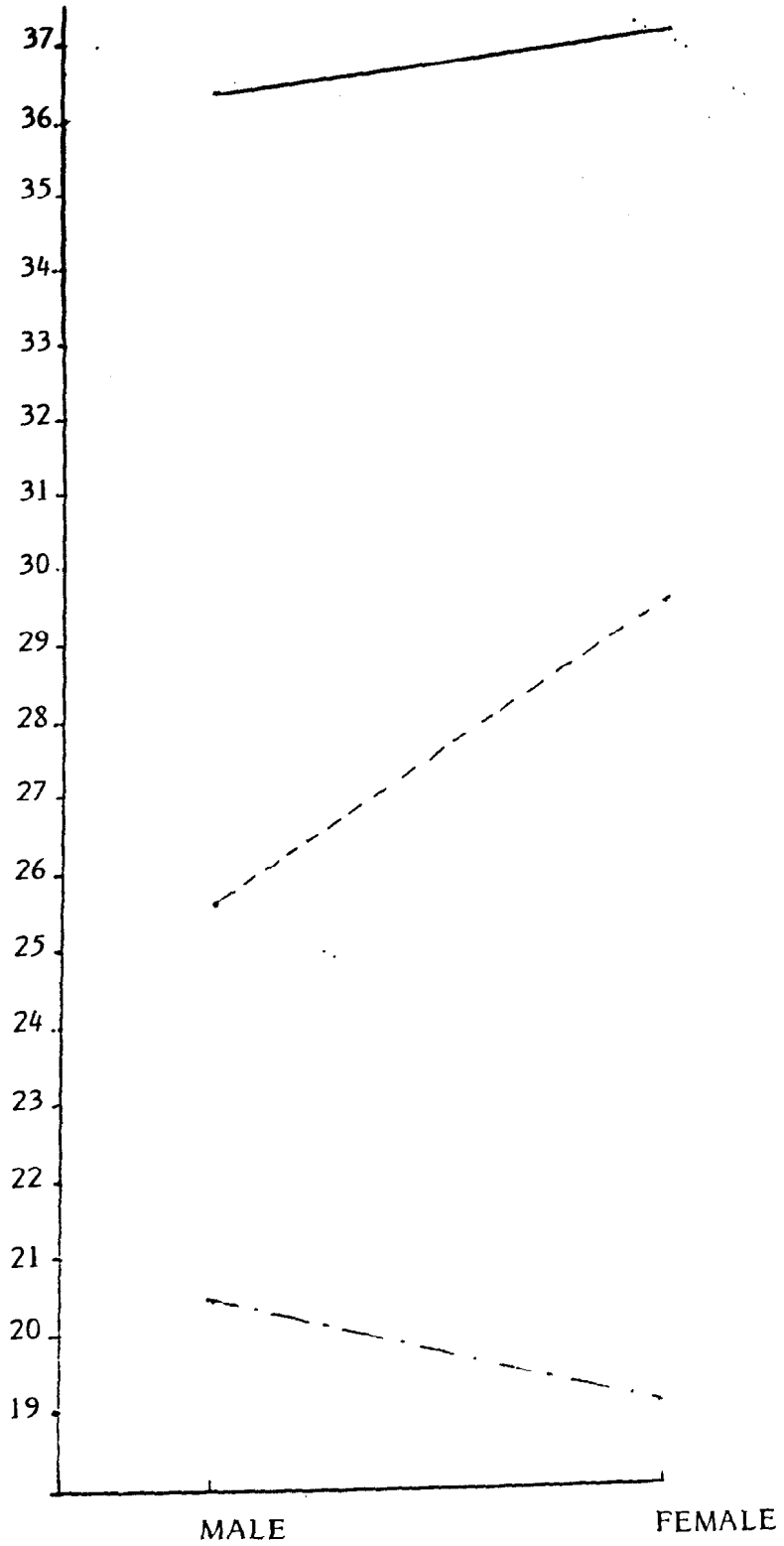
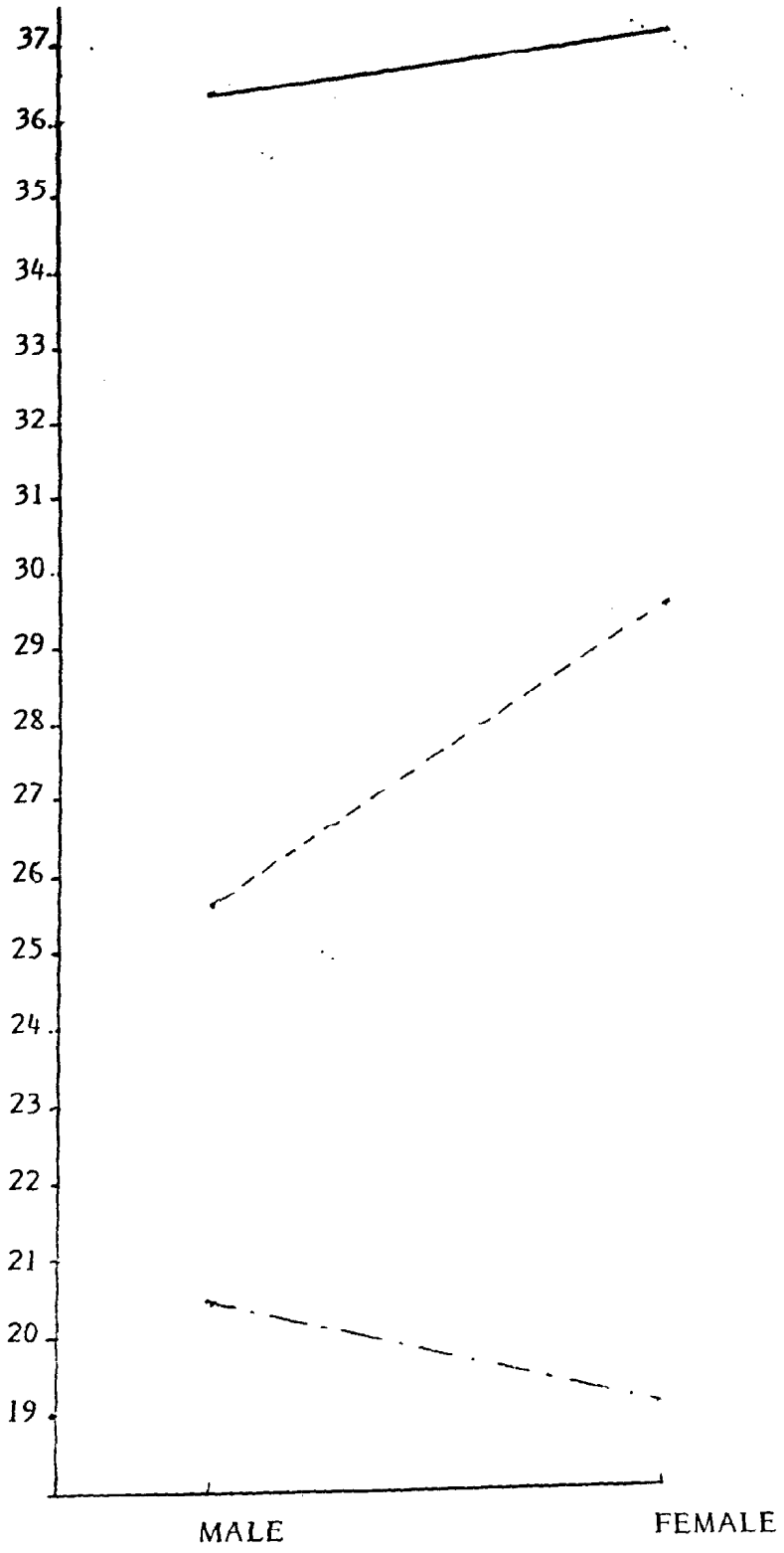


Figure 1f: Graph of the mean scores on the SI scale for male and female pupils of Schmerenbeck, Woodmead and the Indian schools.



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