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THE INFLUENCE OF CO-EDUCATION AND SINGLE-SEX EDUCATION ON ADOLESCENT DEVELOPMENT

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A dissertation submitted to the Faculty of Arts, University of the Witwatersrand, Johannesburg, for the Degree of Master of Arts.

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ABSTRACT

The present dissertation was designed to assess systematically and objectively the relative influence of the systems of co-education and single-sex education in assisting with the resolution of adolescent developmental tasks. Since it was felt by the present researcher that any complete evaluation of adolescent development must involve an appraisal of the social, heterosocial, emotional and intellectual domains, the dependent variables and measurement instruments selected for the present study were:

(i) Home Adjustment)
(ii) Social Adjustment) Bell's Adjustment Inventory
(iii) Emotional Adjustment)
(iv) Heterosocial Adjustment - 'boy-girl' sub-scale of the Mooney Problem Inventory
(v) Anxiety IPAT Anxiety Scale
(vi) Self Concept Coopersmith Self-Esteem Inventory
(vii) Achievement Motivation - Achievement sub-scale of the Edward Personal Preference Schedule
(viii) Academic Attainment - Final Examination Results
(ix) Intelligence -.Mental Alertness Scale of the High Level Battery

The total number of subjects selected for the present study numbered 301 and comprised 146 males and 155 females. This sample was broken down with regard to type of secondary school attended and present educational standard - that is - matriculation or first-year university.

Of the total sample, 149 subjects received co-education and 152 received single-sex education; 161 subjects were matriculation students and 140 subjects were first-year university students.

The statistical procedures applied to the present data, included Factor Analysis, Analysis of Variance and t-tests. Significant differences in favour of single sex education were found in the area of intellectual development and significant differences in favour of co-education were found in the area of heterosocial adjustment. The psycho-educational implications of these findings for both the psychology of adolescence and the policies of co-education and single-sex education are explored and recommendations for the development and implementation of psycho-educational intervention programmes in the schools are indicated.

DECLARATION BY CANDIDATE

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted for any degree or examination in any other University.

M Kark

M Kark

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CHAPTER 1

INTRODUCTION

The 'teenage years' which include the periods of puberty and adolescence comprise an important, transitional period of development often critical to the ultimate success or failure of the individual's socialization, adjustment and later achievements in life. In the few years between late childhood and early adulthood the adolescent must develop a philosophy of life, a set of moral beliefs and standards. She/he must also develop a sense of her/his own identity and have some idea of who she/he is, where she/he is going and what the possibilities are of getting there. The development of one's own identity as a person (what Erikson has called 'ego identity') requires a perception of the self as separate from others (despite ties to them) and a feeling of wholeness or self-consistency, not only in the sense of internal consistency at a particular moment, but also over time. The transitional years which comprise adolescence thus require a number of crucial readjustments. Since during adolescence the individual is in the school environment more than she/he is in the home environment or in any other environment, the school may be viewed as exerting a profound influence upon the adolescent and 'the acceptance of formal education as a necessary part of man's adjustment equipment' (Young 1959, p 417) thus becomes a distinctive feature of our ethos.

Macomber (1968) has suggested that the school 'should act as an integrative agent for the adolescent' and should define behaviour and competencies that are necessary for the adolescent to deal with

her/his problems and to resolve her/his developme tal crises (p 68). In line with this psycho-educational theory there has been a slow but definite trend towards extending the traditional emphasis of education on scholastic material to include a concern for personality growth. Increasing concern is being given to the mental health of the adolescent with a view to assisting personality adjustment and harmonious inter-personal relationships (Minuchin et al. 1969).

A logical extension of the view that the secondary school environment is of major significance in assisting the psychological, social and intellectual development of the adolescent, is that different educational systems will differentially influence the adolescent's resolution of developmental tasks. It has been shown that single sex and co-educational schools differ considerably from each other in tone or atmosphere (Dale 1969), and it follows that each must be exerting a different influence on the attitudes, emotional well-being and personality development of its constituent students. How strange it is, therefore, that the study of these differences which are of psychological and educational significance has in the past been so neglected, especially in the South African context, leaving the protagonists on either side to debate the matter with many theoretical arguments but few empirical facts.

The debate concerning the rival merits of co-education and single sex education may be traced back to 1939 when Pekin published a book in which he considered the objections and the advantages propounded by critics and supporters of co-education. The theoretical arguments identified by Pekin (1939) and which are debated to the present day centre around the contentious belief in an essential difference in

the natures of boys and girls which favour single-sex education and the differential intellectual development of the sexes (Newsome 1948; Phillips 1963; Kremer 1965; Waetjen and Grambs 1963; Kolesnik 1969) and the issue of which system best assists heterosocial and heterosexual development (Aarts et al. 1955; Frison 1959; Levine 1964; de Klerk et al. 1960; Miller 1967; Lamb and Pickthorn 1968; Descamps 1931).

Thus some educational-psychology theorists (Frison 1959; Gaertner 1961; Coleman 1961; Jones et al. 1972) argue with conviction that co-education is inimical to both emotional adjustment and academic attainment. On the other hand, supporters of co-education (Miller 1967; Dale 1969; 1972; Sutherland 1969) content that co-education is necessary to prepare adolescents to take their places naturally in the world of men and women. The latter group argue that the environment of the co-educational school, which more closely approximates the environment of the wider social context, best equips the adolescent to adjust to the social world beyond the school.

Despite the burning controversy over the rival merits of the co-education and single sex education, only rarely have these issues been investigated systematically in their own right. The research which has been conducted in the field of co-education has been largely confined to Britain and Ireland and even then such research has been sporadic in nature and small in volume. The research which has been conducted is characterised by both an objective, scientific orientation and by more personal observation - often in the form of attitudinal surveys.

Dale (1969), Nicholls (1967) and Taucher (1969) conducted attitudinal surveys investigating the attitudes of students towards

their co-educational and single-sex schools. The results of these three surveys indicated a decided preference for co-education among most pupils in secondary schools. Dale (1969) extended his research to include the responses of teachers and ex-pupils who had experienced both types of schooling. Dale found that co-education was the preferred system by virtue of the fact that co-educational schools were felt to offer 'a better preparation for life in a bisexual world, a more natural atmosphere between boy and girl, ... a better attitude to sex ....'(p 176).

On an implicit level the results of the attitudinal surveys suggest that the social environment of the co-educational school equips adolescents better to adjust to the adult world beyond the school. The only attempts to evaluate systematically and objectively the psychological and social adjustment of adolescents attending co-educational schools and those attending single-sex schools were the studies conducted by Dale (1969; 1971) and Van Aswegen (1975). These researchers obtained scores for pupils on many personality measures and both researchers found no significant differences between pupils attending these schools. Although the research by Dale (1969; 1971) and Van Aswegen (1975) was very broadly conceived and intensively assessed, the question of the effects of these two systems on heterosicial adjustment was not addressed. In addition to this, Van Aswegen's research which is the only study in the area of co-education which has been conducted in South Africa, was confined to female students. The effects of co-education on the psychological and social adjustment of male students in South African secondary schools has thus never been investigated.

Taking cognisance of the deficient state of research on the relative influences of co-education and single sex education on South African secondary school students, the present research is aimed at

redressing this by representing a systematically controlled study measuring the psychological, social and heterosocial adjustment of male and female secondary school students.

In addition to the psycho-social crises faced by the adolescent, the adolescent period is also a definite point in intellectual development. During adolescence, intelligence as a truly co-ordinated mental organisation involving sensory-motor, cognitive and conceptual abilities can be said to appear (Piaget 1952; Vinacke 1951). Ausubel (1962) describes the transition during early adolescence as involving movement from 'a predominantly concrete to a predominantly abstract mode of understanding and manipulating complex relational propositions' (p 268). Braham (1965) describes adolescence as 'the period of true intellectual growth' (p 25). However, Braham points out that it is precisely 'when intelligence is beginning to function as a co-ordinated structure and requires the most nurturing circumstances, the adolescent meets a major deterrent to its development, that of the intellectually negating peer group structure, or sub-culture' (p 252). Braham's opinion that the adolescent peer culture in secondary co-educational schools exerts a stultifying effect on intellectual activities is supported by Coleman (1961) who found that status in co-educational schools is dependent upon popularity rather than upon scholastic and intellectual achievement which consequently results in a lowering of the level of academic attainment.

Systematic research surveys on the intellectual achievement of pupils attending co-educational schools in comparison to pupils attending single sex schools have been conducted by Tyson (1926) King (1945), Sutherland (1961), Kolesnik (1969), Strickler and

Phillips (1970), Dale (1969; 1971) and Van Aswegen (1975). The general trend indicated by the results of these surveys is lower academic performance on the part of co-educated girls compared to the girls from girls' schools; however, this trend was found to be reversed in the case of boys where co-educated boys often achieved higher academic results than boys from boys' schools.

Although investigations on academic attainment have revealed certain similarities in results and although these results are consistent with the theoretical argument that a lowering of academic standard of girls occurs in a co-educational school, it is also evident in considering these studies that factors other than co-education or segregation may have influenced the findings. The latter group of factors included age differences, differences in intelligence and differences in social class.

It is the intention of the present researcher to take cognisance of the abovementioned methodological shortcomings in the field of co-education and academic attainment and to represent a well-controlled study assessing, in the South African context, the relative effects of co-education and single-sex education on academic attainment.

A further question comes to mind when assessing the relative influences of co-education and single-sex education and this question which arises is whether any distinctive influence lasts beyond the school to affect performance at university. Research on this issue is confined primarily to a study by Dale (1972) who in turn restricted his research to measure only the academic progress of students who had attended co-educational schools and those who had attended single-sex schools. Thus, the psychological, social and heterosocial

adjustment of students who attended the two school types has never been assessed. The present research is designed to enter a new field by investigating in the South African context, the psychological, social and heterosocial adjustment, as well as the academic attainment of first year university students who received co-education, and those who received single-sex education.

In the present dissertation, consideration will be given to a historical and philosophical overview of co-education (Chapter 2), a theoretical overview of the adolescent period of development and a consideration of the theoretical implications of adolescent development for education (Chapter 3), and finally a review and assessment of studies conducted on the relative merits of co-education and single-sex education (Chapter 4).

CHAPTER 2

HISTORICAL AND PHILOSOPHICAL OVERVIEW OF CO-EDUCATION AND SINGLE-SEX EDUCATION

2.1 General History

In order to give proper consideration to the historical development of any entity, it is useful to confine that entity within certain definable limits. A co-educational school may be defined as 'a school which admits boys and girls on equal terms....it is a school in which boys and girls are educated together, usually in the same classes....' (Howard 1940, p 15). The system of co-education lies in direct juxtaposition to the system of monastic or single-sex education - the system whereby males and females are educated separately in segregated institutions.

Throughout the long history of man, the family has been a basic institution serving as the cultural workshop for the transmission of cherished traditions and for guiding the child in the pathways of development. Since education in the home is usually co-education, co-education can claim to be the most ancient of all systems of education. However, from the history of education in the narrow sense, that is, the history of education in schools, co-education cannot claim a distinguished history. Although co-education has grown considerably in the nineteenth century and twentieth century, its growth has been spasmodic and, in earlier times, only brief glimpses of it are to be obtained.

Glimpses of the joint education of boys and girls can be seen in classical times - though the evidence is fragmentary. Howard (1940) points out that in Sparta, where the position of women was higher

than in most communities of the time, the sexes were by no means entirely separated. It is known, for example, that the educational endowments of Teos provided that the professors of literature should teach both boys and girls. A Roman tombstone exists which depicts a schoolmaster with a girl on one side of him and a boy on the other. In the first century AD Musonius wrote in favour of co-education. He argued that the virtues required in boys and girls were alike. However, the prevailing instinct of ancient Rome was against a common upbringing of boys and girls.

Boys and girls seem to have attended the monastery schools of the Greek Church for some centuries, but after that all trace of co-education in schools has been lost for some hundreds of years. Howard (1940) believes that the adverse influence of priests was a powerful factor accounting for co-education being terminated. Right up to the present day, in countries in which Roman Catholicism flourishes, co-education has made comparatively little headway. The monastic schools of the Middle Ages were attended by boys alone; the girls, when educated at all, attended a nunnery school. Another factor accounting for the failure of co-education to advance in medieval times is attributable to the general view of the position of women and the specific duties for which they were to be trained. For centuries the status of women was low and their role was perceived to be in the home rather than in the outside world. With such a view of the position of women, it would be idle to have expected co-education to flourish.

The early Humanists of the Renaissance held a higher view of the position of women. Education for them theoretically involved the development of personality - body, mind and spirit; in practice they wanted literary accomplishments for both men and women. In

accordance with this elevated view of women, girls began to be admitted to Renaissance schools, especially the 'home' schools of great families. Luther recognized the need for educating girls - he held that salvation was to be attained by reading the Bible and therefore felt that girls should be taught to read. To this extent Luther may be considered the father of modern co-education in practice. It was Luther's Protestant influence which started Primary Schools in Germany, Scotland and the north of England; and girls were often admitted. The movement of elementary co-education was thus heralded and has grown steadily since. Today the co-educational elementary school is the norm internationally.

Thus the effect of Christianity upon co-education was profound, but slow in operation. Christianity laid the foundations in the pagan world of a better view of women, which bore within itself the germs of co-education.

2.2 History in Britain

In the 19th Century there existed in Britain the old established Grammar and Public Schools for the education of boys. At this time in Britain secondary education was limited almost exclusively to boys because the essence of education was based on the roles which adult men and women played in the society: girls, when educated at all, were taught to be useful in the home, and ornamental. The Victorian Age was thus characterized by the 'finishing' of young ladies and the academic emulation of the male sex. New schools founded during the Victorian Era were thus single-sex.

The gradual emancipation of women from the home and her entry into career life which began in the mid-nineteenth century, led to

increased numbers of girls receiving secondary education with the consequent entry of a large number of girls into boys' schools. However, many of the boys' schools of high repute and old traditions would not admit girls and this resulted in secondary schools being built for girls. Barnard (1968) writes that Girls' Public Day School Trust built their first girls' school in 1873 and by 1891 the number of all-girl schools had increased to thirty-six. This single-sex tradition in Britain continued its self-perpetuating course for most of the first half of the twentieth century.

After the Second World War the attendance of secondary schools by boys and girls increased rapidly. The Labour Party came into power in Britain and introduced comprehensive secondary schools which, for economical reasons, resulted in increased co-education. The comprehensive schools in England became a political issue and thus co-education received much attention as evidenced by the extensive research conducted by Dale (1949; 1955; 1962). Despite the increase in co-education in Britain during the present century, it is the single-sex tradition that still receives the majority support.

The advance of co-education in England has been described by Van Aswegen (1975) as being tempered by certain inflexible ideas favouring single-sex education which are often based on tradition, ignorance and prejudice. With relatively few exceptions, the teachers and parents of the pre-war era received single-sex education and this resulted in co-education being foreign to and as such objectionable to the more affluent section of the population. Facts are needed if the supporters of co-education are to convince the opponents of its value. However, in England, the production of facts is very difficult because the

established, traditional single-sex schools attended by the children of the affluent population, are not comparable on sound methodological grounds with the co-education schools attended mainly by children coming from the less affluent sector.

Thus to the present-day the single-sex tradition has continued as the favoured educational system in Britain. However, as Dale (1969) points out, this preference 'is not founded on educational theory but on a combination of historical evolution and a public image of a few schools where an elite educated by an elite produced future scholars for the ancient universities. Yet there is little research to evaluate the achievement of these schools, especially in areas other than the academic' (p xii).

Dale (1969) succinctly sums up the present-day preference for single-sex education in Britain when he writes:

> 'Of solid worth there must have been much but it is not easy to determine where the worth ended and the myth began, nor to what extent the achievement and prestige are due to the special clientele, the "upper crust" of academic success, well qualified staff, or tradition. Certainly there is no reliable evidence that the single sex nature of the education produced better academic progress.' (p xii).

2.3 History in America

Although custom, law and religion in Colonial America tended to consider women as inferior and therefore subordinate to men, conditions on the westward-moving frontier made traditional women's jobs essential and furthermore in many cases required women to perform men's work. Both the American and the French Revolutions unleashed ideas of equality and natural rights that could not be permanently limited to men. As a new society took shape in the

New World under new and changing conditions, traditional attitudes towards the lot, life and work of women had to be revised.

Wider educational opportunities for women soon became a focal point for concern and under the stimulus of such concern, the initial sporadic interest in elementary education for girls became a continuing interest in female academies and seminaries, which, by the time of the Civil War, were to be found in almost every state of the Union. From the beginning, the district schools in the small settlements were open to both sexes. As Howard (1940) puts it 'American civilisation was in a hurry, it had no time to waste in duplicating schools' (p 41). As schools grew in number and their scope widened, they continued to be co-educational. In the west this was perhaps a matter of convenience and economy. In the more thickly populated east it would have been possible, had there been any demand for it, to have established the single-sex school. However, the co-educational school was definitely preferred; it was the embodiment of the American doctrine of equal opportunities for all.

The official view of co-education in America is that it is impartial - it gives the girl the same opportunity for advancement and culture as it gives the boy. At present the entire system of state schools in America is co-educational. Title ix of the Education Amendments of 1972 states that 'no person in the United States shall, on the basis of sex, be excluded from participation in, be denied benefits of, or be subject to discrimination under any education programme or activity receiving federal financial assistance' (Campbell et al. 1975, p 342).

Thus the entire system of public schools in the United States of America which in the 1970s accounted for ninety per cent of total school

enrolments are co-educational in nature. It is only in the non-public schools which account for ten per cent of total school enrolments that males and females receive segregated education. One may be tempted to attribute the existence of these non-public single-sex schools to dissatisfaction with co-education. However, if one takes cognisance of the fact that Roman Catholic Schools enrol approximately eighty per cent of the nation's non-public school students, it becomes evident that single sex secondary education in America, where found, exists almost primarily for religious reasons. (See Campbell et al. 1975, p 148 for statistical information.)

Thus in America, in contrast to Britain, it is the single-sex school which is without a history. In America, co-education is preferred on educational democratic grounds and this policy is founded on the belief that co-education is impartial in the sense that it gives the girl the same opportunity for advancement and culture as it gives the boy. This democratic educational ideal has in recent years come under fire by the feminist movement which alleges that girls are discriminated against throughout their entire educational lives (Horner 1969; 1972; Lenney 1977).

These theorists hold that in co-educational schools the competitiveness, drive and will to succeed of girls becomes radically reduced in order not to appear as 'unfeminine'. Thus the phenomenon of 'fear of success' in women is heightened in mixed-sex educational environments (Horner 1969; 1972). This challenge to co-education needs further researching and may sow a seed for single-sex education becoming the preferred system in that it best promotes attainment in females.

2.4 History in Australia

Australia developed throughout the nineteenth century as an offshoot of the communities of the British Isles. The Australian continent was first settled by immigrants from England, Scotland, Ireland and Wales and, during the first three decades, mainly by involuntary immigrants. As the six Australian Colonies created the economic and social fabrics of their communities, they borrowed heavily and inevitably from the traditions and the models that were at hand in the mother country. The movements of political, social and educational thought of Britain in the nineteenth century influenced the developing Australian nation.

Thus it is an elementary fact that Australia began as essentially a British community and in many fundamental respects is a reproduction of British Society. English-speaking immigrants of whatever origin made do with the British inheritance as long as it stayed workable. However, the geographical problems, population distribution and the internal wranglings of the churches induced Australians to opt for closely-centralized control of education within each of the States, for secularization of the public provision and for novel means of securing a reasonably equal spread of basic opportunity.

It is almost impossible to generalise satisfactorily about the structure of secondary education in Australia except to point to the fact that there exist both State and non-State schools. The majority of Australians for reasons partly to be found in the geographical and social circumstances of the early decades of the history of the society, have found little difficulty in accepting the belief that the education of the community is the responsibility of the governments. These state

schools, which are attended by approximately seventy-five per cent of Australian children are most frequently co-educational in nature. Jones (1974) points out that Queensland, long regarded as the most conservative state educationally, follows the basic principles of co-education in its high schools.

The non-governmental or independent secondary schools in Australia are attended by approximately twenty-five per cent of Australian children, and of these, about eighty per cent attend Roman Catholic Schools. Often called 'private' or 'independent' rather than 'non-government', these schools are generally church-based and single-sex in nature. In 1971 a total of 2 180 non-government schools were in operation, and, of these 1 781 were under the auspices of the Roman Catholic Church. The Church of England controlled 108, thirty-three were Presbyterian and nineteen Methodist sponsored (Jones 1974, p 60).

The non-Catholic independent schools or non-government schools may be considered to be the Australian counterpart of the great public schools in Britain and are likewise founded on prestige and tradition and responsible for an elitist education.

These schools charge substantial fees and are thus beyond the reach of the great majority of people. These non-government schools are single-sex schools. The choice of this type of school is made mainly for social reasons. 'It is customary for parents enjoying a certain social and economic position to send their children to independent schools; to patronise them is part of living up to one's social position' (Partridge 1968, p 79).

New South Wales has the most non-government schools (790), with Victoria next (581) and Queensland third (342). These non-

schools, which are attended by approximately seventy-five per cent of Australian children are most frequently co-educational in nature. Jones (1974) points out that Queensland, long regarded as the most conservative state educationally, follows the basic principles of co-education in its high schools.

The non-governmental or independent secondary schools in Australia are attended by approximately twenty-five per cent of Australian children, and of these, about eighty per cent attend Roman Catholic Schools. Often called 'private' or 'independent' rather than 'non-government', these schools are generally church-based and single-sex in nature. In 1971 a total of 2 180 non-government schools were in operation, and, of these 1 781 were under the auspices of the Roman Catholic Church. The Church of England controlled 108, thirty-three were Presbyterian and nineteen Methodist sponsored (Jones 1974, p 60).

The non-Catholic independent schools or non-government schools may be considered to be the Australian counterpart of the great public schools in Britain and are likewise founded on prestige and tradition and responsible for an elitist education.

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New South Wales has the most non-government schools (790), with Victoria next (581) and Queensland third (342). These non-

government schools - religious and undenominational - are organised along the lines of sex segregation. Objections to the existence of these schools are grounded in the fact that these schools are viewed as accentuating religious, class or economic and c tional lines. The single-sex nature of these schools and the part they play in inequality between the sexes have not however been challenged at national level in Australia.

2.5 History in South Africa

In considering the historical development of co-education in the Western World it has become clear that the educational system of every nation has many determinants and, in studying the educational system of a country, due regard must be given to the people and the history that helped to shape it. Although the South African educational system has many determinants rooted in the Western educational tradition, many of its facets are unique, owing to its own distinctive people and history.

The Dutch settlers, who may be considered the first people from Europe to settle permanently in South Africa, approximately three hundred years ago, brought with them to the Cape a tradition of religious education. They were followed by people of British and German stock.

2.5.1 History under the Dutch Settlers

The Dutch pioneers were a very religious group and believed strongly in salvation through 'religion'. Religious education for their children was all these pioneers wanted and it was given to both male and female children at home by a church official or some itinerant (Behr and Macmillan 1972). Sometimes this religious

teaching was combined with a little elementary instruction in reading, writing and arithmetic. In 1663 provision was made for the first public school at the Cape. This school was attended by both boys and girls. As the settlement at the Cape expanded so did the need for more schools and, in accordance with the demand, various public schools were established in Cape Town and the rural areas. These first public schools established by the Dutch were co-educational and they were, from 1714 onwards, controlled by a special educational commission, the Scholarch, under supervision of the Governor and Council. By 1737 there were four public schools in Cape Town. By 1779 the number of public schools had increased to eight (Behr and Macmillan 1972).

More numerous than the public schools in Cape Town and the villages in the rural areas were the private schools on farms, where farmers hired instructors to teach their children. Sons and daughters of farmers were educated together. For the people in the outlying areas and for the nomadic trekkers permanent schooling could not be considered. Although isolated from the influence of civilization, these Dutch pioneers clung to their Bible and tried to impress its teaching on their families.

It can thus be seen that the foundation stone of education in South Africa - as laid by the Dutch settlers - was co-educational in nature. The Afrikaans-speaking people, who are the descendants of the Dutch settlers and who settled after the Great Trek, chiefly in the areas of the Transvaal and the Orange Free State continued the tradition of co-education which had been established by the Dutch settlers. When Afrikaans Secondary Schools were formed, they were co-educational in

accordance with the Dutch tradition and the religious and social outlook of the Afrikaans-speaking people. Behr and Macmillan identify the present policy of the Educational Departments in the Transvaal and Orange Free State as being that of co-education. This means that although existing single-sex schools are allowed to continue in these provinces, wherever possible new secondary schools are co-educational.

2.5.2 History under the British Settlers

In 1795 the British Government occupied the Cape as a matter of political expediency. The occupation was only of a temporary nature and no important changes were introduced in the educational system of the country. In 1806 the British occupied the Cape for the second time and shortly afterwards introduced a plan to Anglicize education. Although many educational reforms were introduced, State Primary Schools remained co-educational and this situation was continued up to the present. However, as the demand for secondary education grew, 'high schools' were created and it is here that the results of conflicting ideas are to be seen.

As has been previously discussed, the development of co-education in Britain was very slow and met with much resistance from parents and educators as, in Britain, the single-sex high school has a background of tradition, prestige and high reputation. The English Public Schools with their tradition of birth, social position and privilege gripped the imagination of the British settler population and thus many secondary schools in the Cape, which was rapidly becoming a predominantly English settlement, were appointed to be single-sex in accordance with the desires of parents. Thus sex-

segregated education became a South African English-speaking tradition based on the British Public School ideal.

Notwithstanding the existence of many single-sex schools in the Cape, the present Cape educational policy is that of co-education. However, consideration is given to the establishment of separate schools for boys and girls where parents are strongly in favour of such schools.

Natal, which from 1835 was predominantly a British settlement, followed the traditions of the British Cape settlers in establishing single-sex secondary schools. Today most of the secondary schools in Natal - Provincial-aided and private - are single-sex. However, the present educational policy in Natal is to build co-educational secondary schools in new areas. When an additional school is required in an existing area owing to growth of the population in that area, and there is a strong demand for single-sex schools from the parents, then boys and girls are allocated separate schools.

Thus the British settlers brought with them to the Cape a single-sex educational tradition which became the predominant mode of secondary education in the British Settlements - the Cape and Natal. The situation today is that an overwhelming majority of single-sex schools exist in the Cape and Natal, although new schools erected in these provinces are appointed, by the Educational Departments, to be co-educational.

2.5.3 Conclusion

In South Africa, the policy of the Department of National Education is that of co-education. Wherever possible new secondary schools are appointed to be co-educational. However, the Department

feels that this decision should take into consideration tradition and the desires of parents. Where a strong demand for a single-sex school exists from the parents, then serious consideration is given to this demand.

In South Africa, the existence and establishment of single-sex or co-educational schools is not founded on educational theory or research - that is, by a concern for which system best promotes the aims of education - but, instead, the choice is governed by societal values and prejudices which have been shaped by historical evolution and tradition. Taking cognisance of this it becomes clear that research is needed in South Africa regarding the relative merits of the systems of co-education and single-sex education. This will facilitate educational decisions as regards the nature of new schools which are to be formed. Such research would, in addition to providing educational authorities with important and necessary information, provide parents of students attending secondary schools with information regarding which system best promotes the psychological, social and intellectual development of their children. Only when such facts become available will prejudices be dropped and an objective choice made in favour of the system which leads to the optimal psychological, social, heterosocial and intellectual advancement of their adolescents and the future senior citizens of South Africa.

2.6 Historical Overview - General Conclusion

In reviewing the historical development of co-education in Britain, Australia and South Africa, it becomes evident that the positions of these countries regarding co-education is a product of historical

evolution and tradition. In accordance with this trend, the preference for co-educational or single-sex schools has not been shaped by educational theory and facts, that is, by a concern for which system best accomplishes the aims of education. By contrast, however, in American educational thought there has been one strong tradition, expressed at widely separated points in time by Jefferson, Horace, Mann and Dewey, resting on the conception of the 'common school' as being a potent democratizing institution - the conception of the common school, co-educational in nature, in which children of every different kind were made aware of themselves as members of a single community. This particular strain of American social and educational thinking has been decidedly anti-elitist and has idealised the notion of the school as the social microcosm in which young Americans are introduced to a common life, a shared social experience.

British, Australian and South African social thinking has not on the whole conceived the character and function of the school quite in this way. Instead schools have been traditionally thought of more in terms of what they offer academically to the individual child and the academic opportunities they open up for her/him, rather than ir terms of the quality of social life - with its implications for the wider life of the community - to which they introduce and habituate her/him.

Thus the notion of the school as being itself a kind of society, impregnated with particular social ideologies or moralities derived from objectives and ideals operative throughout the national society, has not been very conspicuous in modes of educational thought in Britain, Australia and South Africa.

In accordance with the lack of emphasis on the school as a social system, these countries have not focused much attention on the issue of co-education versus single-sex education with respect to their relative influences on psycho-social adjustment of the adolescent. Thus in Britain, Australia and South Africa, both the single-sex and co-educational traditions exist side by side. Research is needed to draw attention to the socialising function of the school and the relative efficacy of co-education and single-sex education in promoting psychological and social adjustment and intellectual advancement.

Taking cognisance of the historical evolution of ideas of co-education and single-sex education, the present research is designed to focus attention on the social functions of education in the South African context and to assess the relative efficacy of the abovementioned systems in the academic, psychological and social realms of development.

2.7 Philosophical Overview

Throughout the annals of educational history, no force has operated so consistently to bring about changes in the purpose, content and method of education, as has formal philosophy. True, many of those who have served as the instruments of change, the teachers and administrators of schools, have not been philosophers, but they have relied upon the philosophy of others for direction. Among the men who have influenced education most profoundly must be included, Plato and Aristotle, St Augustine and St Thomas Aquinas, John Locke and Jean Jaques Rouseau, Johann Herbart and John Dewey - all men of philosophy.

While it has been stated in many different ways by philosophers, it is generally agreed that the total function of education includes not only the teaching of subject matter, but the development of character as well. In 'The Republic', Plato speaks of the development of character as both a prerequisite for and an integral part of the learner's cognitive development. It is dangerous, he argues, to help a person acquire intellectual skills without first helping him develop a sense of values. Two thousand years after Plato, Bertrand Russell, in his book 'Education and the Good Life', raises much the same point. For Russell, like Plato, believes that a strong moral character is the best foundation for intellectual thought.

Despite the recognition by philosophers that education must concern itself with the development of character, modern educational philosophers seem to have overlooked the existence of co-education and single-sex education. Dale (1969) identifies the following themes as being prominent among the writers of educational philosophy in the present century - 'preparing the pupil to take his place in the adult world', 'the need for right social and emotional development' and even 'the education of the whole man' (p x). However, in considering these fundamental questions, there is often no mention whatsoever of one of the most likely influential factors - co-education versus single-sex education. There is no mention as to whether educational aims are best achieved by educating the sexes separately or educating them apart.

In his book 'Education of the Whole Man' Jacks (1946) emphasizes the important principle that education should be concerned with the total man - his psychic, intellectual, social and emotional aspects

and his moral outlook. Furthermore, education must aim to integrate and balance all these spheres. Yet in all these considerations, there is not any realisation that education may be less than total, unbalanced,and might result in poor psycho-social adjustment if people were educated in schools in which the sexes were artificially segregated. Although single-sex education may be the best way to achieve the aforementioned educational objectives, one would imagine that co-education seems the more likely alternative.

It is thus clear that philosophers of education emphasize the importance of preparing the student to take her/his part in the adult world, yet, at the same time, pay no attention to the role played by the opposite sex in the process. The question of whether sound social, emotional and sexual development can be secured in schools where one sex is completely separated from the other therefore needs to be brought to the attention of educational philosophers in order to effect educational change if deemed necessary. Research studies and the resultant findings conducted in the field of co-education is one effective way of drawing the attention of educational philosophers to the issues of the debate and consequent educational intervention. It is the aim of the present research to address itself to issues regarding the social and psychological functions of education and to assist in the production of objective information in the field of the relative efficacy of different educational systems in fulfilling these functions.

CHAPTER 3

IMPLICATIONS OF ADOLESCENT THEORY AND DEVELOPMENT FOR CO-EDUCATION AND SINGLE-SEX EDUCATION

3.1 Introduction

The previous chapter of the present dissertation has revealed that secondary education has been shaped by tradition and the evolutionary process of history, by philosophy in its determination of the nature of its values, and by society as collective pressures are placed on the schools to meet newly developing needs and conditions. Effective and total education - that is education of the whole person including social, emotional and intellectual aspects, while subject to the above factors, is critically dependent upon another consideration - an understanding of the student who is to be the recipient of secondary education.

The student receiving secondary education is called an adolescent and it is in terms of the needs and characteristics of the adolescent that the systems of co-education and single-sex education must be evaluated. The present chapter will be devoted firstly to a discussion of the developmental tasks faced by the adolescent. This discussion will be followed by a theoretical presentation concerning the manner in which the co-educational and single-sex schools would be expected to differentially effect the resolution of adolescent developmental tasks. The central theme of the present chapter will be that the secondary school has a powerful influence in shaping adolescents' concepts of what they are and what they might be. Jersild (1970) expresses his theme when he writes that the secondary

school 'impinges on most facets of young persons' lives in their transition from childhood to adulthood. It is a way station toward the larger world into which the young persons are moving. When youngsters succeed in high-school their future remains open. When they fail and leave school, it usually means that many doors to the future have been closed. In many respects the high school is in a more strategic position than the home to influence the lives of adolescents.' (p 325).

3.2 Adolescent Theory

The teenage years which include the periods of puberty and adolescence comprise a critical transitional period of development in which the tasks that confront the adolescent are often diverse and traumatic. Schell (1975) succinctly expresses the diverse and difficult tasks confronting the adolescent when he writes, 'Put the personality of a child in the body of an adult, furnish a need to be loved and a desire to be independent, allow a need to be self-directing, but leave out any idea of what direction to take, add love, but also fear that it may not be accepted or returned, and give physical and sexual powers without any knowledge of or experience in how to use them. Then place the person you have constructed into a complex society whose values and achievements are hard to understand and harder to attain. You will have only begun to scratch the surface of an adolescent' (p 345).

The concept of adolescence as a stage of psychological growth emerged only in the nineteenth and twentieth centuries and is far from complete even today. The recent emergence of the concept of

adolescence does not mean that no one ever experienced adolescence before the formation of the concept. However, in the last century three essential aspects of the experience have changed. Firstly, adolescence as a life stage has been acknowledged and socially recognised. Secondly, society has begun to sanction and support adolescence with educational, familial, institutional and economic buttresses. Thirdly, these new resources coupled with societal recognition, has provided an increasing proportion of young people with the possibility of continuing psychological growth during the years from thirteen to eighteen. This opportunity arose when society granted adolescents protection from adult responsibilities, created educational opportunities to fill their time, and developed a recognition of a post-childhood, pre-adulthood stage of life: adolescence.

Much of the writing on adolescence prior to the 1939-1945 War tended to adopt a genetic view derived from Stanley Hall whose monumental work on the subject was the first in the field. Generally, it was believed that adolescence was directly and causally related to the onset of puberty, with the rise of sexual emotion dominating the changes. Adolescence was considered to be a period of universal storm and stress with quite new emotions, interests and abilities arising - all in a more or less inevitable fashion.

Early Freudians adopted much the same genetic view. Freud and his followers considered adolescence to represent the last identifiable stage of psycho-sexual development: the genital stage. During this stage the individual's identity was considered to take

its final form, and, in the place of narcissistic self-love, love for others and altruistic behaviour develop. Although the influence of peers and parents was not considered to be as strong as it was during earlier stages, peers and parents were still believed to play an important role in providing love and realistic direction for the individual.

Post-Freudian theory regarding the adolescent period of development has tended to adopt a socio-psychological interpretation, almost certainly with some biological undertones. These theorists (Adler, Sullivan, Fromm, Mischel, Erikson) all seem to view the search for identity as the major motivating and organising principle. In 'Childhood and Society' (1963) Erikson looks at adolescence as a period of identity versus role confusion and vividly describes some of the conflicts and characteristics of this period. At this time of life the adolescent's body goes through marked physical changes and is flooded with sexual impulses and the young person confronts both imminent intimacy with the other sex and an immediate future filled with conflicting possibilities and choices.

Before adolescents can regain a sense of unity with the world about them, they must incorporate their new physical and sexual attributes and the opportunities they present into a new self-concept. A society that universally recognises these changes and attaches meaning to them makes reworking self-concepts a relatively uncomplicated task. However, in a pluralistic society like our own, the prolongation of adolescence and its bewildering variety of choices may mean greater difficulty. In either case, Erikson has postulated a 'developmental crisis', the moment when development must move one way or the other.

Erikson's concept of identity has two facets. It refers both to a person's feeling about herself/himself, or self-esteem, and to the relationship between her/his self-concept and descriptions of her/him by significant others in her/his life. The most important descriptions involve those behaviours that society considers basic to a person's functioning, and these descriptions are organised into subgroupings which are called roles. Such roles provide significant connections between self and society. The teenager comes to judge herself or himself - her/his appearance, academic achievements and social capacities - by the standards of those who define the roles in her/his social groups. Among these role-definers, parents, peers and teachers continue to be a dominant influence.

Erikson's writings, perhaps more so than those of any other thinker, have a direct relevance for education. As the curriculum, subject matter, classroom and school atmosphere become more conducive to the process of identity formation, the adolescent student will be more inclined to find meanings in her/his life through the school situation. The relevance of the school, therefore, depends to a large extent upon its ability to accommodate itself to the specific ego-forming needs of the adolescent.

If we accept this socio-psychological interpretation of adolescence, almost certainly with some biological undertones, it becomes possible to produce a schema of developmental tasks, needs and drives essential to the resolution of the adolescent 'identity crisis' which are of significance for education. Havighurst (1953) has formulated such an explanatory theory wherein adolescent development is viewed as a process whereby the biologically maturing

individual is confronted more or less in terms of her/his chronological age by an integrated and increasingly complex series of cultural demands or growth tasks. The attainment of these tasks is considered to be assisted or hindered by the environment of the secondary school.

The present discussion will proceed to a presentation of the developmental tasks of adolescence as identified by Havighurst and the educational implications will be considered with special emphasis being given to the manner in which the systems of co-education and single-sex education will affect the resolution of these tasks.

3.3 Developmental Tasks of Adolescence

3.3.1 Achieving New and More Mature Relations with Peers of both Sexes

During the later years of middle childhood, children grow increasingly interested in socializing with each other. Initially social groups are limited to same-sex peers. From the age of thirteen or fourteen, however, most boys and girls become preoccupied with social activities and social experimentation with peers of the opposite sex. With peers of their own sex, adolescents must resolve the social tasks of learning to behave as adults and to assume increasing responsibilities, to organise their social activities and to choose their leaders and to create on a small scale the society of their elders.

With members of the other sex adolescents must learn adequate heterosocial skills and appropriate courtship behaviours. Numerous studies made of the social problems of adolescents have revealed that the 'boy-girl' problem is the most serious of all. Hurlock (1955) points out that for the young adolescent this task is different from the problem faced by the older adolescent. Problems facing the young

adolescent consists of not having a boy or girl friend, wanting more dates, not knowing how to ask for a date, not knowing what to do on a date or what to talk about and being shy. In general the younger adolescent's 'boy-girl' problems centre mainly around establishing heterosexual relationships (Wile 1930; Fleege 1945; Mooney 1949; Cole 1954). For the older adolescent, the 'boy-girl' problems include going steady and issues regarding physical involvement (Wile 1930; Butterfield 1939; Elias 1949; Mooney 1949; Cole 1954). Even older adolescents are frequently faced with the problem of not knowing where and how to meet individuals of the other sex and how to get dates (Kirkpatrick and Caplow 1945).

A second group of sex problems facing the adolescent relates to social behaviour with members of the other sex. The young adolescent is often embarrassed, ill at ease and self-conscious. Feelings of inadequacy in social situations with the other sex vary in intensity, depending on the past experiences of the individual, the opportunities for social contacts with members of the other sex, and the age of maturing in relation to her/his friends (Malm and Jamison 1952). In addition there is the problem of social skills such as dancing, playing games and maintaining a conversation (Hutson and Kovar 1942; Cole 1954).

Success in accomplishing the social and heterosocial tasks of adolescence results in good social adjustment throughout life, failure to do so means an unhappy social life. Not only will relationships with the opposite sex be made difficult, unhappy or impossible, but the individual will find difficulty in working and socializing with other people as equals and will remain limited in her/his relationship with others to childish dependence or arbitrary dominance.

3.3.2 Educational Implications

Adolescence is the prime age for learning to associate with members of the same or other sex. Because most adolescents are in secondary schools, they have opportunities to meet and associate with members of the opposite sex in their work and leisure time. This not only gives the adolescent a wide selection of members of the other sex to associate with, enabling her/him to find which are congenial, but it offers opportunities for daily contacts that would not be possible if she/he were not brought into contact with them in school. In addition, at this age, her/his contemporaries are learning to associate with the other sex and are experiencing similar problems and attempting to resolve them. Together, they can work out the solutions more satisfactorily than each could alone. As Havighurst (1953) points out, the school serves as the 'social laboratory' (p 34) for the adolescent in attaining adequate social and heterosocial adjustment.

Hurlock (1955) has identified two environmental conditions which are essential to the establishment of satisfactory adjustment to members of the opposite sex. The first is an environment in which there is a sufficient number of members of the other sex of appropriate age, intellectual status, and personality adjustment to give the adolescent an opportunity to select congenial companions and to have pleasurable social contacts with them.

Such an environment is descriptive of that which exists in a co-educational school. An environment in which the sexes are segregated, Hurlock (1955) writes, not only increases the difficulty the adolescent experiences in social contacts with the members of the other sex, but, more seriously, it tends to develop in the adolescent a feeling of

self-inadequacy in situations where there are members of the other sex.

The second prerequisite for successful adjustment is an encouraging, sympathetic and helpful attitude on the part of parents and teachers. With the realisation that she/he has someone to turn to for help, advice and encouragement, the adolescent is better able to tackle the problems to which heterosexual adjustment give rise. Since the staffs at co-educational schools comprise both male and female members and since heterosocial difficulties of students are often apt to be acted out in the co-educational school setting, the staff of such schools are likely to play a greater role in the resolution of heterosocial difficulties than the staff at single-sex schools.

One of the reasons which sometimes decide a parent not to send her/his son or daughter to a co-educational school is fear of the moral problem - an uneasy feeling that to educate the sexes together is to invite a series of emotional disturbances which she/he would rather avoid. However, the co-educationalists counter this argument by asserting that the moral problem will never be solved until the parent allows the adolescent to face it, and the 'sex lure' can be most effectively counteracted in the co-educational school. Furthermore, the co-educationalists maintain that to segregate large numbers of either sex from the society of the other is not a natural proceeding and imposes a high degree of strain upon them - a strain under which their morals are more likely to be thrown into confusion

Adversaries of co-education question whether it is fair to introduce an additional complication, that is, the presence of the other sex into the life of the adolescent and feel that it would be

simpler to postpone this introduction (Grobler 1954; Levine 1964). The co-educationalists' answer is that of course it would be simpler to adopt this strategy. If human beings were of one sex, one race, one language, life might be enormously simplified. However, the human race is not homogeneous and thus the incidence of sexual difficulties cannot be postponed. It is not the co-educationalist who introduces the complications, it is nature. Thus the co-educationalist maintains that it is a better plan to co-operate with nature instead of trying to thwart or sidetrack it. The co-educationalists maintain that to suppress natural thoughts and impulses may lead to grave complexes.

Following the foregoing rationale it seems likely that the social and heterosocial tasks of adolescence are best assisted by sending the student to a co-educational school where she/he will meet the other sex on equal terms, work with them and talk to them and where under the supervision and guidance which the school will provide, will be able to make her/his adjustments under safer conditions than exist in the single-sex school.

The question of which educational environment best assists the adolescent in resolving heterosocial crises is of crucial significance if one keeps in perspective the importance of this achievement throughout the lifespan of the individual. Despite the fact that advocates of both the co-education and single-sex education sides of the debate have been arguing this issue with rigour, no research has been conducted on the issue. Clearly, then, this question begs investigation.

3.4 Achieving a Masculine or Feminine Social Role

Historically, those who have favoured a different kind of education for girls and boys have done so on the assumption that the natural characteristics and responsibilities of the two sexes were so different that the future of the human race depended on both learning how to develop their potentialities in order to play more effectively their life role as males or females. Thus the individual's masculinity or femininity was emphasized. Those, on the other hand, who have advocated co-education have tended to emphasize the students' humanity, often to the neglect of their masculinity or femininity. Thus supporters of co-education have focused on the individual's capabilities, responsibilities and opportunities as a human being, while minimizing what they perceived as the relatively insignificant differences between the sexes in all but the procreative function. Not every writer on the subject has necessarily articulated one or another of these positions, but if one examines the arguments for or against co-education, one is sure to find, at least implicitly, one of these two kinds of assumptions.

Underlying the abovementioned assumptions are two diverse concepts of what masculinity and femininity are and how they originate. According to one of these views - which is commonly designated 'The Environmentalists' - boys act in a 'masculine' manner and girls in a 'feminine' fashion not because of any pre-disposing biological factors, but simply because they have been trained to do so in their physical activities, social relations, modes of emotional expression and even in their intellectual functionings.

Many of the Environmentalists, especially the feminists among them object to the traditional distinctions between masculinity and femininity, regarding them as particularly unfair and undesirable as regards women. Such contemporary feminists as Betty Friedan (1977) and Judith Bardwick (1971) hold that women should strive to fulfil themselves not just as females, but as complete human beings, and they support co-education which they feel would minimize rather than emphasize the cultural differences that presently separate the sexes.

The second school of thought - 'The Bio-cultural' - insist that differences between males and females are basically innate and biologically determined and not just tacked on through education. The importance of social training and cultural circumstances is recognized, but one's anatomical inheritance is perceived as far more critical in accounting for most of the observable differences between the sexes. Adherents of the 'Bio-cultural' school hold that such innate differences should be cultivated and not obliterated and that differences between the sexes should be strengthened and/or capitalized on by education. These theorists hold that it is the single-sex school that is more desirable since it best serves masculine and feminine needs. They hold that in co-educational schools the needs and interests of one sex are subordinated to those of the other or a compromise situation exists in which neither the boys nor the girls are served as well as they might be. Kolesnik (1969) argues that 'by gearing the program toward the neuter gender, the co-educational school is perhaps inadvertently contributing to the convergence of sex roles..... and the confusion among men and women as to what masculinity and femininity are all about' (p 10).

3.5 Physical Aspects of Adolescence

The single most important event in adolescent development occurs in the changes that take place in the young person's body. This pubertal growth cycle involves a series of endocrine changes with development of adult sexual characteristics and adult physique. The timing and the extent of these changes are unpredictable from the adolescent's point of view.

During puberty, girls as a group develop faster than boys. The typical fifteen year old girl is physically more nearly on a par with the eighteen year old boy than with boys of her own age and standard (Jersild 1970; Havighurst 1953). In addition to inter-sex differences in the rate of physical development bodily changes may vary greatly between individuals of the same sex. One boy may acquire mature physical characteristics while his peers remain boyish for another couple of years. One girl may reach the menarche at eleven while her friends may not face this event until four years later.

The development of primary and secondary sex characteristics during early adolescence has important psychological repercussions. In this period of rapid growth the individual's body becomes unfamiliar to her/him. Josselyn (1959) points out that individuals in early adolescence often experience a sense of depersonalization. Thus the concomitant psychological developmental task arising from these physical changes is that of forming and integrating a new body image.

Our society places great emphasis on physical appearance. Girls and boys are taught to be concerned with physical appearance because we praise them for being good-looking and for growing faster than their age mates. Thus the adolescent develops a keen interest in her/his

developing body. The adolescent constantly compares herself/himself with peers. Slowness or delayed development usually causes concern. The girl asks herself why her breasts are not developing. The boy is worried because his genitals have not grown as much as those of the other boys he knows. Shortness in a boy and bulkiness in a girl are often causes of concern. Both sexes are troubled by crooked teeth, acne, weight and many other physical characteristics which they may define as inferior. 'It is a rare youngster who is never worried during this period with the question: "Am I normal?"' (Havighurst 1953, p 40). Jersild (1970, p 64) reports that when young people are asked to report on the things that have a favourable or unfavourable effect on their self esteem, they frequently mentioned physical characteristics. Jersild found that at all grade levels, from the sixth through the twelfth, the number of girls who complained about their physical characteristics was larger than the number who spoke favourably about these characteristics.

3.5.1 Educational Implications

Owing to the fact that our society places great emphasis on physical appearance and teaches individuals to evaluate themselves so largely on the basis of their physical appearance, we must expect physical development to be a source of interest, pride, assurance, doubt, worry or inferiority depending upon the individual's particular development. Many problems of behaviour and achievement relate to difficulty in forming a realistic body image (Jersild 1970, p 40). Thus it becomes the task of the educator to establish whether this developmental task is best accomplished by keeping both sexes integrated in co-educational

schools or by segregating the sexes in single-sex institutions. It thus becomes important to determine which educational environment best diffuses the intensity of physical comparison with members of the same sex and assists best in the task of forming a new and integrated body image.

3.6 Achieving Personal Autonomy and Independence from Parents

This task involves emancipating oneself from childish dependence on parents and the development of affection for parents without dependence upon them. Probably there is a biological basis for this task in the sexual maturing of the individual. Since the adolescent boy or girl cannot find sexual satisfaction within the family, she/he must move outside the family and establish emotional ties to people of her/his own age. This necessarily involves some change in the emotional ties that bind them to their parents.

In our society adolescents and their parents are ambivalent about this task. Boys and girls want to grow up and be independent, yet the adult world is strange and complicated, causing them to wish for continual security and parental protection. Parents want their children to grow up, yet they are afraid of what the world may do to innocent and inexperienced youth. Havighurst (1953) holds that this task is more difficult in 'middle-class' life than in the 'upper' or 'lower' classes and they are especially afraid of what life can do to their daughters. This greater difficulty in middle-class families may be attributed to the long period of education, with economic dependence on parents and delayed marriage.

3.6.1 Educational Implications

Havighurst (1953) writes that the rebellion against parents in achieving emancipation is often transformed into rebellion against teachers. School teachers are often the targets for hostility really meant for parents. Especially when parents are very strict and authoritative, allowing no freedom to their children, boys and girls are apt to use the school as a place to assert an independence which they are not strong enough to establish at home. The co-educational school which has at numerous times been documented as having a more relaxed and easy atmosphere than the single-sex school (Dale 1969; 1971) would be expected to accommodate this assertive need of the adolescent better.

Havighurst (1953) holds that teachers often play an important part in the process of 'psychological weaning'. An attractive woman teacher gives boys a point of attachment after they break free from their mothers and before they become attached to a girl of their own generation. A young man teacher does the same things for girls. The co-educational school in which both the staff and student groups are of both sexes would be expected to assist better in the process of psychological weaning than the single sex-school in which the staff and student membership is almost exclusively confined to one sex.

The extreme importance of mastering this developmental task becomes evident when one considers that adults who have failed in this task are dependent people, often still tied to their parents, unable to make decisions on important matters, unable to move about freely in adult society because emotionally they are still children. Failure in this task tends to be associated with failure in establishing adult

relations with age-mates. Marriage is often a difficult matter for such people, and successful only in a limited way when a person finds a father figure or a mother figure for a mate. It thus becomes important to establish through the production of facts, which educational system best assists in the emancipation of adolescents from parents. A comparative study assessing the home adjustment of adolescents attending co-educational and single-sex schools would provide an indication of the extent to which the adolescent is mastering the developmental task of emancipation from the parents and developing self-autonomy.

3.7 Intellectual Aspects of Adolescence

Another goal of adolescent development is the achievement or near-achievement of full growth in mental capacities. During adolescence, intelligence as a truly co-ordinated mental organisation involving sensory-motor, cognitive and conceptual abilities, can be said to appear (Piaget 1952; Vinacke 1951). Ausubel (1962) describes the transition during adolescence as being 'from a predominantly concrete to a predominantly abstract mode of understanding' (p 268). Thus the adolescent period may be considered a period of true intellectual growth and it is the task of education to actualize or develop these mental abilities. The question of the similarities and differences, if any, between the intellectual abilities of males and females is therefore patently germane to an evaluation of co-education.

3.7.1 Sex Differences in Intelligence

When large representative samples of girls and boys have been compared, differences in their general mental ability or IQ have been found to be

small and insignificant. Perhaps the most adequate research on this problem, with the best sampling procedures, was done in Scotland in 1939, when every child in the country who was born on February 1, May 1, August 1 or November 1, 1926, was given the Stanford Binet. The average IQ of the boys was found to be 100,51 and that of the girls 99,7. A difference of ,8 of an IQ point is about as small as has ever been found between any two samples of any population. In a further study done by the Scottish Council for Research in Education on a sampling of children born in 1936, it was found that boys averaged about 4 points higher than girls on the Stanford Binet, but girls averaged about 2 points higher than boys on a different test of mental ability. The smallness of these differences and the fact that they contradict one another have been interpreted as corroborating the similarity of the sexes in measured intelligence.

Even though boys and girls have similar IQs it does not follow that they are identical in intelligence. Intelligence is not a unitary power which operates equally well in all kinds of situations. Rather, it is a composite of several rather distinct kinds of abilities which are present in different individuals in varying amounts. The Thurstones (1941) have identified seven of these Primary Mental Abilities as follows:

(a) Verbal

(b) Numerical

(c) Spatial

(d) Word Fluency

(e) Perception

(f) Memory

(g) Induction

These abilities, which together comprise general intelligence, are relatively independent of one another. It thus becomes important for education to determine whether differences exist between the sexes in particular mental abilities.

Through a review of studies conducted investigating sex differences in intelligence, it emerges that whether they are acquired or innate, certain sex differences are existentially there. This poses the problem of what to do about these sex differences in ability. Following an examination of sex differences in scholastic performance, the educational implications of sex differences in the intellectual realm will be explored.

The sex differences which have been found in mental ability are nowhere near as great as those found in actual achievement. In practically every area of human endeavour males have accomplished far more than females. Yet despite the great preponderance of masculine leadership in adult professional and vocational accomplishment, girls have been found regularly to surpass boys in scholastic achievement, especially in the lower standards (Kremer 1965; Weisenthal 1965). These findings of an incongruous relationship between high ability in females, low professional and vocational accomplishment suggests that a factor exists which inhibits the achievement motivation of females. Horner (1969; 1972) has called this factor 'fear of success', that is, truly succeeding for some reason poses an enormous threat to women, a threat under which they shut down the very will to succeed.

Horner (1969; 1972) conducted research to compare the phenomenon of 'fear of success' in males and females and to identify the reason for its existence. Using the technique of projective story completion

Horner found that ninety per cent of the male students indicated favourable responses to the prospect of success. Sixty-five per cent of the women students Horner tested found the idea of success anywhere between disturbing and terrifying. The chief reason accounting for 'fear of success' in women was that women thought that doing well academically and professionally would jeopardize their relationships with men.

Dowling (1982) has called this tendency females have to step back from their own abilities rather than risk the loss of love 'Gender Panic', and maintains that it involves confusion about our feminine identity. Dowling writes that 'rather than experience the anxiety of doing (and possibly feeling unfeminine as a result), we don't do' (p 162). Thus the general trend indicated by Horner's (1969; 1972) research is that young women often inhibit themselves from succeeding and, worse still, they inhibit themselves from seeking success. Horner's surveys were conducted on students in mixed-sex competitive educational environments. This blocking of ability and motivation to achieve has serious psychological implications as repression of these characteristics leaves the individual feeling frustrated and lacking in personal fulfilment. Maccoby and Jacklin (1966) report a study in which it was found that women decrease in ego sufficiency and complexity between the ages of eighteen and twenty-six, whereas men increase in these respects. The present researcher feels that it is of crucial importance to determine whether the systems of co-education and single-sex education differentially affect the intellectual achievement and achievement motivation of female students. It could be that concern about males and love and emotional security,

all wrapped up in the heavily freighted term 'femininity', which holds females back, becomes diffused in a single-sex educational environment.

3.7.2 Educational Implications

A frequently advanced argument against co-education is based on the differential intellectual development of the sexes. Kolesnik (1969) holds that differences in intelligence between the sexes suggest the need for differential treatment in the school and hence require a re-evaluation of the concept of co-education. One objection advanced by Kolesnik (1969) against co-education is that, for boys, being surpassed by girls in scholastic achievement at the primary school level is likely to be frustrating and discouraging. At the secondary school level where the boy is anxious to make a good impression on his female classmates, being surpassed by them may force him into a position of having to resort to over-aggression or feigned disinterest in academic matters, in order to protect his own self-concept and win the favourable attention of the girls. Kolesnik proceeds to argue that the girl may also be academically inhibited in a mixed-sex classroom, as she comes to realize that competition with boys is ultimately unrewarding. She may deliberately or subconsciously begin to under-achieve so as not to appear brighter than her male classmates. According to Lepp (1965) girls around the age of fifteen, who previously had been very good students in co-educational schools, give up competing with the boys. This Lepp (1965) explains in terms of the female's need for love and her consequent unwillingness to hurt a male through competition.

Other opponents of co-education, Newsome (1948), Phillips (1962) and Hooper (1963) object vehemently to co-education on the grounds

that it results in a lowering of academic standard of females and leads to an equalization in academic achievement between the sexes.

Many educators and psychologists, despite the fact that they recognize that male and female students are different and have different educational needs, are hesitant to recommend that schools should be single-sex. Waetjen and Grambs (1963), maintain that although some of the inefficiency in school is probably due to the co-educational nature, they are hesitant to recommend single-sex education, as they feel it may result in as many problems as it alleviates.

3.8 Conclusion

Through a consideration of the physical, emotional, social, heterosocial and academic tasks of adolescent development, it has become apparent that the environment of the secondary school may exert a powerful positive or negative influence. It is generally accepted by educationalists and psychologists that education should address the development of the whole person - her/his physical, social, emotional and intellectual attributes. Despite this, however, research on the adolescent period of development has been neglected (Scarr 1979). As a result of this many issues regarding adolescent development are debated with much rigour and without research findings to support them. There exists a long-standing debate on the rival merits of co-education and single-sex education in assisting optimally in character development of adolescent students.

Sex differences have been found to exist in scholastic attainment and such differences are emphasized strongly by opponents of co-education

and are acknowledged and accepted by many supporters of co-education. However, the two parties do not view these differences in the same light and the value attached to them differs. While the opponents of co-education feel that such intellectual differences imply that secondary schools should be single-sex to allow for the full actualization of academic potential of both sexes, the supporters of co-education maintain that the overall spectrum of human development is best achieved by educating the sexes together in co-educational institutions. The 'Co-Educationalists' hold that in contradistinction to the single-sex school, the co-educational school serves as a social laboratory for the adolescent in attaining adequate social and heterosocial adjustment. Such schools, it is argued, act as an integrative agent for the adolescent to define behaviours and competencies that are necessary for the adolescent to form an integrated sense of identity.

Taking cognisance of the developmental tasks of adolescence and of the theoretical debate centering on co-education and single-sex education in this regard, it becomes apparent that any complete evaluation of the relative merits of these systems must involve a systematic assessment of all five areas of human development - social, heterosocial, emotional, physical and intellectual.

CHAPTER 4

REVIEW AND ASSESSMENT OF RESEARCH ON CO-EDUCATION AND SINGLE-SEX EDUCATION

4.1 Introduction

The previous chapters of the present dissertation have revealed that both theory and research on the influence of education on adolescent development, are areas which have been neglected by both psychologists and educationalists. In line with the general deficiency of research on adolescence, the relative influences of co-education and single-sex education on the psychological, social and intellectual development of the adolescent has been an officially neglected topic in Australia, South Africa, and to a lesser extent, in Britain. In South Africa one might even dare say that the real issues regarding co-education and single-sex education have been avoided, thus allowing educational policy in this regard to be shaped by historical evolution and culture. It is strange that the Departments of Education in South Africa in all their voluminous accounts of advice and admonitions have made little mention of such a vital subject. As a subject 'apart' from the concern of the Educational Ministries, the issue of co-education and single-sex education is, however, debated with much rigour, prejudice and a large deficiency of facts. Only rarely have the theoretical issues of the debate considered in the previous chapters, been investigated systematically in their own right. Only one study on this vital issue has been conducted in the South African context (Van Aswegen 1975) and even then this was limited to female students. The research which has been conducted on the

issue is mainly of British origin. Such research studies have been characterized by both an objective scientific orientation and by more personal observations - often in the form of attitudinal surveys.

To determine whether one school type is 'better' than another is a very difficult task, as it involves issues concerned with the philosophy of education, and in addition, there are so many factors unconnected with the co-educational or single-sex nature of the schools which influence the development of the students, that to separate the unwanted from the wanted variables becomes an intricate operation. The range of subject is also so vast that each major aspect can only be investigated separately. Some researchers have attempted to evaluate the two systems by measuring which type of school produces the higher academic standard in its pupils (Tyson 1925; 1926; King 1945; Dale 1964; 1974); a few researchers have investigated the emotional and social development of the pupils attending these schools (Atherton 1966; Dale 1969; Van Aswegen 1975); a third small group of researchers have evaluated the systems largely through the attitudes of pupils, ex-pupils and teachers (Dale 1964; 1966; Kolesnik 1969). It is to a consideration of the research which has been conducted on the issue of co-education and single-sex education that the present review now turns.

4.2 Attitudinal Surveys

In an endeavour to measure the relative merits of co-education and single-sex schools, Nicholls (1967), Dale (1969) and Kolesnik (1969) designed studies - comparing attitudes of people towards the two types of schools. In this comparison of attitudes, these researchers

concerned themselves with questions like the following:

(a) Does the experience of teachers lead them to think that co-education is the better type of education?

(b) Does it make the pupils more, or less friendly?

(c) What of the relationships between pupils?

(d) What do the adult ex-pupils think about their schools as preparation for social life in the world outside?

Although the answers obtained to these questions involve the expression of opinion, these opinions are important to consider as they are not made in vacuo but instead spring from actual experience. The present section begins with a consideration of the opinions of pupils and then proceeds to consider those of adult ex-pupils and finally to a consideration of teachers' attitudes.

4.2.1 Attitudinal Surveys Conducted on Pupils

Nicholls (1967) conducted a survey in Manchester involving twelve schools: four boys' schools, four girls' schools and four co-educational schools. The schools were matched on the basis of size, type of locality and the facilities available. Pupils attending the twelve schools were asked whether they would choose a mixed or single-sex school if they went to live in a new town and they were then requested to select, from a given list, the reason for their choice. Nicholls found that boys and girls attending co-educational schools were strongly in favour of co-education. The boys at single-sex schools were also found to prefer co-education. However, Nicholls found that the single-sex educated girls preferred single-sex schools. The pupils who indicated a preference for mixed schools considered

the development of good boy-girl relationships to be their chief advantage, while those who preferred single-sex schools did so because they felt that the presence of the opposite sex had a disturbing influence and because they preferred to be taught by members of their own sex.

Dale (1968) published the results of a longitudinal study he conducted in 1964 and 1966. Dale's study involved an assessment of attitude towards schools of co-educated and single-sex educated school pupils. Dale's sample comprised forty-two schools in Wales and Yorkshire, from which 2 240 pupils aged eleven and fifteen were randomly selected and tested in 1964 and again in 1966. The measuring instrument Dale employed was a questionnaire on which the pupils were required to make judgements on several aspects of school life and to indicate these judgements on a five-point scale. Pupils were also given the opportunity of making free responses. Dale found no significant differences between pupils attending co-educational and single-sex schools with regard to happiness at school. The results which most closely approached statistical significance were in favour of co-educated boys aged eleven and thirteen, co-educated girls aged seventeen and single-sex educated boys aged seventeen. Viewed longitudinally there were no major changes in any group.

Dale (1966) was uneasy about the representativeness of the sample in the schools' project as some Heads of schools did not rigidly enforce the subject selection procedure. Dale therefore administered a 'check' questionnaire to the entire thirteen year-old age group in order to ensure sample representativeness. Dale (1966) found that

the co-educated girls estimated that they were distinctly happier at school than girls from single-sex schools.

In order to obtain more detailed insight into the significance of his results, Dale (1966) conducted a series of short studies on all the girls who said they were unhappy at school. The free responses of the pupils showed that in co-educational schools most of their unhappiness had its origin in the home, whereas in single-sex schools it was factors immediately connected with the schools which were dominant in causing unhappiness. Dale also found that much of the unhappiness in co-educational schools was caused by the attempts of the girls to cope with work which was above their level of intelligence. In line with this latter finding, Dale found that the average IQ of the entire sample of co-educated girls was lower than that of girls from single-sex schools. This difference was found to be statistically significant.

Dale's (1964; 1966) surveys on pupils attending co-education and single-sex schools has thus shown that in general girls are happier in co-educational secondary schools than in girls' secondary schools. As regards the boys, Dale found that at age thirteen, boys were happier in co-educational schools, but this had changed by age seventeen to a statistical insignificant lead in favour of boys' schools. An important finding of Dales' which pertains to the planning of new research, was that factors such as home adjustment and intelligence level affect the level of happiness at school and thus such factors must be taken account of in interpreting the results of any attitudinal research.

Kolesnik (1969) obtained the opinion of school pupils in the

Detroit area regarding the question of co-education versus single-sex education. Students attending one school, which had recently separated seventh and eighth grade boys on an experimental basis, were asked at the end of the school year to evaluate the experiment. Kolesnik found that an overwhelming majority of the boys expressed a preference for separate schools, while girls were about evenly divided on the matter. In a second school with experimental co-educational classes. Kolesnik asked the students to indicate whether they would like to have their younger brothers or sisters in co-educational or single-sex classes when they reached the eighth grade. Kolesnik found that more than ninety per cent of the boys and seventy-five per cent of the girls recommended the single-sex classroom. In a third school in which 114 pupils evaluated the co-educational programme, seventy-three per cent of the boys and seventy-nine per cent of the girls favoured separation of the sexes at the junior high school level.

A major methodological shortcoming of Kolesnik's research is that one cannot determine whether the preference pupils indicated for single-sex education was in fact attributable to the merits of single-sex system alone or whether, in fact, it was attributable to difficulties the pupils encountered in switching over for one year to the co-educational system. In addition, Kolesnik's (1969) research concentrates on the pubescent adolescent in the sixth and seventh grades and from the literature on adolescent development it could be hypothesized that single-sex education may be preferred at this stage of development. These methodological shortcomings render any conclusion drawn from Kolesnik's research tentative.

Kolesnik (1969) extended his research to assess the attitudes towards their education of girls and boys attending single-sex schools in grades nine through twelve. All these students had attended co-educational schools in Grade eight. Kolesnik assumed that these students who had experience of the two kinds of educational situations would be better qualified to make comparative judgements. Kolesnik found that those students who favoured co-education emphasized the social factors involved and expressed the opinion that co-education is more natural and produces healthier boy-girl relationships. Those who favoured single-sex education emphasized academic abilities and achievement and held that academic interests are best catered for in a single-sex environment.

In drawing inferences from the results of the attitudinal surveys conducted on pupils, a major difficulty becomes apparent, namely, that one cannot always determine to what extent preference for a certain type of school is based on ignorance or prejudice. The individual may indicate a preference for a certain school type based on the fact that the person may idealize her/his own school. Thus the criticism may be advanced that pupils are not the best judges of co-education and single-sex education as their experience is limited and they are subjectively involved in the issue.

4.2.2 Attitudinal Surveys Conducted on Ex-Pupils

In an attempt to redress some of the methodological shortcomings of research involving pupils attending co-educational and single-sex schools, Dale (1968) assessed the opinions and attitudes of ex-pupils towards the type of school they had attended. Dale hypothesized

that since ex-pupils are no longer actively involved in the school activities and have had more experience of life, their attitudes towards co-education and single-sex education would be more objective.

Dale (1969) published the results of three surveys he conducted on the ex-pupils of co-educational and single-sex schools to determine their attitudes towards these educational types. The first survey was exploratory and was conducted to assess whether there appeared to be a prima facie case for investigation. Dale asked 1 167 College of Education students to indicate their preference for co-education or single-sex education. The results for both men and women indicated two principal trends. First, that a majority of the students preferred co-education and, second, that all the ex-pupils educated in co-educational schools were more strongly in favour of co-education than were those educated in single-sex schools. Thus the pilot study revealed a preference for co-education in all groups of ex-pupils. Dale realized that the abovementioned finding might be opposed on the grounds that the ex-pupils' preference may be biased owing to the fact that most of them had had experience of only the one type of school she/he had attended. To overcome this problem in drawing conclusions, Dale separated out from the original sample those students who had attended both a co-educational and single-sex school. Although the final sample was small - forty-eight female ex-pupils and fifty-two male ex-pupils, the results indicated that ex-pupils who had attended both schools were heavily in favour of the co-educational school, the males by seventy-seven to fifteen per cent and the females by eighty-eight to eight per cent.

In this pilot study, Dale also obtained the free responses of ex-pupils indicating why they supported or opposed co-education in

secondary schools. In classifying these responses, Dale combined the responses of all the groups according to their basic similarity. Those students in favour of co-education emphasized the social factors involved in these schools and expressed the opinion that co-education provides a healthier developmental atmosphere and encourages more natural relationships between the sexes. The reasons given for opposing co-education were principally concerned with the different abilities, interests and rates of development of boys and girls, while to a lesser extent there were some fears about distraction by the opposite sex and a few qualms about discipline. Thus the arguments given for co-education were primarily social and those against co-education were concerned with instruction.

In the Second College Survey, Dale constructed a more detailed questionnaire than that of the First College Survey, which covered a number of the points at issue between the opposing schools of thought. Questions were designed to make a first exploration into such aspects as happiness in school, the state of pupil-teacher relationships, the type of school preferred, the effect of school life on relations with the opposite sex, attitudes to the opposite sex, marriage and parenthood. Students were asked to make judgement by means of a five-point scale ranging from 'very happy' to 'very unhappy' and were also required to make free comments. The percentage of ex-pupils who selected each value was calculated and the distribution for co-educated and single-sex educated was compared by the Chi-square test.

Dale's Second College Survey revealed that the ex-pupils of the co-educational schools reported themselves as having been happier at school than did those from single-sex schools and they also found the

school atmosphere to be more pleasant. Usually these results were more consistent and stronger for the women than for the men. The reasons both sexes gave were that the social life with two sexes is better, it is a more natural preparation for life in the adult world, relations with the staff and between the staff were more pleasant, and the atmosphere was less tense. With regard to academic work these students found a mixed school more enjoyable and liked the friendly rivalry with the opposite sex, though others emphasized the high academic standard of their single-sex school. It is sometimes said that boys do not like the presence of girls in school. The falsity of this argument was demonstrated by the co-educated ex-pupils, as only three males out of 186 and six females out of 657 agreed with the statement. They also considered that the presence of teachers of the opposite sex had a good influence. As was to be expected, the topic 'preparation for the adult world' yielded considerable advantage to the co-educational schools. Whereas only some ten per cent of the ex-pupils of girls' schools in the Second College Survey said their school life was helpful in their relations with men, the proportion from the co-educated women was three-quarters. Many of the latter also found it easier to work with men in the adult world. The men's results followed the same pattern except that in addition the men from co-educational schools found it easier to work under the direction of a woman than did the men from boys' schools.

The results of the Second College Survey, which have been outlined above, might be criticized on the ground that since the ex-pupils who were evaluating co-education and single-sex education had only

experienced one type of school, they could not validly compare the two schools under consideration. In an endeavour to overcome the possibility of biased evaluation, Dale (1955; 1966) conducted a Third College Survey in which an inquiry was conducted among ex-pupils who had attended both a mixed and a single-sex secondary school. This survey was called the 'Both Schools' Survey and the sample comprized 800 students. The 'Both Schools' Survey revealed that both men and women judge teachers in their co-educational schools to be friendlier and more helpful than those in their single-sex schools. The consensus of the findings about the discipline in these schools is that the ex-pupils considered that both boys' and girls' schools tended towards strictness, an appreciable number being judged 'too strict', this becoming over-severity and harshness in a minority of schools, whereas in their co-educational schools the discipline was mostly reported 'satisfactory'.

One of the most startling differences between the men's groups was that whereas almost half of the men in the 'Both Schools' Survey judged bullying to be frequent or very frequent in their boys' schools, only one-fifth of them made the same estimate for their co-educational schools. The verdict of the women was similar. Men and women also judged the education provided in their single-sex schools to be 'narrower' than in their co-educational schools, and there were not as many enjoyable out-of-school activities. In the area of pupil interaction both male and female ex-pupils were strongly of the opinion that it was easier to make friends in their co-educational than in their single-sex schools and the women thought the girls in the latter were more 'spiteful' and more 'quarrelsome'.

A schooling in which boys and girls spend many years at school with the opposite sex, compared with a schooling which segregates boys from girls, would naturally produce a decided difference in attitude in each sex towards the other. In the replies about the pleasantness of the attitude of the pupils towards the opposite sex, both male and female students of the 'Both Schools' Survey were sure that there was a more pleasant attitude in their co-educational schools. At the same time they reported much more timidity towards the opposite sex among pupils in single-sex schools. The latter were judged to be more 'preoccupied with the opposite sex' and also more 'boy-girl crazy' (Dale 1971, p 295). Ex-pupils of the 'Both Schools' Survey felt strongly that the two sexes had a good influence on each other, improving the boys' appearance, manners and turbulent behaviour, and making them work harder, while on the other side improving the atmosphere among girls, widening their interests and making more normal the interest of the girls in boys.

One of the crucial questions which often lies hidden in the minds of parents, teachers and educationalists, is whether the presence of boys and girls together in co-educational schools would encourage an excessive interest in sex and create an unhealthy atmosphere. The ex-pupils who attended both schools have given a very clear reply to this issue. Seventy-six per cent of the women believed the attitude towards sex to be healthier in the co-educational school than in their girls' school, only seven per cent believing the opposite. The judgement of the men was the same as that of the women.

Finally, on the issue of which school the subjects in the 'Both Schools' Survey preferred, it was found that there was a marked

preference for the co-educational schools. The ex-pupils preferred these schools because 'there is a natural friendliness between the sexes, and they educate each other; they found the atmosphere pleasant and relaxed, enjoy the social life of the school, the friendliness of the teachers, the broad balanced outlook, and the preparation for the adult world' (Dale 1971, p 298).

The 'Both Schools' Survey conducted by Dale (1969) provides us with what may be considered the most objective attitudinal data on ex-pupils' feelings and judgements concerning co-education and single-sex education. The results of this survey indicate pointedly that co-educational and single-sex schools are communities with very different atmospheres, with the co-educational school providing the happier, more balanced, more interesting and more complete education.

4.2.3 Attitudinal Surveys Conducted on Teachers

The present section involves a presentation of one aspect of a many sided attack on the problem of the relative effectiveness of co-educational and single-sex schools in achieving the aims of education. It examines the verdict of those teachers who have had practical experience in such schools and assesses in particular the opinion of those who have taught in both types of schools.

One of the first research contributions in this field was an enquiry conducted in Britain by Valentine in the 1930s. Valentine (1930) asked teacher graduates who had attended mixed and single-sex schools to assess their relative value. Valentine (1950) reported that of the students who had been co-educated he found an overwhelming majority in favour of co-education - sixty-five out of seventy-two.

No figures were given for students from single-sex schools.

Clark (1937) sent a questionnaire in 1936 to the Heads of all mixed secondary grammar schools. He received only seventy-two replies, but although just under ninety per cent had taught in segregated schools, eighty per cent of the Heads said mixed schools had marked advantages over segregated schools, and only eight per cent were in favour of segregation.

The first large-scale enquiry among teachers themselves was that of Moreton who published in 1946 a summary of his 1939 PhD thesis. Moreton using an attitude scale with a population of teachers from secondary schools, found a great preference for co-education with little difference found between the attitudes of various classes of teachers, male and female, married and single, whether educated in mixed-sex or single-sex schools.

Davies (1950) used an attitude scale to assess opinions among teachers in secondary schools of all types. Like Moreton he found a favourable attitude to co-education. He also found that those teachers who had been educated in a mixed school or who had taught in them were more in favour of co-education than the composite number from single-sex institutions.

A major methodological shortcoming of both Moreton's (1946) research and Davies' (1950) research was that there was in both studies a very low percentage of replies, fourteen per cent and fifty-eight per cent respectively. One cannot determine the reason for this low percentage return and thus the possibility that those who did not reply disliked co-education remains very real.

Dale (1969) ascertained the views on co-education of teachers in secondary grammar schools in Glamorgan. Thirty-two schools co-operated in this study and the percentage return was eighty-three per cent. Dale found that in co-educational schools eighty-four per cent of the replies were in favour of full co-education.

In boys' schools fifty-one per cent favoured co-education and in girls' schools forty-one per cent favoured full co-education; whereas an overwhelming majority of the staff of the co-educational school preferred co-education. The verdict of the teachers may be criticized on the ground that many teachers had had teaching experience in only one of the two types of schools, thus making comparisons invalid. To overcome this difficulty in interpreting the results, Dale (1969) tabulated the opinion of those teachers who had taught in both co-educational and single-sex grammar schools. Dale found that the verdict was once again heavily in favour of co-education. Ninety-four per cent of teachers in co-educational schools preferred co-education while the percentage in boys' and girls' schools favouring co-education was seventy-nine per cent and sixty-four per cent respectively.

Kolesnik (1969) conducted a study at the University of Detroit in which 104 teachers who had taught in co-educational and single-sex high schools were asked which system they favoured in grades seven through nine and ten through twelve. Kolesnik found a strong preference for single-sex education in grades seven through twelve. Seventy per cent of the respondents were in favour of single-sex education, twenty-one per cent were in favour of co-education and nine per cent thought that the type of school made no difference.

The findings of a strong preference for co-education in Moreton's

(1946), Davies' (1950) and Dale's (1969) surveys lie in justaposition to the findings of Kolesnik (1969) who found a strong preference for single-sex education. This discrepancy in results may be due to the different geographical areas in which Dale's (1969) and Kolesnik's (1969) studies were conducted - Dale in England and Kolesnik in the USA. However, a more likely reason for this discrepancy is that in Dale's investigation the single-sex schools were under control of the State or other non-religious bodies, while in Kolesnik's investigation separate schools for boys and girls were, with few exceptions, Roman Catholic Schools. It is thus probable that many of the teachers in Kolesnik's (1969) survey who had experience of both co-educational and single-sex schools were of the Roman Catholic denomination and this may explain the strong bias for single-sex education found in Kolesnik's research.

4.2.4 Attitudinal Research - Conclusion

Attitudinal research assessing the relative merits of co-education and single-sex education has shown that co-educational and single-sex schools are communities with very different atmospheres, with the co-educational school being felt to provide the happier, more balanced and more complete education. The preferences which have been cast in the foregoing sections are not merely theoretical opinions on a subject of which the population has little knowledge, but judgements based on experience of at least one of the two types of school under discussion. However, the assessment of opinion, even though this opinion is based on experience, cannot of itself be conclusive, though its value must not be underrated. The findings of Dale's (1964;

1966; 1969) attitudinal research gain in significance when it is realised that the preference for co-education is registered in spite of school loyalty and in the face of a tradition and an educational pressure which in Britain favours single-sex education, and when it is realized that this change has taken place in spite of the superior prestige of the single-sex public school system and of the old established single-sex city grammar and high schools.

The problem of the relative merits of co-education and single-sex education has many aspects and much more investigation is needed before a final judgement can be made. Such attitudinal research, while contributing necessary information, remains largely subjective and does not touch upon the question of whether the differences between co-educational and single-sex schools create long-lasting differences in personality, social development and academic attainment.

In addition to research employing attitudinal surveys, a few researchers have concentrated on a more objective orientation in attempting to assess the systems of co-education and single-sex education. Such an objective orientation has been used with regard to measuring the relative academic attainment of pupils attending the two school types (Tyson 1925; 1926; King 1945; Dale 1957; 1974) and, to a lesser degree, to measure the psychological and social adjustment of these pupils (Atherton 1966; Dale 1971; Van Aswegen 1975). The present review will now move onto a consideration of research which is of psychological and social significance.

4.3 Studies Measuring Psychological and Social Adjustment

Atherton (1966) conducted an enquiry into the happiness of marriage, in which he compared co-educated men and women with those from

single-sex schools. His sample comprised 1 100 men and 1 400 women selected randomly in England and Wales. Atherton's most important finding was that of a statistically highly-significant difference between co-educated and single-sex educated male and female subjects whose schooling went on for five years or more. The group of women lowest in happiness were those who had attended convent schools. However, even when the influence of these subjects was removed from the findings, the co-educated men and women remained significantly more happy in marriage than the subjects who were single-sex educated.

Despite the consistency of Atherton's findings the conclusions drawn cannot be definite owing to the fact that there are many other powerful forces acting for or against the happiness of a marriage which were not controlled, such as social class, age and religion. Thus, Atherton's work should be considered as pioneering a way in a relatively new and difficult area of research.

Dale (1971) published the results of extensive research he conducted to test the hypothesis that emotional and social development might be profoundly affected by the alternatives of co-education or single-sex education. Dale's survey included forty-two schools and the testing instruments employed were a modified Boxall for the juniors and the Mooney Problem Check List and High School Personality Questionnaire for both the juniors and the seniors.

Dale's (1971) junior sample consisted of 1 120 pupils aged eleven years. Anxiety towards school was measured by the number of situations in which the pupil admitted to feeling anxious. The results of the first testing tended to favour co-educational schools. This difference

was not, however, found to be statistically significant. Dale measured the anxiety of these subjects two years later to determine the change in anxiety about schools and he found that the gap between the co-educated and single-sex boys had narrowed; however, neither the gap nor the slight change was statistically significant. The two girls' groups started with the same average score, but two years later those in girls' schools were slightly less anxious than those in mixed schools, though again the differences between the groups and the change in average scores were quite unreliable. Dale (1971) feels that these findings may be attributable to differences between the groups in average intelligence, parental occupational class and the type of 'drop-out' pupil. Dale suggests that these factors all placed the co-educational pupils under a handicap. In addition to these factors rendering Dale's (1971) findings tentative the fact that differences in the longitudinal study were not significant means that any conclusions drawn can only be tentative.

In addition to administering the Boxall to his longitudinal sample, Dale (1971) got all subjects to complete a Mooney Problem Check List in an attempt to assess seven problem areas, including 'school', 'home and family', 'boy-girl problems' and 'people in general'. Dale (1971) found that for the Junior girls in all problem areas for every occupational class, and in both types of schools, there is a marked increase of recorded problems between the ages of eleven and thirteen. In five of the seven problem areas the increase of mention between eleven and thirteen years of age is slightly less for the sample from girls' schools; in the area of 'people in general' there is virtual equality of increase; and the 'school'

area was an exception showing a smaller increase in problems amongst the co-educated girls.

The pattern for boys on the Mooney was similar to that of girls. For both boys and girls problems relating to the opposite sex increased slightly more in the co-educational school than in the single-sex, but this varied with occupational class grouping. The problem area showing the largest differences betwee: the two groups was 'home and family' where the co-educational group had a bigger increase than those educated in single-sex schools. This finding is consistent with the largest proportion of lower-class pupils in the co-educational schools.

In addition to the Boxall and the Mooney Problem Check List all pupils were also given the HSPQ which yields scores on fourteen Personality dimensions. No significant differences were found between boys and girls in the two types of schools on the dimension of Anxiety. On the Neuroticism dimension the score for boys attending single-sex schools was significantly higher at age thirteen than the score for co-educated boys The girls' Neuroticism scores at age eleven and thirteen were virtually equal. On the Introversion-Extroversion dimension, Dale found no significant differences between the two groups of boys and girls.

The overall findings of Dale's (1971) longitudinal research on Juniors attending co-educational and single-sex schools revealed no decided or consistent difference or any of the measures of psycho-social adjustment which could be attributed to type of school alone.

Dale (1971) extended his research on psycho-social adjustment to include senior students aged fifteen and seventeen. The testing

instruments Dale used were the Mooney Problem Check List and the HSPQ. Dale found that the co-educated boys were less anxious both in the main part of the Mooney test and in the section where they were asked about their special problems, but the difference between them and the boys from boys' schools was not found to be statistically significant. The co-educated boys also recorded a rather greater reduction in anxiety between the ages of fifteen and seventeen: however, this difference was not statistically reliable. In the HSPQ the co-educated boys also had lower scores on general anxiety at fifteen and seventeen years of age. With regard to the senior girls, Dale found that the co-educated girls had slightly more problems in total at fifteen years of age, mostly from the section 'people in general', 'home and family' and 'work and future', but this was slightly reversed in 'school' problems, with an equality under 'boy-girl'. None of these differences produced statistical significance. By the age of seventeen, however, the co-educated girls were appreciably lower in overall total, and lower in all the problem areas except 'people in general', where there was equality. The largest difference between the two types of schools in the seven problem sections at the age of seventeen was that of 'school' and this difference verged on statistical significance. When the senior girls were asked to write down those problems which troubled them most, the co-educated girls indicated more in total than did the girls from girls' schools both at fifteen and seventeen years of age, though the difference had been halved in the two years. However, in the 'school' problem section there was equality at age seventeen, and the co-educated girls had slightly more problems in the boy-girl area,

though this was far from statistically reliable. On the HSPQ the co-educated girls had lower general anxiety areas both at fifteen and seventeen years of age and this difference was statistically significant at age seventeen.

On the HSPQ Neuroticism dimensions, senior middle-class and upper-middle-class boys from co-education schools were significantly lower in Neuroticism at age seventeen than boys from boys' schools. No difference was found between the girls on the Neuroticism dimension.

On the HSPQ scale of Introversion-Extroversion the scores of boys belonging to opposing groups were virtually equal both at fifteen and seventeen years of age. The two senior girls' groups recorded almost the same average score at fifteen years of age and two years later, the girls from girls' schools were slightly more extroverted.

Taking an overall view, Dale's (1971) research on psycho-social adjustment of students attending co-education schools and those attending single-sex schools revealed no decided or consistent difference between these students. These findings do not lend any support to either side of the debate on the rival merits of the two systems.

Van Aswegen (1975) conducted research in South Africa in which he applied an analysis by type of school attended to the results of a Project Talent Survey which was conducted in South Africa in 1965, 1967 and 1969. The aim of Van Aswegen's (1975) investigation was to obtain an indication of the influence of single-sex education as opposed to co-education on the personality, interest, adjustment and scholastic achievement of English-speaking female high school

students. The survey was longitudinal and the two groups were compared at the commencement and termination of their high school careers. Van Aswegen's overall sample comprised 246 girls at girls' schools and 235 at co-educational schools, all of whom had attended only the one type of school throughout their high school career. The measuring instruments Van Aswegen employed included a Biographical Questionnaire, the NGAGT (IQ Test), the HSPQ (a personality test), the Adjustment Questionnaire, several tests of aptitude and ability, final examination marks in Standard Six, the PHSF and final examination marks in Standard Ten.

A comparison of the girls at Standard Six level was essential to determine whether any change occurred between Standards Six and Ten. In this comparison Van Aswegen (1975) found that the girls at single-sex schools generally came from higher socio-economic strata, and their parents were better qualified than those of co-educated girls. In comparison with the girls at co-educational schools, their parents cherished higher academic aspirations for them. They were found to be more conscientious in respect of their school work and to participate in greater measure in extramural activities outside the school.

Van Aswegen found that, according to the Adjustment Questionnaire, there were no significant differences between the two groups at Standard Six level. However, according to the HSPQ, the girls at girls' schools were found to be more outgoing, warm-hearted and easy-going (Factor A) than the girls at co-educational schools. This latter finding was found to be consistent with that of the GSZ, where girls at girls' schools obtained significantly higher scores in field fourteen (Social

Gregariousness) than in interest in hobbies - which points to their greater interest in social activities.

In spite of the fact that IQ was kept constant in the investigation by dividing the test and control groups into three comparable IQ groups the pupils at girls' schools nevertheless obtained significantly higher scores in the intelligence field (Factor B) of the HSPQ, which indicates that they were more intelligent and abstract thinking than the girls at co-educational schools.

In the various aptitude tests, the girls at girls' schools obtained better scores than the co-educated girls. The girls at girls' schools also obtained significantly better scores in the standardized scholastic tests than their co-educated counterparts at Standard Six level.

Van Aswegen's (1975) investigation in respect of Standard Ten girls with average intellectual ability revealed no differences in personality traits. However, the girls at girls' schools obtained considerably lower scores than those at co-educational schools in the fields of Personal Freedom, Sociability G and Sociability S of the PHSF.

Although practically no differences were found between the two groups at Standard Ten level, it is nevertheless essential to note that while the single-sex girls at Standard Six level were more outgoing than co-educated girls these differences were no longer found at Standard Ten level. Furthermore, it is fitting to note that the single-sex girls obtained lower scores than their co-educated counterparts in the fields of the PHSF which deal with Personal Freedom, Sociability G and Sociability S. Thus, although virtually no differences were found between the two groups of pupils at Standard

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Ten level, there are indications of a possible change in sociability and association with others among the girls at girls' schools, as reflected by Factor A (outgoing) of the HSPQ and Fields 7, 8 and 9 (Personal Freedom, Sociability G and Sociability S of the PHSF).

Although it would appear from Van Aswegen's (1975) research that pupils at girls' schools underwent certain changes in personality between Standards Six and Ten, such a sweeping statement cannot be made since several variables were not controlled. Such probable intervening variables include socio-economic differences, residential area and family influences, such as the presence of one or two parents in the family, and other siblings. In addition, all rural-urban differences were not kept constant.

4.3.1 Co-Education and Psycho-Social Adjustment - Conclusion

The overall thrust of Dale's (1969) research which was conducted in Britain and the research of Van Aswegen (1975), which was conducted in South Africa on female students, revealed no decided or consistent differences between students attending co-educational schools and those attending single-sex schools. These findings do not lend support to either side of the debate concerning the rival merits of the two educational systems.

Since the area of emotional and social adjustment is vast in itself, the subject cannot be regarded as being completely researched by these two surveys. In addition, one important facet of adjustment - heterosocial adjustment - was not measured by these researchers. As has been indicated in previous sections, the 'boy-girl' problem seems to be the most crucial of all the developmental tasks of adolescence and it is in the resolution of this task that the two systems may be

exerting very different influences. Thus the heterosocial realm of development still needs to be researched.

Van Aswegen's (1975) study, which represents the only South African research conducted on the effects of co-education and single-sex education on psycho-social adjustment, was confined to a female sample. This means that the effects of the two systems on the psycho-social adjustment of male students still needs to be investigated. Such future research in the area should systematically control variables such as socio-economic differences, residential area and possible family influences. In addition, future research should explore the question of whether the possible influence of the two systems only becomes apparent at first year university level, where the student enters a broader social and heterosocial context.

4.4 Comparative Research Regarding Academic Attainment

The scholastic performance of pupils is a common criteria used to judge the merits of a particular school type. Almost all the research which has been conducted on the effects of co-education on academic attainment has taken as a criterion the examination results of pupils taking the first external examination as this is a ready-to-use measuring rod which is reasonably accurate for the comparison of large groups of people. It is, however, by no means easy to assess the reasons for the difference. There are so many factors which have a bearing on academic level reached by groups of pupils that conclusions can usually only be tentative. Such factors are age, social class, academic aptitude, number of subjects taken and comparative qualifications of teachers. None of the researchers in the studies

to be discussed, had sufficient resources to plan an experiment in which these factors were kept reasonably constant. Thus in discussing the findings of these researchers, these variables should be kept in mind. The present researcher will proceed, with the assistance of Dale's (1974) extensive review, to consider these studies in chronological order, subject them to a critical analysis and endeavour to arrive at findings from a general appraisal of the evidence.

4.4.1 The Tyson Survey

The first of the large-scale surveys was carried out by Tyson (1925; 1926) in the Manchester area. Tyson's comparative criterion was the percentage of pupils reaching credit standard in each of nine subjects. Contrary to popular expectation, Tyson found that in almost all subjects boys at co-educational schools reach a higher average attainment than boys at single-sex schools, the difference being statistically significant in seven subjects and for both years. In addition, co-educated boys have a significant superiority in Latin for one year. In French the direction is reversed, there being a significant difference in favour of boys at single-sex schools.

In the case of girls, Tyson found the percentages of success to be much closer together for the two types of schools, but with the girls' schools in the lead.

A number of variables which were not controlled in Tyson's Survey may however influence the abovementioned findings. The average ages of the girls in co-educational schools was four to five months younger than the girls in girls' schools. This represents a distinct

handicap for the girls in mixed schools. Tyson also points out that the co-educational schools are situated in relatively sparsely populated areas and this may give the co-educational schools a pupil intake that is able than that of the city schools, and probably of a lower social class. The cities also tend to attract the better qualified teachers.

Tyson, in a later analysis, attempted to remove these variables by taking the results of only those schools where the density of population was ten persons or less, to the acre. Co-educated boys then increased their lead in three subjects and their inferiority in French became non-significant. When the girls' samples were limited to the rural areas, the change was in the same direction.

In rural schools the co-educated boys were found to lead decisively in three subjects, have a negligible lead in one, and a negligible deficiency in two, when compared with segregated boys. The co-educated girls were found to be superior in two subjects, inferior in two, have a negligible inferiority in one and an equality in the sixth, compared with segregated girls. However, since factors such as social class and age in the female group were not controlled, the conclusion regarding the superior academic attainment of co-educated boys and the equal attainment of both groups of girls must be interpreted with caution.

4.4.2 King's Survey

King (1945) analysed the examination results at the School Certificate level of the University of London Examination Board. King's sample was very large, consisting of 3 000 candidates from 142 boys' schools, 180 girls' schools and 85 co-educational

schools. King could not, however secure separate data for the two sexes in co-educational schools. King's first analysis was conducted to determine the level of attainment in the three types of schools in fifteen subjects with mathematics counting as three subjects. King found that the co-educated pupils had more passes than boys' schools in ten out of fifteen subjects, and more credits in thirteen subjects. In comparison with girls' schools, co-educated pupils had more passes in seven subjects and more credits in three subjects. In English Language, King found that the percentage of candidates who reached the pass standard or above was eighty-five for boys' schools, eighty-six for mixed schools and ninety-one for girls' schools. In English Literature the percentages were seventy-nine for boys' schools, eighty-four for mixed schools and eighty-eight for girls' schools.

As in Tyson's (1925; 1926) surveys, King's survey has several shortcomings which detract from the validity of his findings. Such methodological factors that render King's findings tentative include the rural-urban factor and the greater prestige of the single-sex schools which are likely to increase social class and staff differences, thereby handicapping the co-educational schools. In addition, King (1945) did not investigate the average age of the samples and this factor may favour one group at the expense of another.

4.4.3 Sutherland's Survey

Sutherland (1957) compared the 'Ordinary Level' marks in English Language and English Literature of pupils at twenty-three co-educational schools, seventeen girls' schools and nine boys' schools who wrote the Northern Ireland Senior Certificate Examinations in

1957. Sutherland found, in considering raw scores obtained, that subjects in the single-sex schools had better scores in both subjects. In English Literature and English Language the difference between co-educated and single-sex girls and boys was statistically significant and the direction of this significance favoured the single-sex educated girls and boys.

Sutherland (1957) recognized that the differences between schools within any one of the four groups were of importance and she therefore carried out tests of significance in which the average mark gained by each school was used as the unit instead of the marks of individuals. None of the differences between the segregated and co-educational schools in the two subjects remained statistically significant. This result indicates that the variation of the average mark gained by schools within each group is more important than the relatively small difference between the groups. However, the pattern of slight superiority of scores of the single-sex school remained. Dale (1974) attributes this slight superiority to age differences favouring the single-sex educated girls and to differences in social class which favour the single-sex girls' and boys' schools.

4.4.4 Dale's Survey

Dale (1959) made a detailed analysis of the marks gained in English Langauge and Literature in the Ordinary Level Examinations for the Northern Ireland Senior Certificate. Dale's sample comprised all those pupils from Protestant schools who had not already obtained passes in three or more of the compulsory subjects. Dale's results closely resembled those of Sutherland (1957) except that in three

cases the 1957 lead of the single-sex schools was reduced; in the fourth - girls taking English Literature - it was found to have increased.

The methodological shortcomings of Sutherland's (1957) survey apply to those of Dale's survey. Age differences favoured single-sex educated girls and social class which was not controlled is likely to have favoured the single-sex educated subjects.

Dale (1959) attempted to determine the differences in the average attainment of schools within the co-educational group and similar differences within the two segregated groups. When the school was taken as the unit of analysis, Dale found that the difference between co-educated and single-sex educated boys and girls was much smaller and lacked statistical significance. This result resembles that of Sutherland's (1957) analysis. This does not, however, mean that there is not a difference between the two types of schools and the fact that both researchers found differences which are very similar in amount and direction suggests some validity in the findings and caution one not to overlook them.

4.4.5 Van Aswegen's Survey

Van Aswegen (1975) conducted a study in the South African context to obtain an indication of the influence of single-sex education as opposed to co-education on the scholastic achievement of female high school pupils. Van Aswegen administered several scholastic tests to his sample at the commencement of their high school careers and again at matriculation level. In spite of the fact that IQ was kept constant in the investigation by dividing the test and control

groups into three comparable IQ groups, the pupils at girls' schools nevertheless obtained significantly higher scores at Standard Six level in the Intelligence field (Factor B) of the HSPQ, which indicated that they were more intelligent and abstract-thinking than the girls at co-educational schools. Van Aswegen also found at Standard Six level that, in the various aptitude tests, the girls at girls' schools obtained better scores than the co-educated girls throughout which indicates superior all-round aptitude especially for language and arithmetic.

Van Aswegen's investigation in respect of Standard Ten girls (with average intellectual ability) revealed that approximately the same percentage of pupils at girls' schools as at co-educational schools passed Standard Ten without failing one or more times. Little difference was found in respect of the average examination mark at the end of Standard Ten, although the girls at girls' schools obtained significantly more first classes in Standard Ten than the girls at co-educational schools.

Although one would like to theorize on the basis of these results that the presence of boys in co-educational schools affects the female academic performance, this cannot be done without caution, as there are several methodological difficulties inherent in this analysis. Van Aswegen himself points out that since the groups in his investigation were not paired off in respect of socio-economic differences, family size and residential area, these results cannot, without further investigation, be ascribed to one or the other type of school.

4.5 Scholastic Research - Conclusion

In reviewing the research conducted on the issue of co-education and academic attainment, Dale (1974) reaches the conclusion that, despite all the difficulties and inadequate control of extraneous variables, the common pattern of results which have been found in British and Irish research (with one or two minor deviations) is astonishing. Briefly, although handicapped in a number of ways, boys in co-educational schools did better in the first external examination in five very large surveys and three smaller ones, than boys in boys' schools. This analysis of research has shown with reasonable definitude that the common belief that boys make better progress in single-sex schools and, even, that such schools have a higher attainment level than co-educational ones, is a myth, and furthermore, it appears that the advantage lies with the boys in co-educational schools. On the female side of the research, the analysis of the general results in all subjects is more complex. One thing, however, which clearly emerges is that the difference between the two groups of girls in the British research is smaller than that between the boys' groups, and, in raw scores, it is slightly but fairly consistently in favour of girls' schools. However, Dale (1974) points out that that the co-educated girls are more handicapped in comparison with girls' schools, than the co-educated boys are in comparison with boys' schools. This is because two additional extraneous variables weigh against the co-educated girls. These are the younger age at which they take the examination and the fact that, in these surveys, they are shown to drop fewer of their weak subjects than their single-sex counterparts.

Dale (1974) concludes on the basis of British research spanning about fifty years that 'a cautious summing up would be that the progress of boys is probably improved by co-education, while that of girls is not harmed and that the question of comparative progress in academic work should never again be raised as an obstacle to a policy of co-education' (pp 268-269).

One should caution against blind acceptance of Dale's conclusion on the grounds that the methodological difficulties characterizing British research in regard to co-education are profound. Single-sex schools are more established and located in the wealthier urban areas than are co-educational schools and thus the socio-economic factor cannot be controlled. The single-sex pupils have been found to have a higher IQ than co-educated pupils. The single-sex schools in Britain have more funds available, which means that teachers are better paid and the number of pupils per teacher is smaller than in co-educational schools. As a result of the aforementioned extraneous variables present in the British surveys, it is not methodologically sound to attribute differences found between schools to the single-sex or co-educational nature of the school. In South Africa, however, the extraneous variables complicating comparisons between co-educational and single-sex schools are much reduced. In South Africa, both co-educational and single-sex schools are under State control and the distribution of teachers to the schools is usually random. The staff-pupil ratio in South African co-educational and single-sex schools is roughly equal. Furthermore the distribution of students to the schools is State-controlled. The control of extraneous variables inherent in South African State Educational

System means that the results of educational research in South Africa are not fraught with the methodological difficulties inherent in British research. Such educational research should thus be encouraged in South Africa.

Although the research spanning 50 years, which was conducted by Dale, may, on first examination, seem to exhaust the issue of the differential influences of co-education and single-sex education on the intellectual development of adolescents, this is not necessarily true, as one crucial aspect of intellectual development, that is, achievement motivation, has not received consideration. The discussion in Chapter Three of the present study pointed oxt that the feminist movement in America (Horner 1969; 1972; Dowling 1982) has uncovered the phenomenon of 'fear of success' in women in competitive mixed-sex educational environments, which inhibits the will of women to succeed academically and professionally, and which has been found to have serious psychological implications. Comparative research on the achievement motivation of co-educated and single-sex educated females thus requires urgent attention and begs investigation.

4.6 University Research

In the previous chapters, studies on the academic attainment of students attending single-sex schools and those attending co-educational schools were reviewed. Although academic attainment at matriculation level is an important issue, a second query comes to mind when such comparisons are made, namely, whether any distinctive influence lasts beyond school, so that it affects academic progress in the university.

The transition from the secondary school environment to the wider social and academic environment of the university involves a number of crucial readjustments (Menacker 1975). It seems reasonable to hypothesize that this transition may be more trying for students from single-sex secondary schools due to the fact that the university environment is co-educational and thus involves major heterosocial changes. Research on this issue is limited to two studies by MacCracken (1969) and Dale and Miller (1972).

MacCracken (1969) compared academic attainment at the end of the first year at the University of Leeds. He analysed the first year examination results of students for three successive years and his total sample comprised over 5 500 students. MacCracken found no consistent pattern of difference between students from the two school types, though those from single-sex schools had slightly fewer failures in two years out of three. However, owing to the fact that MacCracken did not include in his analysis the relative entry attainment level of the students, the findings of his research are of little value for assessing the comparative progress of students from co-educational and single-sex schools.

Dale and Miller (1972) compared matched samples of students from co-educational and single-sex schools who entered four colleges of the University of Wales in 1965-66, 1966-67, 1967-68 and the University of Swansea 1968-69. Students from co-educational schools were matched with those from single-sex schools on population of school area, sex, social class, university institution, average grades, best subject and number of attempts in the Advanced Level Examination. A total of 221 matched pairs of students were included in the study.

The comparisons of the performance of the two groups in examination results at the end of the first year of university revealed that in the Arts Faculty, the students from single-sex and co-educational schools made virtually the same average progress. The negligible superiority of the students from single-sex schools was found to be highly unreliable statistically and of no practical importance. In the Science Faculty the co-educated students had a larger superiority and though this difference failed to reach statistical significance, it was found to be quite substantial. In order to examine further both the amount and nature of the differences a pass-fail criterion was applied to the data. This analysis revealed that the co-educated students had a negligible and unreliable superiority in the Arts Faculty and a distinctly larger one in the Science Faculty.

Dale (1972) regards these findings as tentatively confirming the hypothesis that students from single-sex schools find it more difficult to adjust to life and work in a co-educational institution than students from co-educational schools. However, the present researcher feels that such an interpretation may be dangerously misleading as all Dale's findings failed to reach statistical significance.

Further research is needed before such an interpretation may be accepted and all other explanations for these differences need to be explored.

In addition, achievement motivation of first year university students who received co-education and those who received single-sex education needs to be assessed, as this variable constitutes a crucial component of intellectual development.

There has been no comparative research conducted on the question of whether the influences of co-education and single-sex education on psychological, social and heterosocial adjustment becomes apparent at first year university level, when the student enters a broader heterosocial contact. Such research would be of importance in establishing which system best prepares the adolescent for life in the adult world and the findings could also be used to support the hypothesis that possible differences in attainment may be ascribed to interpersonal and intrapersonal factors.

CHAPTER 5

AIM AND METHOD OF THE STUDY

5.1 Aim

It is a well-documented fact in developmental psychology that the teenage years comprise an extremely important transitional stage of development often critical to the ultimate success or failure of the individual's socialization, adjustment and later achievements in life (Jersild 1970; Erikson 1963; 1968). In attempting to identify and understand the socio-cultural factors which assist or handicap the resolution of the developmental crises faced by the adolescent, many psychological theorists and research workers have focused their attention on the influence exerted by the family (Minuchin 1974).

During adolescence the individual is in the school environment more than she/he is in the home environment or any other environment and thus the school becomes of potentially crucial significance in influencing the resolution of the psychological, social, heterosocial, and intellectual tasks of adolescence. In Chapters One and Three, the present researcher was at pains to point out that research on the adolescent period of development has been relatively neglected and instead researchers have concentrated their attentions on the periods of infancy and childhood (Scarr 1979). This general deficiency in research is also characteristic of the question of the influence of the secondary school years of adolescent development.

The debate on the rival merits of co-education and single-sex education is a long-standing one, but it is sustained chiefly by

theoretical arguments with very few research facts existing to support them. The research which has been conducted is characterized chiefly by attitudinal surveys and comparative studies on academic attainment. Relatively few researchers have assessed the contribution made by co-educational and single-sex schools to the resolution of the psycho-social tasks of adolescence (Atherton 1966; Dale 1969; Van Aswegen 1975).

With regard to the South African situation, the government's policies in the four provinces on the issue of co-education or single-sex education at the secondary school level seems to be based on historical evolution rather than upon any objective assessment of the merits of these two educational systems in assisting with the intellectual and emotional development of the adolescent. Research on the issue of co-education and single-sex education as they relate to adolescent development is confined to the research effort of Van Aswegen (1975) which, although conducted on a large scale, was restricted to female subjects. This means that the relative influences of co-education and single-sex education on the psycho-social and intellectual development of male subjects has never been explored in the South African context.

In addition to the aforementioned deficiency in research, the whole question of the effects of the two systems on heterosocial adjustment and achievement motivation has never been investigated. Since, on the basis of attitudinal research, one would expect the realm of heterosocial adjustment to reflect most clearly the differential influence of the two systems, this issue demands investigation. Concerning academic attainment, owing to the fact

that the results of British and Irish research suggest that the effects of co-education and single-sex education on academic attainment may be different for boys and girls (Tyson 1926; King 1945; Sutherland 1951; Dale 1974), the question of the effects of the two systems on intellectual development needs to be explored on both a male and female South African sample.

In the previous section the methodological shortcomings of studies comparing the influences of co-education and single-sex education on academic attainment were considered. These methodological shortcomings were found to be compounded in British research due to the fact that single-sex schools in Britain are usually established and located in the wealthier urban areas, thus introducing a confounding socio-economic variable. In addition, the fact that single-sex students have been found to have significantly higher IQs than co-educated students complicates comparisons on academic attainment between the groups.

Taking cognisance of the fact that no research has been conducted on the influence of co-education and single-sex education on heterosocial adjustment and achievement motivation, and of the methodological shortcomings of previous research, the primary aim of the present researcher is to present a well-controlled study in the South African context, assessing the relative effects of co-education and single-sex education on psychological, social, heterosocial and intellectual development of male and female secondary school students. It is felt that the findings of such a study may prove to be of important practical significance to both the psychology of adolescent development and psycho-educational intervention and policy-making.

The secondary aim of the present research is to pioneer a new field in the South African context by comparing the psycho-social adjustment, academic attainment and achievement motivation of male and female university students who attended either co-educational or single-sex schools. It is hoped that the findings emanating from this research will provide an indication of which system best assists the transition from the school environment to the broader social and academic university context. Any significant findings in this area are of obvious psychological and educational significance.

5.2 The Dependent and Independent Variables

The present research involved an assessment of the psychological, social, and intellectual development of male and female matriculation and first year university students who received co-education or single-sex education during the secondary school years. Since it was felt by the present researcher that any complete evaluation of the effects of co-education and single-sex education on adolescent development must involve a systematic and objective appraisal of the social, heterosocial, emotional and intellectual domains the dependent variables selected for investigation in the present study were:

(1) home adjustment.

(2) social adjustment;

(3) emotional adjustment;

(4) heterosocial adjustment;

(5) level of anxiety;

(6) self concept;

(7) achievement motivation;

(8) academic attainment;

(9) IQ which was initially analyzed as an independent variable but included as a dependent variable in the final analysis (see Chapter 6 Results).

The major independent variables included for analysis in the present research were:

(1) type of secondary school attended:

  (a) co-educational;

  (b) single-sex;

(2) sex of subject;

(3) IQ which was analyzed in the first instance as an independent variable but included in the final analysis as a dependent variable;

(4) standard of education:

  (a) matriculation;

  (b) first year university.

5.3 Rationale for Choice of Dependent Variable

A measure of emotional adjustment and level of anxiety of each subject was believed by the present researcher to constitute a definite measure of intrapersonal adjustment. Anxiety level was believed to provide a measure of intrapersonal adjustment by virtue of the fact that it has been considered by many personality theorists to constitute a measure of psychological well-being (Freud 1973; Fromm 1942; Fromm-Reichmann 1950). These and other psychodynamic theorists hold that, although anxiety forms a central aspect of normal psychological functioning,

when it passes a certain point in subjectivity, anxiety can become a problem and a source of disorganisation. Self-concept was considered to provide a further measure of personality adjustment by virtue of the fact that personality adjustment is enhanced or undermined by degree of acceptance of self (Rogers 1975). In addition to this, the development of a stable sense of 'self' is a crucial element in the resolution of the identity crisis faced by the adolescent (Erikson 1968). Attaining a healthy self-image has, as its concomitant, feelings of adequacy, ableness, personal worth and confidence.

In the present research, measures of social adjustment, home adjustment and heterosocial adjustment were employed to provide an adequate measure of interpersonal adjustments. The attainment of adequate heterosocial adjustment, which may be regarded as one of the central developmental tasks of adolescence (Erikson 1963; 1968: Havighurst 1953), has never been objectively assessed by researchers exploring the relative influence of co-education and single-sex education in enhancing or undermining adjustment of students.

Achievement motivation, academic attainment and IQ were chosen by the present researcher to provide an adequate measure of intellectual development or ability. Previous researchers in this field have regarded intellectual development as being reflected in academic attainment alone. It is, however, the contention of the present researcher that any complete assessment of scholastic development must include an evaluation of academic attainment, achievement motivation and IQ.

5.4 Hypotheses

Taking cognisance of the theoretical debate on the rival merits of co-education and single-sex education, as well as the findings of previous research, the following alternate hypotheses may be generated:

5.4.1 Hypotheses Relating to Psycho-Social Adjustment of Matriculation Students

(a) For male matriculation students:

(i) Males attending co-educational secondary schools will be significantly better adjusted on the psychological, social and heterosocial measures than males attending single-sex secondary schools.

(b) For female matriculation students:

(ii) Females attending co-educational secondary schools will be significantly better adjusted on the psychological, social and heterosocial measures than females attending single-sex secondary schools.

5.4.2 Hypotheses Relating to Intellectual Development of Matriculation Students

(a) For male matriculation students:

(i) Males attending co-educational secondary schools will score significantly higher on measures of intellectual development than males attending single-sex secondary schools.

(b) For female matriculation students:

(ii) Females attending single-sex secondary schools will score significantly higher on measures of intellectual development than females attending co-educational secondary schools.

5.4.3 Hypotheses Relating to Psycho-Social Adjustment of First-Year University Students

(a) For male first-year university students:

(i) Males who attended co-educational secondary schools will be significantly better adjusted on the psychological, social and heterosocial measures than males who attended single-sex secondary schools.

(b) For female first-year university students:

(ii) Females who attended co-educational secondary schools will be significantly better adjusted on the psychological, social and heterosocial measures than females who attended single-sex secondary schools.

5.4.4 Hypotheses Relating to Intellectual Development of University Students

(a) For male first-year students:

(i) Males who attended co-educational secondary schools will score significantly higher on measures of intellectual development than males who attended single-sex schools.

(b) For female first-year students:

(ii) Females who attended co-educational secondary schools will score significantly higher on measures of intellectual development than females who attended single-sex secondary schools.

5.5 Subjects

The total number of subjects chosen for analysis in the present study numbered 301 and comprised 146 males and 155 females. This sample was further broken down with regard to type of secondary school attended

and standard of education, that is, matriculation or first-year university. Of the total sample 149 subjects were co-educated and 152 subjects were single-sex educated; 161 subjects were matriculation students and 140 subjects were first-year university students.

The breakdown of the total sample with regard to sex, school type and educational standard is represented in Table 5.5.1.

TABLE 5.5
BREAKDOWN OF SAMPLE

	Co-educational	Single-sex	Total
(i) Matriculation	75	86	161
Males	40	43	83
Females	35	43	78
(ii) University	74	66	140
Males	33	30	63
Females	41	36	77

5.5.1 Selection of the Matriculation Sample

In order to select a sample of matriculation subjects attending co-educational and single-sex schools, the present researcher approached the Heads of three State Secondary Schools - one co-educational school, one female single-sex school and one male single-sex school. State schools were chosen in an attempt to control the selective processes which were found to take place in Britain, where the more intelligent, better adjusted students were sent to single-sex schools. This control of selective processes was felt to be possible in South

Africa by virtue of the fact that students are allocated to State schools in accordance with geographical zoning, thus effectively controlling any significant selective processes. The schools chosen to participate were closely located geographically - all were located in Johannesburg's North Western suburbs.

The initial matriculation sample comprised the entire matriculation group of each of the three schools. However, in an attempt to control several extraneous variables, a large proportion of the initial sample was excluded from analysis on the basis of information gleaned from a biographical questionnaire which was administered to all students (see Appendix A). This biographical questionnaire was designed to obtain biographical information which allowed for the control of the following factors in selecting the final matriculation sample:

(i) age of subjects within one year yielding an average age breakdown as follows:

(a) mean age of single-sex educated males = 17 years and 7 months

(b) mean age of co-educated males = 17 years and 7 months

(c) mean age of single-sex educated females = 17 years and 5 months

(d) mean age of co-educated females = 17 years and 6 months

(ii) socio-economic level of family which was judged on the basis of location of family dwelling and father's occupation. All subjects included in the final sample could be considered to belong to the middle- to upper-middle socio-economic class

(iii) parental marital status - both parents of subjects included in

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(i) age of subjects within one year yielding an average age breakdown as follows:

(a) mean age of single-sex educated males = 17 years and 7 months

(b) mean age of co-educated males = 17 years and 7 months

(c) mean age of single-sex educated females = 17 years and 5 months

(d) mean age of co-educated females = 17 years and 6 months

(ii) socio-economic level of family which was judged on the basis of location of family dwelling and father's occupation. All subjects included in the final sample could be considered to belong to the middle- to upper-middle socio-economic class

(iii) parental marital status - both parents of subjects included in

the final matriculation sample were alive and living together at the time of the present study. This factor was controlled in an attempt to minimize the influence of familial factors - such as loss of a parent through death or separation - on adolescent adjustment

(iv) continuity of educational experience - all subjects had attended exclusively only single-sex or co-educational schools for their entire secondary school training. Those subjects who had attended both a co-educational and a single-sex secondary school were eliminated from the sample

(v) primary school education was controlled by including only those matriculation students who had attended co-educational primary schools.

5.5.2 Selection of the University Sample

In order to select a sample of first-year university students who had attended either co-educational or single-sex schools, the present researcher undertook to administer questionnaires on a voluntary basis to all students registered for the first-year undergraduate psychology course in 1980, irrespective of faculty registration. A total of 286 students completed the battery of tests. However, in an attempt to control several extraneous variables, a large number of subjects in the initial sample were not included in the final analysis. The extraneous variables which were controlled on the basis of information gleaned from the biographical questionnaire (see Appendix B), were as follows:

(i) age of subjects within one year yielding an average age breakdown as follows:

(a) mean age of single-sex educated university males = 19 years and 8 months

(b) mean age of co-educated university males = 19 years and 7 months

(c) mean age of single-sex educated university females = 18 years and 10 months

(d) mean age of co-educated university females = 18 years and 8 months

(ii) socio-economic level gauged in terms of location of family dwelling and fathers' occupation. All subjects included were members of the middle socio-economic class

(iii) parental marital status - both parents of all subjects were alive and living together at the time of the present research. This factor was controlled in order to minimize the influence of familial factors on adjustment

(iv) continuity of educational experience - all subjects had attended either a co-educational or single-sex school for their entire secondary school years. Subjects who had attended both types of secondary schools were not included for analysis

(v) primary school education was controlled by including only subjects who had received co-educational elementary schooling

(vi) socio-cultural factors were controlled by including for final analysis only 'white' subjects

(vii) the effect of intervening experiences on the transition from school to university was limited by including in the female sample, only those students who had proceeded straight from school to university and, in the male sample, the only intervening experience allowed for was army service.

After removing from the initial sample all subjects who did not meet the control criteria, the final number of subjects included for analysis in the present research was 152 and these subjects were divided into the four groups reflected in Table 5.5.1 on page 95.

5.6 Apparatus

5.6.1 Scales Measuring Personality and Social Adjustment

The psychological and social adjustment of all subjects participating in the present research was measured by the Bell's Adjustment Inventory (Student Form). The Bell's Adjustment Inventory provides four separate measures of personal and social adjustment. The three adjustment scales analysed in the present research were as follows:

(i) Home Adjustment : Individuals scoring high on this scale tend to be unsatisfactorily adjusted to their home surroundings. Low scores indicate satisfactory home adjustment.

(ii) Social Adjustment: Individuals scoring high on this scale tend to be submissive and retiring in their social contacts. Individuals with low scores tend to be more outgoing and aggressive in social contacts.

(iii) Emotional Adjustment: Individuals with high scores tend to be emotionally unstable and people with low scores tend to be emotionally stable.

The fourth sub-scale of the Bell's Adjustment Inventory is the scale measuring health adjustment and this scale was omitted because of its inapplicability to the present research.

The Bell's Adjustment Inventory was chosen for use in the present research for the following reasons:

(i) it is most applicable to persons of late adolescence and early adulthood

(ii) it is suitable for use with both sexes

(iii) the high reliability of the inventory makes inter-individual comparisons possible

(iv) the division of the inventory into four areas of adjustment permits the location of specific adjustment difficulties.

The Bell's Adjustment Inventory is accurately scored using a stencil whic is superimposed on the test.

The IPAT Anxiety Scale Questionnaire was used to determine the level of anxiety of subjects participating in the present research. The IPAT Scale was chosen because of its high reliability and validity and its applicability to both male and female subjects over 14 years of age. The IPAT provides a detailed assessment of the anxiety level of the subject by providing measures of both manifest or overt anxiety and covert or hidden anxiety. The covert and overt anxiety scores may be added together to provide a measure of total anxiety.

A high total anxiety score indicates a high anxiety level and a low score indicates a low level of anxiety. The IPAT Scale is scored by the use of a standard key which is superimposed on the test.

The search for a scale providing a valid and reliable measure of heterosocial adjustment revealed that no standardized instrument providing such a measure has as yet been constructed. The most suitable assessment of heterosocial adjustment available at present seemed to be the measure yielded by the 'Courtship, Sex and Marriage' Problem Area of the Mooney Problem Check List (College and High School Form). This sub-scale of the Mooney comprises thirty items, which are designed to help students express their personal problems in the area of female-male relations. Subjects are required to underline the problems which are of concern to them. Although reliability and validity data are available for the sub-scales comparisons between individuals or groups of individuals are complicated by the fact that the Problem Check List is not a test and does not measure the scope or intensity of student problems in such a way as to yield a test score. A number of items indicated by the individual as being of concern to her/him cannot therefore be regarded as a score, but instead, should be regarded only as a 'census count' of her/his problems which is limited both by her/his awareness of her/his problems and her/his willingness to reveal them. The abovementioned factor constitutes a limitation to the inventory; however, since it is the only available standardized measure for assessing heterosocial adjustment, it was used as such in the present research.

Self-esteem as a measure of personality adjustment was assessed by employing the Coopersmith Self-Esteem Inventory. This scale comprises

twenty-five items which measure evaluative attitudes towards the self in social, academic, family and personal areas of experience. The items constituting the inventory consist of short statements, generally answered 'like me' or 'unlike me'. Validity and reliability data have been calculated for the inventory making intergroup comparisons possible. The Coopersmith Self-Esteem Inventory is marked by superimposing a stencil on the test script. A high score on the inventory reflects high self-esteem and a low score on the inventory reflects low self-esteem.

5.6.2 Scales Measuring Academic Development

The Edwards Personal Preference Schedule (EPPS) was employed to measure achievement motivation, which is considered to constitute an important factor in the assessment of all-round academic development (Horner 1969; 1972). The EPPS is a research instrument which is designed to provide measures of a number of relatively independent normal personality variables. One of the fifteen personality variables measured by the EPPS is the variable 'achievement' which is associated with the manifest needs 'to do one's best, to be successful, to accomplish tasks requiring skill and effort, to be a recognized authority, to accomplish something of great significance ... to write a great novel or play' (Edwards 1959, p 11). The Achievement sub-scale of the EPPS comprises items to which the subject must select one of two responses as characterizing her/him best and is required to circle this response. The EPPS is marked by superimposing a scoring key on the test. A high score on the EPPS characterizes high achievement motivation. The EPPS has been established to have high validity and reliability thus permitting comparisons between individuals and groups.

The intelligence level of subjects participating in the present research was measured by the Mental Alertness sub-test of the High Level Battery. This sub-test provides a measure of general intelligence and the forty-two items of this sub-test include numerical and letter series, verbal analogies, common elements and other problems requiring reasoning ability (Lombard 1975, p1). This scale was chosen by the present researcher because of its suitability for use with matriculants and subjects in higher educational levels and also because it may be administered on a group basis. The Mental Alertness test is standardized for the South African population and norm tables are available. The test is marked by the superimposition of a marking key onto it.

In an attempt to arrive at a standardized measure for inter-group comparisons of academic attainment,it was decided by the present researcher:

(i) to use final English matriculation results as a standard for comparison of attainment between co-educated and single-sex educated matriculants, as this is the only subject written by all English-speaking matriculation students in the Higher Grade Level and

(ii) to use final Psychology I results to compare attainment of co-educated and single-sex educated first-year university students as psychology was the only subject all the students in the present sample held in common.

These sets of final examination results were believed by the present researcher to be the best approximation to an independent and standardized measure of attainment.

5.7 Procedure

5.7.1 Procedure Followed with Regard to Matriculant Sample

(a) Preliminary visit to the Schools

The first procedural step with regard to the matriculant sample in the present research involved obtaining permission from the Transvaal Education Department for the present researcher to approach the Heads of the three proposed schools and to request their co-operation for testing to be conducted at their respective schools during regular school hours. Having been given the consent of the Transvaal Education Department, the present researcher approached the Heads of the schools and requested their permission to conduct testing at their respective schools. All the Heads were informed of the true nature of the study and all three Heads of schools agreed to the testing being conducted in regular school hours. In order to minimize the disruption to the matriculation time-table, it was decided that testing would be conducted over three sessions. It was agreed to extend the normal class period from 35 minutes to 45 minutes for the first testing session in order to allow for completion of the Mental Alertness Test. The remaining two testing sessions would be confined to the normal classroom period of 35 minutes. It was agreed, in accordance with TED regulations, that the tests would be administered by the teachers, who would be briefed on standardization methods of test administration by the present researcher.

(b) Testing

Testing was conducted at the three schools during June and July 1980. This standardization of time of testing was undertaken to ensure the

control of as many extraneous variables as was possible. The tests were administered by the regular class teachers to classes ranging in size from eighteen to thirty-five students. One teacher attended to each class of students and the present researcher visited each classroom during the testing session to answer any questions and to ensure the standardization of procedure.

All the teachers involved in testing were given standard instructions for administering the tests in an attempt to ensure procedural uniformity. All students were given the same preamble to testing, which informed them that the tests were not for school purposes and, as such, would not be seen by the staff or used to assess them, but were instead part of a research project being conducted by a university student on the personality of students attending different schools. It was emphasized that the data collected would be used to assist in comparisons between schools and not for individual comparative purposes. Students were assured of the strict confidentiality of their responses and were told that the only reason their name was needed on test forms was for collating purposes. Students were asked to give their honest responses to items on personality tests and the need for honesty of response was emphasized by explaining to students that socially desirable or haphazard infrequent responses would become apparent in marking the questionnaire and would render that particular profile invalid.

Three class periods, one each over three consecutive weeks, were allocated for testing and the order in which the tests were administered was as follows:

(i) The Mental Alertness Test

(ii) The IPAT, the Bell's Adjustment Inventory, the Coopersmith Self-Esteem Inventory

(iii) Biographical Questionnaire, the Mooney's Problem Inventory and the Edwards Personal Preference Schedule.

5.7.2 Procedure Followed with Regard to University Students

The first procedural step taken in regard to testing of the university sample involved obtaining permission from the Head of the Department of Psychology for tests to be administered on a voluntary basis to first-year psychology students during the regular period for the 'practical psychology course'. Having obtained consent to proceed with the testing, the next procedural step involved the present researcher meeting with the tutors supervizing the practical psychology sessions and informing them about the nature and administration of the tests. Since the time allocated for the practical sessions was three hours, it was decided to administer all the tests in one practical session. It was also decided that students who did not wish to co-operate should be allowed to leave to minimize distortion of results.

Testing was conducted during August 1980 by the regular tutors, with the present researcher visiting the class during the session to ensure standardization of procedure and to answer any questions. The tests were administered in a pre-decided order as follows:

(i) Mental Alertness

(ii) IPAT

(iii) Bell's Adjustment Inventory

(iv) Coopersmith Self-Esteem Inventory

(v) The Mooney's Problem Inventory

(vi) The Edward's Personal Preference Schedule

(vii) The Biographical Questionnaire.

All students were given the same preamble to testing by the tutor which informed them that the tests they would be completing were for research purposes and were not in any way for departmental use. Students were assured of the strict confidentiality of their responses and were told that they were only required to give their names for collating purposes. Students were asked to give their honest responses and need for honesty was emphasized by explaining to students that socially desirable or haphazard/infrequent responses would become apparent in marking the manuscripts and such responses would render the particular profile invalid.

CHAPTER 6

RESULTS

6.1 Analysis of Variance on Mental Alertness

The first statistical analysis applied to the data collected in the present research involved the application of an analysis of variance on mental alertness in an attempt to determine whether the groups under consideration, differed significantly on this variable. The result of this analysis could then be used to decide whether intelligence is a confounding variable in the present research. The importance of this assessment is attributable to the fact that previous researchers in the field of co-education and academic attainment found intelligence to be a variable which affected inter-group comparisons on academic achievement (Dale 1963; 1972; Van Aswegen 1975).

The three-way analysis of variance performed on the Mental Alertness Variable revealed the following findings:

TABLE 6.1

ANALYSIS OF VARIANCE ON MENTAL ALERTNESS

Source of Variation	Sum of Squares	DF	MS	F	Significance of F
Main Effects	2 020,21	3	613,40	8,55	0,00
Sex	3,50	1	3,50	0,04	0,83
Standard	1 915,65	1	1 915,65	24,33	0,00
School	166,81	1	166,81	2,11	0,14
2-Way Interaction	393,565	3	131,18	1,66	0,17
Sex x Standard	40,53	1	40,53	0,51	0,47
Sex x School	24,96	1	24,96	0,31	0,57
Standard x School	315,85	1	315,85	4,01	0,04
3-Way Interactions	0,38	1	0,38	0,005	0,94
Sex x Standard x Schoo	0,38	1	0,38	0,005	0,94
Explained	2 414,16	7	344,88	4,38	0,00
Residual	23 065,07	293	78,72		
Total	25 479,23	300	84,93		

Table 6.1 indicates that standard analyzed as a main effect was found to be significant F (1,300) = 24,33; p = 0,00. Comparison of mean factor scores (see Table 6.1.2) reveals that university students score significantly higher than matriculation students on mental alertness, irrespective of any other variable. However, when school was taken into account, the difference was found to be more pronounced between co-educated matriculation students and single-sex university students than between any other groups (see Figure 6.1.3) yielding a

significant standard and school interaction F (1,300) = 4,01; p = 0,04.

TABLE 6.1.2

MEAN MENTAL ALERTNESS FACTOR SCORES

School	Standard	
	Matriculation	First-year University
Co-educational	29,68	33,13
Single-sex	31,85	36,09
Grand Mean	30,76	34,61

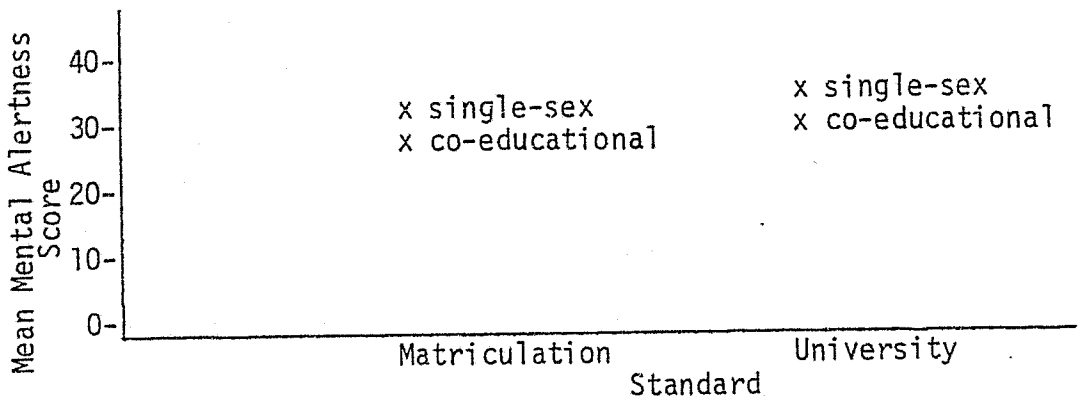


Figure 6.1.3 - School x Standard Interaction on Mental Alertness

Since the present research is not concerned with comparing co-educated matriculation students with single-sex educated university students and since no significant differences in mental alertness were found between the groups being compared in the present research, it was decided that

mental alertness could be included in subsequent analysis as a dependent variable reflecting scholastic ability. Mental alertness or ability was thus not a confounding variable in the present research.

6.2 Factor Analysis

The second procedural step taken with regard to statistical analysis in the present research was the application of a factor analysis to the dependent variables. The purpose of the factor analysis was twofold:-

(1) to reduce the number of dependent variables, thereby assisting the interpretation of results and

(ii) to avoid offering interpretations on several tests which may in fact be measuring the same underlying dimensions.

The dependent variables included for factor analysis in the present study were:

(i) Home Adjustment

(ii) Emotional Adjustment

(iii) Social Adjustment

(iv) Anxiety

(v) Self-Concept

(vi) Grade Achieved

(vii) Achievement Motivation

(viii) Mental Alertness

(ix) Heterosocial Adjustment.

The Factor Analysis performed on the dependent variables revealed the following findings:

TABLE 6.2

VARIMAX ROTATED FACTOR MATRIX

Dependent Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Alert	-0,14	0,93	-0,02	0,09	0,12
Achieve	-0,00	0,14	0,02	0,94	-0,07
Grade	0,09	0,71	0,02	-0,00	-0,28
Heterosocial	0,22	0,00	0,05	-0,07	0,91
Home	0,76	-0,08	-0,14	0,27	0,12
Social	0,23	-0,00	0,94	0,00	0,03
Emotional	0,82	-0,00	0,20	-0,21	0,02
Anxiety	0,83	-0,06	0,14	-0,06	0,06
Self	0,13	0,09	-0,38	-0,09	-0,18

6.2.1 Factor Naming

Factor naming was done by taking cognisance of the loadings of each dependent variable on each of the five factors and the factors were named as follows:

(i) Factor 1, on which home adjustment, emotional adjustment, anxiety and self-concept loaded most heavily, was called The Personality Adjustment Factor.

(ii) Factor 2, in which mental alertness and grade achieved loaded most heavily, was called the Scholastic Achievement Factor.

(iii) Factor 3, on which social adjustment loaded most heavily, was called The Social Adjustment Factor.

(iv) Factor 4, on which achievement motivation loaded most heavily, was called The Achievement Motivation Factor.

(v) Factor 5, on which heterosocial adjustment loaded most heavily, was called The Heterosocial Adjustment Factor.

6.3 Analysis of Variance

Having applied a factor analysis to the data, the third procedural step, taken in the present research as regards statistical analysis, was the application of five three-way analyses of variance on the data to determine the effects of sex, standard and school and the interaction between these independent variables on the five factors.

6.3.1 Analysis of Variance on Personality Adjustment Factor

The three-way analysis of variance performed on The Personality Adjustment Factor revealed the following findings:

TABLE 6.3.1

ANALYSIS OF VARIANCE ON PERSONALITY ADJUSTMENT

Source of Variation	Sum of Squares	DF	MS	F	Significance of F
Main Effects	14,70	3	4,90	5,08	0,00
Sex	12,67	1	12,67	13,15	0,00
Standard	2,50	1	2,50	2,59	0,10
School	0,10	1	0,10	0,11	0,74
2-Way Interactions	2,82	3	0,94	0,97	0,40
Sex x Standard	0,57	1	0,57	0,59	0,44
Sex x School	1,38	1	1,38	1,44	0,23
Standard x School	0,61	1	0,61	0,64	0,42
3-Way Interactions	0,20	1	0,20	0,21	0,64
Sex x Standard x School	0,20	1	0,20	0,21	0,64
Explained	17,73	7	2,53	2,63	0,01
Residual	282,26	293	0,95		
Total	299,99	300	1,00		

Sex as a main effect was found to be significant F (1,300) = 13,15; p = 0,00 and comparison of mean scores of males and females in the present sample revealed that males in the total sample are significantly better adjusted on the Personality Factor than females :

$\bar{x}$ males = -0,21

$\bar{x}$ females= 0,19

6.4 Analysis of Variance on Scholastic Achievement Factor

The three-way analysis performed on the Scholastic Achievement Factor revealed the following findings:

TABLE 6.4.1

ANALYSIS OF VARIANCE ON SCHOLASTIC ACHIEVEMENT

Source of Variation	Sum of Squares	DF	MS	F	Significance of F
Main Effects	11,47	3	3,82	3,99	0,00
Sex	3,67	1	3,67	3,84	0,51
Standard	6,17	1	6,17	6,44	0,01
School	1,23	1	1,23	1,29	0,25
2-Way Interactions	7,92	3	2,64	2,76	0,04
Sex x Standard	2,60	1	2,60	2,72	0,10
Sex x School	1,30	1	1,30	1,36	0,24
Standards x School	3,83	1	3,83	4,00	0,04
3-Way Interactions	0,07	1	0,07	0,07	0,78
Sex x Standard x School	0,07	1	0,07	0,07	0,78
Explained	19,47	7	2,78	2,90	0,00
Residual	280,51	293	0,95		
Total	299,99	300	1,00		

Taking cognisance of the mean factor scores of the groups being compared (see Table 6.4.2) the findings indicated by Table 6.4.1 may be described as follows:

(i) Standard analyzed as a main effect was found to be significant F (1,300) = 6,44; p = 0,01 and examination of mean factor scores (see Table 6.4.2) revealed that first-year university students achieved significantly higher grades on the scholastic measure than did matriculation students irrespective of any other variable.

(ii) The interaction between standard and school was found to be significant F (1,300) = 4,00; p = 0,04 (see Figure 6.4.3) and t-tests applied to the means of the groups involved revealed that:

(a) single-sex educated matriculation students score significantly higher in scholastic achievement than co-educated matriculation students t = 2,16; p < 0,05.

TABLE 6.4.2

MEAN FACTOR SCORES ON SCHOLASTIC ACHIEVEMENT

	Standard	
School	Matriculation	First-year University
Co-educational	-0,32	0,21
Single-sex	0,02	0,08

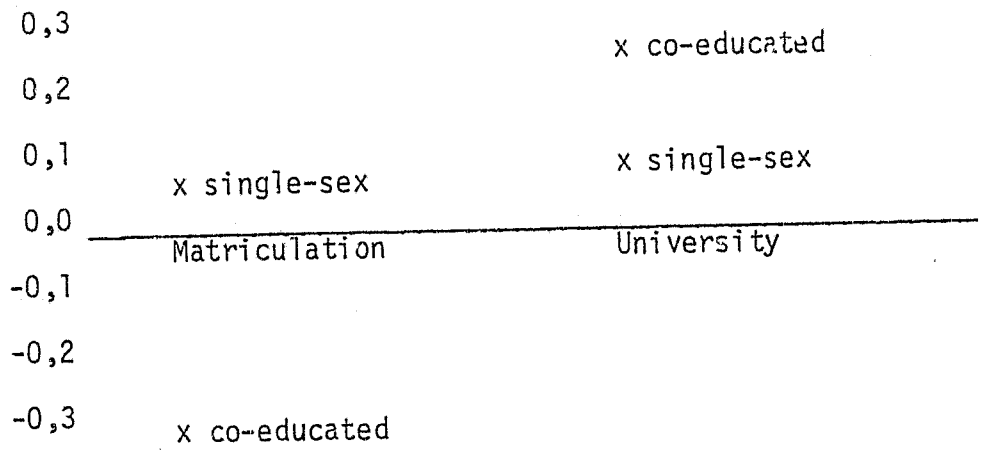


Figure 6.4.3 - School x Standard Interaction on Scholastic Achievement

6.5 Analysis of Variance on Social Adjustment Factor

The three-way analysis of variance performed on the Social Adjustment Factor revealed the following findings:

TABLE 6.5

ANALYSIS OF VARIANCE ON SOCIAL ADJUSTMENT

Source of Variation	Sum of Squares	DF	MS	F	Significance of F
Main Effects	1,14	3	0,38	0,37	0,77
Sex	0,55	1	0,55	0,54	0,46
Standard	0,49	1	0,49	0,48	0,48
School	0,11	1	0,11	0,11	0,73
2-Way Interactions	0,89	3	0,29	0,29	0,83
Sex x Standard	0,05	1	0,05	0,05	0,81
Sex x School	0,65	1	0,65	0,65	0,42
Standard x School	0,11	1	0,11	0,10	0,74
3-Way Interactions	0,38	1	0,38	0,38	0,53
Sex x Standard x School	0,38	1	0,38	0,38	0,53
Explained	2,41	7	0,34	0,34	0,93
Residual	297,58	293	1,01		
Total	299,99	300	1,00		

No significant differences were apparent in the groups under consideration on any level of the social adjustment factor.

6.6 Analysis of Variance on Achievement Motivation Factor

The three-way analysis of variance performed on the Achievement Motivation Factor revealed the following findings:

TABLE 6.6.1

ANALYSIS OF VARIANCE ON ACHIEVEMENT MOTIVATION FACTOR

Source of Variation	Sum of Squares	DF	MS	F	Significance of F
Main Effects	25,06	3	8,35	9,04	0,00
Sex	17,15	1	17,15	18,56	0,00
Standard	3,64	1	3,64	3,94	0,04
School	5,95	1	5,95	6,44	0,01
2-Way Interactions	3,81	3	1,29	1,39	0,24
Sex x Standard	0,62	1	0,62	0,67	0,41
Sex x School	3,03	1	3,03	3,28	0,07
Standard x School	0,07	1	0,07	0,07	0,78
3-Way Interactions	0,33	1	0,33	0,35	0,55
Sex x Standard x School	0,33	1	0,33	0,35	0,55
Explained	29,26	7	4,18	4,52	0,00
Residual	270,73	293	0,92		
Total	299,99	300	1,00		

Taking cognisance of the mean factor scores of the groups being compared (see Table 6.6.2) the findings indicated by Table 6.6.1 may be described as follows:

(i) Males in the total sample score significantly higher on achievement motivation than females, irrespective of any other variable F (1,300) = 18,56; p = 0,00. However, taking school into account, the interaction between sex and school was found to approach significance F (1,300) = 3,28; p = 0,07, and t-tests applied to the data revealed that this marginally significant interaction is attributable to:

Co-educated males scoring significantly higher on achievement motivation than co-educated females t = 4,71 p < 0,01.

(ii) Single-sex educated subjects score significantly higher on achievement motivation than co-educated subjects, irrespective of any other variables F (1,300) = 6,44; p= 0,01. However, taking sex into account, a marginally significant interaction between sex and school results F (1,300) = 3,28; p = 0,07, and t-tests applied to the means reveal that this marginally significant interaction is attributable to single-sex females scoring significantly higher on achievement motivation than co-educated females t = 3,35; p < 0,01.

(iii) First-year university students were shown to score significantly higher on achievement motivation than matriculation students, irrespective of any other variable F (1,300) = 3,94 p = 0,04.

TABLE 6.6.2

MEAN FACTOR SCORES ON ACHIEVEMENT MOTIVATION

Sex	Co-Educational	Single-Sex
Males	0,20	0,28
Females	-0,46	0,01

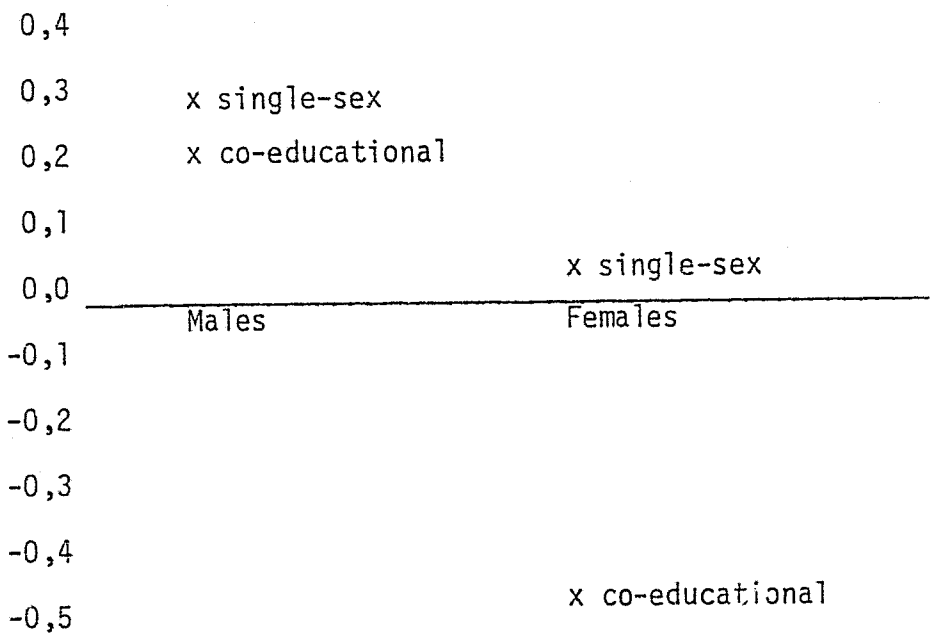


Figure 6.6.3 - Sex x School Interaction on Achievement Motivation

6.7 Analysis of Variance on Heterosocial Adjustment

The three-way analysis of variance applied to the heterosocial adjustment factor revealed the following results:

TABLE 6.7.1

ANALYSIS OF VARIANCE ON HETEROSOCIAL ADJUSTMENT

Source of Variation	Sum of Squares	DF	MS	F	Significance of F
Main Effects	23,53	3	7,84	8,69	0,00
Sex	15,88	1	15,88	17,59	0,00
Standard	7,44	1	7,44	8,24	0,00
School	2,11	1	2,11	2,34	0,12
2-Way Interactions	11,13	3	3,71	4,11	0,00
Sex x Standard	4,87	1	4,87	5,39	0,02
Sex x School	2,69	1	2,69	2,98	0,08
Standard x School	2,77	1	2,77	3,07	0,08
3-Way Interactions	0,81	1	0,81	0,90	0,34
Sex x Standard x School	0,81	1	0,81	0,90	0,34
Explained	35,49	7	5,07	5,61	0,00
Residual	264,50	293	0,90		
Total	299,99	300	1,00		

Comparisons of the mean factor scores of the groups on the heterosocial adjustment factor (see Table 6.7.2) indicate that the findings of Table 6.7.1 may be described as follows:

(1) Sex analyzed as a main effect was found to be statistically significant F (1,300) = 17,59; p = 0,00 and

(i) Females in the total sample were found to be significantly better heterosocially adjusted than males, irrespective of any other variable F (1,300) = 17,59 p = 0,00.

(ii) When standard is combined with sex a significant interaction results F (1,300) = 5,39 p = 0,02. t -tests applied to the means reveal that this significant interaction is attributable to matriculation females being significantly better heterosocially adjusted than matriculation males.

(iii) When school is combined with sex a marginally significant interaction results F (1,300) = 2,98 p = 0,08. t -tests applied to the means reveal that this marginally significant interaction is attributable to co-educated males being significantly better heterosocially adjusted than single-sex educated males. t = 2,37; p < 0,05.

(2) Standard analyzed as a main effect was found to be significant F (1,300) = 8,24; p = 0,00 and

(i) Matriculation students were found to be significantly better heterosocially adjusted than first-year university students F (1,300) = 8,24 p = 0,00.

(ii) When school is combined with standard a marginally significant interaction results F(1,300) = 3,07 p = 0,08. t-tests applied to the means reveal that this marginally significant interaction is attributable to co-educated matriculation students being significantly better heterosocially adjusted than single-sex matriculation students. t = 2,26; p < 0,05. However, as the findings on the school x sex interaction indicate, this does not hold for female co-educated and single-sex educated matriculation students, but instead is caused chiefly by the differences between male matriculation students.

TABLE 6.7.2

MEAN FACTOR SCORES ON HETEROSOCIAL ADJUSTMENT

	Co-Educational	Single-Sex	Grand Mean
Matriculation	Males $\bar{x}$= -0,12	Males $\bar{x}$ = 0,52	Males $\bar{x}$ = 0,21
	Females $\bar{x}$= -0,52	Females $\bar{x}$ = -0,45	Females $\bar{x}$ = -0,49
	Mean Males + Females = 0,31	Mean Males + Females = 0,03	
University	Males $\bar{x}$= 0,22	Males $\bar{x}$ = 0,26	Males $\bar{x}$ = 0,24
	Females $\bar{x}$= 0,12	Females $\bar{x}$ = 0,00	Females $\bar{x}$ = 0,07
	Mean Males + Females = 0,17	Mean Males + Females = 0,12	

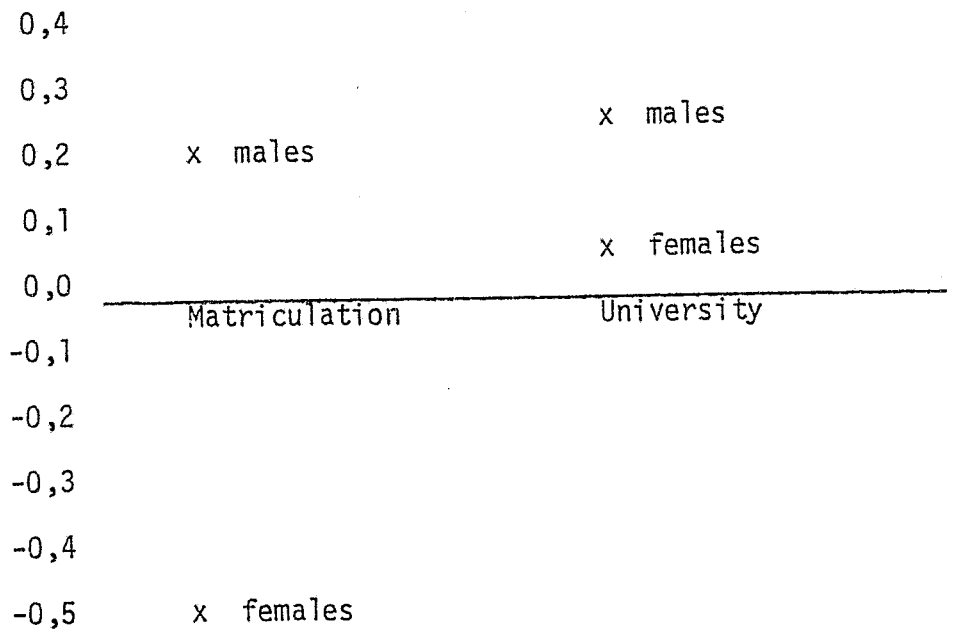


Figure 6.7.3 - Sex x Standard Interaction on Heterosocial Adjustment

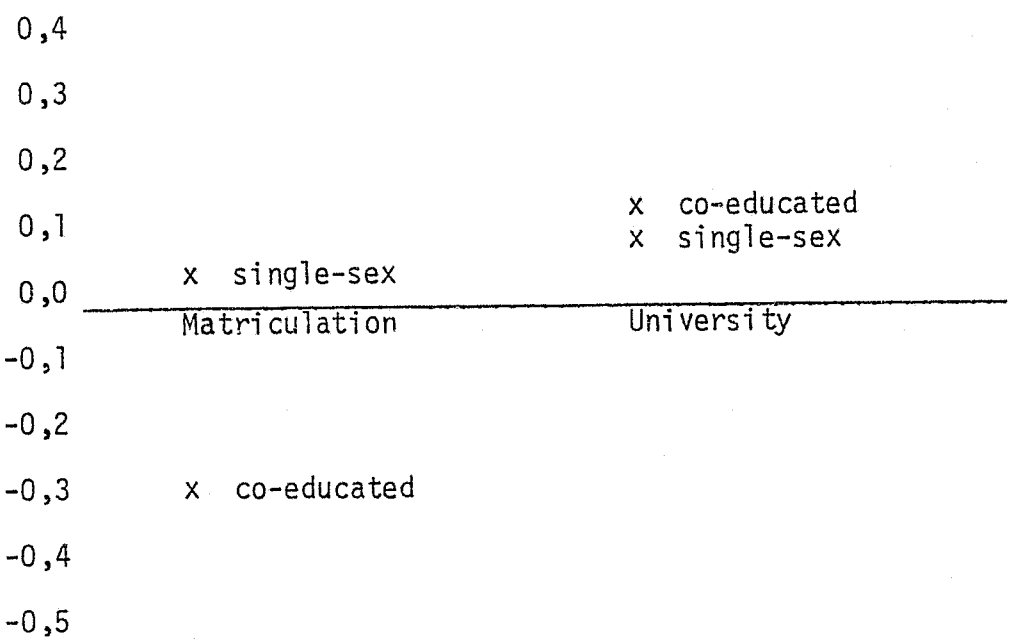


Figure 6.7.4 - Standard x School Interaction on Heterosocial Adjustment

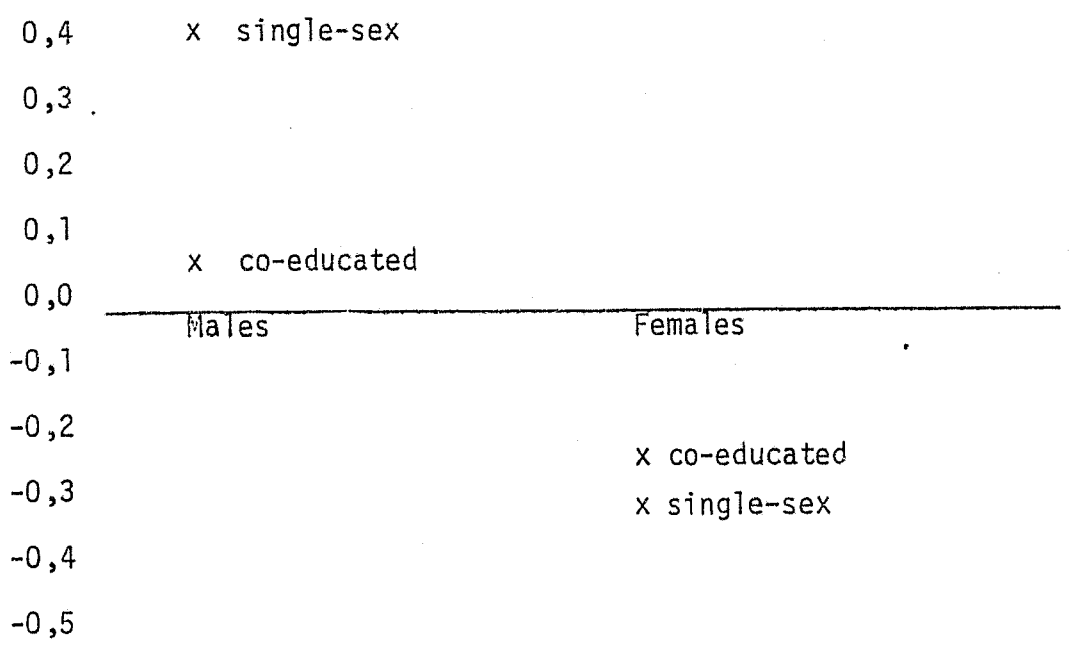


Figure 6.7.5 - Sex x School Interaction on Heterosocial Adjustment

6.8 Summary of Significant Findings Relating to School

The general pattern of results relating to the effects of co-education and single-sex education on personality, social, heterosocial and academic development indicate that:

(i) Single-sex educated matriculation students score significantly higher on measures of scholastic attainment than co-educated matriculated students $t = 2,16$; $p < 0,05$.

(ii) Single-sex educated female students score significantly higher on achievement motivation than co-educated female students $t = 3,35$; $p < 0,01$.

(iii) Males in the total sample were found to score significantly higher on achievement motivation $F\ (1,300) = 9,04$; $p = 0,00$. This finding should not however, disguise the fact that the discrepancy between the achievement motivation of males and females is in fact chiefly attributable to co-educated males scoring significantly higher in achievement motivation than co-educated females $t = 4,71$ $p < 0,01$. The difference between the achievement motivation scores of single-sex educated males and females was not found to be significant $t = 1,92$; $p > 0,05$.

(iv) Co-educated male matriculation students were found to be significantly better heterosocially adjusted than single-sex educated male matriculation students $t = 2,37$; $p < 0,05$.

CHAPTER 7

DISCUSSION

In discussing the results of the present study, it should be borne in mind that the interpretations which are to follow are to be considered tentative and restricted to the described population and measurement procedures. It is also to be noted that these general findings are based on statistical probabilities of responses and therefore cannot be applied to the prediction of individual cases. In discussing the present findings, a probability value of 0,05 will be read as indicating a significant difference between groups on the dependent variables.

7.1 Discussion of Findings Regarding the Personality Adjustment Factor

It is a well-documented fact that the anxious or poorly adjusted adolescent is hostage to fortune, liable to physical illness as well as nervous complaints. No matter how high the academic attainment, the future is not bright unless satisfactory personality adjustment can be effected. In this task of assisting personality adjustment, the literature on educational theory as related to adolescent development has revealed that the school can exert a strong influence for good or ill. The traditional emphasis of education on scholastic material has thus been extended to include a concern for personal growth (Minuchin et al. 1969). This new educational trend coupled with the findings of Dale (1964; 1966; 1969), extensive attitudinal research which revealed that the co-educational school provides the happier, more balanced and

complete education and addresses itself more closely to the ego-forming needs of the adolescent, led to the present hypothesis that satisfactory personality adjustment which is central to a good education is assisted to a significantly greater degree by the system of co-education than by the single-sex educational system. The findings in the present study of no significant difference between the two systems on the personality adjustment factor leads to the rejection of this hypothesis.

On the overt level the present finding is in concordance with the findings of the surveys conducted by Dale (1971) and Van Aswegen (1975) which were designed to evaluate systematically and objectively the personality adjustment of adolescents attending the two types of schools, the latter study being confined to female subjects. These researchers found that despite trends in favour of co-education, no significant differences exist between subjects attending the two types of schools, at matriculation level. However, one must remain alerted to the fact that the design of the present research is cross-sectional while that of Dale (1971) and Van Aswegen (1975) is longitudinal. An examination of Dale's and Van Aswegen's research in longitudinal perspective reveals that differences in favour of single-sex schools, which were apparent at Standard Six level, were no longer apparent at matriculation level. This finding seems to indicate that there is a selective process on entrance to secondary school, whereby the more intelligent and better adjusted students choose or are sent by parents to single-sex schools. Since the present study was limited to urban South African students who were allocated by the Transvaal Education Department to a particular school in accordance with geographical

zoning, this intervening selection factor does not seem applicable. The present findings, it seems, may thus be interpreted as realistically reflecting that no significant differences in influencing personality adjustment are apparent between students attending co-educational schools and those attending single-sex schools.

The present finding may be further interpreted as indicating that, insofar as personality adjustment is concerned, it is not the co-educational or the single-sex nature of the school that is the crucial influencing factor, but rather that within both these environments the school must act as an integrative agent for the adolescent and help define behaviours and competencies that are necessary for the adolescent to deal with her/his problems and resolve her/his developmental crises. It is possible that the modern trend in education towards focusing increasing attention on the adolescent as a growing personality and less on what is formally taught compensates in a sense for any deficiency which may have existed in either system prior to this new conceptualization of education. This explanation for the present findings, however, can only remain tentative, owing to the fact that there are no systematically conducted studies dating back to the mid 1900s when the organizational structure of single-sex schools was very rigid and controlled and the goal of eduation was very restricted (Pekin 1939).

Another possible explanation for the present findings is that since the school provides a relatively protected environment which is supportive to the adolescent's personality adjustments, it may be expected that no significant differences would be apparent at

matriculation level. Following this rationale, it seems possible that it is only when the adolescent enters the wider heterosocial context of the university that differences in adjustment will become apparent, owing to the fact that the environment of the co-educational school more closely approximates that of the university and of the wider social context of the adult world. The present research which was extended to include a university sample, did not support this interpretation. However, since the present study is the only one which has assessed the personality adjustment of university students who attended the two types of schools, the rejection of this explanation must be considered tentative and further research is clearly needed to measure the effect of the two school types on adjustment to the adult world beyond the school.

7.2 Discussion of Findings Regarding the Social Adjustment Factor

In considering the developmental tasks of adolescence, it became apparent that if the adolescent is to become truly adult, not just physically mature, she/he must in the few years between childhood and young adulthood establish co-operation and workable relationships with peers of both sexes, without being dominated by them. These relationships formed with peers serve as prototypes for later social relations and are of critical importance in helping the individual to define her/his own identity. The literature on adolescent development, coupled with educational theory, has revealed that in the task of assisting social development, the school can exert a strong positive or negative influence. The social climate of the school, as is true of the home, is a factor of importance in the

social adjustment of the individual. Not only through lessons but through the interpersonal relationships of teachers and students, the school may foster an understanding of people and situations which would not be possible in the narrower and more homogeneous social environment of the home (Schell et al. 1975; Havighurst and Neugarten 1967). Dale's (1965; 1966) attitudinal research revealed a preference for co-education among ex-pupils who had attended both types of schools. The reasons given by both sexes for this preference were social in nature and were as follows:

(a) the social life with both sexes is better;

(b) co-education provides a more natural preparation for life in the adult world;

(c) relations with staff and between staff were more pleasant; and

(d) the social atmosphere in the school was less tense.

This theoretical rationale, coupled with Dale's (1949; 1965; 1966) findings, led the present researcher to test systematically and objectively the hypothesis that subjects who received co-education would be significantly better socially-adjusted than subjects who received single-sex education. The present findings of no significant differences between the groups on the social adjustment factor does not lend support to this hypothesis.

The present finding seems to confirm the findings of the survey conducted by Dale (1971) and Van Aswegen (1975) which were designed to evaluate systematically the social adjustment of students attending the two types of schools, the latter being confined to female subjects. Both these researchers found no significant differences between the groups on social adjustment at matriculation

level. However, one must remain alerted to the fact that the design of the present research is cross-sectional while that of Dale's and Van Aswegen's is longitudinal. An examination of Van Aswegen's research in longitudinal perspective reveals that the significantly greater adjustment on the sociability factor of the HSPQ found at Standard Six level among single-sex educated girls compared to co-educated girls was no longer apparent at matriculation level. This finding suggests that in some way the single-sex environment of the secondary school negatively influences the sociability of these subjects. Van Aswegen's (1975) finding seems to indicate that, in the South African context, as in Britain, there is a selective process in operation, whereby the better-adjusted, more intelligent, students select or are sent by parents to single-sex schools. Since the present investigation was confined to a sample of urban South African students who were allocated by the Transvaal Education Department to a particular school in accordance with geographical zoning, this selective factor was felt to be effectively controlled. In addition, Dale (1971) and van Aswegen (1975) found that socio-economic factors influenced their research findings. In the present study, socio-economic status was carefully controlled. In view of the control over the selective process and socio-economic factors, the present finding may tentatively be interpreted as reflecting that the systems of co-education and single-sex education do not differentially influence social adjustment of students as measured by the Bell's Adjustment Inventory.

In explaining the present finding that single-sex and co-educational secondary schools do not differentially affect social adjustment, the

present researcher felt it was important to examine the description of social adjustment as measured by the Bell's Adjustment Inventory and to conduct an analysis of the items included in the scale. The analysis of the social sub-scale of the Bell's Adjustment Inventory revealed that this scale is directed to measuring only one, but nevertheless important, aspect of social adjustment, that is, the degree of submissiveness or assertiveness in social contacts. Social Adjustment is viewed by the present researcher as involving far more than just the submissive-assertive dimension in relation to social contacts. The present researcher feels that a scale which includes in equal proportion items relating to submissiveness and assertiveness, social skills in relation to same-sex peers, social competence in relation to contemporaries, older people and members of the opposite sex, is needed to assess effectively social adjustment as affected by the different school types. Objective evidence that the Bell's Social Adjustment Scale does not provide a complete measure of social adjustment is derived from the factor analysis performed by the present researcher on the dependent variables which revealed that social adjustment did not load on the heterosocial adjustment scale of the Mooney Problems Inventory. The construction of a more comprehensive scale of social adjustment and its application to the measurement of the relative influences of co-education and single-sex education on it is an issue that requires further inquiry.

The present finding on the social adjustment factor may be interpreted as indicating that the environmental factors needed to attain adequate adjustment to same-sex peers and adults are present in both co-educational

and single-sex schools. The interpersonal relationships formed between staff and students and those formed between students themselves in both co-educational and single-sex schools seem to serve as adequate prototypes for social situations in the borader social context. In addition to this, it remains a distinct possibility that social experiences outside of the school context, that is, with siblings and their peers, with parents and family friends, compensate for any deficit in social experience which may result from attending a single-sex school.

Another possible explanation involves attributing the present finding to the socially protected environment of the school and an expectation that differences between students would only become manifest at first-year university level, where these students are confronted with social tasks in a broader, less clearly-defined context. The present study was thus extended to test this hypothesis on a university sample which had attended co-educational schools and those who had attended single-sex schools. The findings at university level of no significant differences in social adjustment between the groups being considered does not support the hypothesis that it is only when single-sex and co-educated students are thrust into the heterosocial environment of the university that differences in social adjustment become apparent. However, owing to the fact that the adequacy of the Bell's Adjustment Inventory is in question and does not tap heterosocial adjustment and because the design of the present research is not longitudinal, the rejection of this hypothesis must remain tentative. The necessity for further research on this issue is clearly indicated.

7.3 Discussion of Findings Regarding the Scholastic Attainment Factor

One of the major goals of adolescent development is to achieve or almost achieve full growth of mental capacities. During adolescence, intelligence as a truly co-ordinated mental organisation involving sensory-motor, cognitive and conceptual abilities can be said to appear (Piaget 1952; Vinacke 1951). Ausubel (1962) describes the transition during adolescence as being 'from a predominantly concrete to a predominantly abstract mode of understanding' (p 268). Thus the adolescent period may be considered a period of true intellectual growth and it is one of the chief tasks of the educationalist to tailor the educational process in a way that allows the adolescent to actualize these mental abilities to the greatest possible extent. The present research was designed to measure whether the systems of co-education and single-sex education differentially affects the actualization of mental abilities of students.

7.3.1 Discussion of Results at Matriculation Level

The present research revealed that single-sex educated students score significantly higher on measures of scholastic attainment than co-educated matriculation students. This finding does not support the common pattern of results found in British and Irish research (Sutherland 1957; Dale 1959; Dale 1974) among male matriculants. In five very large surveys and three smaller ones, these researchers found that boys in co-educational schools did better in the first external examination than boys in single-sex schools. On the female side of the research, the present findings do, however, seem to support those of Dale (1959; 1974) and Sutherland (1957), who found

differences between the two groups to be smaller but consistently in favour of the girls in single-sex schools. However, bearing in mind that in the case of both male and female subjects, the results of Dale and Sutherland often did not reach statistical significance and taking cognisance of the methodological difficulties in the British research, one must caution against attaching any firm interpretations to these findings. However, the present findings which were statistically significant and in which several methodological factors were controlled warrant attention.

The only other survey conducted in this question in the South African context is that of Van Aswegen (1975) and although Van Aswegen's sample was considerably larger than the present sample, it was confined to female students. The present findings regarding intellectual attainment do not accord with those of Van Aswegen (1975), who found little difference at matriculation level between girls at single-sex schools and those at co-educational schools, although girls at single-sex schools obtain significantly more first-class passes in Standard Ten. A probable explanation for the discrepancy in findings between Van Aswegen's research and the present research is that the standard of comparison in Van Aswegen's study was average final matriculation examination results, whereas in the present study it was final English matriculation results. This may suggest that English results are not representative of general matriculation results, thus limiting any interpretations attached to the present finding. There is thus a need for further research on this issue, which should be designed to include both a male and female sample and to arrive at a broader objective measure of attainment. This type of measure will, however, be very

difficult to construct, owing to the fact that in the new system of subject gradings in South African secondary schools, English is the only compulsory Higher Grade subject written by all students.

A possible explanation for the finding that single-sex students score significantly higher in academic attainment than co-educated students is that from early childhood through to adulthood, girls and boys have different and clearly defined interests (Kolesnik 1968). Following this rationale, it may well be that in attempting to appeal to the academic interests characteristic of the one sex, the teacher inadvertently neglects those of the other sex. Alternatively, the teacher may compromise in trying to interest both groups simultaneously and, by so doing, fail to stimulate a genuine interest on the part of either group. Grambs (1963) expresses a similar view when he writes that the lower achievement in co-educational schools is probably due to the fact that these schools operate as 'unsexed' institutions in a society that demands differentiation according to sex.

A further explanation for the present findings is based on the differential intellectual development of the sexes (Hobson 1947; Havighurst and Breese 1947; Herzberg and Lepkin 1954). These theorists maintain that in co-educational schools, being surpassed by girls in scholastic attainment where boys are anxious to make a good impression on their female counterparts, may force them into a position of feigned lack of interest in academic matters in order to support his own self-esteem and win the favour of the girls. The girl on the other hand may become academically inhibited at a co-educational school, as she realizes that competition with boys

is ultimately unrewarding and does not accord with the sex role stereotype into which she is socialized and which involves pleasing the opposite sex.

The present findings on intellectual achievement may tentatively be taken to indicate a distinct advantage for single-sex education in promoting academic attainment. This has important implications for education of the sexes in co-educational schools. The co-educationalists may, however, counter this argument against educating the sexes together with the argument that single-sex education may result in as many problems in the psycho-social areas of adjustment as it alleviates in the area of academic development. It thus becomes important to consider together the findings of the present study on the psycho-social and academic variables. Such an analysis will provide an overall perspective of the influences of the two systems and will be undertaken in Section 7.6.

The aforementioned interpretations may be taken to indicate a distinct advantage for single-sex education in the promotion of academic achievement. However, an alternative to opting for single-sex education because of inhibition against achieving amongst girls in co-educational schools may be to develop programmes to conscientize students in co-educational schools to the ways in which they are conforming to sex role stereotypes in an attempt to remove them. In addition, while many educationalists realize that some of the under-achievement and learned inefficiency in school is attributable to the co-educational nature of the school, they are hesitant to recommend single-sex education, as they feel it may result in as many problems as it alleviates. These theorists also question whether any destructive

influence lasts beyond school to affect academic attainment at university.

It is to this question that we now turn our attention.

7.3.2 Discussion of Results at First-Year University Level

Despite the fact that academic attainment at secondary school is an important issue, a second query comes to mind when considering the relative merits of co-education and single-sex education, namely, the question of whether any distinctive influence lasts beyond school, so that it affects academic progress at university. The present researcher hypothesized, on the grounds of the difficulties inherent in the transition from school to the wider university context, that single-sex students would score significantly lower in academic attainment than co-educated students. This hypothesis is grounded in the belief that the environment of the co-educational school which more clearly mirrors the environment of the 'adult world' will ease the transition into university.

The present finding of no significant differences in attainment between first-year university students who received co-education and those who received single-sex education does not support the abovementioned hypothesis. This finding does, however, accord with the studies of MacCracken (1969) and Miller and Dale (1972) which revealed no consistent pattern of difference between students who had attended the two types of schools. Those differences which were found to exist were not statistically significant.

On a manifest level the present findings suggest that if difficulties in transition between school and university do exist, these difficulties

are not significantly more intense for single-sex educated students and thus do not differentially affect academic attainment at university level. However, on a covert level, taking cognisance of the findings at matriculation level, it becomes apparent that the significant lead held in the area of attainment by single-sex students does not seem to be maintained at first-year university level. This pattern may be regarded as tentatively suggesting that students from single-sex schools do find it more difficult to adjust to life and work in the co-educational university environment than students from co-educational schools. It is possible that the increased transitional demands on single-sex students result in their higher grades at matriculation level not being maintained. In line with this reasoning, one may be led to conclude that educating the sexes in separate institutions at matriculation level for the sole purpose of promoting superior academic attainment is short-sighted, as the advantage gained seems to be lost at the level of tertiary education.

The present researcher cautions against attaching too much significance to the abovementioned interpretation on the grounds that the design of the present research is cross-sectional and not longitudinal. A longitudinal study, which could perhaps employ broader measures of scholastic attainment, is needed to assess the credibility of this tentative interpretation.

Another interpretation for the present findings is that the transition from secondary school to university may involve a major intellectual readjustment which outweighs any possible secondary school differences. This interpretation derives support from the theoretical scheme of Perry (1968). In his book entitled 'Forms of Intellectual and Ethical

Development in the College Years', Perry outlines an intellectual developmental scheme which begins on entering university. Very briefly, Perry's scheme covers the transition through nine intellectual and emotional positions, from what he calls 'basic dualism' to 'committed relativism'. During this process students move out of the security of an authoritarian dualistic world to a position of seeing a multiplicity of possible truths. At this latter position, the student feels alienated, but finally moves through to the realization that she/he is free to choose and to commit herself/himself to a particular viewpoint. It is at this point that for the first time the individual student really sees the full extent of her/his essential aloneness, as well as the full extent to which she/he is responsible for making her/his life meaningful. The student thus realizes that she/he can no longer hope to derive her/his strength or academic structure from an external authority, and becomes responsible in a large measure for creating her/his own authority. This intellectual shift possibly precipitates an existential crisis, the intensity of which may mask possible differential effects of secondary education on the attainment factor.

7.4 Discussion of Findings Regarding the Achievement Motivation Factor

The finding of the present study that males in the total sample score significantly higher in achievement motivation than females, and that this difference is even more accentuated between co-educated male and female students, seems to indicate the existence of a sex role stereotype related to motivation to achieve which is exacerbated in co-educational schools. This significant difference in achievement motivation was

found to extend beyond the school to affect motivation to achieve at university level.

The present finding of a significant sex difference in achievement motivation which favours male subjects may be explained by the fact that despite recent explorations of alternative life-styles by a growing minority, most adolescents, particularly males, and their parents are committed to the belief that future financial security and status rests primarily in the hands of the male. Males are more likely to have to work for the greater portion of their adult lives and in most cases a family's financial security depends largely on the earning capacity of the husband and the kind of position he has. As a consequence of this parents, teachers and even peers are likely to play into the status quo by placing considerably more pressure on the achievement aspirations of males than on those of females. For females, identification with an adult role still unfortunately involves assuming successfully the roles of wife and mother and only secondarily, if at all, that of a career orientation (Bardwick 1971; Douvan 1966). It is probable that these factors in general cause females to set their achievement aspirations lower than males, although there are many notable exceptions.

There is another important factor accounting for the lower achievement motivation amongst females compared with males. According to sex role stereotypes, aggressive, competitive behaviour is more likely to be viewed as masculine, while affiliative, nurturant and interpersonally oriented behaviour is more likely to be considered feminine. Most vocational 'achievement situations', especially high-status positions, are competitive and owing to the fact that competition is often

considered by teachers, parents and peers to be a sublimated form of aggression, a girl who engages in vigorous competition, particularly with male competitors, may be viewed by others and by herself as 'unfeminine'. As a consequence of this, the female student, rather than fearing failure, may come to fear success. Margaret Mead (1939) expressed a similar view when she suggested that traditionally in our culture 'boys' are unsexed by failure and girls by success' (p 94).

Fear of success has been shown by Bardwick et al. (1971) and Horner (1969; 1972) to be clearly more characteristic of female than males. Horner (1972) describes a study in which freshmen and sophomore college students were asked to write a story to the cue 'After term finals, Anne, (and for men, John) finds herself (himself) at the top of the medical school class'. The stories of the female subjects tended to be characterized by three principal themes: The fear of social rejection, concern about one's femininity and denial. The response of fear of success occurred significantly more frequently for females than for males. A further finding of Horner's (1972) was that most females will explore their intellectual potential to full measure only when they are in a non-competitive setting and least of all when competing with males in a mixed educational environment.

The additional finding of the present study that co-educated females score significantly lower in achievement motivation than single-sex educated females, at both matriculation and first-year university level, seems to confirm Horner's finding that fear of success amongst female students reaches the greatest proportion in a competitive educational

environment which includes males. It thus seems that co-educated females are made most acutely aware of the sex role stereotype indicating the undesirability of entering into competition to achieve with males.

The full significance of the present findings on the achievement motivation factor, for both educational policy-makers and psychologists, is only fully appreciated if one considers the consequences of repression of one's potential to achieve, especially vocationally. Such repression or negation, in many cases, leaves the individual feeling, at best, frustrated and lacking in personal fulfilment and has a profound effect on her/his emotional being and may result in an existential crisis for the individual. Germaine Greer (1971) succinctly expresses the limitations placed on the self-realization of women, when she writes 'We know what we are, but not what we may be, or what we might have been' (p 69). The present findings suggest that the South African educational system may be reinforcing these limitations placed on females. There seems an urgent need to conscientize students, teachers and parents into becoming aware of the covert and overt application of these stereotypes which discriminate against the female student, especially in co-educational institutions.

The present researcher holds that the issue of achievement motivation amongst male and female students in co-educational and single-sex South African schools requires further investigation. Research employing different measuring instruments and objective criteria, such as number of students entering university from the different school types, would serve to affirm or challenge the present findings and interpretations, which are of deep significance for both the policy of co-education and psychology of women.

7.5 Discussion of Findings Regarding the Heterosocial Adjustment Factor

During the latter years of middle childhood, children grow increasingly interested in socializing with each other. Initially social groups are limited to same-sex peers. From the age of thirteen or fourteen, however, most boys and girls become preoccupied with social activities and experimentation with peers of the opposite sex. It is during the secondary school years that the adolescent must learn adequate heterosocial skills, how to converse and play social games and the appropriate courtship behaviours. As they become older, adolescents must become skilful enough to break away from the large mixed peer group, which is characteristic of ages fourteen to sixteen, and form foursomes and twosomes, which allow for a more intimate relationship.

Numerous studies made of the social problems of adolescents have revealed that the 'boy-girl' problem is the most serious of all (Wile 1930; Butterfield 1939; Elias 1949; Mooney 1949; Cole 1954). Since by adolescence, the person is in the school environment more than she/he is in the home environment, or any one other environment, one would expect the school to exert a major influence on the heterosocial development of the adolescent. Havighurst (1953) has described the school as being the 'social laboratory' (p 34) of the adolescent, in which social skills towards the opposite sex are modelled by staff and older students and experimented with by the adolescent within the school context. This theoretical rationale led the present researcher to hypothesize that co-educated students would be significantly better heterosocially adjusted than single-sex students. This hypothesis was tested at both matriculation and first-year university level.

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7.5.1 Discussion of Findings at Matriculation Level

Co-educated male matriculation students were found to be significantly better heterosocially adjusted than single-sex educated male matriculants. However, no significant differences were found between female matriculants attending these two school types.

The present findings regarding heterosocial adjustment seem to confirm the findings of the only other research which indirectly tapped this issue. Dale (1964) administered the Mooney Problem Inventory to a very large sample of boys and girls between fifteen and seventeen years of age. Dale found that co-educated boys indicated clearly fewer problems in overall total at both fifteen and seventeen years of age and this finding verged on statistical significance. The differences between the two groups were found to be most marked in the area of 'school problems' and continued in the area of 'boy-girl' relationships. As regards the two groups of girls, Dale found that co-educated girls indicated slightly more problems in the boy-girl area, though this was far from statistically reliable.

The first issue that emerges from the present findings and which demands explanation is the differential effect of school type on heterosocial adjustment according to the sex of the subject. A possible explanation for this finding is derived from the fact that traditional childhood and early adolescent experience generally provides girls with a greater degree of competence in heterosocial situations than boys. This is because for most girls sexual behaviour involves incorporating sexuality into a social role and an identity that already includes capacities for tenderness and sensitivity. For

most boys, however, the pathway to mature heterosocial behaviour involves sexuality first, and only secondarily does the capacity for concerned tender and loving sexual relations develop. Thus cultural stereotype and parental and peer socialization emphasize, to use Reiss' (1973) terms, 'body centered' sexuality for the male and 'person centered' sexuality for the females. Thus, during adolescence, both boys and girls learn to incorporate sexual behaviour into their gender roles, but the ease with which this done is different for each sex. From this explanation emerges the distinct possibility that boys rely more heavily on the social environment of the secondary school than do girls in attaining satisfactory heterosocial adjustment.

Another possible explanation for the finding that the school environment seems more critical for boys than for girls in influencing heterosocial adjustment is the different social stereotypes which exist in our culture and which dictate the societal expectations of the two sexes in heterosocial relationships. Jerome Kagan (1964) has described the social stereotypes of males and females in our culture as follows: '... In sum, females are supposed to inhibit aggression and open display of sexual urges, to be passive with men, to be nurturant to others, to cultivate attractiveness.... Males are urged to be aggressive....sexually assertive, ... and suppressive of strong emotions, especially anxiety' (p 143). It thus seems that there is pressure on boys to initiate social contact and to be assertive in maintaining such contact, while the girl is allowed and even expected to assume a passive role in the initiation and maintenance of heterosocial relationships. It thus seems likely that the school environment functions more critically as a 'heterosocial laboratory'

in the development of the adolescent boy, thereby resulting in significantly lower heterosocial adjustment in boys who attend single-sex secondary schools and are in a large measure denied much heterosocial experience.

Additional support for the interpretation that males seem to rely more heavily on the heterosocial environment of the secondary school in learning to relate to the opposite sex, than do females, is derived from a consideration of the different maturational paces of the sexes. It is common knowledge that girls mature socially more rapidly than boys and this results in the sexes being chronologically equal, but developmentally unequal. This more rapid social maturation of girls leads to them tending to be dissatisfied between the ages of fourteen and eighteen with the attentions of boys their own age. It thus seems likely that girls in the senior classes rely more on heterosocial experiences outside of the school for learning adequate and acceptable heterosocial patterns. This results in the effects of school type on heterosocial adjustment being minimized in the case of girls. For boys, on the other hand, the situation is practically reversed and the secondary school environment plays a major role. In comparison to co-educated boys, single-sex educated boys do not only lack heterosocial experience owing to the artificial segregation of the sexes, but are in addition subjected to pressures by society, films and the media to perform as aggressive, assertive young lovers full of physical and emotional confidence with the opposite sex. All these societal expectations combined with a lack of heterosocial experience seem to result in heterosocial inadequacy and hesitance in initiating and maintaining contact with females amongst single-sex educated males.

In sum, the present findings on the heterosocial adjustment factor at matriculation level indicate that the secondary school environment is not a significant factor influencing adjustment in females. For males, however, the heterosocial tasks of adolescence seem to be assisted best by sending them to co-educational schools where they meet the opposite sex on equal terms, work with them and under the supervision and guidance that the school will provide, become able to make their adjustment under safe conditions. The significance of this finding is fully appreciated only if one remembers that satisfactory resolution of the heterosocial tasks of adolescence has a profound effect on later life adjustments.

7.5.2 Discussion of Findings at University Level

The finding in the present study of no significant differences in heterosocial adjustment between first-year university students who received co-education and those who received single-sex education does not support the hypothesis that the heterosocial environment of the university will result in significantly more adjustment problems for university students who received single-sex education.

A possible explanation for the present findings is that since adjustment and attainment have been found by other researchers to be positively correlated (Von Aarde 1967; Leibowitz 1971), it is probable that only those matriculated students who are adequately adjusted gain access to university by obtaining a sufficiently high academic matriculation standard.

The issue of a possible selective factor operating whereby only the better emotionally adjusted students gain access to university requires further investigation in a longitudinal study. This

selective process may be found to account for no significant differences between co-educated and single-sex students being apparent at university level.

A further explanation for the finding of no significant differences at university level may be that psychology students form a very select and hence limited group, and that, had a larger sample been used, significant differences may well have been found. In addition, the 'boy-girl' sub-scale of the Mooney Check List is limited as a measure of heterosocial adjustment in that the results yielded depend on the extent to which the individual herself/himself is aware of her/his problems and is willing to acknowledge them. Thus, regarding heterosocial adjustment the hypotheses generated by the present researcher require systematic evaluation on a larger and more representative sample. There is also a need for the construction and validation of a comprehensive scale to measure heterosocial adjustment.

7.6 Overview and General Discussion

The previous chapters of the present dissertation have clearly indicated that the adolescent period of development has been relatively neglected in both the research and practical aspects and instead 'a romance with infancy has gripped child psychology over the past decade' (Scarr 1979, p 180). However, psychologists and educationalists have begun to realize that adolescence constitutes a critical transitional period of development, often crucial to the individual's socialization adjustment and later achievements in life. Like other transitions in life, the adolescent period involves a number of important readjustments. Since by the time the individual reaches

adolescence, she/he is in the school environment more than in the home or any other environment, the school may be expected to exert a powerful influence on the individual in assisting with the resolution of her/his developmental tasks. In line with this realization, the concept of education has been broadened to include not only that which is formally taught, but also concern with the social and emotional aspects of the individual student.

It is with regard to the influence of the secondary school years in assisting with the resolution of adolescents' developmental tasks that the debate on the relative merits of co-education and single-sex education assumes a position of prominence. It has been shown by Dale (1966; 1967; 1968), in his extensive attitudinal research, that the communities of the single-sex and co-educational schools differ considerably from each other, in tone or atmosphere. It thus follows that each community must be exerting different influence on the attitudes, emotional well-being and social development of the students comprising them. How strange it is, therefore, that the study of these differences has been so neglected in the South African context, allowing educational policy in this regard to be determined by historical evolution and culture. In addition, the lack of research findings in this area has meant that the protagonists on each side of the debate have been left to argue the issue with few facts and much prejudice.

Research which has been conducted on the relative merits of co-education and single-sex education has been chiefly concerned with measuring the effects on intellectual development of students (Tyson 1929; 1927; King 1966; Sutherland 1961; Dale 1974). These studies, which are of British and Irish origin, measured the academic

attainment of students in the two systems, using differenc examination criteria as the standard of comparison. The findings of these studies indicated no clear or consistent pattern of difference in attainment at matriculation level between students receiving co-education and those receiving single-sex education. However, as the previous chapters have indicated, these studies are fraught with methodological shortcomings which the South African State Educational System bypasses. It was thus felt by the present researcher that a study on attainment in the South African context would provide a significant contribution of research facts. The only other study comparing attainment in single-sex and co-educational schools in the South African context was conducted by Van Aswegen (1975) and his research was con ned to female students and complicated by an uncontrolled urban-rural factor.

In addition to the deficit and methodological shortcomings of research on the influence of co-education and single-sex education on intellectual development, one crucial aspect of such development has been completely overlooked by these researchers. The variable which is felt to constitute an important dimension in intellectual development and which has not been assessed is the achievement motivation factor. The women's movement in America has unleashed a stormy issue with the discovery in the studies by Horner (1969; 1972) of fear of success in women which was found to constitute a self-fulfilling prophecy insofar as it inhibits females from succeeding or even seeking success. Fear of success was found to be intricately linked with the sex role stereotype of wife and mother into which females are socialized. Since Horner's research was conducted in

mixed-sex competitive educational and professional environments, it becomes important to compare the phenomena in different educational settings in an attempt to identify the factors exacerbating it. Fear of success or low motivation to achieve has important psychological consequences, as individuals who repress their intellectual potential are often left feeling frustrated and lacking in personal fulfilment.

It is in the area of intellectual attainment and achievement motivation at matriculation level that the present research yielded findings of significance for psychology and education in general, and more critically for the psychology and education of women.

The first finding of importance is that single-sex matriculation students score significantly higher on measures of intellectual attainment than do co-educated matriculation students. The generally lower level of intellectual attainment in co-educational schools revealed in this study has serious implications, if one considers the competition for increasingly scarce college facilities and the importance of attainment in this regard. In addition, the actualization of one's intellectual potential is a critical factor in contributing to a sense of emotional and social well-being. It thus becomes evident that to deny females the full development of their intellectual abilities by keeping them to the level of the more slowly intellectually maturing males, which seems to occur in co-educational schools, is to perform a gross disservice. In addition, to expect males to compete at an age where they are anxious to impress and are evidently handicapped, results in lower achievement than educating them under less threatening conditions present in single-sex schools. It is thus important that, in the current enthusiasm for the development of the whole person and

the accompanying emphasis on emotional adjustment, the importance of intellectual attainment should not be minimized.

The second finding of significance, regarding the effects of co-education and single-sex education on intellectual development, relates to the achievement motivation factor. Single-sex educated females were found to score significantly higher in achievement motivation at both matriculation and first-year university level than co-educated students. This seems to indicate that co-educated females are socialized into fearing success or even ambition significantly more than single-sex educated females. This finding lends support to the argument of the feminists (Horner 1969; 1972; Dowling 1982) that traditional sex role stereotype and its role in inhibiting even the motivation to achieve in females are more profound in mixed-sex competitive environments. It thus seems that the charge of the feminists that females are discriminated against throughout their school lives has very real ground in co-educational schools and concomitant serious implications for the policy of co-education.

The findings of the present study in the area of intellectual development at matriculation level indicates that co-education is inimical to the development and actualization of the individual's intellectual potential. Despite this finding, advocates of co-education may, however, issue a reply that, even recognizing this fact, single-sex education should not be regarded as the preferred system, as it probably results in as many difficulties in the psychological, social and heterosocial realms of development, as it alleviates in the intellectual realm. It is to the findings which emerge from the present study relating to this issue that we now turn our attention.

Despite its importance, research on the comparative effects of co-education and single-sex education on the psychological and social adjustment of adolescent students has been very neglected and is limited to the studies by Atherton (1966), Dale (1971) and Van Aswegen (1975). Although these surveys revealed no significant findings, a crucial aspect of development, namely, heterosocial adjustment was left unassessed. Furthermore, in the South African context research on psycho-social adjustment as relating to co-education and single-sex education is limited to the study by Van Aswegen (1975) which was restricted to females. The present research was designed to provide a thorough and systematic assessment of psychological, social and heterosocial adjustment of male and female students attending co-educational schools and those attending single-sex schools.

The only significant finding emerging from the present assessment of psycho-social adjustment was that co-educated matriculated males were found to be significantly better heterosocially adjusted than single-sex educated matriculated males. This suggests that the heterosocial tasks of adolescence seem to be assisted best in males by sending them to co-educational schools where they are given the opportunity to meet the opposite sex and under the supervision and guidance that the school provides is able to make their adjustments under safe conditions than would otherwise be possible. For females, however, the co-educational or single-sex nature of the school was not found to be an important factor influencing adjustment.

A general consideration of the findings at matriculation level reveals that the argument of the protagonists of co-education that

single-sex education may result in as many problems as it alleviates is only a 'half-truth'. This argument can only be applied to the heterosocial adjustment of males. For females this argument does not hold and, as the present findings indicate, they are possibly better off in single-sex educational institutions. The present findings furthermore suggest ~~that co-educated females are~~ contributing significantly to promoting heterosocial adjustment in their male counterparts and yet at the same time are having to inhibit and sacrifice both their motivation and ability to achieve. How familiar this picture is with females once again making huge sacrifices to provide ego strength to their male contemporaries! In the Cinderella Complex, Collette Dowling asks the following question: 'Could it be that women actually make themselves unsuccessful? Could it be that concern about men and love and emotional security .... is holding us back' (p 157). The present findings on the achievement motivation factor suggest that the answer may well be 'yes', for 'rather than risk a life without love' co-educated females will give up a great deal - drop-out, turn their backs on their ambition, flee anxiously into anonymity' (Dowling 1982, p 159).

Considered together, the findings of the present study at matriculation level indicate that single-sex education seems the preferable system for females, as it promotes significantly higher achievement motivation and actual attainment than co-education. The picture for males presents a double-bind type situation with single-sex education being the more favourable system in regard to promoting academic attainment and co-education being more favourable in promoting heterosocial adjustment. It is thus clear that all sub-groups, with

the exception of single-sex educated females, are sacrificing opportunities to develop optimally in at least one critical developmental area.

In addition to the importance of the secondary school environment in assisting with adolescent development, a second query comes to mind when comparisons are made between co-educated and single-sex educated students. This is the question of whether any distinctive influence of these systems lasts beyond school so as to affect attainment and development at university. The present research was designed to include a pilot study to investigate this issue by comparing psycho-social and intellectual development of first-year university students who received co-education and those who received single-sex education. This is the first time the question has received attention in the South African context. Furthermore, in Britain, Dale's (1972) research was designed to assess only intellectual attainment.

The only significant finding resulting from the present investigation at first-year university level, was that of a significant difference in achievement motivation between co-educated and single-sex educated females, in favour of the single-sex educated females. One may question whether the non-significant findings on the other measures indicates that the systems of co-education and single-sex education have no influence on later life adjustment. The present researcher feels that to accept this interpretation unconditionally would be incorrect as the sample used in the present study was small and psychology students constitute a very select group. This question thus requires further investigation on a large representative student sample. In addition, since the variables of psychological adjustment and attainment have

been found by other researchers to be highly correlated (Van Aarde 1967; Leibowitz 1971), a selective factor may thus account for the present findings. It may be that only those matriculated students from both co-educational and single-sex schools who are adequately psychologically adjusted score sufficiently high enough academically to gain access into university. This would then mean that the influence of secondary education on adjustment would be significantly underplayed.

The present researcher maintains that the question of whether any distinctive influence of co-education or single-sex education lasts beyond school to affect adjustment and attainment at university, would be best measured in a study of longitudinal design in which the correlation between subjects' scores on the dependent variables is explored.

CHAPTER 8

LIMITATIONS OF THE PRESENT STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

8.1 Measurement Instruments

A very real difficulty in the present study was the quantitative appraisal of the multiplicity of variables existing in psycho-social adjustment and intellectual development. This is a problem common to all social research and may be partly overcome only with the development of more adequate measurement instruments and operations. In the present study psycho-social adjustment was defined by four particular instruments, namely, the Bell's Adjustment Inventory, the IPAT Anxiety Scale, the Coopersmith Self-Esteem Inventory, and the Mooney's Problem Check List. This does not, however, mean that adjustment per se has been measured. Theoretical propositions cannot be subjected to empirical appraisal without measuring operations; however, one can never be certain that the yielded measurements of the instrument are equivalent to the definition of the proposed characteristics. This means that the possibility of inherent limitations within the selected measurement instruments is recognized by the present researcher.

In addition to the inherent limitations of all measuring instruments, the 'boy-girl' sub-scale of the Mooney's Problem Check List as a measure of heterosocial adjustment was further limited in that the results yielded by it depend on the extent to which the individual herself/himself is aware of her/his problems and is willing to acknowledge them. There is thus a need for the construction and validation of a

comprehensive and sensitive scale to measure heterosocial adjustment.

The intellectual development of subjects in the present study was measured by

(i) the Mental Alertness Scale of the High Level Battery,

(ii) the Achievement Sub-scale of the Edwards Personal Preference and by

(iii) the final examination marks at matriculation level in English, and

(iv) at first-year university level in Psychology One.

While the present researcher recognizes that English results in the Matriculation Board examination are a limited criterion for assessing academic attainment, this criterion was adopted, as the present system of standard grade and higher grade subjects makes averaging the final marks in all subjects meaningless and English is the only subject written on the higher grade by all English-speaking students. The choice of psychology final examination results as a measure of attainment at university level is also limiting. However, this, too, was the only subject taken by all students in the university sample. In addition it was felt that the combination of these examination marks with scores on the Mental Alertness Test, yields a composite measure of attainment.

Thus, as regards measurement instruments, the limitation of the present research indicate the following suggestions for future research in the area of co-education and single-sex education:

(a) the development and application of a comprehensive and sensitive scale to measure heterosocial adjustment;

(b) the construction, by means of weighting the scores on subjects written at matriculation and university level, of a composite score reflecting academic attainment.

8.2 Subjects

Although the initial sample tested for the purposes of the present research was very large, the stringent control over subject variables which was introduced by the present researcher meant that the final matriculation and university samples included for analysis were not very large. However, despite this, the present sample size was felt to be sufficiently large to yield meaningful findings. Methodological rigour was felt to be a more important criterion than a large sample in which many important factors, such as age, socio-economic status, and parental marital status are left uncontrolled, thus yielding meaningless findings.

The present researcher does, however, feel that the university sample, which was confined to students taking Psychology One in their first year, is restricted, as these students constitute a select group. Since the university study was intended to constitute a pilot study into the area, this sample seems adequate. However, future research in the area should include a broader spectrum of university students in their analysis, so as to yield findings which are more representative of university students as a whole.

8.3 Methodological Factors

There is one subject variable which is relatively simple to control and may be of interest to measure in future research. This variable is the constitution of sibling groups, that is, whether the subject is an only child, belongs to a single-sex sibling group or belongs to a mixed-sex sibling group. This is a factor not accounted for in the past and present research and may be of importance to assess. For example,

one may hypothesize that subjects who are the only child in the family or who belong to same-sex sibling groups and are educated in single-sex institutions will be the least well adjusted group on the heterosocial personality dimension. Owing to the lack of heterosocial experience with siblings in the home, these groups may rely more heavily on the environment of the secondary school for heterosocial experience than subjects from mixed-sex sibling groups.

There are many forces which help to determine whether a school is good or bad or merely mediocre and although this is not the place for a comprehensive review of them, their mention should help to keep matters in perspective. The well-being of a school naturally depends to a great extent on the personality of the head, or of a few key people. The extent of this influence will, in turn, depend partly on the interaction of these leaders with the personalities of the rest of the staff, and the interaction of both leaders and staff with the type of student at the school. In a co-educational school several major factors are added - the interactive influence of boys and girls, of male and female teachers and even of students with male and female teachers. These add a new dimension to the school community, a dimension which springs from the roots of human nature and is perpetually at work - the influence of one sex on another.

The present findings of no significant differences between the groups at first-year university level may be attributable to the possibility that only those students who are adequately psychologically adjusted attain a sufficiently high academic standard in matriculation to allow them access into university. Future research should thus

be directed to exploring this issue in longitudinal perspective and should indicate the correlation between subjects' scores on the dependent variables.

8.4 General Directives for Future Research

The findings of the present research indicate that it is in the areas of intellectual achievement, achievement motivation and heterosocial adjustment that the differential influences of co-education and single-sex education on development are most manifest. Strangely, though, it is precisely the areas of achievement motivation and heterosocial adjustment that have been overlooked by researchers in this area. Perhaps the neglect of these developmental areas in research has been due to the fact that no completely satisfactory measurement instruments have been constructed for their measurement. There is thus a need for the construction and validation of comprehensive scales to measure achievement motivation and heterosocial adjustment, and the application of such scales to the fields of co-education and single-sex education.

CHAPTER 9

SUMMARY AND CONCLUSION

When considered together, the findings of the present study at matriculation level indicate that single-sex education seems the preferable system for females, as it promotes significantly higher achievement motivation and attainment than co-education. The picture for males, however, is not as clear with single-sex education promoting significantly greater academic attainment and co-education promoting significantly better heterosocial adjustment. With the exception of single-sex educated females, the present findings reveal that each sub-group included for analysis in the present study is sacrificing opportunities to develop optimally in at least one critical area. The group which appears to be the worst affected is the co-educated females, who seem to inhibit both their motivation and ability to achieve.

At this junction, psychologists and educationalists may retort in despair, 'Well what are we to do, given the fact that further research is clearly needed and that the policy of the Departments of Education in the four provinces is to follow co-education?'. In answer to this question, the present researcher recommends that, in addition to addressing themselves to further research, psychologists and educationalists begin to develop psycho-educational intervention programmes, which can be instituted in co-educational and single-sex schools in the appropriate areas. This suggestion should not be taken to mean that the present researcher believes that any one educational system can optimally

achieve all educational aims and answer all the developmental needs of adolescents. However, once serious limitations of one system relative to another are identified, some form of corrective intervention becomes possible and necessary.

The present findings at matriculation level indicate that any psycho-educational intervention programme for co-educational schools should include the following directives:

(i) All female students to be conscientized to the phenomena of 'fear of success' and 'gender panic';

(ii) Feminist literature to be included in school libraries and efforts to be made to secure instructional materials, including textbooks, which favourably portray women in non-traditional roles;

(iii) Sensitize all staff to the issue of sexism and to what are discriminatory practices.

Only if such a programme is developed and instituted will the system of co-education gain credibility, for the present findings indicate that, as it presently stands, co-education promotes the development and achievement aspirations of males to the neglect of those of females and this has concomitant important psychological repercussions.

In regard to single-sex educated males, the finding of significantly lower heterosocial adjustment when compared to co-educated matriculation males suggests the need for the development and institution of a psycho-educational intervention programme which should include the following directives:

(i) Bring the issue of heterosocial difficulties into the open in informal counselling sessions. This will allow for the sharing of difficulties with peers and staff and lead to them becoming normalized.

(ii) Develop extra-curricular activities in the secondary school environment which are designed to include females. This will assist with and increase the frequency of heterosocial contacts.

It is interesting to note that authorities at some single-sex schools for boys in Johannesburg have already introduced relatively unstructured heterosocial programmes. However, the introduction of such activities has been based on informal observations of staff at these schools. Findings such as those from the present study provide a firm research foundation for these trends. In addition, the present findings provide directives for the development of clearly structured psycho-educational programmes in this regard.

A further recommendation arising from a consideration of the findings in the present study is the development of a parent programme aimed at enhancing parent awareness of potential limitations of each type of educational system and counselling in connection with possibilities in the areas of prevention and remediation. Such programmes could be offered both before the type of secondary school is selected for the student and during her/his secondary school years.

Taking cognisance of the findings and inferences from the present study and the related literature, it seems that the decision as to which type of educational system should be selected for any adolescent is a highly individual one and should take account of:

(i) the personality characteristics of the individual

(ii) the values of the adolescent and the parents. In regard to males, a decision as to whether one places greater value on academic attainment than heterosocial adjustment becomes necessary when considering the alternatives of single-sex education and co-education

(iii) the sibling structure of the family. Co-education may be the recommended system when the sibling structure is single-sex. This possibility should be considered and research is required on this issue.

In line with the view that the choice regarding co-education or single-sex education is both delicate and critical, the present researcher feels that the present system in South Africa of departmental allocation to schools in accordance with geographical zoning, should be revised and the real differences, advantages and limitations of the systems of co-education and single-sex education should be publicized and brought to the attention of the public. This would allow a decision with regard to co-education or single-sex education to be made, taking into acount the abovementioned factors, rather than on the basis of culture, tradition or prejudice.

APPENDIX A

BIOGRAPHICAL QUESTIONNAIRE

Please complete this form. In completing the form circle the appropriate answer - for example - if your answer is 'yes' then mark it as follows: (YES)/ NO. It is important to understand that the word 'co-education' refers to schools attended by both boys and girls while 'single sex school' refers to schools attended by either boys or girls.

Name of school:_____

Name:_____

Age: _____Years _____ Months

Sex :_____

Father's occupation:_____

Mother's occupation:_____

Suburb in which you live:_____

Number of brothers and sisters:_____brothers; _____ sisters

School type: Co-educational_____; Single-sex_____

Have you attended the present school since standard six? YES/NO.

If no to the above was your previous high school co-educational or single-sex? Co-educational_____; Single-sex_____

Was the primary school/s you attended co-educational? YES/NO

Subjects chosen for Matriculation and level on which examinations will be written : (Please list)

Subject: Level:

_____

_____

_____

_____

_____

_____

APPENDIX B

BIOGRAPHICAL QUESTIONNAIRE (STUDENT FORM)

Please complete this form. In completing the form circle the appropriate answer - for example - if your answer is 'yes' then mark it as follows (YES) / NO. It is important to understand that the word 'co-education' refers to schools attended by both boys and girls while 'single-sex school' refers to schools attended by either boys or girls.

Name :_____

Age :_____ Years _____ Months

Sex :_____

Father's occupation : _____

Mother's occupation : _____

Suburb in which you live:_____

Numbers of brothers and sisters:_____ brothers; _____ sisters

Type of primary school attended: Co-educational; Single-sex

Type of high school attended: Co-educational; Single-sex; Both

Did you proceed straight from matriculation to university? YES / NO

Is this your first year at university? YES / NO

Degree for which you are registered _____

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