

**THE INFLUENCE OF PARENTAL CAREER INTERESTS ON
ADOLESCENTS' CAREER CHOICES.**

DALENE PHILIPPA SHER

A dissertation submitted to the Department of Psychology, Faculty of Arts,
University of the Witwatersrand, Johannesburg, in partial fulfilment of the
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DECLARATION

I hereby declare that this dissertation, which is being submitted to the Department of Psychology, Faculty of Arts, at the University of the Witwatersrand, for the degree of Master of Arts in Industrial Psychology, is my own work, and that it has not been incorporated in any thesis submitted for any degree at this or any other university.

Dalene Sher

Dalene Sher

On this the 31st day of January, 2000

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ABSTRACT

The impact of parental interests on their children is a very important aspect of the career decision-making process of adolescents. The aim of this study was to find further support for this claim on knowledge, exploring the influence of both the mother and the father.

If parents have any influence over their children's career choices, one expects a high congruence between their interests. To investigate whether parents impact on career choices of their children congruencies in interest based on Holland's (1985) model were analysed. According to Holland, an individual's occupational interests are classified by means of a three-letter code, with each letter representing one of six personality types - Realistic, Investigative, Artistic, Social, Enterprising, Conventional. Therefore, three-letter codes obtained from the results of girls' and their parents', and boys' and their parents' completed Self-Directed Search Questionnaires, formed the basis for investigating congruencies. The Iachan Index (1984) was used to interpret raw data - a precise technique for the assessment of the degree of agreement between any two three-letter codes.

The mean agreement scores for the mother-daughter, mother-son, father-son, and father-daughter groups did not point to a close match between pairs of three-letter Holland codes, regardless of single sex or pre-educational schooling. The only significant difference in mean agreement scores between these groups was between the father-son and father-daughter groups - fathers are more congruent to sons than daughters in their interests. Resultant mean agreement scores between three-letter codes and occupations of mothers and fathers did not point to a close match. This

superficially does not support Holland's (1985) theory of vocational choice that one's occupation must fit one's interests. There was also no significant difference between mean agreement scores of mothers and fathers in this regard, supporting research that Holland's (1985) theory is relevant to the female population. Cross-tabulations revealed that females aligned themselves most frequently with the Social Type, and males most frequently chose the Enterprising Type. This result was in accordance with previous studies and popular theory on sex stereotypes.

The conclusion was drawn that no generalisation can be made about whether parents do or do not have an influence on their children's occupational interests and subsequent career choices.

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1. INTRODUCTION AND RATIONALE FOR THE STUDY

Today, work is considered to be one of the major facets of an individual's life, and over the last few years theories have emerged to try explain why people choose to do the work they do. Only in the late 1800's did theorists start to question the nature of career choice (Wortley, 1995). Before that, choosing a career involved far less choice, and there were fewer external factors to influence vocational interests. The scenario of sons following their fathers into the same occupations as apprentices, and girls following their mothers' footsteps of marriage and home-building, is one that was familiar in years gone by, but certainly not today.

Gati (1991) points out that the importance of interests in choosing a satisfying area of study or occupation was recognised long ago, and that interest inventories were found to be a useful way to learn about peoples' interests. An individual's interest profile, which portrays the relative attractiveness of various occupational titles or activities, is one of the basic sources of information used by career counsellors (Miller, 1994). Furthermore, the counsellor's interpretation of an individual's interest profile is strongly influenced by his or her particular perception of the structure of vocational interests (Wortley, 1995). Thus, the structure of vocational interests has implications not only for vocational theory but also for career counselling practice (Gati, 1991). This structure refers to the relative similarity among groups or clusters of occupations, called fields in Roe's (1956) terminology, or among interest/personality types, in Holland's (1985) terminology (as is particularly important in this context). Holland characterised people in terms of personality types to which they belong, and interests, and environments in terms of the dominant type of people in them.

What is of interest in the current study, and what is the reason for undertaking the current study, however, is where vocational interests and occupational preferences come from. Authors in this field of inquiry offer mixed views as to the nature of the relationship between vocational interests of children and parental influence over these. Whether it is that such researchers as Ginzberg, Ginsburg, Axelrad and Herma (1951) are correct in saying that individual development is a precursor of occupational development, or whether Tiedeman and O'Hara (1963) are right that career development is a process arising through the interaction of the individual's personality with the demands of society, or whether Donald Super (1978 cited in Wortley, 1995) was correct in his belief that one chooses an occupation which would allow one a role in life most consistent with one's self-concept, one cannot dispute the parent's role in all of these. A parent influences a child's development by the nature of the parent-child relationship; a parent influences a child in the socialisation process by merely living together; and a parent influences a child's self-concept also by the mere nature of a family relationship.

However, these are merely assumptions without evidence as to their generalisability. Since parents are the primary role models in their children's lives (Sdorow, 1994), it would be easy to make these assumptions, but to glean more information about the exact nature of the relationship, and to aid in the process of career counselling, an important research question then is to investigate whether parents have an impact on the vocational interests and choices of their children.

2. LITERATURE REVIEW

2.1 Parents as Influencing Agents of Children's Interests

In Reber's Dictionary of Psychology, interest is defined as:

"One of those terms that slipped unnoticed into the technical vocabulary of psychology, especially educational psychology. Its meaning is loose at best and at one time or another has been used to imply all of the following: attention, curiosity, worthiness and desire.

Most authors merely follow their intuitions in its use, it's hard to go wrong"

(Reber, 1985 p363).

Therefore it appears that the concept of "interest" has been manipulated and interpreted to suit the needs of whoever has come into contact with it. Evidence emphasising the lack of clarity surrounding this issue can be found in abundance throughout the literature; Wortley (1995) even suggests that amongst all the psychological constructs, it is "possibly the most researched and of the most occupational significance", although, "even here, however, it is not always certain what we are testing" (p24).

Perhaps the most comprehensive treatment of interests to date has been put forward by Berdie (1946). He sees interests as: "factors within an individual which attract him or repel him from various objects, persons or activities within his environment" (Berdie, 1946 p305). He also goes on to say that interests are in the affective domain and that the feeling that they invoke have to

be inferred from behaviour or expressed preferences - things in which one is interested normally elicit positive feelings, while things in which one has little interest elicit little affect, and things in which one is totally disinterested elicit feelings of aversion or apathy (Murphy and Davidshofer, 1994). For example, some people enjoy debate and discussion, other individuals can take it or leave it, and still others are so averse to such an activity that they actually hate it.

Berdie (1946) also proposes that other criteria are involved in determining interest in any particular area. Some may be:

- Persistence and activity (particularly if these are voluntary and not otherwise rewarded).
- Success in an activity (presumably due to persistence and practice).

Another equally important characteristic of interests that is worth noting, is that they differ in terms of their specificity (Super, 1973). The usual conception of interests is that they are tied to specific activities or objects such as interest in painting, interest in sport, or interest in music.

However, much broader domains of interest have also been identified including interest in figures, interest in art, interest in society and humanitarian interests, or even scientific interests.

Within the occupational domain, measures of specific interests (eg. Economist) have tended to be more useful and beneficial than measures of general interests (eg. Business) in predicting future occupational choices and satisfaction (Murphy and Davidshofer, 1994).

What should have become evident to the reader throughout the above discussion, is how interchangeably the concepts of personality and interest can be used. These domains certainly seem to be related. In fact Holland (1985) went as far as to propose that there is no fundamental difference between personality and interest measures.

What is not clear, is where these so-called interests originate from. Interest development seems to have been a severely neglected area of research in the literature. Campbell and Hanson (1991) observe:

"Strange as it may seem, almost no knowledge exists about the ways in which various patterns of interests develop. Virtually all the previous research has concentrated on the technology of measuring interests, describing group characteristics, determining the degree of predictability of vocational behaviour ... Little has been done to learn how different patterns of interest form in the first place." (p3).

Anna Roe (1956) was the first to investigate the origins of interests using a psychoanalytic model. She attempted to relate personality to early life experience, and to show the manner in which interests and occupational choice in turn arise. She proposed that a child's early needs, and the degree to which they were or were not satisfied determines ultimate personality information. Roe believed that psychic energy would be channelled into various directions within a child, as a result of parenting style.

It is here then where one needs to introduce the nature-nurture debate. That is, do interests arise from nature's inner promptings, without external guidance, or is socialisation responsible for interest formation, as Roe suggested in her inferences about parenting style on children's interest formation?

A century ago Francis Walton insisted that "nature prevails of nurture" (Holden, 1987 p598).

Today, those like Walton who believe that heredity moulds personality, assume that evolution

has provided us with inborn behavioural tendencies that differ from person to person (Buss, 1990). Research in behavioural genetics has shown that even newborn infants exhibit differences in temperament - some are emotionally placid, while others are emotionally reactive (Matheny, Riese and Wilson, 1985). But how might these differences in temperament contribute to the development of differences in personality and interests? The answer is that they may affect how infants respond to others, and how people respond to them in turn because of their temperament. Consequently this may predispose infants to be less or more sociable depending on the responsiveness of others towards them, and this then lays the groundwork for later personality traits and interest formation (Sdorow, 1994).

Another argument for the nature side of the debate provides the strongest support for the hereditary basis of personality and interests. One finds it difficult to dispute studies which have focused on identical twins that have been reared apart, and still exhibit very similar personality characteristics and interests. In addition, Montessori (1949) argued that it would be wrong to assume that children are whatever we make them to be, for children also learn and develop on their own, from their own maturational promptings

But on the other side of the debate many are still adamant that genetics alone cannot be the sole influencing factor on the development of people's interests. Piaget's (1966) argument focuses on the importance of the environment in shaping children's interests. The evidence, he says is in the fact that children who grow up in impoverished rural communities frequently develop at a slower pace because they lack intellectual stimulation. Children are always encountering events that capture their interest and influence them in various ways. It may not be that the environment which nourishes, stimulates and challenges the child is only parental in nature,

children themselves build cognitive structures out of whatever they are exposed to (Crain, 1992). Similarly developmentalists are under the opinion that the environment reinforces and controls behaviour to a considerable extent, but still maintain that in the crucial instances a child's thoughts, feelings, actions and interests develop spontaneously from within, and that interests are not exclusively patterned by the external environment (Crain, 1992).

Bandura's (1986) theory of personality stresses the concept of reciprocal determinism which reflects the belief that neither personal dispositions nor environmental factors can by themselves explain the behaviour of human beings. This differs from environmental determinism which was favoured by Skinner (1974 cited in Sdorow, 1994), and psychic determinism favoured by Freud (1965 cited in Sdorow, 1994). Both these concepts assume that a person is merely a behavioural pawn. Environmental determinism assumes that individuals are pawns controlled by external influences, and psychic determinism assumes that individuals are pawns controlled by unconscious internal motives. Instead Bandura assumes personality traits, environmental factors (such as role models and social training practices or socialisation), and overt behaviour all together affect one another in the formation of interests.

It may seem strange to debate these issues in a discussion about parental influence on children's interests, since it seems obvious that whether it be by virtue of nature and genetics through which interests are passed on, or by socialisation, parents would naturally be involved in either scenario. What is not obvious, however, is the process that occurs wherein children's interests tend to be vastly different to their parents' interests. The current author puts forward that perhaps, in such cases, the argument for nurture must win, for it is possible that children are exposed to many other influencing socialisers besides their parents - the media, peers, teachers,

and even differing schooling systems. This possibility is important in this study since we cannot neglect the fact that children from different educational backgrounds are exposed to differing methods of education by virtue of the schooling system.

Crain (1992) points out that as one enters a different kind of environment (offered by different schools), not only is the environment suited to meet a typical individual's physical needs, but social and cultural environments persist within that environment which try to induce the individual to behave in a supposedly proper manner. This is definitely evident when considering single-sex schools which cater specifically and exclusively for their pupils, largely based on the sex of these pupils. And similarly co-educational schools provide a different environment for their mixture of pupils. Undoubtedly socialisation that may take place within a school (an atmosphere in which children spend most of their time) will be affected by the environment of that school. Sdorow (1994) even goes as far as to say that the psychosocial development of children, and subsequently their interest formation, depends on how parents approach child-rearing practices, and she believes that this includes the choice of schooling which parents make for their children.

2.2 Parents as Agents of Occupational Choice

A substantial part of the literature suggests that parents can affect children's self-esteem, self-competence, values, interest, personality and psychological orientation (Young, 1994). The child development and socialisation research has also long recognised the pervasive influence parents

have on all aspects of human development, and this includes career development (Otto and Call, 1985). After an extensive review and synthesis of the literature about what young children know about careers and about developmental career awareness, Birk and Blimline (1984) concluded that parents are primary determiners of children's career choices. A host of studies were cited to support their conclusion, for example, in the research by Pallone, Hurley and Rickard (1973), and Steinke and Kaczowski (1961) most adolescents listed their parents (usually the same-sex parent) as most responsible for their career choice.

In a research project involving over 76 000 male college students, Werts (1968) found that fathers both directly and indirectly encouraged sons to have occupational interests similar to their own. Werts and Wailey (1972) found that fathers influenced both sons and daughters as to permissible choices of occupations. Alden and Seinerth (1979) asked a sample of 1 470 students to rank order the people having the most influence on their career choice. Parents were ranked as the most influential, followed by friends, teachers, counsellors and siblings. Almost a decade later, Kortlik and Harrison (1989) found parents to impact on the career choices of children more than student counsellors (or guidance teachers), teachers, friends, other relatives, or people working in the child's self-stated field of occupational interest. Davies and Kandel (1981), in a study of adolescents' perceptions, also found that parents have more influence on their children's educational and occupational aspirations than do the children's best friends. Basow and Hower (1979) found that parental role models were most influential in affecting the career choices of university students.

Similarly, in a study by Palmer and Cochran (1988) who were investigating the effectiveness of a programme of career planning for parents in order to help their adolescent children, they

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reported several studies which show that as fundamental figures in the lives of developing individuals, parents have a large influence on the career development of their children (Brachter, 1982; Schoffner and Kleimer, 1973; Schulenberg, Vondracek and Crouter, 1984). For example: Gulick (1978) showed that parents view themselves as the central figures in their children's career development and tend to want to play an active role. Eirk (1979), Burke and Weir (1979), Mitchell (1978), Roberts (1979) all concluded that children expect their parents to be important influences and so turn to them for help with career planning. Weishaar, Green and Craighead (1981) discussed the significant influence of parents on their children's career plans, and Grotevant and Cooper (1985) similarly found that parents significantly influence their children's career development.

Although the literature on adolescents of the past few decades has argued that young people are involved and integrated in youth cultures that have little regard for parental interests and values (Otto and Call, 1985), more recent reviews (eg. Young, Friesen and Borycki, 1994) of the literature give increased evidence of the influence parents and families have on young people's development in terms of future occupations.

Otto and Call (1985) conclude that:

"Young people tend both to share their parents' interests in the major issues of life and also to turn to them for guidance on most major concerns. The concept of parent-child alienation as a usual feature of adolescence is a myth". (p65)

Young (1994) points out that often some parents may experience an inner conflict between wanting to exert some form of influence on their children's lives, and at the same time they do not want to provide too much direction, or to impose their own occupational interests and preferences. Many parents have a range of suitable and acceptable occupations to which they would like their children to aspire. This is much like the acceptable range of occupations proposed by Gottfredson (see Gottfredson, 1981 for further information on the range of acceptable occupations). In addition, parents believe that they can lay a suitable groundwork for the successful career development of their children by influencing them broadly and imploring them to be responsible and capable and hard-working (Trusty, Watts and Erdman, 1997).

Parents have used many different types of activities to influence their children's career development and subsequent career choices. Some provide their children with information pertinent to various occupations, others make suggestions based on personal experience, and still others leave the choice of an occupation totally up to their offspring in the belief that it is each individual's right to decide on a future life as they wish (Young, 1994). But what parents do not realise is that despite all their efforts socialisation and unconscious activity forces them to influence the choices their children make in general, and subsequently about career direction.

It is important to note that although parents report that they do not want to influence the specific occupational choice of their children (Young, 1994), parents do influence children's development, not necessarily by playing an overt role, but by their own attitudes on the subject, their own interests and personalities, and a number of early socialisation influences that affect the process of children's later formation in a somewhat more passive fashion (Inman-Amos, Hendrick and Hendrick, 1994).

The literature reviewed points to the need to establish whether parents have a passive role (through the transmission of personality traits and interests) in impacting on their children's career development, rather than a more active role (such as coercing a son or daughter to follow in the exact occupational footsteps as that of the parent). If parents do have any influence over their children's career choices, it may be that it is the personality similarities and similarities in interests of the parents and their children that causes such an influence. In fact, personality theorists (such as Roe, 1956) have been pointing out for years that the personality of children is directly related to the personality of the parent (especially of the same sex) (Sdorow, 1993).

Roe and Siegelman (1964) found:

“...no support for any general hypothesis of a relationship between early parent-child interaction and specific occupational choice. There are, however, some suggestions of relationships between early parent-child interactions and later attitudes towards persons, and some further suggestions that this has played a part in the choice of a few occupations”. (p9)

In general, research has provided convincing evidence that children's career development is influenced greatly by the parents. Miller and Form (1964 cited in Birk and Blimline, 1984) even identified the “accident of birth” as a deciding factor in determining children's eventual occupational choices. The “accident” establishes family, race, ethnicity, social status, sex, and educational and cultural opportunity. In other words, the environment into which a child is born sets the stage for future career choice. Within the environment, there are factors by which the child “accidentally”, and not necessarily by his/ her own free choice becomes influenced. It is this that vocational and occupational psychologists need to remember in their work with adolescents

trying to decide on occupations, and the rest of their lives.

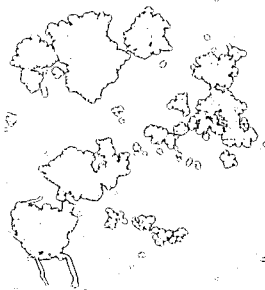
However, one cannot assume that merely because a child is "accidentally" born to parents with differing cultural and social backgrounds, it is the parents that are the influencing agents in their children's careers. Erikson (1980) and Piaget and Inhelder (1969) were cited in a study by Miller's (1994) to show that previous research had indicated a clear similarity between parents and children's personalities (and subsequently interests), but not specifically as it applies to the field of vocational counselling. Wortley (1995) suggests we should be weary, as vocational counsellors to depend too much on the child's background information for clues as to where a child's future career lies. Other investigator's such as Schneider, Ryan, Tracey and Rounds (1996) are emphatic in their position that although the opportunities presented to a child at birth by his/ her parents, set the stage for development, career choice is based on much more than what the parents offer. In fact, it is based on the type of education they are exposed to, their social world, the interaction with popular media, and generally the influence of the greater environment outside the family.

No matter which view is correct - whether it is parents who have an influence over their children's career choices, or whether children's career interests are determined by the environment at large - we need to pick one side of the argument and establish its credibility. The argument for parents has been chosen in this research so as to be able to say either that parents do or do not influence children's career choices by virtue of their interests, since to examine whether the greater environment of the child is a daunting task with too many facets to be considered. With the method chosen here one has the chance of excluding parents as influencing agents of children's career choice, if this is what is proved by the ensuing study.

2.3 Holland's Theory of Vocational Interest

In order to understand how people choose their work and educational environments in order to gain satisfaction from them, it is important to view certain models that explain the processes involved. In turn, making the correct vocational choice is critical in optimising a person's individual productivity and self-actualisation (Wampold, Ankarlo, Mondin, Trinidad-Carrillo, Baumler and Prater, 1995). Therefore, what is needed to explain the existence of a relationship between a parent's occupational interests and personality, and those of a child, in relation to career choice, is a theory which focuses on these factors specifically. Holland (1985) stated that vocational theory must be based on an assessment of personality and interest dimensions. From the discussion of how interests are conceptualised, the current author proposes that Holland's theory of vocational interest is not only ideally suited, but is a fitting theoretical framework on which to base the ensuing study.

John Holland attempted to integrate the domains of personality and interest into a comprehensive and easily understandable theory of vocational choice. He felt that existing vocational knowledge was not useful due to its disorganised nature, and therefore advocated the development of a map, or rather, typology of persons and occupations to guide people in using this information (Holland, 1966). Holland added that any previous attempts at theorising were aggravated due to the misconception amongst researchers, that theoretical proposals required careful, extensive planning. He disagreed with these ideas and unashamedly turned to speculation in an attempt to stimulate new theory building:



"I admit that I have frequently gone well beyond the data; however, I feel that there is as much risk in creeping empiricism as in idle speculation" (Holland, 1966, p. 1).

Unlike the major writers before him who had differentiated interests from personality (eg. Strong (1943), Berdie (1960), and Super and Crites (1962)), Holland hypothesised that the choice of an occupation is an expression of personality. In this regard, he points out via a longitudinal study performed in 1962, that expressed vocational preferences could sometimes be moderately correlated with self-ratings on certain personality traits, and with specific scales of personality tests. Holland continues and draws our attention to various writers whose statements, although often tentative, have suggested the need for a more comprehensive view of vocational preferences and interests:

"Bordin (1943) for one, proposed that 'interest inventory scores are measures of self concept'; others have maintained that 'vocational choice is the implementation of a self-concept' (Super and Crites, 1957)" (Holland, 1966, p. 3).

It was Holland who inevitably got to the heart of the matter when he suggested that there is no fundamental difference between the questions in personality and interest inventories. He argued that there is no basis on which to differentiate, conceptually, the measures derived from these questions. "In short, what we have called 'vocational interests' are simply another aspect of personality" (Holland, 1966, p. 3).

Holland (1985) put forward several hypotheses upon which his theory is based:

1. The choice of a vocation is an expression of personality.
2. Interest inventories are personality inventories.
3. Vocational stereotypes have important psychological and sociological meanings.
4. The members of a vocation have similar personalities and similar histories of personality development.
5. Because people in a vocational group have similar personalities, they will respond to many situations and problems in similar ways, and they will create characteristic interpersonal environments.
6. Vocational satisfaction, stability and achievement depend on the congruence between one's personality and interests, and the environment in which one works.

For each of these hypotheses Holland has provided evidence and convincing argument in support of their acceptance (Holland, 1985).

But still the essential premise to Holland's theory is that interests and personality are the same, and it is a particular personality structure that leads one into a particular occupation. Personality, as Holland (1985) sees it involves the needs or emotional life of humans, and includes the dynamic factor of interests. Holland (1985) organised the worlds of occupational interests and personality traits in his model of vocational personality types. He assumed that vocational interests are an important expression of personality (Costa, McCrae and Holland, 1984 cited in Tokar and Swanson, 1995). The environment of an occupation is also determined by the personalities of those in it, and so the attraction to an occupation is primarily by the similarity to the people within the vocation (Wortley, 1995).

Holland's view is that characteristics making up a personality suited to a particular occupation are created through preferred activities, interests, competencies and values (Holland, 1985, Huang and Healy, 1997). Several theories in vocational psychology indicate that the variables that determine how people choose to cope with the world of work are abilities, interests and values - defining what the person can do, likes to do, and considers important to do (Crites, 1969, Osipow, 1983, Weinrach, 1979 cited in Nordvik, 1991).

Holland (1985) has explained how people fit into the working world by using the assumption that there are certain combinations of human attributes which correspond to categories within the working environment. Holland's theory predicts, and has been substantially verified (eg. Holland, 1992, Spokane, 1985, Wampold et al, 1995), that vocations are sought out according to the personality, interests and abilities, as well as the environments that will allow the expression of these qualities. Therefore, his idea that people can be categorised meaningfully as one of six personality types which are typically differentiated in terms of vocational interest, is quite useful in the field of occupational psychology (Strahan and Severinghaus, 1992). Holland's theory further explains that people must be categorised in this way because people will only be satisfied in an environment or occupation to the extent that they have similar personalities and interests to those people within that area (Schwartz, 1992). Congruence, according to Holland (1985), is a measure of interpersonal similarity in a given environment which is made up from the personality types within his model.

Over the years Holland's publications have shown substantial development in his ideas concerning these vocational groups as he studied them (Wortley, 1990). Overall the six personality types to which all people can be characterised as resembling one or more of, are the

Realistic type, the Investigative type, the Artistic type, the Social type, the Enterprising type, and the Conventional type. His understanding of these types are based on a series of empirical studies on the structure of vocational interests, as well as a result of several construct validation studies, and an unswaying belief that personality is absolutely fundamental in choosing a career (Goh and Leong, 1993).

Holland (1966) speculates that the types reflect common outcomes of growing up in a Western culture. A person's resemblance to each of the six model orientations is referred to as his/ her occupational personality pattern - the model that an individual mirrors most closely being his/ her personality type:

The Realistic Type (R), shows a preference for working with tools, objects and machinery. He is typically physically strong with good dexterity, motor co-ordination and skill, but with an aversion to the social, cultural and creative spheres, perhaps even lacking verbal and interpersonal skills (Holland, 1966). This kind of person prefers to work in an environment of a mechanical, agricultural, electrical or technical nature where abstract problems are found to be interesting. Individuals who enter or prefer the following occupations resemble this type: electrician, aircraft mechanic, plumber, toolmaker, engineer, farmer etc. (Gevers, du Toit and Harilall, 1997).

The Investigative Type (I), prefers to think rather than to act out problems and work on ambiguous tasks (Holland, 1966). He/ she is interested in investigating systematically phenomena in the physical, biological and cultural spheres, and uses scientific and mathematical skills in a task-orientated environment (Gevers et al., 1997). Careers suited to the investigative

type include physicist, biologist, mathematician, anthropologist, astronomer, geologist and chemist.

The Artistic Type (A), likes an environment in which he/ she is free to achieve creativity and individualistic expression. His/ her skills are of the artistic kind - those that are related to self-expression in language, music, art, drama, and can be intraceptive and not very well-structured or physical in nature (Gevers et al, 1997). Occupations relating to this type are those of author, actress, interior decorator, journalist, musician, architect and poet.

The Social Type (S), is social, humanistic, religious, and enjoys working with people through education and care (Holland, 1966). The personality is characterised as needing attention, possessing of verbal, educational and interpersonal skills, and feeling in its work. Problem-solving usually involves oral debate and not particularly highly ordered analytical thinking. Occupations that may interest this type are nursing, psychology, teaching, and social work etc.

The Enterprising Type (E), possesses the skills needed for selling, dominating, leading, and taking part actively in an enterprising manner in the business world or in public life. This type is interpersonal in his/ her relationships, specialising in persuasion and oratory abilities in work that requires long periods of intellectual effort (Gevers et al, 1997, Holland, 1966). Most likely occupations would include law, politics, sales and business (managers, executives, producers, directors).

The Conventional Type (C), likes activity that is ordered and structured whether tasks are in the numerical or verbal spheres (Holland, 1966). He/ she enjoys working with and manipulating

data, and is averse to leadership roles, ambiguous situations and problems that require interpersonal and physical skills. Particular skills therefore, are rather those involved in clerical, computational and routine tasks. Thus preferred vocations would be accountant, clerk, bank employee, administrator, data inputter, typist etc.

People who enter the work environment which has the same type as their interest type according to Holland's model, are said to have made a congruent choice. These six idealist categories are the basis for the classification of all vocations. They are represented in a hexagonal structure that depicts their relationships with one another (in terms of corresponding attributes, interests and traits), and the degree of psychological similarity (Wampold et al, 1995) (See Figure 1.)

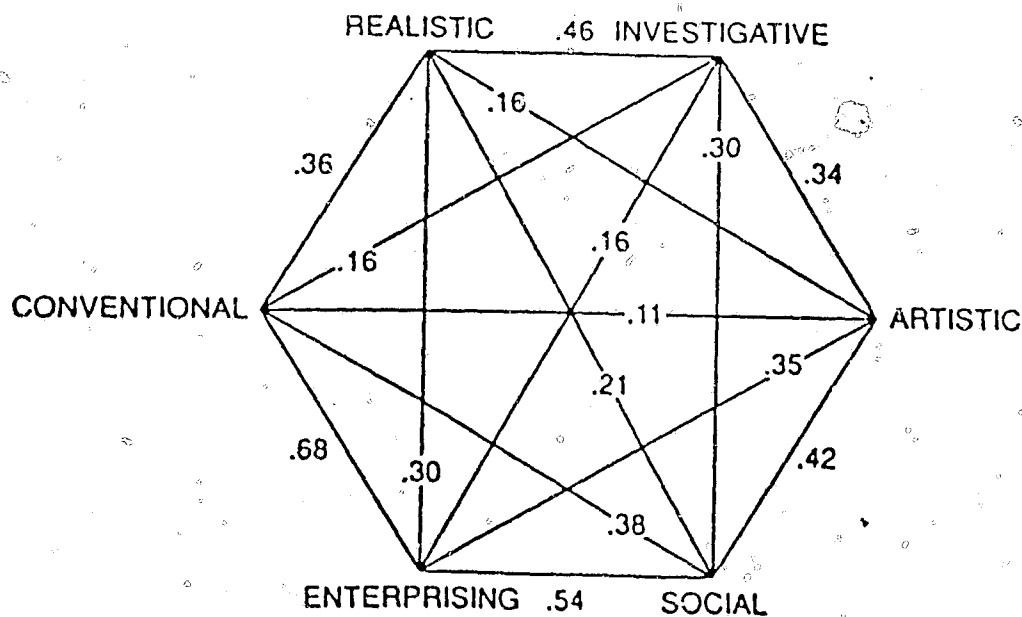


Figure 1. Holland's hexagonal model of personality-interest constellations (Holland, Whitney, Cole and Richards, 1969, p8).

More commonly known as the RIASEC hexagon, it is assumed that adjacent types are most similar and those at opposite ends are least similar (Holland, 1985). Research has shown (eg. Cole and Hanson, 1971, Rounds, Davison and Dawis, 1979, Swanson, 1992, Tracey and Rounds, 1993) that the hexagonal model is an adequate representation of the interrelations between Holland types. For example, the enterprising and social types are next to each other because these types like to work with people and have many interpersonal skills, whilst the investigative and artistic types are close together because they prefer to be intraceptive and asocial (Holland, 1966).

The hexagonal model has been primarily used in guiding individuals to careers compatible with their interests and personality dispositions (Betz, Harmon and Borgen, 1996, Prediger, Swaney and Mau, 1993). The hexagonal structure has implications for:

- a) stability, consistency and predictability of interests, where individuals with interests closer together on the hexagon should show greater stability in interests and vocations than those with less proximate interests; and
- b) performance and satisfaction in occupations, where individuals in occupations who have a better fit or congruence between their interests and the occupational environment should have more favourable vocational outcomes (such as greater career satisfaction and achievement) than individuals who have a lower degree of interest-occupation fit.

Thus, as Tracey and Rounds (1993) point out, Holland's hexagonal structure of types and work environments "provides an easily grasped means of understanding and integrating interest and occupational information with respect to the similarity of types and occupations and provides as well predictions regarding optimal person-environment match" (p230).

Holland's theory has been investigated by large-scale psychometric research which has given it considerable empirical support (eg. Holland, 1985, Osipow, 1983, Nordvik and Brovold, 1988 cited in Nordvik, 1991). The theory is widely considered one the most influential career development theories and occupational taxonomies in vocational psychology (Tracey and Rounds, 1993). Johnson (1987 cited in Miller, 1991) also pointed out the significance of the numerous clones of Holland's taxonomy within the marketplace, testifying to its practicality. Furthermore, Holland's typology of vocational interests has been found to be compatible with a number of other typologies. Super (1957 cited in Patterson, 1992) for one, arrived at several interest groups which closely resemble those put forward by Holland, ie. Technical, Material, Scientific, Musical or Artistic, Literary Humanistic or Social Welfare, Business Contact and Business Detail.

In addition Holland's hexagon has shown consistency in almost 700 studies and over 30 years (Prediger and Vansickle, 1992). However, this is not to say that Holland's model is perfect and has not been critiqued in any way. There is evidence that does not support Holland's view that personality and interests play a role in occupational choice, and some researchers went as far as to say that people are too complicated to belong solely to the simple types proposed by Holland, and that most individuals are really a mixture of all the types in varying degrees (Gati, 1991, Meir, 1973, Morrow, 1971). One study which raised such a concern was done by Thomas and Robins (1979 cited in Wortley, 1990). It looked at the moves of 61 middle-aged men in the managerial and professional fields who had changed occupations. Contrary to Holland's hypotheses, most did not move into occupations most congruent with their occupational interests or personality types. Those who had entered more congruent occupations were not more satisfied with their new careers than those whose careers turned out to be not as congruent.

Although many studies, based on several instruments and numerous groups of subjects, seem to support Holland's hypothesised hexagonal arrangement of personality/ interest types, some authors such as Gati (1985, 1991) do not agree exactly with Holland's theory and typology. Instead, they believe that a person's interests are separate, not equal to, personality as Holland (1966, 1985) proposed, and that to classify people in terms of the types represented by Holland's hexagon is too simple in explaining how people go about choosing a career.

In addition, if one considers that John Holland formulated his work using samples of young, mainly white, male, North American students, the generalisability of his theory to other racial groups, women and other non-Western cultures becomes seriously questionable. Even Holland (1966) concedes that this theory is based primarily on studies of men and is, thus, probably less useful for understanding the behaviour of women. He goes on to say that a special but closely related theory for women is needed. However, despite Holland's recognition of a need for future research in this regard, subsequent studies in the area have found that for samples of women and other cultures "the relationship of interests stayed the same, although the shape of the hexagon was often somewhat distorted" (Wortley, 1995, p53). An in-depth discussion of these studies in question is, however, beyond the scope of this study.

Despite this criticism of Holland's theory (and many other critiques of his research), it is still felt that Holland's model of vocational choice provided the most suitable framework on which to base the current study.

2.4 Previous Studies - those which need detailed review

Previous studies have attempted to find support for the theory that parents influence their children's ultimate career choice. One of the most noteworthy studies was done by Dr M.J. Miller (1994), wherein the aim was to extend the research on the relationship between parental personality and interest types and those of their children, as it relates to vocational counselling. His research was based on Holland's theoretical model, and was similarly backed up by Gottfredson (1981) and Roe (1956) whose arguments that parents are the primary determinants of their offsprings' career development, lent support to Miller's debate. According to the results of the study, Miller concluded that, "parents are role models who may affect their children's values and personalities as well as the focus of their aspirations" (p1399).

However, when considering the nature of the study done by Miller, the current author believes the results to be sceptical at best, and the study's reliability to be highly questionable. Not many explanations were given as to why Miller chose to use the methodology he did, and this leaves us with an ill-feeling as to whether the study was really saying what it did truthfully.

Firstly, the sample size was of forty parents along with their children, and according to Miller, for no other reason than for the ease of interpretation of the data, mothers were paired with their daughters and fathers were paired with their sons. Although this pairing has been seen to be appropriate in some of the literature (eg. Sdorow, 1993, see section on parents as agents of occupational choice), no such explanation was given. In addition, one wonders how Miller could have made such a sweeping generalisation as to say that parents do have an influence on their

children's career choices when the sample size was inadequate, and we are always advised as researchers by those research analysts such as Rosenthal and Rosnow (1991) that for results to be truly generalisable samples must be maximised.

Other issues within Miller's sample also need to be discussed. Since the sample was taken from a Caucasian population with teenagers described as college-bound, and all coming from the same age bracket, the sample eliminates confounding variables such as race and most likely socio-economic status - the teenagers being college-bound perhaps telling us their elevated economic status. He also neglected to inform us of any cultural or religious differences amongst the families in the study, or indeed where in fact he found the subjects in the first place (school, community service, religious group). This poses a problem as these are possible extraneous variables as well. Parents may raise their children in differing ways based on cultural or religious positions, and children are influenced by the norms that these affiliations bring with them, according to social learning theory (Sdorow, 1993). Culture is defined by Blem (1985) as a set of learned beliefs, values, attitudes, habits, and forms of behaviour that are shared by a society and are passed on to future generations. Parental attitude, interest and personality transmission may be influenced by a number of factors. These include general family cohesiveness, personality agreement between parents, and parental supportiveness of the child (Inman-Amos et al, 1994). Such factors occur in different degrees in different families, and certainly across different cultures. Apart from social and economic variables, culture can be seen as an important external or environmental variable which affects parenting influences and personality transmission (Van der Merwe and Van der Merwe, 1975). It is not certain, once again, if these factors were at all controlled for by Miller.

In addition, one is left to ponder whether the families involved in the study were stereotypical families with both parents in the same household with their children, or whether single-parent families were included. It has been suggested that role-modelling in the "atypical" family may be obscured, and that mothers in the single-parent family may have differing impacts on their daughters in terms of career choice than mothers in the typical family, and that fathers living away from their children may similarly exhibit such differential influence (McLanahan and Booth, 1989 cited in Trusty, Watts and Erdman, 1997). Miller did not state whether he'd taken into account that parents sometimes adjust and compensate for family transitions where one parent is absent from the household in which the children primarily live with the other parent (through separation, divorce, or death of a spouse), and that this may impact on how parents influence their children's career development, and possibly by how much (Trusty, Watts and Erdman, 1997).

Miller's study was based on the premise that if parents were to exert some significant influence over their children's career choices, then one would expect parents and children to show some similarity between their occupational personalities and interests. With the use of Holland's (1985) theory (discussed in the previous section) he set out to explore whether this concept is indeed applicable to the field of occupational psychology. However, the current author questions the manner in which Miller went about seeking to compare the occupational interests of parents and children. He says: "Each parent and child read specific descriptions of each of the six personality types outlined by Holland; they were asked to select the three types most descriptive of them" (Miller, 1994 p1388). This obscure method of obtaining data strikes the current author as not very professional in today's world of research. No specific scale was administered to subjects and thus there was no objectivity. It is quite possible that subjects chose types that seem

more popular or socially desirable, and according to Donald Super (1957, 1963, 1980 cited in Anastasi, 1993 and in Palmer and Cochran, 1988) adolescents of the age in Miller's sample are probably not at a sufficient stage of career maturity to be able to select a self-descriptive occupational type without the guidance that an objective measure would provide.

Although Miller's study seems to be seriously flawed, it has set the stage for further studies to clarify what he originally set out to accomplish in the field of career guidance. In a study by Sher (1998) an attempt was made to do just this. The researcher undertook a similar study to that of Miller (1994) in so far as she used the same underlying concepts and research question, but ruling out a large number of limitations inherent in Miller's study. Her hope was to achieve results based on a better standard of research. In addition, Sher's study tried to localise the concept that parents are influential in their children's career choices to the South African context. This was important since Miller's study was particular to the United States of America.

The hypotheses from the study by Sher (1988) stated:

- A. There is a congruence between the three-letter Holland codes obtained from mothers and their daughters on the completion of Holland's Self-Directed Search.
- B. There is a congruence between the three-letter Holland codes obtained from fathers and their sons on the completion of Holland's Self-Directed Search.

The results indicated that there was not a high congruence between three-letter Holland codes obtained from mothers and daughters, and from fathers and sons. However, it was found that

some congruence does occur in some of the pairs. Also, the trend noticed seemed to indicate a split in both groups. "About half of each group shows low agreement scores, while the other half exhibit high agreement scores" (Sher, 1998 p25).

These confounding results do not clearly answer the research question about whether parents' and children's three-letter Holland codes would be similar, and are also not in line with Miller's (1994) findings which indicated that high congruencies did exist between parent and child. The very high congruencies and the very low congruencies could result in the moderate means in agreement scores that were recorded. It appears that some mothers and daughters, and some fathers and sons show close occupational interests while others don't.

In the study by Sher (1998) children were paired with their same-sex parent since, as the literature indicated (eg. Birk and Blimline, 1984, Sdorow, 1993), children are more likely to model off their same-sex parent. But this may not be so if one looks at differences between children's and parents' occupational interests as low agreement scores indicate. The suggestion was that perhaps a child in a two-parent household will take something from each parent, especially since traditional gender roles are not perpetuated as strongly in today's environment as was previously the case. Or the child may model off the opposite-sex parent (Miller, 1994) for reasons such as primary caregiver, nonstereotypical gender-role positions within the household, working patterns or parenting style.

Interestingly enough what was noted in Sher's study was that some of the RIASEC personality types fell more commonly in the male group's codes, whilst others appeared more frequently in the codes of the female group. The Realistic and Enterprising types seemed to be more attractive

to fathers and sons, while the Social and Artistic types seemed to be more attractive to the mothers and daughters. Holland's (1966) theory proposed that this configuration is typical amongst males and females, and this facet of his typology will be discussed in the next section about gender influences on career choice.

Once again, however, certain limitations in Sher's study of 1998 confound the results somewhat, and consequently findings need to be looked at quite tentatively. One deficiency of the study was that the sample (N=210) was not sufficient. Ideally a larger sample would have given a more generalisable set of results. Perhaps also, the extremely abnormal or detrended distribution that was found in this study would have been given more meaning to in a more concrete manner with a larger number of congruence scores to work with. Further, the sample was not representative of the general South African population. The subjects were students and parents from two private single-sex Christian schools, and were from the upper socio-economic class, sample selection should preferably have included children who were students at co-educational schools, students from underprivileged backgrounds (or varying socio-economic status), and students from an array of cultural and religious backgrounds (controlling for these differences of course). This, however, was beyond the scope of Sher's study. Also, since only subjects who returned their questionnaires in a complete and suitable manner were used in the study, selection was not as random as one would have liked, and rather indicated a volunteer sample.

For the reasons that have been mentioned above, the current researcher chose to replicate the previous studies mentioned with the changes that have been suggested, and also by adding new dimensions to the main concepts so as to extend the field of vocational and occupational psychology even further.

2.5 Gender Influences on Interest, Personality and Career Choice

In the study by Sher (1998) mentioned previously, it was noted that some RIASEC personality types fell more commonly in the male group, whilst others appeared more frequently in the female group. More specifically, it was found that the frequency of males choosing the Realistic types was extremely high compared to that of females. This was also the case with the Enterprising type. As has already been discussed in the section on Holland, these personality types are most likely to find occupations such as electrician, mechanic and plumber, and politician, business associate and lawyer, respectively. In today's world these are typically and traditionally thought of as "men's" occupations. Although these fields may have been kept exclusively for the male ranks in years gone by, many females do enter these occupations nevertheless. In addition, the Social and Artistic personality types showed up much more frequently in the females' codes than in those of fathers and sons. Society seems to see those in the helping professions (Social), and those who are artistic as more feminine in nature, and the study by Sher (1998) seemed to indicate that the world's view may indeed be correct.

But, one must consider that Sher's (1998) study did not take into account the socialising effects of the schooling system. Since her study's sample was taken from two single sex schools, the schooling system may contribute to the stereotypical patterns found. Girls-only schools in South Africa, as well as boys-only schools, cater specifically for their students, and sometimes this means catering for their sex. A girls school is likely to offer home economics (cooking, sewing) as one of its subjects, and not woodwork, or mechanics that a boys-school would encourage their students to partake in. Perhaps girls show no interest in Realistic type activities merely because

they have not been adequately exposed or encouraged in them, and likewise it may be that boys in a boys-only school would be looked down upon if he were engaged in activities that may be considered too "creative".

It should be noted that Holland in his writings of 1966, did say that the Realistic type and Enterprising type should be seen as masculine, and the Artistic type and Social type as feminine. However, it would be misguided to continue in this vein without other evidence that gender (or rather the sex of children) is also an influencing factor on career choice.

Even though values may be changing, it seems that society still approves of traditional sex role behaviour in the home or at work, according to Chusmir and Koberg (1989). The distinction between male and female serves as a basic organising principle for every human culture. Although societies differ in the specific tasks they assign to the sexes, all cultures allocate adult roles on the basis of sex, and anticipate this allocation in the socialisation of their children (Prinsloo, 1992). Not only are boys and girls expected to acquire sex-specific skills, they are also expected to have or acquire sex-specific self-concepts and personality attributes, to be masculine or feminine as defined by that particular culture (Barry, Bacon and Child, 1957 cited in Bem, 1981). The process by which a society thus converts male and female into masculine and feminine is known as the process of sex-typing (Bem, 1981).

The universality and importance of this process is reflected in the prominence it receives in psychological theories of development, which seek to elaborate on how the developing child learns the appropriate "gender". In psychoanalytic theory the emphasis is on the importance of identification with the same-sex parent (Archer, 1986). In social learning theory the emphasis

is on the explicit rewards and punishments for behaving in sex-appropriate ways as well as the vicarious learning that observation and modelling can provide (Sdorow, 1993). In cognitive-developmental theory the emphasis is on the ways in which children socialise themselves once they have firmly labelled themselves as male or female (Kohlberg, 1966 cited in Bem, 1981).

But what is it that is learned? Clearly the developing child is learning content-specific information - the particular behaviour and interests that are linked with their sex. In most societies, this is a diverse and sprawling network of associations encompassing those features directly related to male and female individuals, such as anatomy, reproductive function, interests, attributes, personality, division of labour (Spence and Helmreich, 1981). As children learn the contents of society's sex-typing preferences, they learn which attributes are linked with their own sex and therefore themselves. This does not simply entail learning where each sex is supposed to stand on each attribute or personality, but involves the deeper lesson that attributes are actually differently applicable for each sex (O'Heron and Orlofsky, 1990). That is, adults in the child's world rarely notice or remark on how strong a little girl is becoming, or how nurturant a little boy is, despite their readiness to note these attributes in the "appropriate" sex. The child learns to apply this same selective way of thinking to him/ herself, and thus choose among the dimensions of personality and interests those which are only applicable to his/ her own sex (Bem, 1981).

Simultaneously, the child also learns to evaluate his/ her own adequacy as a person in terms of how society organises the sexes, to match preferences, attitudes, behaviour and attributes against prototypes which become prescriptive standards or guides for individuals. Therefore individuals are prompted to regulate their behaviour so that it conforms to the society's definitions of being

male or female (Forshaw and Shmukler, 1993). In this way it seems, cultural myths about sex-stereotypes become self-fulfilling prophecies, and this is how Bem (1981) came up with the concept of sex-typing.

Sex role behaviour within the concept of sex-typing is typified by the division of labour into male and female tasks, or by the exhibition of interests in areas deemed appropriate to the roles commonly assigned to men and women, according to Feldman and Aschenbrenner (1983). For instance, in line with her childbearing role in the family, a woman is expected to be interested in and nurturant towards people in the working world. Correspondingly, a man is expected to exhibit interest in economics and business, in accord with the breadwinner role!

There is also a general consensus (eg. Constantinople, 1973) that sex-typing also involves sex-related personality characteristics, and if one looks carefully at them, one might discover some of Holland's (1966) thoughts on personality or interest types coming through - men are meant to behave in ways that are instrumental (or operative/ mechanical), outward-orientated towards the world, and analytically problem-solving, while a female's behaviour is supposedly expressive and interpersonally directed. Personality traits are sex-typed in accordance with the expressive and instrumental orientation of the roles of being male or female (Feldman and Aschenbrenner, 1983). And since, as proposed in this dissertation due to the theory of Holland (1985), choosing an occupation is an expression of one's personality and interests, if one's sex affects one's personality and interests, then one's sex must in effect affect one's career choice.

Based on this premise, much research has investigated stereotypes related to sex in the workplace. Arkkelin and O'Connor (1992) cite early studies in which it was suggested that the

"good professional" is described as male (eg. Massengill and DiMarco, 1979, Powell and Butterfield, 1979, 1984, Schein, 1973, 1975), and it seems that even more recent research suggests that this bias continues in the workplace (see such studies as Brenner, Tomkiewicz, Schein, 1989, Heilman, Block, Martell, Simon, 1989, Schein, Mueller, Jacobson, 1989). Therefore it seems that some occupations are sex-typed, so that when people think of particular occupational roles (eg. nurse or manager) it triggers related male or female schemas, and as such sex-typed occupations reflect schemas about the various personality traits and interests considered typical of the individual in that role, based on an individual's biological sex (Arkkelin and O'Connor, 1992, Gottfredson, 1981).

But one must wonder who is directly responsible for encouraging children to become so sex-typed and see the world according to stereotypes of the sexes. It is not true that all children are sex-typed in their interests and behaviours, but regardless of how parents treat their children, their attitudes and interests, children still perceive that parents expect them to conform to gender role standards set by society, and so show preferences for interests based on what is supposedly sex appropriate (Albert and Porter, 1986). A recent review also supported earlier findings (Maccoby and Jacklin, 1974) that sex-role development is directly related to the differential treatment of parents to their sons and daughters (Lyott and Romney, 1991 cited in Sdorow, 1993). If one considers this view it seems important that Albert and Porter's (1986) study showed that children are more likely to model sex-typed behaviour off their same-sex parent. Their research found that children demonstrate a higher degree of sex-typing in regard to parents of their own sex, and thus it is believed that interests and personality (occupational or otherwise) would follow more closely those of the same-sex parent (Sdorow, 1993).

It is evident that if parents hold gender-differentiated perceptions of and for their children's competencies and interests, through self-fulfilling prophecies parents can play a critical role in socialising gender differences in their children's perceptions of themselves, their interests and acquisition of skills. And in the end the differences that emerge in interests and skills and perception influence the type of jobs and activities females and males seek out and qualify for. (Eccles, Jacobs and Harold, 1990).

In addition, since parents are not and can never be the only socialising agents in their children's lives, they are not the only one's who promote sex-typing. The educational system plays a large part in the lives of children, and it has already been mentioned that schools play a role in the sex-stereotyping of students. Bem (1983 cited in Dimitrovsky, Singer and Yinon, 1989) and others such as Gilbert (1981) have proposed that education promotes training along sexual stereotypes, and so locks men and women into their respective sex roles, limiting capacity and learning possibilities. And the type of educational system a child is exposed to also affects their degree of sex-typing. Quakenbush (1987) goes as far as to say that the traditional sex-typed person who is highly attuned to sex-appropriate behaviour usually emerges from single-sex schools where exposure to the opposite sex is limited, and that undifferentiated individuals who are less in tune with how they are supposed to behave according to their sex, are products of co-educational schooling where the sexes may not be exactly treated the same, but exposure to the other sex is evident.

Up to this point studies have found that "sex-appropriateness" has been a major referent by which children evaluate occupations for themselves (Birk and Blimline, 1984). If occupational choices continue to be influenced by sex-role stereotypes, then the career development process

is, unfortunately, not a process of choice, but one of meeting societal expectations. In the study by Birk and Blimline, they once again found that children indicated stereotypic preferences for occupations; that is, boys predominantly chose Realistic type occupations, and girls mainly chose Social type occupations. It therefore seems that if career awareness is to become free of sex-role stereotyping and if adolescents and adults are to consider for themselves a wide range of occupational choices, then early socialisation patterns must change.

However, one must also realise that recent research has been trying to focus more on the ways one's psychological gender is more important than biological sex as a determinant of what a "good professional" is, and how children should choose their career (Gevers et al, 1997), since sex-stereotyping is increasingly becoming taboo in the world of work and education.

2.6 Summary

When one links the literature back to the research question about whether parents have an influence over their children's career choices, one must emphasise that previous research has generally provided convincing evidence that the development of children is influenced substantially by the family, and especially by the personality and interests of their parents. This has been noted over many years by researchers who firmly believe that the environment in which a child lives and is accustomed to sets the stage for his/ her future life (Birk and Blimline, 1984). What is not certain, however, is whether this influence spreads to career choice. Within the environment there are various factors by which the child may accidentally and only sometimes by

choice become influenced in terms of occupational interests.

Of course it cannot be said that parental influence based on personality type and interests is alone in predicting children's career choice, but one is led to expect from the literature and previous studies that have been outlined in the literature review, that parents and their children should exhibit similar personality types and interests, and thus would be most satisfied in similar occupations characterised by these occupational interests. In addition one cannot expect that gender influences alone are accurate in predicting occupational interests or personality types of individuals as some of the literature suggests, but it is possible that this could be an area of influence.

In summary, the literature provides us with the information that parents probably do have an impact on their children's career choice since personality and interest structure is related to a choice of career, and parents seem to have an influence over these facets of their children's lives. It seems to be true that Miller's (1994) opinion holds some value, that it is strange that the role and influence of parents and personality or interests, and parental environment have been largely ignored by vocational counsellors in their work. It is also evident that despite repeated attempts to discover if parents influence their children's career choices through occupational interests, no study has successfully managed to give evidence that is grounded in strong research methodology. In addition, no research has included children from differing educational backgrounds, nor have both the parents of children no matter if they are girls or boys, been included in any studies of this nature.

Thus the current study was done to elaborate on the research on the relationship between parental personality types and occupational interests and those of their offspring by using Holland's (1985) theoretical model of occupational choice, and also to discover if the sex of a child has any impact on which occupational interests are chosen.

Also, since there is criticism for Holland's theory of vocational choice as outlined in section 2.3, it was thought that the current study would provide the ideal opportunity to assess its practicality for mothers and fathers of children involved in the study, and so once again determine if it holds any value that occupational interests should match chosen occupations, and whether the research is correct in saying the theory is relevant to both males and females.

With this in mind, the aims of the current study are laid down in clear-cut hypotheses to guide the research process:

3. HYPOTHESES

1. The mean index of agreement score between the Holland codes of mothers and daughters should point to a close match.
2. The mean index of agreement score between the Holland codes of fathers and sons should point to a close match.
3. The mean index of agreement score between the three-letter Holland codes of mothers and daughters should be significantly different and higher than that of mothers and sons.
4. The mean index of agreement score between the three-letter Holland codes of fathers and sons should be significantly different, and higher, than that of fathers and daughters.
5. The mean index of agreement score between the Holland codes of mothers and daughters, when daughters attend a single sex school, should be significantly different and subsequently higher than the mean index of agreement score between the Holland codes of mothers and daughters, when the daughters attend a co-educational school.
6. The mean index of agreement score between the three-letter Holland codes of fathers and sons, when the sons attend a single sex school, should be significantly different and subsequently higher than the mean index of agreement score between the three-letter Holland codes of fathers and sons, when the sons attend a co-educational school.

7. The mean congruence between the three-letter Holland codes of mothers' stated occupations, and the three-letter Holland codes derived from mothers' Self-Directed Search Questionnaire results, should point to a close match.
8. The mean congruence between the three-letter Holland codes of fathers' stated occupations, and the three-letter Holland codes derived from fathers' Self-Directed Search Questionnaire results, should point to a close match.
9. There is no significant difference between the mean congruence scores of mothers and fathers, as they pertain to stated occupations and three-letter Holland codes, as stated in Hypotheses 7 and 8.
10. Males in the sample (whether fathers or sons) should show a preference in their three-letter Holland codes for the Realistic and Enterprising Types above the other RIASEC personality types, and this should be most marked in sons who attend the boys-only school.
11. Females in the sample (whether mothers or daughters) should show a preference in their three-letter Holland codes for the Social and Artistic Types above the other RIASEC personality types, and this should be most marked in daughters who attend the girls-only school.

4. METHODOLOGY

4.1 Description of the Subjects and the Sample

Bohrnstedt and Knoke (1988) point out that a large proportion of social research is performed on a specific sample, or on a limited number of observations, rather than on observations of an entire population, for this would surely be impossible to accomplish. In this regard the investigator usually gathers some form of data on the same portion of all units of analysis, and ultimately wishes to be able to say something about the entire population from which the sample has been drawn. In other words, one would like to make generalisations about a whole class of cases even though one has observed only a few of these cases (Elifson, Runyon and Haber, 1990, Kaplan, 1964, 1987). In order to do this the researcher must carefully choose the manner in which the sample is to be gained. The best way to do this is through the method of random sampling which hopes to include most elements in a population that would allow for later generalisations. Unfortunately, this method of sampling was not conducive to this study, and the researcher had to rely on a convenience volunteer sample.

The sample for this study comprised of triads of individuals. That is, students were paired with their mothers and their fathers to form groups of three. In order to accomplish this, the researcher had to rely on specific schools to provide the students and their parents. Thus the sample was convenient because the settings were specifically chosen according to permission schools gave for participation in the study. The sample was also classified as a volunteer sample by the fact that only those individuals who returned completed questionnaires could be used in

this study. It should be emphasised at this point that those subjects who did in fact decide to participate in the study did so of their own free will and were not coerced to partake by the separate schools, by the researcher (who had no personal contact with subjects whatsoever), or in any other way. In addition, although the sample could not be totally anonymous due to the nature of matching that was inherent in the study, subjects were assured confidentiality as to the findings pertaining to each individual, and confidentiality has been successfully maintained throughout the study with only the researcher having access to subject names.

In the present study the total sample consisted of 513 subjects. This comprised of 42 male students from a single-sex school, and both their mothers and fathers (group 1), 40 female students from a single-sex school, and both their mothers and fathers (group 2), 40 male students from a coeducational school, and both their mothers and fathers (group 3), and 46 female students from a coeducational school, and both their mothers and fathers (group 4). Originally 100 questionnaires were handed out to the boys-only school, 120 to the girls-only school, and 150 in total to the co-educational school.

Three private Christian schools were used in this study - a boys-only school, a girls-only school, and a co-educational school. The co-educational school was included as a form of control group that controlled for socialisation that occurs in the schooling system. These schools were specifically chosen in an attempt to control for a range of confounding variables such as socio-economic status, religion and race. The issue of race is an important one in this instance because, as Ryan, Tracey and Rounds (1996) point out, it is not totally clear whether the instrument used in this study (the Self-Directed Search) is valid when applied to groups other than those on which they were validated. Even with the South African version of the SDS, it is safer to assess

only groups for which the instrument was originally validated - that is, the white population group. And thus we can only make generalisations about this specific group (and unfortunately making the content of the sample a limitation of the study).

Students from standards eight, nine and matric were selected for the study as it seems that students in this age bracket are most suitable in terms of career maturity as Super (1957, 1963, 1980 cited in Anastasi, 1993) explained it (see literature review for further details).

Table 1. Mean ages of parents and children.

	Mean Age (for group 1, group 2, group 3, and group 4 combined)
Students	16
Mothers	44
Fathers	47

Table 2. Mothers' Level of Education.

	Frequency	Percentage
Matric	79	45.7%
Undergraduate Degree	20	11.6%
Postgraduate Degree	28	16.2%
Diploma	39	22.5%
Other level of Education	5	2.9%

Table 2 indicates that quite a large majority of mothers of students in the sample have an educational level up to matriculation level. This was also in fact the case regardless of the school to which their children went.

Table 3. Fathers' Level of Education.

	Frequency	Percentage
Matric	56	32.4%
Undergraduate degree	27	15.6%
Postgraduate degree	49	28.3%
Diploma	30	17.3%
Other level of Education	9	5.2%

Table 3 indicates that fathers in the sample were distributed across a range of educational levels, with most falling into the matriculation category. This pattern was evident across each group ie. there was not much variation in the pattern no matter where the father's child went to school.

Table 4. Mothers' Schooling experience.

	Frequency	Percentage
Co-educational Schooling	84	49.1
Single sex Schooling	87	50.9

Table 4 indicates that mothers across the sample attended both co-educational and single-sex (girls-only) schools in equal proportion. Once again this pattern was seen regardless of what type of school mothers sent their children to.

Table 5. Fathers' Schooling experience.

	Frequency	Percentage
Co-educational Schooling	93	54.4
Single sex Schooling	78	45.6

Table 5 indicates that fathers attended co-educational schools in a slightly higher frequency than they did single-sex (boys-only) schools. Although this was the case across the sample, it was evident in the majority of groups that the proportion of fathers who experienced co-educational schooling versus those who attended schools only for boys was more or less equal regardless of the present schooling experience of their children.

As a final note regarding the composition of the sample, the researcher was forced to eliminate certain subjects from the sample. This was only done because of specific biographical details that did not comply with the study, and so could not be included for fear of confounding results. All in all only 8 triads of subjects were excluded for reasons such as: either mother or father had not completed the test (the Self-Directed Search); a step-father or step-mother had completed the questionnaire on behalf of the biological parent; biographical details were not filled in; or tests were left half complete or unreadable.

4.2 Description of the Instrument Used - the Self-Directed Search

Holland operationalised his ideas on the personality/ interest dimension in various inventories. He developed the Vocational Preference Inventory and the Self-Directed Search since he maintained that through the completion of such tests as these, it can be directly seen that "the choice of an occupation is an expressive act which reflects the person's motivation, knowledge, personality and ability" (Holland, 1966, p4).

The Self-Directed Search (SDS) was chosen for this study because it provides data in the form of three-letter summary codes which can be compared to one another. It is also in line with the aims of the study - to determine individual's occupational interests - since it measures occupational interests directly. The test also provides an objective scoring system restricting bias and contamination of the data (Gevers, Du Toit, and Harillal, 1997). Of course, the SDS was used by the researcher in order to establish continuity between the previous study conducted by Sher (1998), in which the SDS was the main testing instrument, and the present study.

John Holland originally developed the SDS in the United States of America in order to provide a questionnaire that would fit into the theoretical framework he had established about career choice (Gevers et al, 1997). Boyd and Cramer (1995) emphasise that the reason the SDS is one of the most effective, successful and widely used occupational interest questionnaires in the world, is because of its direct link to Holland's theory of vocational choice.

The SDS is relatively short in length, taking only approximately forty minutes to complete

(Isaacson, 1985). It is easy to administer to a large sample, and can be used in private, in large groups or wherever a person wishes to complete it (Walsh and Osipow, 1986). Experimental studies have shown that the SDS has the ability to increase an individual's self-understanding, improve on the number of vocational alternatives an individual considers, and contribute to an individual's satisfaction with current vocational aspirations (Holland, 1979 cited in Walsh and Osipow, 1986).

The first edition of the SDS was initially seen in 1970, and has been continuously revised since then, with the latest edition emerging in 1985. However, this was only for populations within the USA. Subsequently the South African Human Sciences Research Council adapted and standardised the SDS for the South African population in 1992, and this was the version that the researcher administered to participants. The format of the original instrument was maintained, but certain wording and language (amongst other changes) was modified to fit the nature of the South African population.

The instrument consists of 228 items (Tokar and Swanson, 1995) and is described as a self-administered, self-scored and usually self-interpreted career counselling instrument (Anastasi, 1988, Walsh and Osipow, 1986, Zunker, 1990) suitable for both high school pupils and more mature adults (Gevers et al, 1997). It is presented in the form of an assessment booklet (the actual test), as well as an occupational classification booklet which is used to interpret results of the test.

The actual assessment questionnaire requires a person to list vocational interests, rate him/herself in terms of abilities, and state preferences for various activities and occupations (Boyd

and Cramer, 1995, Anastasi, 1988), for each of the six RIASEC interest fields. More specifically, the sections call for responses in the form of "yes" or "no", which correspond to the responses of "like" or "dislike", and sometimes "have knowledge" or "no knowledge". These sections are:

- Section 1: Activities - items in this section deal with activities in the occupational world. For example, whether the individual likes to, or would like to repair motor cars, or whether they are indifferent to, or would not like to partake in this activity.
- Section 2: Competencies - items in this section inquire whether the testee has a working knowledge of the activity and whether he/ she can carry out the activity competently or efficiently. For example, whether the individual can competently change a car's tyres, or whether the individual cannot perform this activity, or does so poorly.
- Section 3: Occupations - items in this section deal with the feelings and attitudes of the testee towards a variety of occupations. The testee indicates those occupations that are felt to be interesting and those which are not interesting. For example, whether the occupation of a motor mechanic appeals to the individual, or whether this occupation holds no interest for the individual. It should be noted that very brief descriptions of the occupations, which are listed in this section, are given to assist the individual in making his/ her decisions.
- Section 4: Self-rating of abilities or skills - items in this section are arranged differently to those in previous sections. There are two groups each comprising six abilities or skills

which correspond to the six RIASEC interest fields. The testee is required to rate his/ her mechanical or manual, scientific or mathematical, artistic or musical, teaching and social and interpersonal, sales or managerial, and general clerical abilities on a six-point Likert-type scale. For example, the testee must say whether his/ her mechanical ability (fixing things, using tools and machines) is very low (1), low (2), low average (3), high average (4), high (5), or very high (6).

(Gevers, Du Toit and Harillal, 1997).

Once completed the questionnaire can be scored for each individual. The scoring system involves tallying items for which a "yes" answer was given, for each RIASEC interest field within each section. Thereafter summary scores for each RIASEC interest type are calculated (Anastasi, 1988), and those three types with the highest summary scores are incorporated into a three-letter Holland code, with the highest being in first position, the second highest in second position, and the third highest ranked last (Strahan and Severinghaus, 1992).

The use of this three-letter summary code varies according to the purposes of the investigator. In straightforward vocational guidance, the code would be used along with Holland's Occupational Finder (Prediger, Swaney and Mau, 1993) - an individual would look up his/ her code in such a manual, and would be given a representation of suitable groups of occupations according to his/ her specific summary code configuration. In this study, however, looking up suitable occupations in a manual corresponding to each three-letter code, does not fulfill the purposes of the study. Thus this section of the SDS is ignored in the present study.

Another use of the three-letter Holland summary code is to establish whether one's actual interests (as described by the SDS) match what one believes is the best occupation to enter personally and which is his/ her preference (obtained through self-report). Iachan (1984) suggested that by measuring the degree to which one's real and ideal occupational interests agree, one can guide individuals into better decisions about career choice. The procedure involves comparing the three-letter code from the SDS with the three-letter codes of occupations which an individual has expressed interest in. Alternatively, should the investigator wish to assess whether there is any agreement between the summary codes of various individuals, and what the degree of this agreement is, Iachan (1984) proposed that this could also be done with the results of the SDS. Discussion about how this can be done will follow in section 4.5.

The uses of the SDS and the raw data that it produces are many. This, however, is only made possible by its commendable reliability and validity. For the South African version of the SDS, the most recent research by Gevers et al (1997) found that the alpha scale reliability estimates for the SDS summary scales ranged from .92 to .94 for the male population, and from .91 to .93 for the female population.

Other studies on other versions of the SDS report differing reliability estimates. For instance, Boyd et al (1995) studied the 1985 revision of the SDS and reported alpha scale reliabilities for the six SDS scales as ranging from .59 to .91. But these did tend to cluster in alpha reliabilities closer to the .80's. Krieschok (1987 cited in Miller, 1993) reported a coefficient alpha ranging from .50 to .93 on the SDS, with most of the reliability scores falling between .83 and .93. Tokar and Swanson's (1995) study found that the internal consistency estimates for SDS summary scales range from .86 to .91 for young adult samples, and from .87 to .92 for older adult samples.

Overall reliability findings seem relatively consistent. Apart from some questionable measures in the .50 range which are not a good indication of suitable reliability measures, the other reported alpha reliability estimates indicate that the SDS (in whichever form or version) can, in fact, be considered to be more reliable than unreliable.

The validity of the SDS was tested over a four-year period by Miller (1991). He found that for 171 male Investigative-type college students, first-letter SDS summary codes predicted the students' college major, as well as their occupational plan four years later, in nearly 66.6 percent of the cases. Similarly, Tokar and Swanson (1995) found evidence of concurrent validity in the SDS instrument. This was indicated by the degree of agreement between a respondent's first-letter SDS summary code, and the first-letter summary code of their current vocational aspiration, or actual occupation.

Numerous advantages are evident for the Self-Directed Search. One such advantage is that an individual's resemblance to the occupational interest types of the assessment is determined in five different ways (hence the various sections of the instrument). Secondly, the SDS is used conservatively so that a permutation of scores is obtained on completion of the test, and not merely a score comprising of a single letter (Walsh and Osipow, 1986). Thirdly, the SDS is an inexpensive instrument, and it is an open inventory allowing the scale to be totally transparent, and so conveying to the test-taker an important message by him/ her simply taking the test. Fourthly, the SDS has been extensively used in a wide variety of settings, and has simultaneously generated considerable research (Anastasi, 1988). And lastly, its chief practical appeal comes from the SDS's brevity and simplicity, its feature of being self-administrable, and its role in aiding individuals to expand their career options (Gevers et al, 1997).

Since its publication a few years ago in South Africa, it has repeatedly undergone revision in order to simplify its structure and reduce biases related to gender and culture that may affect career decision-making (Gevers et al, 1997). Nevertheless, more information about the SDS is needed, and more data needs to be considered pertaining to the SDS about its use for women, minority groups, culturally diverse groups, very young teenagers, and adults (Zunker, 1990), in order to help researchers in their work.

(Please see Appendix A for the version of the SDS used in this study.)

4.3 Research Design

Christensen (1985) defines a research design as "the outline, plan or strategy specifying the procedure to be used in seeking an answer to the research question" (p155). Rosnow and Rosenthal (1991) qualify this by saying that the research design is thought of as a "blueprint that provides the scientist with a detailed outline or plan for the collection and analysis of data" (p69). The research design employed for the purposes of the present study is probably the simplest of the correlational designs, namely the non-experimental cross-sectional correlational design. It involves the observation of two or more variables at the same point in time and is said to be particularly useful in survey or field studies such as the present study, where control over subjects is difficult to acquire (Christensen, 1985). In this type of design, the researcher is interested in the co-variation between variables in order to establish whether two or more variables are related (Potter, 1996).

As has already been noted, the occupational interests of each individual in the sample were obtained via the well-established interest (personality) inventory, the SDS. Christensen (1985) points out that survey-type research involves the application of interviews or questionnaires, such as the SDS, to relatively large groups of individuals, as is the case in the present study, so that the presence of certain characteristics may be identified among these groups - which was ultimate aim of this study. In the present study, information in the form of occupational interests was collected for each participant on a single or once-off occasion.

Since the primary area of concern involved examining the relationship between individuals' three-letter Holland summary codes, a correlational research design seemed well-suited to the purposes of the study.

4.4 Overview of Procedure

The three aforementioned schools were approached to establish participation, and permission to go ahead with the research was obtained. The researcher provided representatives (ie. guidance teachers) of the schools with the research packages already described, and which can be found in Appendix A. These were then distributed in open envelopes to all the students in the particular grades pinpointed, and the requirements, if they were to participate in the study, were explained to them. The direct aim of the study was not conveyed in a hope that biases in test completion would not occur. The students and their parents were given three weeks to complete the test, but the researcher had to extend this time frame to allow for students who were writing

exams, who were going away on school tours, and whose parents were unavailable until a later time, to also participate in the study.

Students then returned completed tests to the schools in the sealed envelopes; the researcher collected these and made sure they were seen by her alone. This last point was important so as to ensure the participants' confidentiality. Although anonymity could not be guaranteed (and parents and students were advised of this in the covering letter) since the researcher needed to establish who matched who within the triads, confidentiality was maintained at all times.

Once collected, the researcher set about scoring individual tests and establishing triads. It is important to note that although the SDS is typically a self-scorable test, the researcher advised participants that self-scoring was not necessary. This was done in order to minimise the time individual's needed to spend on doing the study (thus making it more appealing), and so that the researcher could ensure accuracy throughout the scoring procedure.

In addition to the SDS, a form requesting biographical details of the parents was sent out. The reason behind this request was so that the researcher could discover the schooling experiences of parents, their educational backgrounds, and their current occupations (see Appendix A).

After the data collection, the researcher went ahead with statistical analysis of the data - determining the mean congruencies between parents and children, significant differences of agreement scores between the groups, mean congruencies between parents' stated occupations and their three-letter Holland codes as obtained from the SDS, and looking at the frequencies of Holland Types chosen by the male and female groups.

Students were advised individually of their three-letter Holland codes in letters similar to those in Appendix B, and the schools were also briefed on the results of the current study.

4.5 Data Analysis and Statistical Procedures

- **The Iachan Index**

In the Holland (1985) classification system, agreement of an individual's three-letter summary code with any other individual's three-letter summary code is made possible by the proposed Iachan index. Moreover, it is possible to establish whether an individual's three-letter summary code is in agreement with his or her actual work environment (Iachan, 1984). Thus, the Iachan Index is a useful technique for the measurement of agreement for partially ordered or ranked data, specifically with the Holland classification system. According to Holland (1985), Iachan's Index is the most accurate technique for assessing the degree of agreement between two three-letter Holland codes, or between a recorded summary code and a person's actual occupational preference.

It has already been established that the instrument used in this study - the SDS - produces raw data in the form of a three-letter code, with each letter assigned a certain ranking, ie the first letter is the highest, the second letter less highly ranked, and the third letter ranked the lowest. The Iachan Index measures the agreement between the same letters in different codes based on their individual rankings within each summary code. The outcome is that more weight or importance is assigned to those letters which match in position within the codes. For example,

RIA and RIA are codes with letters in the exact same positions, meaning that rankings are high and the weight is at its highest. If the codes were rather RIA and RAI, the weight would not be as high because the letter I have different rankings within each code.

A measure M is computed by adding the weights for letters that correspond with one another in summary codes, according to each letter's position within each three-letter Holland summary code.

Table 6. Illustrative weights for assessing agreement between three-letter codes.

	First Letter	Second Letter	Third Letter
First Letter	22	10	4
Second Letter	10	5	2
Third Letter	4	2	1

Table 6 shows the specific weights for each configuration of agreement ($W = 22, 10, 5, 4, 2, 1$). For example, if the first letters of both codes agree, a weight of 22 is given.

The total agreement score between codes ranges from 0 (the lowest agreement) to 28 (the highest agreement). For example, if a parent's code was ASE, and the corresponding child's code was SEA, then it can be seen that all letters in the parent's code exist too in the child's code. However, the letters within the separate codes are ranked differently. Thus, the A has a weight of 4 since the congruence is between letter one and letter three, S has a weight of 10 since

it is the second and first letter that match, and E has a weight of 2 because it is found in position two and position three in the rankings within the codes. The resultant M index for this pair would be the sum of the weights, namely 16.

Once the M index has been computed for pairs of codes they are interpreted according to Iachan's (1984) findings. He used quite large weights so that it would be easy to discriminate among different configurations of three-letter Holland codes. He proposed that when interpreting scores of agreement or congruence, the following should be adhered to:

- ▶ Agreement scores ranging from 0 to 13 point to very poor matches between codes.
- ▶ Agreement scores ranging from 14 to 19 do not point to a close match, but some congruence is evident.
- ▶ Agreement scores ranging from 20 to 25 indicate that the codes are reasonably close matches.
- ▶ Agreement scores ranging from 26 to 28 indicate extremely congruent codes that are in almost total agreement.

Therefore with our example on the previous page, these individuals are not very closely matched, but agree slightly.

This procedure of computation is relatively easily to calculate, but unfortunately does not consider individual's who find themselves with codes in which letters are equally ranked. These ties within summary codes need to be dealt with so that neither tied letter is ranked unfairly higher or lower than the other. When ties occur in statistics, it is usually the practice to assign

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the average weight to each of the tied ranks. Strahan and Severinghaus (1992) found that this approach of using an average for handling ties within Holland codes, was an appropriate statistical method.

It is easily demonstrated with an example. If a parent's code is S/EC, with S and E tied as the first rank, the averaging procedure will incorporate codes of SEC and ESC. That is, if S/EC is paired with CSA, the index of agreement is calculated by working out the weights between SEC and CSA, and the weights between ESC and CSA, and then taking the average of the resultant M measures that resultant from each calculation, to provide an acceptable measure of agreement between the two summary codes (Strahan and Severinghaus, 1992).

It appears that this method for handling ties in three-letter Holland codes is not only statistically possible, but is logically possible, allowing for all letters to be ranked as they should be, discarding no data, and acknowledging relationships between tied scores. This statistical procedure to deal with ties in codes proposed by Strahan and Severinghaus, 1992) as well as the M measure or Iachan Index formulated by Ronald Iachan in 1984, appear to be accurate solutions for assessing the agreement between any two three-letter summary codes in the Holland classification system using data generated by the Self-Directed Search. It was thus chosen for use in this study because it is directly applicable and consistent with Holland's theoretical framework, is comprehensive, easily computable, and widely acknowledged in the literature.

• ANOVAs and T-tests

One of the most common situations in psychological research is where we want to compare the means of two or perhaps more than two groups. Perhaps the most common method of comparing means is to use the t-test which hypothesises that there is in the population from which the sample in our study was taken, either no difference between means, or that there is a significant difference between the means of two groups (Rosnow and Rosenthal, 1991). The t-test is a test of significance in which there can only be two groups (or two variables). In the current study the t test was useful in comparing the mean congruencies of the mothers' real and ideal (as indicated by their three-letter Holland codes) occupations, and the fathers' real and ideal occupations.

In an attempt to discover whether mean congruence scores of mothers and fathers, mothers and sons, mothers and daughters, fathers and sons, and fathers and daughters differed significantly from one another, for the various schools and overall, it was necessary to employ a statistical technique commonly referred to as ANOVA (analysis of variance). Although it is true that we are comparing means when we use ANOVA, we used this statistical technique as opposed to the simple t test because it allows us to compare means of more than two groups at once. Howell (1995) proposes that the popularity and usefulness of this technique is attributed to two facts:

"First of all, the analysis of variance, like t, deals with differences between sample means, but unlike t, it has no restriction on the number of means. Instead of asking merely whether two means differ, we can ask whether two, three, four, five, or k means differ. Second, the analysis of variance allows us to deal with two or more independent variables simultaneously..." (p284).

But then why do we call it analysis of *variance* when what we are really doing is comparing *means*? According to Rosnow and Rosenthal (1991) it is because we are doing both - we are comparing variances - the variance among means is compared with the variance within conditions, in order to find out apart the means are on average.

- **Correlations**

In research in the behavioural sciences, we frequently wish to know whether two sets of scores are related, and if they are, the degree of their relation (Siegel and Castellan, 1988). The present study called for the investigator to examine the relationships between two or more sets of variables, such as that relationship between mean age of subjects and mean congruence scores. As such it was required to employ a statistical technique called the correlation, which tells a researcher whether or not a relationship between two variables exists, and how strong this relationship is. In other words, a correlation provides a global index of closeness of relationships (Rosnow and Rosenthal, 1991).

5. STATISTICAL ANALYSIS AND RESULTS

For ease of interpretation, statistical results will be presented in line with the specific hypotheses they set out to examine. Those results pertaining to hypotheses about mean index of agreement scores between the various family members will be analysed first, then those results pertaining to the mean congruence between the real and ideal occupations of the parents will be analysed, and thereafter the gender influences according to hypotheses 10 and 11 will be examined.

Hypotheses 1, 2, 3 and 4 state that we should expect to find that mean index of agreement score between the Holland codes of mothers and daughters, and that between fathers and sons, should point to a close match, and that this mean index of agreement score should be significantly different, and higher, than that of mothers and sons, and fathers and daughters respectively.

Tables 7 and 8, and histograms 2 and 3 reflect the analysis with reference to these hypotheses.

Table 7. Mean Congruence Scores for sons and daughters overall.

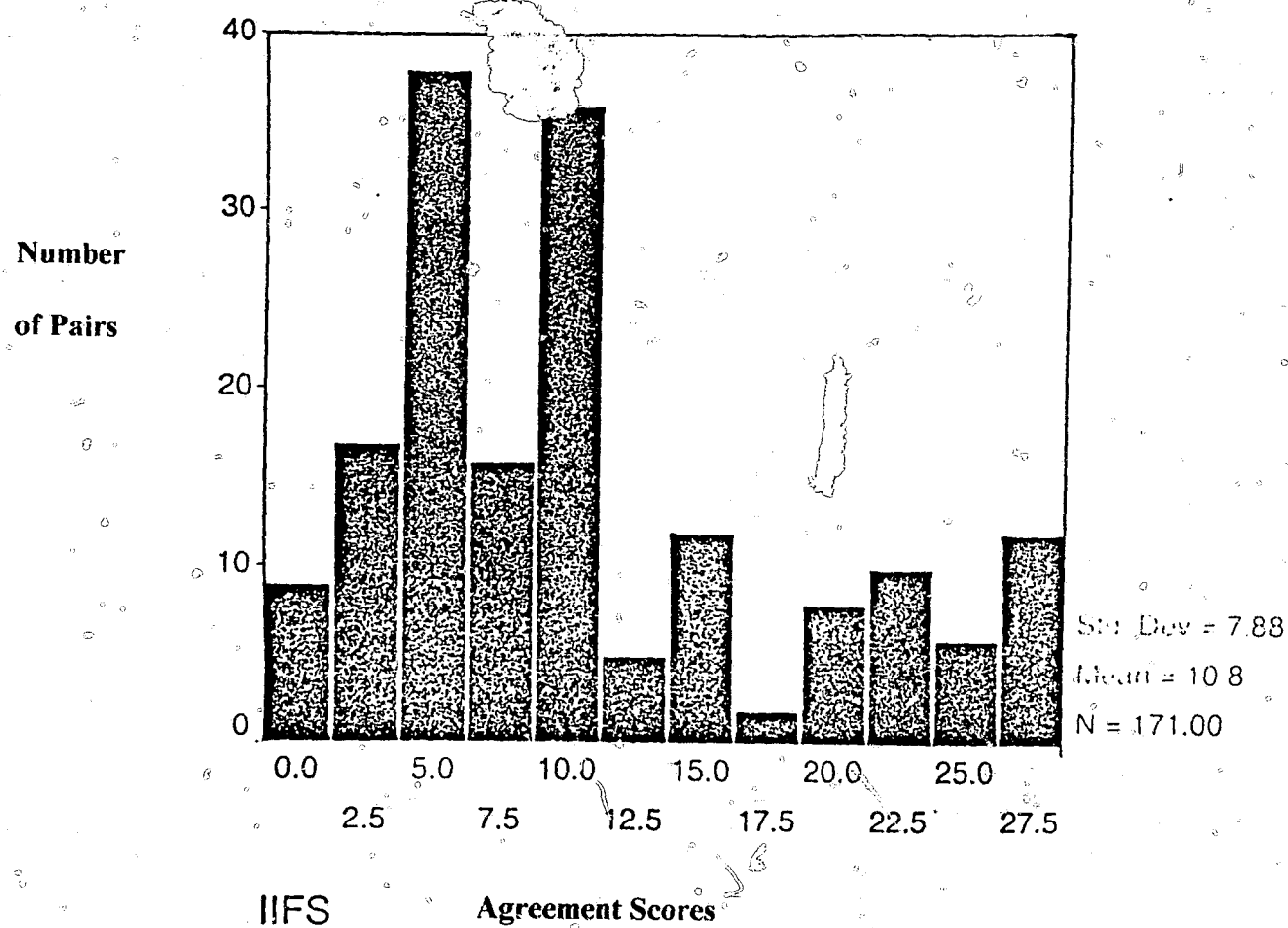
Student Gender	Measure	Mean
Male	Mother-Father	9.20
	Mother-Son	11.23
	Father-Son	12.83
Student Gender	Measure	Mean
Female	Mother-Father	10.36
	Mother-Daughter	15.18
	Father-Daughter	8.79

Where Measure is the measure of agreement or congruence between these groups.

Table 7 reveals to us that the mean index of agreement score between the codes of mothers and daughters is 15.18, which, according to Iachan (1984) does not point to a close match. Thus hypothesis 1 stating that we should expect to find a close match between the Holland codes of the mothers and daughters must be rejected. Similarly, the mean index of agreement score between the Holland codes of fathers and sons, which should point to a close match according to hypothesis 2, is only 12.83 - also not a reflection of a close match. Therefore hypothesis 2 must also be rejected.

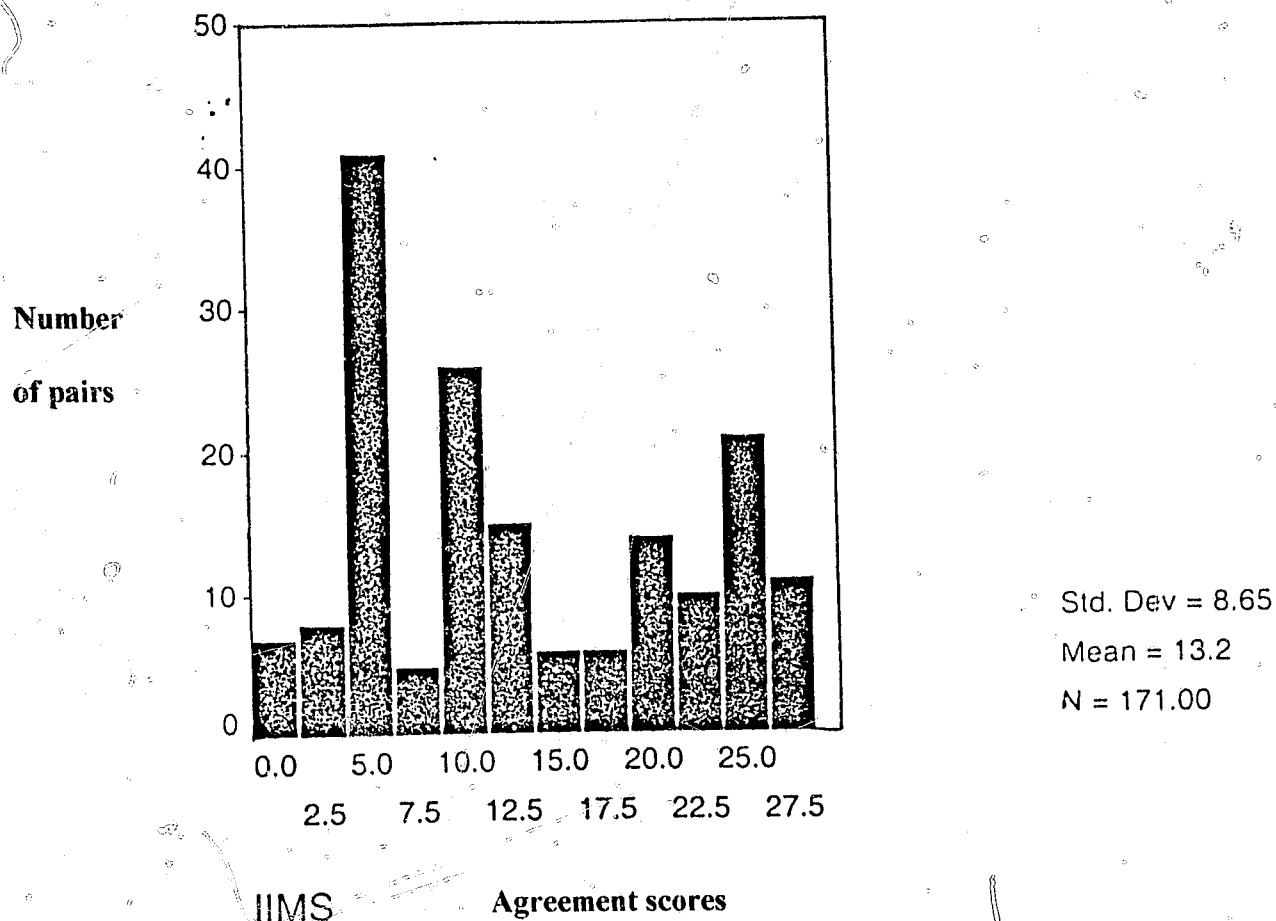
In an attempt to show the frequency distribution of agreement scores between the codes of mothers and their children, and fathers and their children, Histograms 1 and 2 are presented.

Histogram 1. Frequency distribution of agreement scores for mothers and their children, for the whole sample.



Where MS is the measure of agreement or congruence between mothers and their children.

Histogram 2. Frequency distribution of agreement scores for fathers and their children, for the whole sample.



Where MS is the measure of agreement or congruence between fathers and their children.

Histograms 1 and 2 show that not all agreement scores (reflected along the x-axis, or horizontal axis) fall below 20, which is the cut off between close matches and matches which are not close (according to Iachan, 1984). Table 7 revealed that the mean agreement scores between the Holland codes of parents and their children failed to point to a close match, but in Histograms 1 and 2 we see that some parents and children have closely matched codes - in fact in Histogram 1 showing the agreement scores between the codes of mothers and their children, about one third

of the pairs are closely matched, and in Histogram 2, showing the agreement scores between the Holland codes of fathers and their children, over one quarter of the pairs are closely matched. Still, however, we must reject Hypotheses 1 and 2 because not all parents' and children's codes are closely matched (and those which do are in the minority), and the mean index of agreement scores in Table 7 do not point to a close match.

We were also able to tell from Table 7 that the mean index of agreement score between the Holland codes of mothers and daughters is higher than that between mothers and sons (the means being 15.18 and 11.23 respectively). Also, the mean index of agreement score between the Holland codes of fathers and sons is higher than that between fathers and daughters (the means being 12.83 and 8.79 respectively).

[Interestingly enough Table 7 also indicates that the mean index of agreement score between the Holland codes of mothers and fathers of boy children is lower (it is 9.20) than the mean index of agreement score between the Holland codes of mothers and fathers of girl children (it is 10.36).]

Although the above results support Hypotheses 3 and 4 partially (in that they agree that the mean index of agreement score between the Holland codes of mothers and daughters is higher than that between mothers and sons, and similarly for fathers and sons versus fathers and daughters), they do not tell us whether the differences noted in the table are statistically significant.

Therefore, an ANOVA was done in order to determine whether the mean index of agreement score between the Holland codes of mothers and daughters was significantly different to that

between the Holland codes of mothers and sons. Similarly the ANOVA was done to determine whether the mean index of agreement score between the Holland codes of fathers and sons was significantly different to that of fathers and daughters. The results are presented in Table 8.

Table 8. ANOVA for the agreement scores between the codes of mothers and fathers, mothers and their children, and fathers and their children, when the child's/ students' gender is the independent variable.

Measure	Degrees of Freedom	F-value	Significance
Mother-Father	5	.475	.794
Mother-Student	5	1.316	.260
Father-Student	5	3.362	.006

Table 8 shows that there was a significant difference between the mean agreement scores of the Holland codes between fathers and their children according to the gender of the child. If one notes the results in Table 7 show that fathers and sons exhibit a higher mean congruence between their Holland codes than fathers and daughters, then the significant result in Table 8 means that the mean index of agreement score between the Holland codes of fathers and sons is significantly different, and higher, than those of fathers and daughters. Having established this, we must fail to reject Hypothesis 4 which stated that this is just what should happen.

However, since there was no such significant difference found between the mean agreement

scores of the Holland codes between mothers and daughters, and mothers and sons, we must reject Hypothesis 3 which stated that we should expect the difference between mean agreement scores not only to be higher for mothers' and daughters' Holland codes, but to be significant in addition.

Several tables represent the analysis of Hypotheses 5 and 6. Hypothesis 5 states that the mean index of agreement score between the Holland codes of mothers and daughters, when the daughters attend the single sex school, should be significantly different, and higher, than that of mothers and daughters when the daughter attends the co-educational school. Table 9 relates to the results of this analysis.

Table 9. Mean Congruence Scores between Mothers and their Children, for students from differing schooling backgrounds.

Student Gender	Student Schooling	N=sample size	Mean
Male	Co-educational	41	12.63
	Boys-only	43	9.88
	Total	84	11.23
Female	Co-educational	46	15.05
	Girls-only	41	15.32
	Total	87	15.18
Total	Co-educational	87	13.91
	Single-sex	84	12.55
	Total	171	13.24

Table 9 shows that mothers' and daughters' Holland codes, when the daughter attends the single sex school, shows only a slightly higher mean congruence than when the daughter attends the co-educational school, and that the mean congruence scores in both cases do not point to a close match at all. This result is only in partial fulfilment of Hypothesis 5, however, and does not show whether there was a significant difference between the mean agreement scores, or not.

Therefore, an ANOVA had to be conducted, and the results from this test of significance are presented in Table 10 where the mean agreement scores of students', from differing schooling backgrounds, and their parents' Holland codes were compared.

Table 10. ANOVA for the Agreement Scores between Mothers and Fathers, Mothers and their Children, and Fathers and their children, showing differences for the child's schooling background.

Measure	Degrees of Freedom	F-value	Significance
Mother-Father	1	9.316	.003
Mother-Student	1	1.084	.299
Father-Student	1	1.509	.221

The results of Table 10 indicate to us that no matter whether daughters attend the single sex or co-educational school, there is no significant difference between the mean index of agreement scores between the Holland codes of mothers and daughters when schooling background is the independent variable. Therefore, we must reject Hypothesis 5, which states that there should be a significant difference.

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The results of Table 10 indicate to us that no matter whether daughters attend the single sex or co-educational school, there is no significant difference between the mean index of agreement scores between the Holland codes of mothers and daughters when schooling background is the independent variable. Therefore, we must reject Hypothesis 5, which states that there should be a significant difference.

In addition, the ANOVA in Table 10 was used to tell us about Hypothesis 6, which states that the mean index of agreement score between the Holland codes of fathers and sons, when sons attend a single sex school, should be significantly different and higher than that of fathers and sons when the sons attend the co-educational school. It is clear from Table 10 that no significant difference exists between the two groups (fathers and sons with sons at the co-educational school, and fathers and sons with the sons at the single sex school). Therefore, Hypothesis 6 must be rejected.

The results from Table 11 also point out that Hypothesis 6 must be rejected.

Table 11. Mean Congruence Scores between Fathers and their Children, for students from differing schooling backgrounds..

Student Gender	Student Schooling	N=sample size	Mean
Male	Co-educational	41	13.00
	Boys-only	43	12.67
	Total	84	12.83
Female	Co-educational	46	10.16
	Girls-only	41	7.24
	Total	87	8.79
Total	Co-educational	87	11.50
	Single-sex	84	10.02
	Total	171	10.78

Table 11 presents to the researcher the information that, in fact, the Holland codes of sons who

attend the co-educational school show a higher mean congruence with the Holland codes of their fathers, than those of sons who attend the single sex school. Although neither mean congruence scores for fathers' and sons' Holland codes, whether sons attend the single sex or the co-educational schools, do not point to a close match, the results of Table 11 contradict Hypothesis 6, and so we must reject Hypothesis 6 based on the results of this table as well as Table 10.

What we have failed to mention thus far about the results indicated in Table 10, is the interesting result concerning the mean index of agreement scores between the Holland codes of mothers and fathers, when the independent variable is the child's schooling background. The table shows that there is a significant difference in the mean agreement scores between the Holland codes of mothers and fathers, depending on whether they send their children to a co-educational or a single sex school. Table 12 subsequently tells us more about this finding.

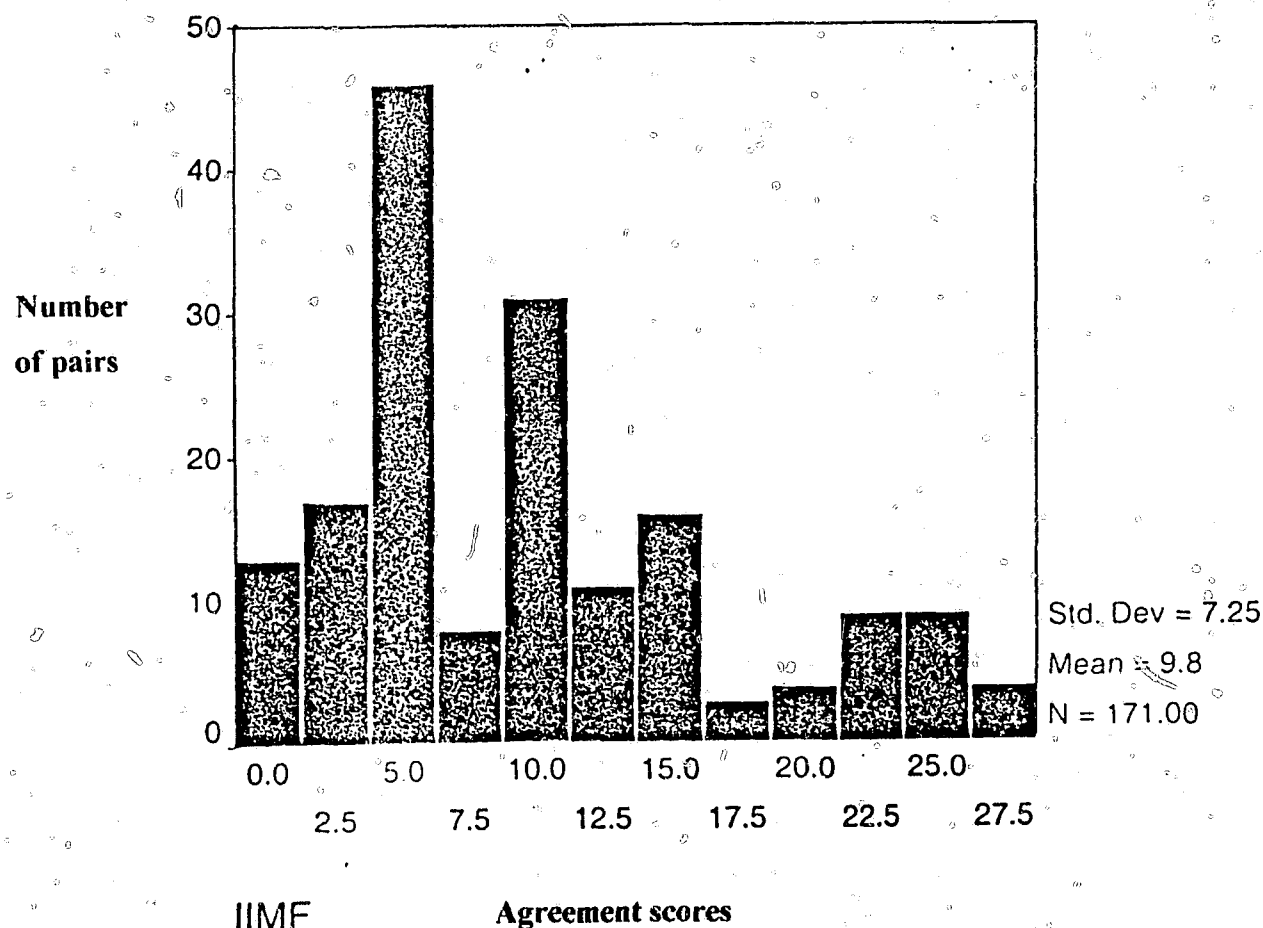
Table 12. Mean Congruence Scores between Mothers and Fathers, for students from differing schooling backgrounds.

Student Gender	Student Schooling	N=sample size	Mean
Male	Co-educational	41	10.82
	Boys-only	43	7.65
	Total	84	9.20
Female	Co-educational	46	11.93
	Girls-only	41	8.59
	Total	87	10.36
Total	Co-educational	87	11.41
	Single-sex	84	8.11
	Total	171	9.79

Table 12 tells us that the mean index of agreement scores between the Holland codes of mothers and fathers is higher when their children (whether daughter or son) attend the co-educational school. Although this result does not pertain to any specific hypothesis, it is still interesting.

Overall, the mean index of agreement scores between the Holland codes of mothers and fathers no matter if their child is male or female, or whether the child goes to the single sex school or to the co-educational school, do not point to a close match.

Histogram 1. Frequency distribution of agreement scores for mothers and fathers, for the whole sample.



Where MF is the measure of agreement or congruence between mothers and fathers.

Histogram 3 above emphasises that most pairs of mothers' and fathers' Holland codes (roughly 85%) showed agreement scores below 20, which do not point to a close match.

In addition to this, several other analyses were done out of interest and do not point to any specific hypotheses. These are outlined in Tables 13, 14, 15 and 16.

Table 13. Mean Congruence Scores between Mothers and their Children with mothers having differing schooling backgrounds.

Student Gender	Mother Schooling	N=sample size	Mean
Male	Co-educational	42	9.92
	Girls-only	42	12.54
	Total	84	11.23
Female	Co-educational	42	15.73
	Girls-only	45	14.67
	Total	87	15.18
Total	Co-educational	84	12.82
	Girls-only	87	13.64
	Total	171	13.24

Table 14. Mean Congruence Scores between Fathers and their Children for Mothers with differing Schooling backgrounds.

Student Gender	Mother Schooling	N=sample size	Mean
Male	Co-educational	42	13.08
	Girls-only	42	12.58
	Total	84	12.83
Female	Co-educational	42	9.64
	Girls-only	45	7.99
	Total	87	8.79
Total	Co-educational	84	11.36
	Girls-only	87	10.21
	Total	171	10.78

Table 15. Mean Congruence Scores between Mothers and their Children with Fathers having differing schooling backgrounds.

Student Gender	Father Schooling	N=sample size	Mean
Male	Co-educational	46	11.88
	Boys-only	38	10.43
	Total	84	11.23
Female	Co-educational	47	15.15
	Boys-only	40	15.21
	Total	87	15.18
Total	Co-educational	93	13.53
	Boys-only	78	12.89
	Total	171	13.24

Table 16. Mean Congruence Scores between Fathers and their Children for Fathers with differing Schooling backgrounds.

Student Gender	Father Schooling	N=sample size	Mean
Male	Co-educational	46	11.74
	Boys-only	38	14.16
	Total	84	12.83
Female	Co-educational	47	9.62
	Boys-only	40	7.82
	Total	87	8.79
Total	Co-educational	93	10.67
	Boys-only	78	10.91
	Total	171	10.78

All that these tables really revealed to the researcher was that no matter the nature of the schooling background (single sex or co-educational) of either of the groups of parents in the study, there was still no mean congruence scores between the Holland codes of parents and their children that pointed to a close match. This result further negates the effects that schooling background has on influencing parental impact on children's occupational interests, and their subsequent career choices.

Several multivariate tests were done to establish whether there were any interaction effects between gender of students and schooling backgrounds of any of the family members (ie. mother, father or child). No significant interactions were found. Correlations between the age of mothers, fathers and children, and the mean agreement scores between the codes of mothers

and fathers, mothers and children, fathers and children did not reveal any significant findings.

Now the statistical results as they pertain to the real and ideal occupations of parents will be analysed. The results relate to Hypotheses 7, 8 and 9, and are presented in Tables 17, 18 and 19.

Hypothesis 7 states that the mean congruence between the three-letter Holland codes of mothers' stated occupations (obtained from biographical data forms), and the three-letter Holland codes derived from the results of the mothers' completed Self-Directed Search Questionnaires results, should point to a close match. Hypothesis 8 states that this should be similarly so for fathers. In order to investigate whether this was so, once again the Iachan index was employed to compare Holland codes and reach mean agreement scores between the Holland codes suggested, for both the mother and father groups. Results are presented in Table 17.

Table 17. Mean Congruence Between Three-letter code of Mothers' stated Occupations and Three-letter Holland codes, and similarly for Fathers.

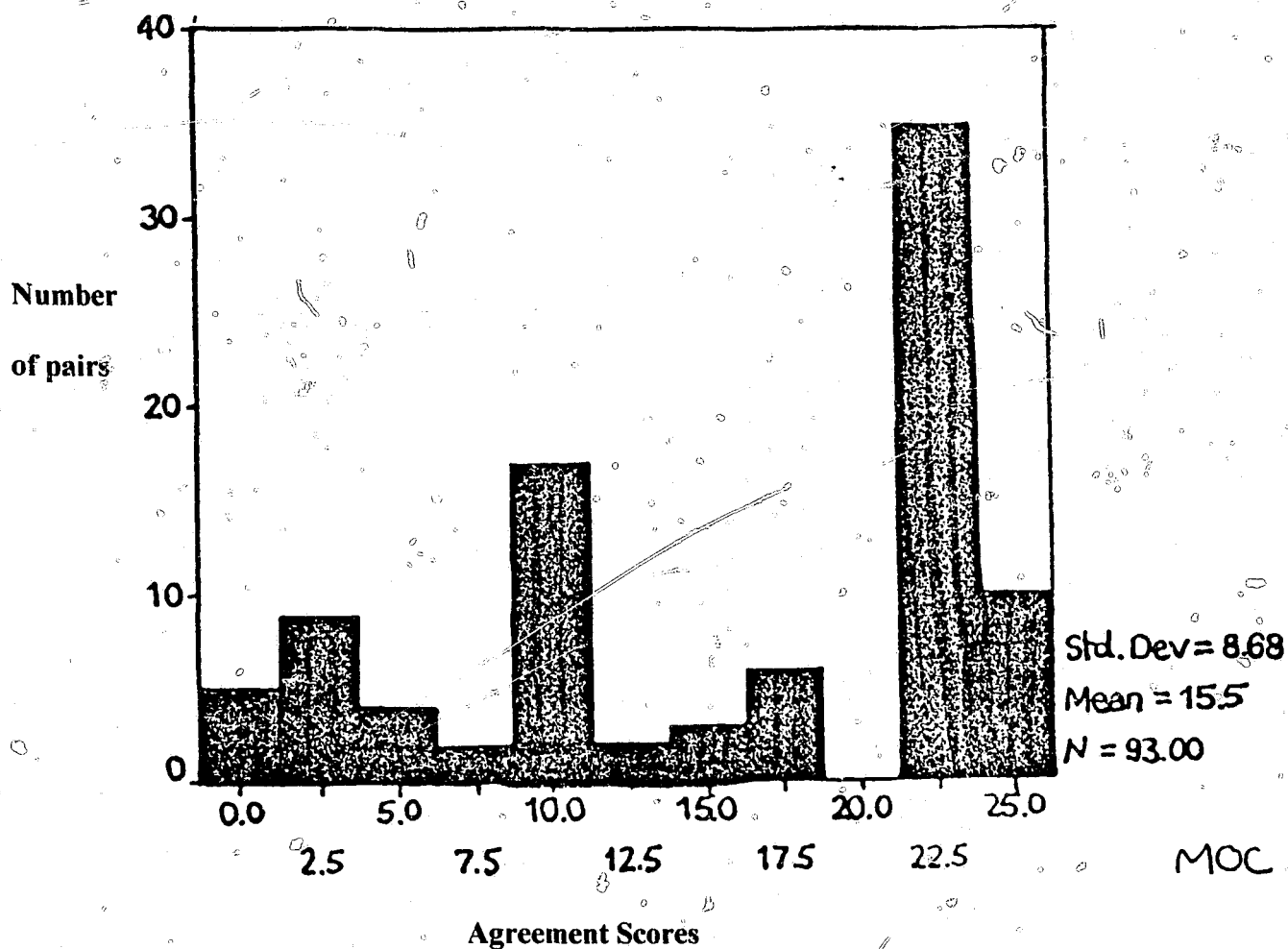
Measure	Mean	Standard Deviation
Mothers' three-letter Holland codes - mothers' occupations	15.706	8.598
Fathers' three-letter Holland codes - fathers' occupation	16.04	9.006

Where Measure is the measure of agreement or congruence between these groups.

Table 17 reveals to the reader that although some match was evident between the Holland codes of both mothers' and fathers' stated occupations, and their three-letter Holland codes, the mean agreement scores for both groups was below 20, and so does not point to a close match. This then means we have to reject hypotheses 7 and 8 which state that the mean agreement scores for both the mother and father groups should point to a close match between their real and ideal occupations.

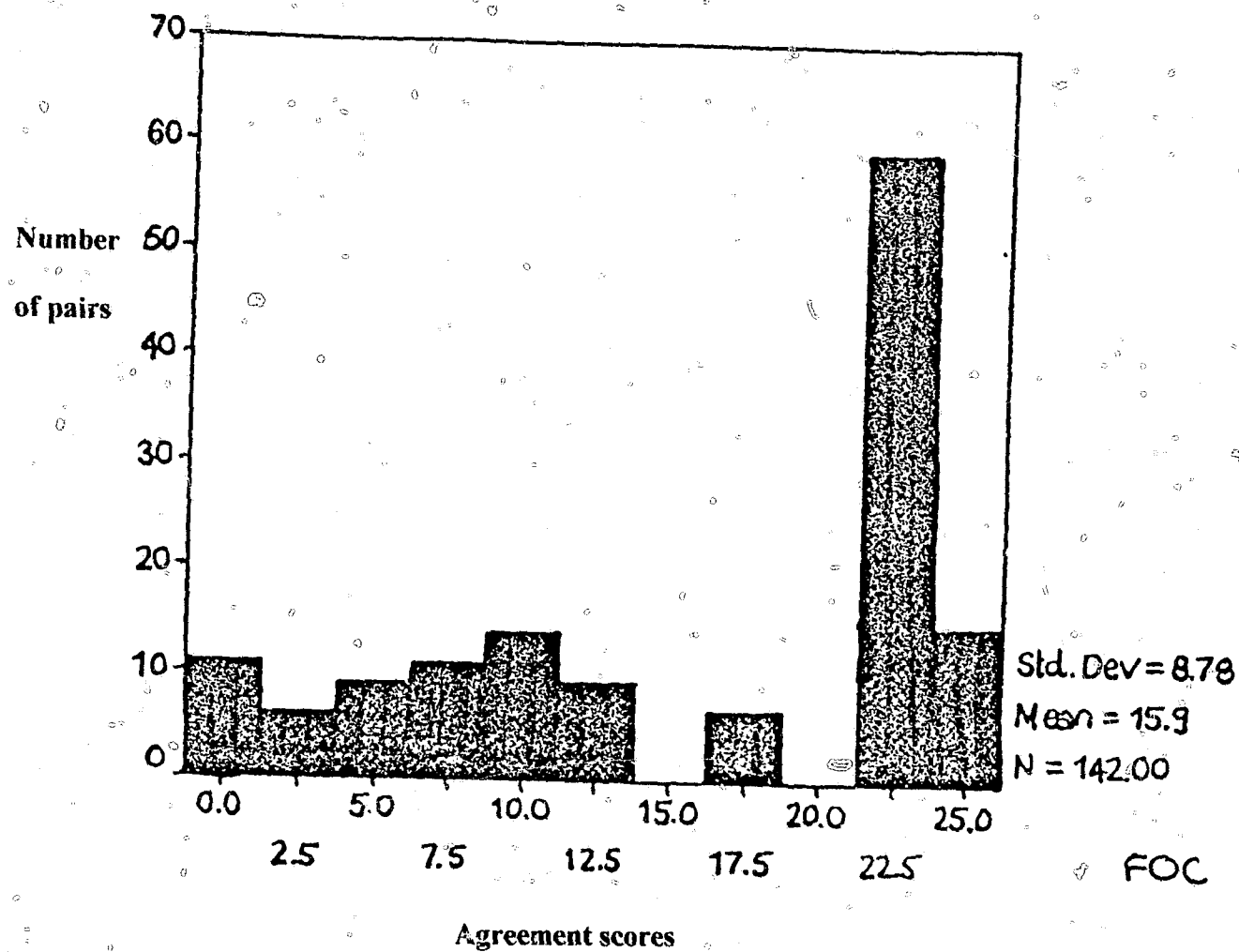
Histograms 4 and 5 compound this finding by showing the frequency distribution of agreement scores between Holland codes of stated occupations, and three-letter Holland codes, for mothers and fathers, respectively.

Histogram 4. Frequency distribution of agreement scores between Mothers' stated Occupations and three-letter Holland Codes.



Where MOC is the measure of agreement or congruence between mothers' stated occupations and their three-letter Holland codes.

Histogram 5. Frequency distribution of agreement scores between Fathers' stated Occupations and three-letter Holland Codes.



Where FOC is the measure of agreement or congruence between fathers' stated occupations and their three-letter Holland codes.

It can clearly be seen from both Histograms 4 and 5 that in about half of all the pairs (stated occupations together with three-letter Holland codes) for the mother and father groups, agreement scores show that there is a close match between their stated occupations and their

three-letter Holland codes. Perhaps the very high agreement scores coupled with some of the very low agreement scores have combined to give us the very moderate mean congruence scores

Table 17.

Although Table 17 shows that the mean index of agreement score for the Holland codes of mothers regarding their real versus ideal occupations was lower than the mean index of agreement score for the Holland codes of fathers regarding their real versus ideal occupations, Table 17 is unable to show us whether there was a significant difference between these mean index of agreement scores as Hypothesis 9 wishes to discover.

Hypothesis 9 states that there should be no significant difference between the mother and father groups' mean agreement scores as they pertain to stated occupations versus three-letter Holland codes. The result of a paired samples t-test which was employed to analyse Hypothesis 9, is presented in Table 18.

Table 18. T-test testing for the significance between mean agreement scores of the stated occupations and three-letter Holland codes for mothers and fathers.

Measure	Degrees of Freedom	Significance
Mean agreement between Mothers' stated occupations/ Holland codes - versus - Mean agreement between Fathers' stated occupations/ Holland codes	85	.763

Table 18 shows that there was no significant difference between the mean index of agreement scores of mothers and fathers as they pertain to real versus ideal occupations. This result supports Hypothesis 9, and so we must fail to reject Hypothesis 9.

As an additional analysis, it was decided to determine whether the mean index of agreement scores of Hypothesis 9 correlated to one another. Table 19 shows the results of this correlation.

Table 19. Correlation between mean agreement scores of parents' stated occupations and three-letter Holland codes.

Measure	N=sample size	Correlation	Significance
Mean agreement score for mothers' stated occupations/ Holland codes - and - Mean agreement score for fathers' stated occupations/ Holland codes	86	.336	.002

Since Table 19 shows that there is a significant correlation, we must assume that the mean index of agreement score between the mothers' stated occupations and three-letter Holland codes, and the mean index of agreement score between fathers' stated occupations and three-letter Holland codes, are associated with one another in a significant manner.

In order to establish whether one should accept or reject hypotheses 10 and 11 (that males in the sample would show a preference for the Realistic and Enterprising Types, and that females in the sample would show a preference for the Artistic and Social Types), cross-tabulations on the codes of all groups were done. These show the frequencies of Holland's personality types in each group, together with their placement inside the three-letter codes. The results of these cross-tabulations can be viewed in Tables 20 to 35.

Table 20. Male students, from the Co-educational school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter Frequency	Second Letter Frequencies	Third Letter Frequencies
Realistic Type	2	6	11
Investigative Type	15	6	7
Artistic Type	6	6	4
Social Type	3	15	7
Enterprising Type	16	9	5
Conventional Type	2	4	10

Boys from the co-educational school chose the Enterprising Type most frequently as their first letter, the Social Type most frequently as their second letter, and the Realistic Type most frequently as their third letter, in order to make up their three-letter code.

In order to establish whether one should accept or reject hypotheses 10 and 11 (that males in the sample would show a preference for the Realistic and Enterprising Types, and that females in the sample would show a preference for the Artistic and Social Types), cross-tabulations on the codes of all groups were done. These show the frequencies of Holland's personality types in each group, together with their placement inside the three-letter codes. The results of these cross-tabulations can be viewed in Tables 20 to 35.

Table 20. Male students, from the Co-educational school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter	Second Letter	Third Letter
	Frequency	Frequencies	Frequencies
Realistic Type	2	6	11
Investigative Type	15	6	7
Artistic Type	6	6	4
Social Type	3	15	7
Enterprising Type	16	9	5
Conventional Type	2	4	10

Boys from the co-educational school chose the Enterprising Type most frequently as their first letter, the Social Type most frequently as their second letter, and the Realistic Type most frequently as their third letter, in order to make up their three-letter code.

Table 21. Male students, from the Boys-only school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter Frequency	Second Letter Frequencies	Third Letter Frequencies
Realistic Type	11	9	8
Investigative Type	10	10	9
Artistic Type	4	3	8
Social Type	5	6	10
Enterprising Type	13	15	7
Conventional Type	2	4	3

Boys from the boys-only school chose the Enterprising Type most frequently as their first letter, as well as their second letter, and the Social Type most frequently as their third letter, in order to make up their three-letter code.

Table 22. Female students, from the Co-educational school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter Frequency	Second Letter Frequencies	Third Letter Frequencies
Realistic Type	0	0	1
Investigative Type	3	12	9
Artistic Type	9	13	11
Social Type	25	14	4
Enterprising Type	9	11	17
Conventional Type	3	3	11

Girls from the co-educational school chose the Social Type most frequently as their first letter, as well as their second letter, and the Enterprising Type most frequently as their third letter, in order to make up their three-letter code.

Table 23. Female students, from the Girls-only school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter Frequency	Second Letter Frequencies	Third Letter Frequencies
Realistic Type	1	0	1
Investigative Type	10	6	11
Artistic Type	9	10	6
Social Type	15	17	2
Enterprising Type	3	8	15
Conventional Type	5	2	8

Girls from the girls-only school chose the Social Type most frequently as their first letter, as well as their second letter, and the Enterprising Type most frequently as their third letter, in order to make up their three-letter code.

Table 24. Mothers with daughters in the co-educational school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter	Second Letter	Third Letter
	Frequency	Frequencies	Frequencies
Realistic Type	0	1	2
Investigative Type	5	6	5
Artistic Type	4	3	7
Social Type	16	16	11
Enterprising Type	11	14	15
Conventional Type	10	7	10

Mothers with daughters at the co-educational school chose the Social Type most frequently as their first letter, as well as their second letter, and the Enterprising Type most frequently as their third letter, in order to make up their three-letter code.

Table 25. Mothers with daughters in the girls-only school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter	Second Letter	Third Letter
	Frequency	Frequencies	Frequencies
Realistic Type	0	0	0
Investigative Type	2	1	8
Artistic Type	10	11	2
Social Type	15	14	9
Enterprising Type	5	14	13
Conventional Type	9	3	11

Table 24. Mothers with daughters in the co-educational school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter Frequency	Second Letter Frequencies	Third Letter Frequencies
Realistic Type	0	1	2
Investigative Type	5	6	5
Artistic Type	4	3	7
Social Type	16	16	11
Enterprising Type	11	14	15
Conventional Type	10	7	10

Mothers with daughters at the co-educational school chose the Social Type most frequently as their first letter, as well as their second letter, and the Enterprising Type most frequently as their third letter, in order to make up their three-letter code.

Table 25. Mothers with daughters in the girls-only school's gender cross tabulation showing frequencies of letters representing the RIASEC interest fields in their codes.

	First Letter Frequency	Second Letter Frequencies	Third Letter Frequencies
Realistic Type	0	0	0
Investigative Type	2	1	8
Artistic Type	10	11	2
Social Type	15	14	9
Enterprising Type	5	14	13
Conventional Type	9	3	11

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