The Development of Architectural Concepts:
A Comparative Study of Two Schools of Architecture

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ABSTRACT

There are both intuitive and theoretical bases to the notion that differences exist in the way in which architects and non architects construe their physical environment. Despite their procedural constraints, many previous studies have added empirical weight to this assumption.

As it is most likely to be within the schools of architecture where the socialisation of professional values takes place, the thesis explores changes in the structure and content of architectural concepts and evaluations as a function of time spent in training.

Further, the thesis considers the variation in architectural orientation amongst the students, and explores the adoption of school specific values.

The study focusses on two schools of architecture, one university based, in the north of Britain, and one polytechnic based, in the south. A cross-sectional sample of fifteen students in each year of training were interviewed at both schools. Data were collected using the Multiple Sorting Procedure, an open-ended yet structured sorting technique, and analysed using Multidimensional Scalogram Analysis (MSA) and Smallest Space Analysis (SSA).

The results demonstrate the development of architectural concepts from concrete tangible concepts, to more complex abstract ones. The students' evaluative judgements show both development with each year sampled, and school specific differences in the type of architecture preferred. Architectural evaluation is shown to be based upon architectural style. The students' judgements of the buildings, combined with their architectural 'heroes' allows the proposal of a model of stylistic orientation in architecture.

Case studies indicate that the results derived from the Multiple Sorting Procedure accord well with the students' orientation in architecture; in the focus of their architectural interests, in their evaluative judgements, and in the type of architecture they design.

The architectural, educational and methodological implications are discussed.
DEDICATION

To my parents
Acknowledgements

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Many psychologists, sociologists and architectural theorists have addressed the question of what it is that is different about the way in which architects think. Architects have been found to exhibit a number of characteristics which differentiate them from non architects.

They have beliefs and values regarding architecture and the profession, and an image of themselves and their work. Such shared ideas may be thought of as characteristic of the occupational sub-culture. However, architects have also been shown to think in a qualitatively different way about topics concerning the built environment. Architects construe the environment using different constructs to 'lay' people, and consequently work with a different set of evaluative dimensions.

It is likely that these distinguishing features of architects' conceptual systems are acquired within the schools of architecture where an extensive period of socialisation takes place.

The first aim of this thesis is to examine the different constructs used and evaluations made by students of architecture at various stages of their education. By investigating the conceptualisations of a cross-sectional sample of students it is aimed to achieve a better insight into the development of the architectural conceptual system.

Thus the first chapter of the thesis will review those characteristics of the architectural profession which have been revealed by previous
authors, in order to give a broader picture of the characteristics one would expect to be developing in the architectural students.

This review will cover two perspectives: the more global aspects of architectural beliefs, professional values and images of their work, and the more specific aspects of the way in which architects conceptualise and evaluate the products of architecture, the buildings themselves. It is the latter, more specific views with which this thesis is concerned.

In order to provide a better understanding of the developmental process, Chapter Two examines a variety of developmental theories on which the developments of architectural education may be modelled. Cognitive, moral and student development theories are considered. This chapter thus provides a developmental perspective on the educational changes taking place within the schools.

The specific hypothesis relating to this stage of the research is that students at different stages of their education will construe and evaluate architecture in qualitatively different ways.

The notion that architectural education produces 'standard' stereotypical architects who think in the same way as their colleagues is clearly naive. Yet studies comparing architects and non architects have assumed this homogeneity of thought within the architectural profession. The second assertion of the present thesis is that the very process of education that creates inter-professional variation
must also be partially responsible for the creation of intra-professional variation.

Chapter Three reviews the intuitive and empirical evidence for variation within the profession; in the kind of work undertaken, in the specific beliefs and values held, and in the styles of architecture designed and preferred. This review focusses on the role of training amongst the many possible factors associated with intra-professional differences.

Different 'types' of architect are undoubtedly the product of numerous influences from individual personality to the ethos of the time. The present thesis examines one factor, the school attended, as a possible influence on architectural variation.

It is therefore hypothesised that in addition to providing socialisation into the general occupational culture, the schools of architecture also impart a set of values specific to the sub-culture of the institution.

The present thesis sets out to describe these differences through interviews and sorting tasks with students in each of five years of their training in two different schools of architecture, one Polytechnic based and one University based, in different locations, one in the north, and one in the south of Britain.
The Multiple Sorting Procedure was selected as an open-ended, yet structured methodology for the study of conceptual systems. Chapter Four outlines the theoretical background to the Multiple Sorting Procedure, and describes its use and advantages. Related analysis procedures are also reviewed.

The pilot study, detailed in Chapter Five, takes the form of a re-analysis of sorting data from groups of architects and non architects in America and England. This provides a test of the sensitivity of the methodology to inter-group differences and similarities in the structure of architectural concepts.

Chapter Six outlines the specific aims of the thesis along with the details of the data collection. The participants, schools, and sorting procedure are described. The results chapters follow.

Chapters seven and eight describe the development of architectural concepts and evaluations respectively, comparing year of study and school affiliation. Chapter Nine examines the architects who act as the students' heroes, as an index of their orientation in architecture.

Throughout these three domains; concepts, evaluations and heroes, two issues are considered. Firstly, descriptive issues focussing on quantitative variations, eg in the number of concepts, categories, heroes, etc, and secondly the content of the variations are discussed, eg which concepts are used, who is admired etc. Thus each chapter is structured from the general, descriptive patterns to the specific content of the data.
Chapter ten integrates the information on the students' heroes with their architectural evaluations and proposes a model of stylistic orientations, and Chapter Eleven studies four students in the form of case studies. In each example, the students' concepts, evaluations, and heroes are related to the actual designs they have produced.

The final chapters consider the architectural, educational and methodological implications of the findings.
CHAPTER ONE

Conceptualisations of Architecture: Characteristics of Architects.

1.1 Introduction

The opening chapter of this thesis aims to describe those qualities of architects' beliefs, values and conceptualisations which are characteristic of the profession. Such a review illustrates those aspects of the architect's conceptual make-up which distinguish members of the profession from those who have not undergone such a training.

Section 1.2 reviews various aspects of the architectural belief system in the form of a hierarchy; from beliefs pertaining to professionalism, as a general concept, to beliefs governing their work as architects, to the most personal beliefs which members of the profession have about their own abilities and responsibilities.

Section 1.3 takes a brief look at the processes of socialisation occurring within the schools of architecture, which may play an integral part in the transmission of these belief systems.

The beliefs which characterise the profession can be seen to relate directly to the environment, in the form of beliefs regarding architects' role in the creation of the buildings we use and beliefs regarding the influence of architecture on society. The buildings they create can be seen to be at the centre of their value system, and in turn have a pervading impact on the nature of their professional construct system. These construct systems have been the focus of a variety of research reviewed in section 1.4. Studies of architects' conceptualisations have generally been undertaken within a comparative
framework, using various non architectural, 'lay' samples in the form of an experimental 'control' group. The final section of this chapter adopts an historical approach, unfolding the methodological strategies employed in comparative research, from the early semantic differential studies, through repertory grids, to the approach adopted by the present thesis, the multiple sorting task.

1.2 A Hierarchy of Beliefs

Professional and Occupational Beliefs

The beliefs which a person holds with respect to their occupation can be thought of as forming a hierarchy. The literature suggests that as members of a professional group, architects hold views about their work which are consistent with the views of professionals in general. In addition, as members of a specific occupational group, architects will hold views of their work which are consistent with their occupational sub-culture.

Wilensky (1964) defines a profession by means of two criteria,

'(1) The job of the professional is technical--based on systematic knowledge or doctrine acquired only through long prescribed training.

(2) The professional man adheres to a set of professional norms.'

(Wilensky 1964 p138)

The first of these requirements is based on shared knowledge within the profession. In her definition of the features of a profession, Musgrave (1972) asserts that not only does an occupation require a well-defined
area of knowledge, but that this area of knowledge should not be too large, thus requiring the talents of other occupations, and not so small that the knowledge base may be acquired by anyone. This knowledge and the training it requires must be specified, so that entry to the profession may be controlled. Thus the profession requires a register of qualified practitioners on the basis of their undertaking an established training. Additionally, in return for the restrictions of the formal training, the profession 'requires absolute freedom to practice its calling as the members think fit.' (Musgrave 1972 p145)

This suggests that members of the profession are united by their shared knowledge and separated from those who have not undergone the training. In outlining the features of an 'occupational community', Salaman (1974) states that the other members of the occupational culture act as a reference group which provides the source of values, and places a perspective on the world. Owing to the shared values and beliefs, members seek recognition and acceptance from their peers. They believe that other members of the community are the only ones capable of judging their work. This is particularly true of architects, whose impetus for design often comes from the work of their peers, and is judged by their peers, through journal recognition by architectural critics, and through architectural competitions. Recognition from either of these sources can 'make' an architect. The cycle of inspiration and judgement confined within the profession leads to even greater isolation of the community.

These kinds of 'inward looking' behaviours reinforce community members' beliefs and values. As Allsopp (1974) points out,
'Probably all people who have a cultivated skill, whether it be in architecture, surgery, computer programming, football, acting or embroidery, develop standards of judgement, criticism and conversation peculiar to that group. Thus a surgeon can perform an excellent operation, though the patient dies, and an architect can design a students' hostel which is the cynosure of professional admiration but creates detestable living conditions.' (Allsopp 1974 p3)

In addition to having undergone an established training to gain recognition as a member, Salaman (1974) states that occupational communities are held together by some kind of controlling body, which also plays a part in socialising the individual into the skills and values of the profession.

Indeed, the presence of a governing body is a further defining feature of the professions. This association registers all those qualified to practice, and builds the framework in which the profession operates. In essence it is disciplinary, as it undertakes to apply sanctions against the members who fail to meet the professional requirements, with the power to strike from the register those who act unethically, or incompetently. The professional body also provides conditions of service and a code of professional conduct, thus enabling the professional to guarantee a level of service,

'A professional man must not only be of proved competence, but he must also be trustworthy. The client assumes that his ignorance will not be exploited and that the practitioner is of good character.' (Musgrave 1972 p143)

This code of conduct provides the 'norms' to which the professional adheres, referred to by Wilensky (1964) in his definition of a profession.

The significant aspect of this code of conduct is the implication that the professional provides a service for the public. Professionals see
their work as 'the rendering of altruistic service to society as a whole' (Lipman 1970 p7), and this carries with it the assumption that the work is not of financial benefit, ie that the professional does not 'devote his specialised knowledge and skills wholly or predominantly to the furtherance of his financial interest' (Lipman 1970 p6). Indeed the status of the profession relies upon the fact that the client's interests are uppermost.

The problem with architecture is that, with a few exceptions, it is essentially a financial enterprise, and thus does not run parallel with some other professions. Thus it is possible that at some time there will be a conflict of interests, where professional ethics indicate that the architect should defer his commercial gain to the client's interest.

In order to account for such distinctions, Halmos (1967) defines two types of professions, personal and impersonal service professions. The former consisting of doctors, nurses, teachers, social workers etc, and the latter of lawyers, accountants, architects etc. Halmos claims that,

> 'the self denial, matter-of-fact self-effacing personal care, and even human warmth and kindly solicitousness, required by the professionals in health, welfare, and education, is likely to be far more prominently in evidence in their work than in the practice of law, accountancy or architecture.' (Halmos 1967 p13)

Thus architecture is deemed an impersonal service profession, although the creations of the architect are incumbent upon us all. As Lipman (1969) states, the service of architecture is,
'in a unique position vis-a-vis its public: architectural decisions take tangible form, and are available for all to experience. Where the results of professional work are so concretely manifest it is in the profession's interest, and particularly its economic interest, to project certain images of professional scope and competence' (Lipman 1969 p194-195)

Although the client, and indeed the users, must 'trust' the architect to provide the kind of building which is suitable for their requirements, many architects would state that human needs are at the centre of their concerns. However, the social concerns of the personal service professions are set, Halmos claims, in close human relationships. Thus while architects may believe that they are agents for human good, they are not intimately involved with those who will use the buildings they design.

Hence, for example, where the physician's concerns are with the patient, rather than the disease, the architect's are not with the user, but with the building. The 'service' they provide is the creation of the physical environment.

Therefore, at the most general level of professional beliefs the emphasis in the architects' value system can begin to be identified as the provision of buildings to contain people and their activities.

Nevertheless, most architects would strongly deny that the designs they produce bear little relation to the people who use them. Emphasis has grown on the service side of all professions, and Halmos (1967) states that 'sociological and social psychological tuition originally reserved for students of the personal service professions' (p14) has become a feature of the training for impersonal service professions, and that,

'a personal service institution, such as a university, exhibits its ethics of personal service even to those it trains for an impersonal service.' (Halmos 1967 p18)
It is Lipman's (1970) assertion that it is this feeling of professionalism; of providing a personal rather than impersonal service; which leads architects to the belief that their buildings affect the people who use them. Whether the profession does or does not provide the service, it is the belief in this provision which is kept within the profession and creates, as Halmos states, a 'self-fulfilling fallacy'. He adds,

"One might say about the idealistic aspirations of professionals that some are born great, some achieve greatness, and some thrust greatness upon themselves." (Halmos 1967 p22)

In the case of architecture this 'fallacy' is better described as architectural determinism, and architects' belief in it was brought to light by a number of authors in the early 1970's, from empirical study to casual observation. For example as Arnheim notes,

"I was puzzled to notice in the practitioners of architecture, professionals, teachers, and students, a kind of malaise, a disillusionment that made them neglect the active study of design or even denounce it as a frivolous diversion from the serious social obligations of architecture." (Arnheim 1977 p2)

This change in orientation stemmed, it has been suggested, from the Modern Movement removing the architects' role as manipulator of the aesthetic environment, and placing the emphasis on more social, and political aspects of architecture. Architects were required to search for an alternative 'meaning' in their work. Kaye (1960) believes that this resulted in a change toward the technical side of design. He claims that the architects' self-image has moved away from,

'the creative artist expressing a unique vision, and toward that of the professional seeking to find the best possible solution .......... a trend in other words, away from the artist and towards the technician.' (Kaye 1960).

assertion that unlike their earlier counterparts, a purely aesthetic role seems to be no longer a sufficient basis for architects' professional endeavour. However, it is social concerns rather than technical concerns which Lipman sees as becoming increasingly important,

'Their traditional role as manipulators of man's aesthetic responses to his physical surroundings as being related to, even subsumed by social considerations' (Lipman 1971 p46)

In a series of papers, Lipman elucidates this changing emphasis by the analysis of the writings and speeches of noted members of the profession from 1960 to 1968. His findings are backed up by interviews with many 'ordinary' architects to ensure that the elite were representative of the majority. As members of a specific sub-culture, Lipman claims that architects in Britain share beliefs about the social consequences of their work. The scope of this belief ranged from the idea that architects could create communities, to the effects of room layout on behaviour.

Lipman (1970, 1971) discerned a set of recurrent ideas and propositions which he classified into categories to cover a number of issues from creating an image of a new 'stable' society, through 'raising the human spirit' with design, to public participation in the 'adventure' of building. Underlying these statements there appeared to be a genuine concern on the behalf of the authors for the architects' obligations to the client and to society at large. The study concludes that the underlying value orientation of the 1960's architect is towards a professional subservience to the 'enhancing of the human condition' through knowledge and skills of 'quintessential worth for mankind'.
Blau (1980) found a similar attitude amongst a sample of American architects interviewed in the mid 1970's. She carried out a survey of four hundred and sixteen architects in the New York area, asking them to rate a series of statements regarding the nature of architecture on a five point scale from strongly agree to strongly disagree. From the analysis of her findings she concludes that,

'these results confirm Lipman's interpretation of data for British architects; namely, that architectural determinism still appears to be a major premise in architectural thinking, although the concept has been vigourously attacked in the professional literature for at least a decade.' (Blau 1980 p351)

Blau adds that taken in their entirety her results,

'unambiguously show that the most important issues in architecture at the moment do not revolve around questions of design and form but rather the social issues' (Blau 1980 p354.)

Thus, whilst architects may believe that they are contributing to people's lives, it is through the mediation of the buildings they design; it is the designs which play the important role, the designs which have social and emotional implications.

Therefore, the practitioners' view of the role of architecture itself, whilst related to social concerns, is primarily directed at what the building can 'do'; again the design of the building is central to the values and beliefs of the profession.

With respect to these determinist beliefs, it is Lipman's assertion that in addition to the necessity for a change in the architects' self-image, psychologists and sociologists had a hand in giving architects
the impression that the environment could manipulate people's behaviour, from their early determinist studies. However, since those early days of environmental psychology, researchers have been at pains to illustrate a transactional relationship between people and the environment, using mediating social factors, and by emphasising the importance of intentions, meanings and interpretations.

Therefore, as Lipman (1969) points out, it is not surprising that,

'there are social scientists who are sceptical, if not incredulous, about the varying declensions which this aspect of architectural doctrine has assumed,' (Lipman 1969 p198).

Nonetheless, the social implications of design have become an integral part of accepted architectural theory.

'Architectural social theory contends that the social behaviour of building users is influenced and even determined by the physical environment in which the behaviour occurs,' (Lipman 1969 p190).

However, as a 'theory', this premise should be testable (Popper 1963), and hypothesis testing does not rate amongst the priorities of architecture. Whilst social scientists are in a position to contribute to this testing the problem remains that architects are notoriously sceptical of the benefit of social science, and on the whole, are not prepared to accept that information provided is actually 'usable'. By means of illustration, consider two published conversations with noted architects; firstly Philip Johnson,

*Philip Johnson:* But sociologists - what in heaven's name can they do?

*Q:* Well, the sociologists and psychologists said that olive green is the best colour to use inside a school. That idea has become so dominant in the last ten years that now even the blackboards in schools are olive green. The olive green classrooms are now just as aggressively boring as the old fashioned grays and browns.
Philip Johnson: That shows you about sociologists. Nobody these days will believe anything that is spontaneous or artistic. Everything is scientific. Sociologists pretend that sociology is wissenschaft (science), which of course it's not. It's just abracadabra. It is the role of the artist to show what the town should be like. Sociology in architecture is a crutch.

Q: Do you ever read any sociology and city planning?

Philip Johnson: I glance through their books.

Q: And you never find anything helpful?

Philip Johnson: No, I learned about city planning by walking round the streets of cities. I have seen how people feel and how I feel.

and, secondly Kevin Roche,

Q: Sociologist want to co-operate, but they find that the architects are not interested.

Kevin Roche: That might be partly because their information isn't usable. It's the problem of the special disciplines again, those who go their own way. Just as the products of the architect's hands are very often not really usable by the person who occupies them, the sociologists products seem valuable, but mainly to the person who is doing the producing.

Q: But these special disciplines provide you with material which...

Kevin Roche: It's interesting in itself, but how one can meaningfully apply it to improve the end product, which is ultimately going to be a piece of environment, is hard to find out.

(From Cooke and Klotz 1973 p42/p55)

However, just as architects are reluctant to accept any guidance from social scientists in what they can do (Mackinder and Marvin 1982), they are now equally reluctant to accept advice on those things which they cannot. To part with the idea that their work can influence people's lives would be to part with a rewarding aspect of their professional self-image.

Lipman states that if the architects' objectives are realised, they will,
'exercise a considerable influence on the social lives of those who use or come into contact with the buildings.....If their perceptions of the effects of their work prove correct, the profession will shape the social and personal lives of vast segments of the population.' (Lipman 1970 p5)

Similarly, Blau believes that these social concerns indicate some possible changes in future orientation,

'If architects are still not giving priority to users' needs—and most critics feel they are not—the architects in this study indicate that this will be, or should be, the future trend.' Blau 1980 p353)

The architects' reluctance to dismiss architectural determinism seems then, to be connected to the fact that it is now firmly engrained as part of their self-image.

'Not unexpectedly, architects tend to subscribe to the belief that their professional activities—in particular, building design—reach beyond the handling of material resources; that they influence people's lives on more far-ranging and subtle levels.' (Lipman 1970 p5-6)

However, the common denominator of the studies reporting this belief is that these ideas were emerging in the 1960's, when the Modern Movement was still the major design influence and dictated that the form of the building should follow its function, and the architects' role as artist was seen as an egocentric and disreputable one. With the advent of Post-Modernism, the 1980's have seen a revival of aesthetically oriented building, and with it, it is possible that the architects' self-image is re-incorporating the traditional belief in architecture as a creative art.
Occupational Self-Image

Intuitive evidence suggests that the architects' self-image as artist is quite strong, and it may seem somewhat surprising that Lipman and Blau's studies did not elucidate this belief. However, the problem with any study where the responses are governed by the researcher is that they only find what they were looking for; the statements rated by the architects in Blau's (1980) study defined the scope of the orientations she found, and Lipman (1969) was only concerned with identifying the social orientations from the start.

Salaman (1974) uses self-image as one of the defining features of an occupational community. He claims that all members of an occupational community have a self-image in which their occupational role dominates. They see themselves as 'architects' or 'planners' and as such, people with specific qualities, interests and abilities. Not only do the members see themselves as 'architects', for example, but by internalising the value system they will describe themselves as possessing those attributes which are considered to be characteristic of the occupation.

However, given the wide range of skills required by the architectural profession, the term 'characteristic' becomes less clear. For example,

'The architect's duties, briefly, consist of design of the building, the preparation of the working drawings and contract documents, the arranging of the contract, the supervision of the work whilst in progress, the certifying of the interim payments and the examination of final accounts.' (Willis et al 1981 p7)

MacKinnon (1969) adds that an architect's success is dependent also upon his skill as a businessman and to some extent as,

'lawyer, advertiser, author-journalist, psychiatrist, educator and psychologist,' (MacKinnon 1969 p322)
Nevertheless, despite this variety architects are seen primarily as people who design buildings, and secondly as having the technical background to ensure that the design actually works.

The technical and the creative are often viewed as diametrically opposed talents in our society, yet the architects' work is,

'a science as well as an art, for he must produce a structure as well as create form, and must combine aesthetic effect with practical considerations.' (Willis et al, 1981 p1)

However, as Prak (1984) points out, this dual image which architects present to the public could place them in 'no man's land' with respect to their 'pure' scientific or artistic counterparts, for the architect,

'is often decried by the artists as a philistine who sells his integrity for some shekels, and by the engineers as a half-baked technician.' (Prak 1984 p25)

Even though design itself occupies only fifteen percent of an architect's time, the design of the building over-rides all other aspects of the work in terms of their importance to the architects themselves.

In defining an architect, Kostof (1977) states,

'This is what architects are, conceivers of buildings. What they do is to design ... The primary task of the architect .... is to communicate what proposed buildings should be and look like. (Kostof 1977 p5)

When questioning a sample of fifty-two London architects, Salaman (1970) found that creativity and design enjoyment constitute the major sources of job satisfaction. Thus, it is most likely that despite the changes in the architects' role, they continue to 'define themselves as artists, even when they present themselves as environmental scientists.' (Heath 1974 p181)
Thus, in addition to the architects' view of the role of architecture being centred on the buildings, their self-image, despite their many varied talents is also focussed on the buildings they produce, ie on their role as designers.

Further evidence of the artistic orientation is found in the fact that most architects' ambition is to set up their own practice, to allow themselves artistic autonomy, and all the frustrations architects face stem from the inability to design with the freedom of the artist (Salaman 1970). One of the major inhibitors of this is the client. Salaman (1970) found that 'client interference' was claimed to be one of the aspects of their work which architects disliked most. Any restrictions imposed on their artistic autonomy, the core of the motivation and job satisfaction, would doubtless be greeted with hostility. However, unlike most artists, architects' work is commissioned, thus precluding the pure expression of the artist and necessitating a client oriented approach. In order to see the completion of their ideas in built form, architects are obliged to submit to the clients' requirements, except in such rare cases when they are given aesthetic freedom, for example when they are designing their own houses. Architects are required to act according to the clients' brief, both in order to maintain their professional status, and in order to remain solvent (Prak 1984). Hence, if both architect and client are to be satisfied with the outcome, some kind of compromise must be achieved. As Lawson points out,

'No creative individual can be so altruistic, so devoted to the solution of others' problems, so committed to satisfying others' needs and desires, that he denies himself any self expression or recognition of his work.' (Lawson 1980 p175)

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The client does not represent the only frustration for architects. Salaman's study (1970) revealed that equally disliked were time spent on 'dull jobs or in administration' and 'restrictions from byelaws, government regulations, local authority regulations and so on.' These types of restrictions, again interfere with the freedom to design as they please, for architects must,

'satisfy the fire officer, the building inspector and the town planner, and in addition, depending on the nature of the particular project, the housing corporation, health inspectors, Home Office inspectors, the water authority, the Post Office, factory inspectors, and so the list goes on.' (Lawson 1980 p67-68)

Architects' design frustrations do not even appear to end with the successful completion of the project. It is at this point that the user moves in and often destroys the architect's illusions of how the building will be used. For the architect who is reluctant to relinquish his creation the result can be very disheartening. Lawson (1980) refers to an incident in which Stirling admits his resistance to the users' invasion. He confesses that he tends to keep 'coming back and hanging around and probably pester the daylights out of them.' (Stirling 1965 p239) On this occasion he found that the residents had plastered the brick fire places, destroying the consistent use of brick work inside and out. Although this rates as a frustration for the architect, such an incident upholds the often argued point that architects should actually leave some of the design undone, or at least flexible, to allow for this kind of user personalisation.

In parallel with their self-image, architects have often been accused of presenting themselves as slightly eccentric artists. As Prak (1984) cynically comments, 'The artistic ambitions of many architects tempt
them to adopt the mannerisms of the misunderstood genius.' (p16), or as Muschamp (1974) observes, 'The serious architect has spent many years in training and feels entitled to to his traditional aura.' (Muschamp 1974 p6)

The artistic 'image' so often associated with the profession is also perpetrated by the media. As Lawson (1980) points out, the media still portray designers as flamboyant characters in films and books. The architects in Salaman's study agree with this image. The majority of architects studied believed that they could identify an architect at a party without being told who he or she was. When questioned further the typical architect was seen to be wearing a bow tie, a coloured shirt, grey suit, suede shoes, and brightly coloured socks.

The respondents in Salaman's (1970) sample believed that architects are different from other people owing to their artistic awareness. It is, however, the artistic element of architects' work which can lead to criticism from outside the profession. Although Lipman (1969; 1970; 1971) and Blau's (1980) evidence suggests personal service ideals within the profession, Prak (1984) suggests that the artistic side of the architects' work often leads to criticism because unlike other professions, their ambition is to create rather than to serve.

Another criticism which the 'artist' image provokes, is that architects are 'elitist'. As in all the arts, one movement follows another and each is couched in terms which make it difficult for anyone other than the initiated to understand. Architects often refuse to discuss their design strategies (Salaman 1970), and although the architect "borrows
images and slogans from technology, politics and fashion,' he is 'appalled at the notion of having to equate his work with these sources.' (Muschamp 1974 p6). Understanding of architecture is often restricted to the elite, even though it is experienced by everyone.

On the other hand, from the architects' perspective, it is yet another frustration for architects that they are particularly prone to the ignorant critic. It is a common failing to judge an architect's solution to the design problem independently to having any knowledge of what the problem actually was.

In conclusion, it can be seen that the beliefs which characterise the profession, from beliefs in the role of architecture in society, to their own self-image, are centred on the actual designs and the resulting buildings which form our environment; It is architects' conceptualisations of architecture which form the core of their belief systems.

It is the architectural concepts, used by the profession in defining their conceptualisations, with which the present study is concerned, and in particular their development within the period of training in the schools of architecture. Thus, before turning to previous research on architectural concepts, section 1.3 will address some of the possible processes by which architectural education may transmit the beliefs in architecture which are at the heart of the conceptualisations acquired by the students.
1.3 Socialisation and Selection

The hypothesis of the present study is that socialisation into the profession occurs within the schools of architecture, bringing with it a set of beliefs and conceptualisations of architecture. Further, whilst showing some commonalities in the conceptual systems of students as a result of architectural education in general, there will also be a relationship between conceptualisations and the specific school of training.

'Socialisation' is the broad term applied to the process by which an individual adopts the norms and values of the society in which he or she operates. Two types of socialisation are discussed in the literature, 'primary' and 'secondary' socialisation. Primary socialisation refers to the socialisation of the child into the society in which he or she is raised, undertaken by the family or 'significant others'. Secondary socialisation, on the other hand, refers to the process by which adults adopt the standards of the section of society in which they live or work. Secondary socialisation can thus be defined as,

'all later processes by which an individual is inducted into a specific social world. For example, every training in an occupation involves processes of secondary socialisation' (Berger and Berger 1976 p75)

This process involves 'the internalisation of institutional or institution-based 'sub-worlds' ' (Berger and Luckman 1981 p158), and is clearly at work within the schools of architecture to a greater or lesser extent. Students do not purely learn facts without also gaining a myriad of beliefs and values which apply to their particular 'sub-world'.
Lipman believes that the 'social commitment' he identified in the writings of architects in the 1960's stems in part from the course content of sociology, social anthropology, and social psychology.

Lipman (1970) states that these courses were included in the training owing to,

'their potential for identifying 'user requirements' for designers, and the part they play in preparing students for the commitment to the profession's supra-client values,' (Lipman 1970 pl8).

It is Lipman's assertion that socialisation into the architectural subculture takes place mainly at the drawing boards and during studio tuition. For it is here that the students are involved in one-to-one contact with tutors who present the values and beliefs of the profession. His analysis of the 'Education' comment sections of the Architects' Journal during the 1960's showed an emphasis on studio tuition 'as a means of anticipatory socialisation for the profession's objectives,' (Lipman 1970 p19).

For Lipman, the socialisation occurs within the formal and informal interactions between students and staff during design work, which provides the students with their values and beliefs with respect to the profession. He concludes,

'studio tuition thus forms the kernel of a five year period of education which, in addition to more general pedagogic goals, is directed toward the development of 'creative ability' and 'self awareness'. Appropriate values are believed to be communicated by the rapport established in face-to-face contact: the studio is the venue in which, as designer, the student is called upon to make value judgements, and the drawing board is the place where the teacher is likely to pose his own personal judgement as a challenge to that of the student.' (Lipman 1970 p20-21)
There is however, a more specific aspect of architectural education which has attracted a lot of attention from various authors, ie the architectural 'crit'. Peterson (1976) states that,

'This teaching strategy is almost universally used in the visual arts....Further the tone of the comment may be hostile, jocular, patronising or supportive,' (Peterson 1976 p147).

The primary purpose of the 'crit' is for evaluating the students' work, however its secondary purpose must certainly be related to socialisation. As Attoe points out,

'The design critique has traditionally had the triple purpose of informing, judging performance, and screening out sluggards, ne'er do wells and trouble makers,' (Attoe 1978 p78).

It is the 'informing' which carries with it the knowledge and values which the tutors hope will be instilled in their students. Berger and Berger (1976) state that socialisation can be viewed,

'primarily as the imposition of controls from without, supported by some system of rewards and punishments,' (Berger and Berger 1976 p63).

The potential of the 'crit' for reward and punishment is great. The type of criticism used in this process is varied, 'in the studio setting criticism tends to be based ...... on a mixture of methods, including citations of facts, interpretation, dogmas and rules of thumb,' (Attoe 1978 p78).

Of the student-tutor relationship Attoe writes in the hope that,

'for every student leaving school there is a memory of at least one critic-teacher whose wisdom, sensitivity, enthusiasm, or moral outrage was sufficiently compelling to provide a reference point in years of designing to come,' (Attoe 1978 p78).

Despite this hope, there are many unpleasant tales of the architectural
'crit', and many students find them a daunting prospect. Martin Pawley (1975) writes of his 'lovely student life' at the Architectural Association (AA), 'My student life was not a joke--unless it was a joke on me'. He describes an incident during a crit at the AA,

'At one crit during my fourth year at the AA a student collapsed whilst his project was being energetically ridiculed by a visiting critic. The critic did not notice this event until a dreadful silence caused him to turn round some moments later. At Oxford girl students had sometimes burst into tears and locked themselves in the lavatories under similar circumstances. 'Come out, Miss Barrett, please come out!' At the Beaux-Arts some students had committed suicide. My own route, as you have gathered, was to go mad.' (Pawley 1975 p23)

In terms of socialisation, the crit provides a powerful tool, for linked with informing, judging and screening, are the social processes involved in such a situation; much stands to be lost by students who do not conform, when confronted by an audience of their tutors and peers.

Central to the 'crit', as the name implies, is the use of dispraise. This method of training is used, according to Goode (1978), firstly to illustrate the discrepancy between performance and the standard required, and secondly to induce motivation. Goode (1978) contends that this method of training is mainly found in the competitive sports and performing arts, those areas where control is needed over physical movement. However, the architectural 'crit' provides a further clear example of such training. Goode describes the social processes of dispraise thus,

'It accuses the person of failing to try hard enough to live up to the ideal set. It is experienced as a loss of esteem and usually, of affection as well. It is an assertion that, at a
minimum, one was not a true member of that group when one did poorly. At a maximum it is a threat that in future one may be rejected or ejected. It therefore creates anxiety which can be reduced only by trying harder.' (Goode 1978 p306)

It is worth adding that, underneath the apparently unpleasant face of the crit, there is often no more than the student's welfare at heart. As Goode points out,

'Dispraise is usually used interspersed with affection, and both coach and pupil know that ordinary standards are not being applied...there is then, a kind of perverse honour in being so criticised: the less competent are not so maltreated; instead they are ignored.' (Goode 1978 p307)

It is important to mention at this stage, that according to Epstein (1971), ranking amongst the ignored are likely to be the female students. She writes of the inconsistent use of sanctions and rewards applied to women lawyers; for example, criticisms being withheld where there are necessary. In addition to the 'performers', lawyers also feature in Goode's (1978) analysis. Goode points out that law students are also subject to training through dispraise, the common feature for the trainees being the importance of performance where,

'errors may not be detected and corrected before they have resulted in catastrophe' (Goode 1978 p310)

If this training is required to prepare law students for the rigours of court, then by being lenient on the female students one is, according to Epstein, banishing them to solicitors' offices, where they are deemed 'suited' to matrimonial work.

With respect to architects, although they may have to present their work for clients, this type of 'performance' is more akin to the presentations of scientists, which Goode uses as a comparison group.
Scientists, he claims, are not under the same performance pressures, as there is plenty of time for a paper to be prepared, and any mistakes can be rectified before it is presented. Nevertheless, students who are receiving less criticism are receiving less feedback. If women are being withheld criticism for fear of adverse reactions, then it is likely that fewer female students will complete their education.

In addition to the formal socialising processes involved in teaching, there are other informal processes involved in architectural education. Tutors, 'in addition to fulfilling the expected role of expert and information giver, must be ready to fulfil, at times, the roles of scholarly model, counsellor, facilitator and friend' (Heist and Wilson 1968 p197), and thus may provide socialisation through their informal contact with the student. However, whilst a social relationship of guidance would be optimal, Attoe (1978) points out that this is rarely possible, for the teacher remains a figure of authority.

The student sub-culture may also contribute to socialisation through the views of peers. Simply having greater involvement in college life contributes to socialisation, according to Etzioni (1964). He found that students at a commuter college were are less socialised compared to those who reside on site,

'all other things being equal, residential colleges can have a considerably deeper educational impact with the same investment in normative control.' (Etzioni 1964 p72)

Having considered the socialisation which occurs within the schools of architecture, it is necessary to consider two other forms of
socialisation, continued socialisation following the period of education, and pre-socialisation before entry to the schools of architecture. Firstly it is clear that socialisation does not stop once the training period is complete. Architects will doubtless encounter other 'sub-worlds' which will influence their beliefs and values. Sewell (1971) found that the longer the public health officials in his study had been in the profession, the more likely they were to take the established professional stance on problems of water pollution. This could be interpreted as deepening commitment to the profession's beliefs. On the other hand it could simply reflect differences in education according to the era in which the professional trained.

Whilst post-educational socialisation will probably occur throughout the architects' career, the likelihood is that the greatest overall change due to socialisation takes place during the intensive years of training; the period in which the 'lay' person 'becomes' the professional.

An interesting counter to this position comes from those studies which have not found the predicted differences in socialisation over a period of professional training. One such longitudinal study by Ryle and Breen (1974) was conducted on the changing conceptual structure of students enrolled for an MA in Social Work. Using a repertory grid, they examined the change in the students' concepts of self and others. Ryle and Breen hope that the students,

'will at least begin to acquire a sense of professional identity and will be able to go some way towards recognizing and, perhaps, modifying those aspects of their personalities and ways of relating to others which might interfere with their capacity to see their clients and colleagues clearly and respond to them appropriately.' (Ryle and Breen 1974 p139)
Although the authors express doubt that a two year course is an adequate length of time to implement such a socialisation, they did indeed find some evidence of conceptual change. However, these changes were not, as had been expected, in the students' construal of those relationships pertaining to their professional role. The most stable of the constructs was 'behaves professionally to', the construct which was the most expected change owing to the course, along with other professionally relevant concepts, such as 'understands feeling of' and 'objective about'.

In contrast it was the 'more affectively charged' constructs which show change over time, eg 'sincere with', 'feels hostile to' and 'made to feel competent by'.

This lack of expected change may indeed be due to the lack of time allotted to their training. However, it is more likely to represent the fact that students enrolling for an MA in social work will undoubtedly have had a good deal of professional experience, and will already have a fairly strong set of professional concepts.

However, a study of medical students carried out in 1957 showed that there was little change in the students' orientation over the length of their training when intuitively one would expect a high level of socialisation, (Merton et al 1957). The authors suggest that students are pre-selected on the grounds that they already socialised into professional norms owing to family connections with the profession. In one sample of four hundred and ninety-eight medical students, Thielens (1958) found that fifty percent had a relative who was a doctor, and seventeen percent had a parent who was a doctor.
It is in fact quite possible that students are selected on the basis of their level of pre-socialisation. That is to say that students are selected for the course on the grounds that they have the views and professional ideals which the tutors believe are necessary for successful entry to the profession.

With respect to architectural students, there is some evidence to suggest that tutors select students on the grounds that they are 'suitable' for entry to the profession. Abercrombie et al (1969) suggest that the selectors at the Bartlett school of architecture were more inclined to accept applicants who were similar to themselves.

Although Abercrombie's study was not designed specifically to examine this hypothesis, there is some evidence to suggest that selectors chose students who scored similarly to the interviewers on a number of tests. Both the interviewers and the selected candidates scored highly on 'creative interests' and 'unconventionality', and low on 'submissiveness to authority' and 'social conformity'. Although the selected candidates and the interviewers attained similar scores on these tests, Abercrombie et al (1969) conclude that the selectors appeared to chose the people who scored furthest from 'normal' on the tests.

This process of selection to the profession is similar to selection to an organisation, indeed a school of architecture may be seen as an organisation in itself. With respect to organisational selection, Salaman (1979) points out that interviewees are questioned about their views to see if they are suitable to enter the organisation, on the
assumption that suitable candidates will need less socialisation to accept the organisation's views. He says,

'Organisational selection can be seen, to a great extent, as a search for candidates who display some degree of anticipatory socialisation.' (Salaman 1979 p183)

He quotes Van Maanen (1976), as saying that a new member's acceptance of the organisation's values 'creates a sort of psychological barrier prohibiting the individual's desertion of the organisation.' (p88)

However, to return to educational selection, it is also possible that rather than the schools consciously selecting students on the basis of their pre-socialisation, the students self-select, an interest in the area being the impetus for application. For example, those students who had relatives in the profession would be more likely to have an interest in the area, and also more likely to have a basic knowledge of the professional norms.

Even though pre- and post-educational socialisation can be assumed to play a part in the development of professional concepts, the period of education itself remains the potentially most intensive stage of this process.

As Prak (1977) states,

'the beliefs and attitudes of the architect are products of his professional training and practice. Such beliefs have grown and been developed primarily within the sub-culture of architects and architectural critics. It may well be that such terms as; 'crisp' or 'lively' refer to a system of norms and beliefs that is valid only within that sub-culture; a sort of professional lore that is handed down from generation to generation in the architectural schools.' (Prak 1977 p1).

It is the development of certain aspects of this 'professional lore'
which concerns the present thesis. Therefore the focus of the study is placed on the years spent in architectural education in order to examine conceptual development. The following section reviews some of the research which has been directed toward the elucidation of architectural conceptualisations, by the comparison of architectural and non architectural 'control' groups, in the aim of identifying those concepts which are exclusive to the architectural profession.
1.4 Characteristics of the Architectural Concept System.

The previous section has demonstrated that in addition to providing the required professional training, architectural education can be seen to play a major role in socialising architects into their professional values.

The present chapter has also illustrated that the roots of the architectural belief system are in architecture itself. That is, architects' beliefs regarding their own professional role and the role of architecture in society are focused on the design and influence of the buildings they create.

Research into the way architects conceptualise has also been focused on environmental issues. The majority of research in this area has concentrated on the way in which architects attribute meaning to the built environment, usually represented by photographs or drawings. The primary aim of such work has been to compare the conceptualisations of architects and non-architects in the hope of pin-pointing the disparities between lay and professional opinion.

Thus, it is the unique characteristics of the conceptual system used by the architectural profession which are supposed to lead architects to make judgements which differ from those who have not undergone such a training.

This intuitive hypothesis has theoretical backing. Canter (1977) proposes the notion of 'environmental role' as a framework for studying differing conceptualisations of the environment. Environmental role may be defined as, 'that aspect of a person's social or organisational role which is related to his dealings with his physical surroundings,'
Differing environmental roles emerge from the different patterns of interactions people have with the environment. The different intentions and activities people link to places form the basis of their differing environmental roles, and these in turn lead to different conceptualisations regarding the environment. Clearly the training and experience which architects have with respect to the environment could form the basis of their environmental role.

It is this theoretical perspective which provides the framework for the assumption that architects have a different set of conceptualisations to non architects. That is, through their training and experience in dealing with the physical environment, architects develop a conceptual system which then guides their future interactions, judgements, and interpretations.

These characteristic ways of thinking have been demonstrated in a number of ways. Different strategies in problem solving have been demonstrated between designers and non designers in both experimental and applied situations.

For example, Lawson (1979) contrasted the way in which architectural and non architectural students approach the solution of a problem. He compared a sample of final year architectural students with science students at a similar stage in their education. He presented them with a problem involving the maximisation of colour through the combination of blocks. He found that whilst the architects adopted a solution oriented approach, testing various solutions until the best was achieved, the science students attempted to formulate principles for
solving the problem. Lawson claims that the difference is due to the emphasis in architectural education on teaching by example, by reference to previous solutions, rather than by the process by which they are achieved.

Similarly, Heath (1974) contrasted the way in which designers envisaged that the space in a new housing development would be used, with the way the user's actually did arrange the furniture in their homes. In several areas the architects imagined wrongly, and on several occasions, the architects claimed that the arrangement they would use would necessarily be different to those of the inhabitants.

Such studies demonstrate role differences in the way architects and non architects solve spatial problems. However, the focus of the present chapter is on the study of role differences in the attribution of meaning to the environment. The evidence that such differences exist is extensive, but subject to numerous flaws. In reviewing this area of research an historical perspective will be adopted, illustrating the evolution of conceptually and methodologically more complex research strategies.

Early research in this area relied heavily on the use of semantic differential scales on which the participants were asked to rate a series of environments presented to them in the form of photographs, slides and drawings. The dimensions resulting from the factor analysis of these ratings are usually compared between samples of architects and non architects acting as a comparison or 'control group'.

Canter (1969) aimed to compare architectural students with other, non
design trained students from the same university. The first section of
the study focusses on the architectural students, and thirty third and
fourth year students volunteered to rate a selection of elevations and
plans designed by previous students. A standard semantic differential
scale was employed, and factor analysis of the students' ratings
revealed three main factors, 'character', 'coherence' and
'friendliness', accounting for forty-two, seventeen, and sixteen
percent of the variance respectively. Canter concludes that these three
factors relate to one single evaluative dimension, in conflict with the
expected 'evaluation', 'potency', and 'activity' dimensions predicted
from Osgood's (1957) work.

In the second half of the study, whilst using non architects as
participants in an attempt to form a comparison group, Canter used a
different set of stimuli, line drawings of room interiors, and a new
set of scales based on the dimensions found in the architects' ratings.

Predictably, the dimensions obtained in the second study did not
compare to the first, the emphasis falling on friendliness. However, as
Canter (1969) points out the differences are,

'probably due to both the differences between the subjects and the
differences between the presentation of interiors and exteriors.'
(Canter 1969 p45)

A later study by Canter et al (1974) maintained the same set of slides
and (translated) semantic differential scales throughout the study, in
a cross-cultural comparison of architectural evaluation. The aim was to
'give a clue to the culture-specific and culture-bound aspects of
people's responses to the environment' (Canter et al 1974 p80). Six sub-samples were compared, architectural and non architectural students, representing three nationalities, British, Spanish and German.

The cultural difference in the evaluations was indeed represented in the data. However, in each case the architectural students were more similar to one another than were the non architectural samples, indicating that the architects' training had produced in them a similar mode of judgement regarding architecture.

Using a similar procedure, Hershberger's (1969,1980) study compares the dimensions of environmental meaning utilised by architectural, pre-architectural and non architectural students.

The students were presented with a selection of twenty-five slides of campus buildings, in various styles, types and sizes. The students rated each building on a set of thirty semantic differential scales. Each sub-group's data was factor analysed. The first factor for all the sub-groups, accounting for the largest proportion of the variance, was found to be one of 'space-evaluation', incorporating scales such as 'cheerful-gloomy', and 'open-closed'. The second and third factors, 'organisation' and 'potency' were also common to all the sub-samples.

Hershberger concludes that whilst all the sub-groups interpreted the buildings through the same 'code', using spaciousness, potency, and organisation, the differences associated with architectural education could be found on the affective and evaluative dimensions. He estimates that thirty percent of the time the architects' and non architects' judgements are in different directions, with those buildings rated by
the architects as good, pleasing, etc, being rated by the non architects as boring, annoying and bad.

Hershberger's (1969), Canter's (1969) and Canter et al's (1974) studies work within a very similar paradigm. In the search for group differences in the use of dimensions of environmental meaning, the components of these dimensions are provided by the researcher in the form of the bipolar adjectives of the semantic differential scales. It is the relationship between judgements on these scales and the evaluative or preference dimensions which the researchers believe have implications for user-oriented design.

Conceptually, the aim often appears to be essentially determinist, to identify styles, shapes and viewing angles of buildings which would provide the ideal environment to satisfy the onlooker. Features of the buildings, eg 'jagged', 'smooth', are related to elements of evaluation, eg 'pleasant', 'warm'.

For instance, Hershberger (1972) believes that semantic differential research holds the promise of predicting people's comprehension of the built environment before buildings are designed. He states that,

"The architect, to design new environments which will maximally benefit the occupants, must know which aspects or attributes of the physical environment cause which thoughts, feelings, attitudes or behaviours" (Hershberger 1972 p6.4.1)

To this end, he advocates the use of more photographs, more scales and more participants. There are however, those who believe that semantic differential studies, however large, hold no further promise at all. As Wohlwill (1976) summarises,

"It is clear that no valuable insights .... can possibly be expected from further mindless proliferation of factor analyses of semantic differential ratings." (Wohlwill 1976a, p50)
Indeed, the methodological weakness of these studies is clear. Kelly (1955) has stated that providing constructs for participants in psychological research runs the risk of being outside the respondents' 'range of convenience', i.e., the constructs may not be understood or interpreted in the way the researcher envisaged.

This is particularly relevant when the very aim of the research is to identify concepts used by a group of specialists. To provide constructs is to preclude the architects' use of their own, relevant, and probably richer and more complex constructs.

There have been a number of studies aimed directly at comparison of judgements using the participants' own versus provided constructs. In summarising this work Adams-Webber (1970) concludes that the use of participants' own constructs generates more extreme ratings. Seen from the other point of view, it might be concluded that provided constructs elicit 'dampened' or less certain responses. Nonetheless, with respect to all the studies, Adams-Webber concludes that elicited constructs were found to be more meaningful to the participants than those provided by the researchers.

The theoretical contribution of semantic differential studies is post hoc; clusters of inter-correlated variables which form the factors are used to propose 'intervening variables' such as 'friendliness' (Canter 1969) or 'potency' (Hershberger 1969). These theoretical constructs can, however, only be operationally defined by reference to the semantic scales which load on the factors.

Rather than deriving theoretical entities from factor analyses of
semantic differential scales, Kaplan (1973) began with the theoretical constructs which she believed would predict evaluation, i.e. 'mystery', and 'coherence'. The sixty photographs used in the study were then pre-selected to represent environments with quantitatively different 'amounts' of these qualitative constructs in built, natural and semi-natural settings.

The participants in the study were architectural students, psychology students, and students of landscape architecture. They rated each photograph on a five point scale on both the hypothesised variables, and on an evaluative scale.

This study, however, also has some basic methodological weaknesses. Having selected the photographs according to the theoretical criteria, the students were given the definitions of these criteria to be rated at the start of the study. The students thus display their ability to assess the photographs according to the researcher's initial scheme.

Additionally, the extent to which each photograph possessed each of the attributes was in some cases determined by the angle of view in the picture. For example, 'mystery' being the extent to which not enough of the scene was revealed by the camera viewpoint.

Not surprisingly, given the demand characteristics of the study, the most positive ratings for the built scenes came from the architects, the part building/part natural scenes from the landscape architects and the natural environments from the psychology students. Nonetheless, Kaplan found that the architects' preferences were predicted from the 'coherence' of the scenes, the psychologists' from the 'mystery' of the scenes, and the landscape architects' preferences were equally well
predicted from both. The question remains however, as to whether the buildings were simply inherently more 'coherent' and the natural environments more 'mysterious'.

In conclusion, one might consider that Kaplan's theoretical terms are not operationally defined from semantic differential scales, but rather themselves converted into such scales. Nonetheless, the relevance of these theoretical constructs is still an assumption on the part of the researcher, and the need for participant generated constructs is crucial in any attempt to find meaningful dimensions of understanding.

In addition to the reliance on provided constructs, much of the semantic differential research suffers from further weaknesses. Not only is the use of semantic differential scales based upon an underlying assumption of bipolar constructs (Osgood et al 1957), but the use of factor analysis constrains the data to fit into a number of linear dimensions.

As Garling (1976) points out, the use of multidimensional scaling techniques in the analysis of environmental perception allows the researcher access to categorical models of understanding, as opposed to 'the dimensional model pre-supposed by the semantic differential technique.' (Garling 1976 p 385). In his own research, Garling (1976) demonstrates the advantages of MDS procedures in revealing the basis of individuals' knowledge of the environment. He concludes that 'this basis is best conceived of as a categorisation process' (Garling 1976 p413).

The work of Oostendorp and Berlyne (1978) provides an example of the use of MDS procedures in gaining an understanding of environmental
construing. As part of a larger study of 'lay'/professional differences in the perception of the aesthetic environment, Oostendorp and Berlyne (1978) took similarity judgements between each combination of pairs in a set of twenty slides of historic building styles. The similarity data was converted into a four dimensional plot showing the similarity of the buildings, using an MDS technique known as INDSCAL. In the second stage of their research, the authors set out to identify the dimensions of this hypothetical space using semantic differential scales and factor analysis. The factors obtained from this procedure were overlaid onto the similarity structure in order to 'interpret' the similarities.

Whilst the authors claim to have demonstrated the 'value of these procedures for research in environmental and architectural psychology' (Oostendorp and Berlyne 1978 p81), the use of provided constructs and factor analysis in the second half of the study in order to interpret the space was unnecessary. Having asked the participants to make similarity judgements in the first half of the study, it would have been more pertinent to ascertain the basis of these judgements from the respondents themselves.

The first steps towards the use of elicited constructs were made by those researchers who applied Kelly's (1955) personal construct theory and the repertory grid technique to environmental issues.

In summarising his reasons for selecting this path, Stringer (1977) states that although he was 'wilfully and greedily hooked by the mighty trident of... personal construct theory, and the repertory grid technique,' (Stringer 1977 p300) there were other more particular reasons for this choice of orientation in his work.
In his analysis of the previous work in environmental perception and evaluation, he identifies three motivations, each with a corresponding methodology. The first approach he characterises as 'justificatory', being in essence an attempt to justify the action of environmental decision makers by testing whether their goals had been achieved. The semantic differential discussed above provided much of the methodology for this approach and as Stringer reiterates, 'one cannot know how people will interpret the scales,' especially when dealing with experts, as 'they would have to accept the semantic differential as an adequate expression of their environmental semantic structure,' (Stringer 1977 p302).

The second approach Stringer terms the 'proleptic' approach, having the aim of discovering which environments are valued in an attempt to replicate them for the future. Stringer characterises this research as using preference rankings which he does not feel carry enough psychological meaning.

The third approach, however, he characterises as the search for a general understanding of people's values with respect to the environment, and the ways in which they correspond to other value systems. Stringer (1977) states that studies in this domain are not purely evaluatory, and this approach allows a range of responses to be elicited, and meaning defined from their relationships with one another.

Placing himself firmly in the latter group, Stringer adopts the repertory grid technique, whereby fewer assumptions are made by the researcher. He concludes that the repertory grid, 'preserves individual
construct systems. It integrates perception and evaluation." (Stringer 1977 p303).

An example of the use of the repertory grid technique with respect to lay/professional differences in the attribution of environmental meaning comes from Leff and Deutsch (1973). The sample sizes were small, however, the study illustrates the qualitative differences in construct use when the choice is left to the participants.

Leff and Deutsch (1973) compared the conceptualisations of two groups of students, one comprising ten architecture and planning students, and one of ten graduate students in other fields. Interestingly, half of the design professional sample consistently used more constructs than the 'lay' sample, and half used less. Four out of the five participants using less constructs were the architects in the sample, and four out of the five using more were the non architectural professionals. However, the difference in construct use was not only quantitative. Leff and Deutsch (1973) also found that the non design professionals were more likely to use constructs which were wholly or partially defined as ethno-demographic. Thus the 'lay' sample tended to characterise the environments in terms of ethnic, socio-economic, generational and life style characteristics of the people who populated the environments.

However, in this study, not only were the constructs provided by the participants, but so too were the environments. People were asked to imagine places which they knew. The difference between a 'place' one knows, with all its associations, and an 'environment' in a photograph may have led the definitions in the direction of human actions and
intentions (Canter 1977), at least for those of whom 'expert' opinion was not expected.

The repertory grid technique not only holds the advantage of using more meaningful, elicited constructs, and occasionally elicited places too, but also maintains the individuals' content when aggregated across groups. The use of mean differences, employed by the semantic differential approach is often criticised for its lack of attention to individual variation.

In his analysis of the methodological developments in environmental cognition research, Downs (1976) sees grid methods as the 'natural step in any gradation from semantic differential studies' (Downs 1976 p 74), yet he is hesitant to dismiss the semantic differential without acknowledging its impact on expanding the field of environmental cognition. He states that,

'we are growing out of the semantic differential, but, like last year's fashions, it was useful when we needed it.' (Downs 1976 p74).

As a replacement, Downs feels that the repertory grid fulfills all the capabilities of the semantic differential, and still adds more. For Downs (1976) the repertory grid technique,

'imposes the least number of constraints on the person as he or she tries to communicate his or her understanding of some part of the world.... Grid methods allow us to have the better parts of both worlds: we can be humanistic, relevant, and soft while maintaining an objective, scientific, and hard nosed stance.' (Downs 1976 p74)

Nonetheless, Wohlwill (1976b) condemns both semantic differential and repertory grid methods for not generating, in practice, any output capable of obtaining group comparisons. He expresses his doubts at the way in which these procedures are used in environmental research,
"these tools have seen such a mushrooming in popularity in the environment-behaviour field, and been put frequently to such mindless use, as to raise grave questions concerning the direction that this whole enterprise is taking." (Wohlwill 1976b p390)

Despite the methodological advantages of the repertory grid technique over the semantic differential, the theoretical objections are similar. Even though grids provided the impetus for more elicited response research, the underlying theoretical basis of the personal construct system (Kelly 1955) is also based on bipolarity. Kelly believed that people make sense of the world by means of judgements of likenesses and differences. In Kelly's terms each construct is formed of an axis, of two opposite poles. According to personal construct theory, when a person makes a judgement of what an item is, they inevitable designate what it is not. Fransella and Bannister (1977) illustrate the point.

'When we say that Bill Bloggs is honest, we are not saying that Bill Bloggs is honest, he is not a chrysanthemum, or a battleship or the square root of minus one. We are saying that Bill Bloggs is honest, he is not a crook.' (Fransella and Bannister 1977 p5)

In this respect personal construct theory and the repertory grid fall prey to the same theoretical criticisms as the semantic differential, precluding the existence of categorical constructs.

Inspired by the advantages of the repertory grid technique, and with the aim of improving on its weaknesses, the multiple sorting task (Canter et al 1985) was developed over a number of years by Canter and his colleagues.

The roots of the multiple sorting task are founded in a number of areas. Kelly's (1955) work contributes an emphasis on people's own personal understanding of the world, and hence the use of elicited
constructs. Contemporary cognitive psychology points to the importance of categorisation in human information processing (eg Rosch 1977), and the early sorting procedures used by clinical psychologists provided a methodological model.

In their article 'Instead of Grids', Brown, Richardson and Canter (1976) expound the advantages of the multiple sorting task over the repertory grid technique. The authors first point out that in simple terms, the Multiple Sorting Procedure takes less time than the repertory grid, and is enjoyed more by the participants. However, in addition, Brown et al (1976) state that the actual process of filling out a grid can become the central part of the research. In their experience, they claim that the grid, 'had taken over and we had lost the person' (Brown et al 1976 p4). They found that the task of completing the grid detracted from the information the people were able to provide. The person's attention is directed towards the completing of the grid at the expense of the reflections made on the actual topic area. The Multiple Sorting Task, on the other hand, allows for the elaboration of constructs and relationships between constructs. The Multiple Sorting Task takes place in what is essentially an open-ended interview situation. Thus questions can be asked of the subjects and any information which seems potentially interesting can be expanded upon whilst the participants are actually there.

In comparing the two procedures, Brown et al (1976) demonstrated that the constructs generated through the sorting task, as compared to the repertory grid, were richer. However, in cases where the same construct may appear to be used by different sub-groups, the Multiple Sorting Task allows the different interpretations of that constructs to be revealed.
In conclusion, they state,

'Inclusion of the rep. grid in the psychologists' battery of research tools was a praise worthy attempt to admit the subject's ability to structure his own experiences. We have no quarrel with that aim, but doubt that the role rep grid technique is always the best way to elicit constructs ..... With our grids we felt we hit the top of the iceberg of environmental construing, with the sorting task we were at least getting below the water line' (Brown et al 1976 p5)

The wide variety of applications for the multiple sorting task has been demonstrated in numerous pieces of research exploring role differences in environmental construing. For example, Young (1978) employed such a methodology in his attempt to identify the differences between architects' and non architects' interpretation of building type. Following Krampen (1977), Young proposed that there were various features of building which acted as cues to their function, and he hypothesised that these cues would carry different meanings for architectural and non architectural sub-samples.

He tested the interpretation of formal features of building type in a matched sample of architects and engineers. He asked the two groups to sketch each of six types of building in one minute. Then he split the groups such that half the architects were to sort the architects drawings according to building type, and half were to sort the engineers drawings. The same procedure was followed by the engineers.

Young (1978) found that not only were the architects' drawings easier to sort for both groups owing to their inclusion of the relevant cues, but the architects were better at identifying their colleagues drawings. This indicates that architects, through their training, have developed an ability in both the production and the recognition of formal cues.
Interestingly, he also found that the ability to detect the building type was related to subsequent evaluations of the building. If enjoyment is related to identification of building type, and architects have an increased ability in identification it follows that architects should prefer more buildings than non-architects.

Nevertheless, although Young provides an intriguing example of the Multiple Sorting Task in the comparison of architects' and non-architects' conceptualisations of building type, he provided the construct deemed to be of importance, and thus the categorisation scheme.

Groat (1979), on the other hand, demonstrates the differences between architects' and accountants' interpretation of architecture using their own elicited constructs. In her study, participants were asked to categorise a selection of buildings according to any scheme they felt to be important.

She set out with the specific intention of testing the claims which the architectural critics had made regarding Post Modern architecture. They suggested that the formal characteristics of Post Modern architecture rendered it comprehensible to 'lay people' and architects alike. Using the Multiple Sorting Task and non-metric multidimensional scaling techniques she was able to examine and compare the conceptualisations of architects and accountants, with respect to a range of contemporary buildings. She reported a number of differences. Architects tended to conceptualise architecture by means of a greater number of constructs which were qualitatively different to those of the accountants, being more conceptually ambiguous. In terms of the evaluative dimensions
there were also differences, the accountants failing to appreciate some of the buildings which gained the approval of the architects.

In summary, the present review has arrived at two related conclusions. Firstly, although there has been little chance of cumulative or comparable results in this field, the weight of evidence suggests that architects do indeed construe the environment differently to those without architectural training. The constructs used by different sub-groups in conceptualising the environment differ both quantitatively and qualitatively.

The second conclusion derives from the inadequacies of the early research; that open-ended procedures using participant generated constructs (eg Multiple Sorting Task) provide the most productive access to these differences. The rationale for the use of the Multiple Sorting Task in the present study will be elaborated in Chapter Four, however, the present review has demonstrated, in historical terms, its necessary development in the study of differences in environmental construing.
Summary of Chapter One

Previous research indicates that architects have adopted the service ideals of the professions, resulting in a belief in architectural determinism, i.e., that architecture exerts an influence on the people who use and view its products. Additionally, architects' occupational self-image centres on their role as designers and on the creation of buildings, indicating that the architectural value system is centred on the creation and influence of the buildings themselves.

The most intensive period of socialisation into the profession is likely to be during the years spent in architectural education. It is in the schools of architecture that both professional values and a system of architectural concepts are most likely to be acquired.

Research into the concepts used by architects and non-architects in construing the environment has indicated that architects use both qualitatively and quantitatively different constructs to those who are not architecturally trained. Although this field of inquiry has been limited by poor methodology, the development of increasingly appropriate research strategies has culminated in the Multiple Sorting Procedure, which has proved particularly suitable for the study of professional concepts.
2.1 Introduction

Having considered the beliefs and conceptualisations which characterise the architectural profession, and the assertion that these characteristics seem likely to have developed during education, the present chapter will consider a number theories which could guide our understanding of the process of this change.

In examining the major psychological theories of development it becomes clear that there are a number of common themes in the structure and content of both child and adult theories of development. The theories to be considered in the present review are Piaget's theory of intellectual development (Flavell 1963), Kohlberg's (1963, 1969) theory of moral development, and three theories of student development: Perry's (1970) scheme, the Reflective Judgement Model (Kitchener and King 1981), and Hunt's (1971) model of conceptual change. In addition, other models of conceptual change will be considered where appropriate.

Rather than presenting these theories in any great depth, the present review aims to identify those recurrent aspects of the theories which may be used as analogies to the development intuitively expected in architectural education.

Section 2.2 considers similarities in the content of theories of conceptual development, focusing on such themes as the development of abstract concepts, and the changing viewpoints taken by the individual. This will be followed by a discussion of the implications of these
common themes for architectural education in section 2.3. Section 2.4 turns to the structure of the theories in terms of the process of conceptual change addressing such issues as individual differences, impetus for conceptual change, and the theoretical postulates of stages and end-points. Section 2.5 will summarise the implications for the structure of conceptual change during architectural education.

2.2 Conceptual Development: Issues in the Content of Conceptual Change

The Development from Concrete to Abstract Concepts

The first and most widely emphasised aspect of the content of conceptual development, concerns the ability to deal with increasingly abstract concepts. The major psychological theories indicate a development from dealing with concrete, tangible aspects of the world to the ability to consider abstract concepts. For example, Piaget's theory of intellectual development (Flavell 1963) directly confronts the mental manipulation of increasingly less tangible entities. In the first of Piaget's stages, the sensorimotor period, the infant is purely concerned with actions on physical objects, whereby the infant aims for 'practical physical success'. In Piagetian theory, stages two and three, the pre-operational and concrete operational stages, lay the ground work for stage four, the stage of formal operations and the end-point of adult functioning in Piaget's terms. It is during this intermediary period of development that the ability to deal with representations of objects is acquired. Whilst the sensorimotor period is centred in actions upon physical objects, the concrete operational period allows the cognitive representation of physical objects. In this respect, Piaget emphasises the notion of 'reversibility' (Flavell
1963), ie that the child gains the ability to mentally manipulate objects, providing the knowledge that if an array of objects are changed, this is not a permanent alteration and that they can be changed back to their previous positions.

However, the final stage of development, formal operations, allows not just the manipulation and representation of physical entities, but the ability to manipulate abstract, non-physical entities. Once the stage of formal operations is reached, hypothetical situations can be considered, and deductions can be made from verbally stated relationships.

Piaget's four stages of cognitive development also form the basis of Hart and Moore's (1973) exposition of development of spatial knowledge. Hart and Moore contend that the cognitive structures required for intellectual development also define the ways in which the developing child is capable of construing the environment. This development progresses in much the same way as Piaget's, with knowledge of space being acquired via actions within it. Thus the first stage involves acquisition of spatial knowledge through action (sensorimotor), followed by unco-ordinated representations of the world based on objects which have been perceived or acted upon in the past (pre-operational).

The last two stages of concrete operations and formal operations bring with them the ability to represent both real and symbolic aspects of the environment, allowing a reference system which is independent of fixed references. Performance on Piagetian tasks are mirrored by the environmental equivalent, for example, imagining a route in reverse being an index of reversibility. Similarly, the development of
environmental knowledge measured by cognitive mapping techniques also portrays a natural progression from landmark features (single physical indices) to more complicated maps built around inter-connections and inter-relationships, (eg Canter 1977; Spencer and Darvizeh 1981).

Piaget's theory of moral development (1932) also evidences a change from concrete to abstract concerns. In the early stages of development, Piaget suggests that children rely on absolute criteria of right and wrong, which are dependent on the physical scale of the damage. The worst guilt falls on the perpetrator of the most damage, and the worst lie is the one furthest from the truth. It is not until later stages of moral development that more abstract concepts such as 'intentionality' are used as modifiers to the judgement of the severity of the 'crime'.

Similarly, according to Kohlberg's (1963, 1969) theory of moral development the child is initially concerned with concrete physical effects. In the pre-conventional levels, right and wrong are defined by their physical outcomes in terms of reward and punishment. This stage is followed by a degree of reciprocity, but this is seen purely in terms of the return of favours, again being based on the personal physical benefits involved. At the conventional stage (levels three and four) the individual is concerned with laws and rules. That is, sanctions that can be applied, but need not be related to direct physical consequences; good behaviour is seen as that which gains approval. Authority is represented in the form of family rules and laws of the land and these rules are followed for their own sake.

However, at level one of the post-conventional stage, the person accepts that rules may be examined and changed as required by society.
Although laws and regulations remain a concern of the individual, emphasis is placed on their possible change. Level two of the final stage in Kohlberg's theory allows for 'principled thought', i.e., the individual is guided by his or her own conscience according to their own self-chosen moral framework.

Kohlberg's theory of moral development (1963, 1969) can be seen to parallel Piaget's theory of intellectual development in the increasing need for abstract thought. The theories move from manipulation of physical objects and concern with physical outcomes, to the representation of physical objects and the representation of physical consequences in the form of rules. Finally, the later stages allow representation of non-physical entities and the ability to form one's own ethical principles in Piaget's and Kohlberg's theories respectively.

With respect to the theories of adult, particularly student development, a similar trend can be identified. For Perry (1970) and Kitchener and King (1981) the development from concrete to abstract concepts can be found in the individual's concept of knowledge.

Perry (1970) interviewed a number of students as part of a longitudinal study of development during college years. The original nine 'Positions' he identifies can be reduced to four basic stages. In the first stage, 'dualism', the students seek dichotomous yes/no answers to intellectual and social questions. They are rigid in their approach and seek one basic 'truth' which they assume to exist, and this 'truth' is supposed, is known by external sources.
The following stage in Perry's (1970) scheme is characterised by the view that there are multiple versions of the truth which are dependent upon the individual's perspective, ie that there are different interpretations of the truth. In the third stage, relativism, the students are able to acknowledge that rather than one truth there are a multitude of possible truths. The final stage of Perry's scheme, termed 'commitment in relativism', allows for the knowledge that many truths exist, however the individual is able to commit themselves to the 'truth' they believe in, ie to their own personal beliefs and values. Perry states that the complex thinking characteristic of this stage of development can also encompass a variety of inclinations within the individual without causing 'cognitive confusion'.

The Reflective Judgement Model (Kitchener and King 1981) takes a similar view to Perry's in its emphasis on the individual's understanding of knowledge and reality. However, they additionally chart the way in which beliefs are rationalised. Using a similar methodology as Kohlberg, Kitchener and King (1981) draw on people's justifications of their beliefs with respect to a series of dilemmas regarding controversial issues. The Reflective Judgement Model proposes seven stages of development during which the individual progresses away from the initial notion of the objective existence of reality, knowledge, and beliefs which require no justification.

Hunt's (1971) view of development also follows the individual's beliefs from stage one, a simple concrete 'good/bad', 'right/wrong' stance to a more complex, integrative understanding of the individual's position in relation to society, (stage four). Hunt defines his four stages, or conceptual levels, through rating responses to a paragraph completion
task on topics such as conflict, authority and rules.

Thus it can be seen that these three theories of adult development are based on very similar notions of conceptual development. In each case the authors propose a development from rigid conceptions of the world to more flexible abstract beliefs. Such theories propose levels of cognitive readiness for abstract thought. However, empirical studies show that concrete concepts are indeed acquired prior to more abstract ones. Studies of concept acquisition indicate that concrete categories such as furniture and animals are amongst the first children learn, whilst more abstract concepts are attained later in development (eg Klausmeier et al 1974). Similarly studies of the development of self-concept show that physical, possessive and action descriptors (rides a bike, has brown hair, has a brother) are used well in advance of non physical, inferential qualities such as personality, (eg Keller et al 1978).

The Changing Viewpoints of the Individual

One aspect of the early 'concrete' stages of the adult development theories discussed above has been the individuals' initial reliance on a single perspective. This is evidenced by the dualistic thought of both Hunt's (1971) and Perry's (1970) stage one individuals. Similarly, Kitchener and King's (1981) early stages of 'immature' conceptual development are based on the belief in a single interpretation of reality and knowledge, which has objective existence. In all three theories these preliminary stages of development are characterised by the view that there is one 'truth'.

However, in the later stages of development, according to all these
theories, the individual grows to believe in a multiplicity of versions of the truth, and that knowledge, beliefs and values can only be defined relative to the individual's context and perspective.

Thus, with respect to the type of development expected, the theories of adult development reviewed here all contain some reference to a shift in the individuals' viewpoint, from being self centred to acknowledging the views of others.

Clearly these positions parallel those proposed by the child development theorists. Piaget's well-documented 'egocentric child', moves from the profound egocentricity of the sensorimotor period, where infants are unable to differentiate themselves from the rest of the world, to the eventual ability to decentre, allowing knowledge of other's perspectives, both physically and emotionally. Similarly, in Kohlberg's (1963, 1969) scheme, people in the early stages of moral development define right and wrong purely in terms of the outcome for the individuals themselves; actions are judged by the personal consequences. At best reciprocity is the motivation for moral behaviour, with the expectation that moral 'debts' will eventually be repaid. Later stages of moral development evidence others' viewpoints in the form of societal needs, and in the final stages in general ethical principles and in global human rights.

Piaget's position is that allocentricity, the ability to 'decentre' and see multiple perspectives, is the end point of that particular dimension of cognitive development. However, for Kohlberg and the student development theorists, acknowledgement of multiple perspectives occurs around the middle stages of development. This discrepancy
between the theories stems essentially from their different concerns. Whilst Piaget's theory of intellectual development deals purely with cognitive function, the other theories reviewed here are concerned with more affective aspects of the individual's world, in which judgements and beliefs are the focus of change. For these theorists the final stages of development also have similarities. Whilst others' views are still acknowledged, the individual progresses to a position whereby they are able to commit themselves to their own personal beliefs.

Thus Kohlberg's (1963, 1969) post-conventional moral thinkers are not bound by rules, nor by the relative concerns of individuals, but by their own enduring principles which guide their beliefs and values. For Hunt (1971) it is the third of his four stages which represents the highest level of tolerance for uncertainty. Individuals at this stage are open to others' ideas, yet this is an openness which does not allow for external impositions. By stage four, these impositions may be re-accepted, provided that they fit with the individual's now clear understanding of self and environment. At this stage individuals can accept standards which are applicable to both self and others.

For Perry (1970), the move from own to multiple perspectives is the defining feature of his scheme, along with the final stages of 'commitment in relativism'. The final group of stages represent the point at which the individual is able to commit themselves to the position they believe in. Similarly, in the final stages of development of Kitchener and King's (1981) model, the individual also develops in such a way as to allow a more committed position. Whilst the middle stages of their scheme are characterised by the view that reality and knowledge are relative to people's perceptions and interpretations, the
final stages allow for systematic exploration of the possible positions, and the ability to critically judge the relative merits of each.

Owing to the 'commitment' evident in the later stages of development on these affective and judgemental dimensions individuals at the beginning and the end of the developmental progression may in some respects appear similar. However, whilst both will have a set of committed opinions, it is their more global attitudes to others beliefs which betray the true difference in conceptual development.

In the middle stages of development, before commitment is attained, the individual who can see multiple perspectives is in a position of uncertainty with respect to his or her views of right and wrong, truth and fallacy. There is no longer a 'fall-back' of external knowledge of the truth, and before a commitment is made to one version of the truth a chaotic view of the world reigns. The middle stage individual is able to consider and organise a vast array of possible viewpoints. Whilst this is a successful stage in some respects, as it can deal with each new situation in its context, it lacks established criteria on which to formulate judgements. Perry (1970) presents numerous examples of this 'purgatory of Relativism' in which his,

'students found themselves standing, outside of Eden. The University compactly representing through 'a liberal education' the diversity of the modern world and the contingency of modern knowledge, is revealed as Serpent. The students have eaten.' (Perry 1970 pl76)
2.3 Implications for the Content of Development in Architectural Education.

Section 2.2 has demonstrated some consistencies in the theoretical content of conceptual development which may be represented in the development of a professional concept system within the schools of architecture.

There is an extensive body of theoretical support for the development of concrete tangible concepts in advance of more complex and abstract concepts, both in terms of the ease with which they are learnt, and in terms of the 'cognitive readiness' to cope with less physical concepts.

The preceding review also indicates that students at the outset of their training should hold strict dualistic views of architecture, with dichotomous 'good-bad' judgements, and that these opinions will be derived from those in authority who 'know the truth'. This simple 'right-wrong' view of architecture should also display a lack of tolerance for others' (wrong) opinions.

If the same pattern of conceptual change holds with reference to architectural education as for the general patterns identified by Perry (1970) and Kitchener and King (1981), the stage following 'dualism' should evidence what might be considered 'confusion' in the students' orientation in architecture. The knowledge that there are many ways to design and many solutions to the design problem suggests that these students would be less harsh on opposing styles and approaches. They may also appear to lack commitment to any particular approach to design as, to them, all possible approaches are as good or bad as each other.
Students in the final stages of development according to Perry (1970), Kitchener and King (1981), and Hunt (1971), would be characterised by more tolerance to a variety of perspectives than those in the first stages of development, but would evidence commitment to their own viewpoint with strong opinions on architecture.

The above synthesis is speculative, and as mentioned in section 2.2 is dependent on the domain in which the changes occur. For example, if the dimensions of the architectural conceptual system are based on cognitive factors, they would be open to qualitatively different sorts of changes than if they were based on affective factors.

Having considered some of the possible content areas of conceptual change, the following section addresses the process and mechanisms of change which can be derived from an analysis of the available theoretical frameworks.

2.4 Conceptual Development: Issues in the Structure of Conceptual Change

Theoretical Approach

The study of development can be characterised in terms of two types of approach, theories of aging and theories of growth (eg Fischer and Silvern 1985). Whilst those writing on the aging process have contributed methodologically, their emphasis been on intellectual decline, (eg Baltes and Schaie 1976, Horn and Donaldson 1976). The primary concern of such studies is those aspects of adult intellectual functioning which show increments and decrements in performance with age. In this respect, the conceptual development of the students in the
present study is more aligned with the cognitive structural changes proposed by the growth theorists. Such theories of cognitive growth are represented by the stage theories reviewed in section 2.2, the most characteristic being Piaget's theory of intellectual development, (Flavell 1963).

The major problem with stage theories is in their lack of attention to individual differences, emphasising commonalities between groups of people within broad age bands. Most theorists hold that the sequence of development is invariant, however allow for individual differences in the rate of progression through these stages. Although some authors do suggest education strategies to encourage the rate of growth, they have generally had little success in identifying those aspects of educational experience which may in reality be associated with development, (eg Khalili and Hood 1983)

With respect to individual differences there is something to be learned from the approach taken by the life-span perspective, as

'After early childhood, individuals function in ever more diverse contexts, and they also show increasing diversity in how they select and manage those contexts.' (Fischer and Silvern 1985 p617)

Therefore, in order to have the best possible combination of approaches, theorists should endeavour to work within research paradigms which account for both individual and group differences. Fischer and Silvern state,

'It is misleading to speak in terms of stages without also noting the wide range of individual differences in development, and it is misleading to speak in terms of individual differences without noting the commonalities that occur across individuals.' Fischer and Silvern 1985 p617)
With respect to this desired paradigm, much can be learnt from Kelly's (1955) personal construct theory. For Kelly, human development is a constant process of hypothesis testing, i.e., acting on assumptions about the world, observing 'effects' and re-adjusting the 'personal construct system' to incorporate the new 'data'. For Kelly there are no stages for,

'man, in Kelly terms, is 'a form of motion' not a static object that is occasionally kicked into motion' (Fransella and Bannister 1977 p82)

Kelly's emphasis is on the individual, yet his approach allows group comparisons. It is this person-oriented approach, discussed further in Chapter Four, which provides some of the impetus for the approach taken by the present thesis, for like personal construct theory it aims,

'to stand in others' shoes, to see their world as they see it, to understand their situation, their concerns' (Fransella and Bannister 1977 p5)

End-Points

In addition to the ignorance of individual variation, stage theorists rule out diversity in the outcome of development through the stipulation of the end-points. As mentioned above, the rate of progression through the stages may be variable, yet it is only in exceptional circumstances that stage theorists see people 'fixated' at an early stage of development. The fact is that the end points of these theories may well be too advanced, or not advanced enough, to represent the full range of adult development. For example, with respect to Piaget's theory of cognitive development, there has been concern amongst several authors that 'formal operations' does not adequately describe the cognitive functioning of adulthood. Writers have proposed
several versions of cognitive abilities which occur 'beyond formal operations' (eg Labouvie-Vief 1980, Broughton 1977).

The opposite trend, to over-estimate development appears to be a feature of the other theories reviewed in this chapter. Whilst it is as well to represent all possible stages, it should be borne in mind that few may complete the development these theorists envisaged. Regarding Kohlberg’s stages of moral development, Duska and Whelan (1977) believe that, 'a great segment of society is probably located at the fourth stage or in the transitional stage of four and one half' (Duska and Whelan 1977 p75), characterised by 'skepticism', 'egoism', and 'relativism'. Further they add that 'for most of us, if there is a highest stage, it might be quite difficult to comprehend' and that Kohlberg himself resorts to illustration of this stage by reference to the reasoning of, for example, Martin Luther King.

Perry’s scheme of intellectual and ethical development (1970) is also in essence a stage theory, even though Perry calls his stages 'Positions' so that they carry no assumptions of their duration, and so that the term 'Position' can express 'the locus of a central tendency or dominance' (p48) amongst a range of structures at a given time.

Perry defines an end-point at Position nine, and although he envisaged the complete development during college years, he acknowledges that not all students reach this final stage. Nonetheless he did find seventy-five percent of his sample attained a degree of commitment associated with positions seven and eight. However, further research on Perry’s scheme, whilst confirming the sequence of stages, found a more modest development during undergraduate years, with most students graduating
at the end of stage two, or the beginning of stage three (King 1978).

Khalili and Hood (1983) found a similar over-estimation of growth from empirical data relating to Hunt's (1971) model. Their sample of University students showed a very modest progression through Hunt's stages. They found, on average, only one stage difference in conceptual development between the students at the outset and the completion of their undergraduate years.

In a review of all the available data pertaining to the conceptual development hypothesised by the Reflective Judgement Model, Brabeck (1984) identified Kitchener and King's (1981) post stage four thinkers only in a sample of graduate students, and the highest she identified was stage six in a sample of Post Doctoral researchers. Thus she states that although students in the final stages of this scheme might be the, 'type of student college professors hope for and may even expect to encounter in class.....research shows that these students are only found in advanced graduate programs' (Brabeck 1984 p25).

Domain Specific and Sample Specific Development

Two further problems with the structure of stage theories concern the generality of their predictions. It is a common failing of such theories that they do not account for differences in development associated with the sample selected, or with the domain of development being studied.

Most authors propose their theories on the grounds of work with very specific groups. Piaget's focus on Swiss children has allowed for a
good deal of cross-cultural research testing the validity of his predictions with various other cultural groups. Piaget himself (1966) sees the scope of cultural differences in much the same way as individual differences, as being found in the rate of progression through the stages.

However, his opponents see the differences as being more broadly based. For example, Greenfield (1976) has suggested that Piaget's scheme is descriptive of the development of a Western scientist, but is not adequate to describe the development of Eastern thought. Other critics focus on the inapplicability of the type of tasks Piaget uses as an index of the stages of development for cultures other than the white, Western middle-class (eg Labov 1972).

The Piagetian tasks are also the focus of criticism surrounding domain specific development. Whilst most authors recognise the existence of domain specific development, few admit its synthesis into the body of the theoretical scheme. Piaget makes a theoretical gesture to such phenomena with the concept of 'horizontal decollage'. He uses this theoretical construct principally in order to explain the disparity between children's conservation abilities when dealing with different media. Nonetheless, as Baldwin points out, 'the explanation for horizontal decollage is not really incorporated into the fundamentals of Piagetian theory.' (Baldwin 1980 p272)

However, small changes in the materials or contexts of most Piagetian tasks have been found to produce large changes in children's performance on them. Much research in developmental psychology has been
directed toward presenting Piaget's tasks in different ways and thereby prompting early success or late failure. For example, infants can be discouraged from displaying the AB error given appropriate landmarking (Bremner 1978), children can take others' perspectives when confronted with a doll's house rather than three mountains, and conservation of number is possible for a four year old when a marauding teddy bear, rather than a psychologist, creates havoc with the display! (McGarrigle in Donaldson 1978).

Piaget is not the only theorist who fails to separate the domains of development. The difference between cognitive and affective development has already been discussed, yet Perry (1970) makes little attempt to separate the two. Thus, for example, whilst a student may see many points of view (relativism) with respect to his academic life, this may not be the case with his love life; he may be committed to his choice of career, but not to the idea of marriage. Perry (1970) defines 'commitment' as either of these positions, although clearly they differ.

On the other hand, although Hunt (1966) does not incorporate such variations into his theory, he is prepared to confront the possibility of domain specific variation quite directly. He quotes,

'A person need not reach the same level of abstractness....in all areas of development. Individuals vary considerably in terms of the generality of their stage of functioning' (Harvey Hunt and Schroeder 1961)

The Process of Change

The final aspect of the structure of the theories which could hold implications for student development is in the postulated process of change. All the theories presented in this chapter regard new
information, which cannot be processed under the old schemata, responsible for the process of change.

For Kelly this reformulation occurs as a result of the continuous process of hypothesis testing, and conceptual change according to the results of the 'experiment'. In Kelly's terms the individual is constantly in flux. However, for the stage theorists the gathering of a body of information which cannot be processed using the old schemata takes place prior to, and finally provides the impetus for structural change.

Piaget defines this process as 'equilibration'. He states that the 'organism' is constantly in search of cognitive equilibrium, and in order to do this, new information must be rationalised. Thus if new data can be incorporated into the existing cognitive structure this is termed 'assimilation'. If the new data does not fit the individual's 'scheme', then 'accommodation' must occur, the change of cognitive structure to allow for the new information. This balancing process forms the basis of cognitive change.

However, as Bryant (1982) points out, owing to 'methodological problems',

"the causal side of Piaget's theory, despite a considerable body of research, remains untested. Yet there is no reason, in principle, why it should not be tested adequately" (Bryant 1982 p161).

Both Perry and Kohlberg cite new experiences and dilemmas which need to be resolved as the momentum for development. Perry gives little more explanation of this process than 'forces of growth', however in the case of moral development Kohlberg (1963; 1969) claims that the
individual is capable of comprehending the values of the next consecutive stage, and is 'cognitively attracted' to it. Thus, when moral dilemmas become impossible to solve, the individual will progress to the next stage.

2.5 Implications for the Structure of Change in Architectural Education

The implications for the structure of change within the schools of architecture are less clear than the expected content of those changes. However, several tentative predictions can be made. On the basis of some of the failings of developmental theory it seems to be of great importance to consider both individual and group differences in development. A methodology must be selected which will provide information about group changes, yet maintains individual data. The selected methodology is discussed in detail in Chapter Four.

Additionally, end-points for development should not be assumed. It is possible that some students will graduate in the same, or in a similar stage to that in which they started their training. It is also possible that they will progress to a stage which is more 'advanced' than any of their colleagues. No assumptions should made about the rate or end-point of the developmental sequence.

With respect to the type of development expected it should be noted that different areas of their training may show different types of development. For example, some aspects of architectural knowledge may be considered cognitive whilst others may be affective, producing different types of change. It is possible that evaluative aspects of
architecture will show the kind of development evidenced on affective dimensions, as for example by the students in Perry's (1970) scheme, whilst development on less emotively charged concepts in architecture may follow a Piagetian process of change more akin to intellectual development.

The process of development may be supposed to relate to the synthesis of new information presented to and acquired by the students. It is unclear whether conceptual changes will progress gradually during education, or shift in stage like conceptual re-structuring. However, the cross-sectional nature of the present study precludes any investigation of the actual process of change in architectural education.
Summary of Chapter Two

Examination of the structure and content of some of the major theories of student and child development reveals a number of recurrent themes. These themes can be considered as a basis for predicting the conceptual changes brought about by architectural education.

All the theories considered emphasise the ability to deal with increasingly abstract concepts, and all incorporate the individual's increasing ability to consider viewpoints other than their own. In terms of the process and structure of conceptual change, analysis of the failings of stage theories points to the importance of individual differences, and the necessity of rejecting pre-conceived end points of development. Similarly the need to consider development within its particular context should not be overlooked. Differences associated with the particular sample studied, and the domain in which the development occurs should also be expected.
3.1 Introduction

The earlier chapters of this thesis have been concerned with the characteristic features of the architectural profession as a whole, and the possible analogies for their development which may be gleaned from developmental theory.

The 'group identity' for the architectural profession is easily extrapolated from the literature, for much of past research has been focussed on inter-professional differences between groups of assumed homogeneity. However, it is obvious that no consensus view exists in architecture, and many different ideologies and values can be identified. The pre-occupation with inter-professional differences has masked the potentially more interesting issues of variation within the profession.

As demonstrated in chapter one, research within this paradigm typically presents mean ratings for the samples considered, or the majority views on various issues. Methodological constraints further preclude any intra-professional considerations. Similarly, the preceding review of developmental theory has emphasised the importance of considering individual differences, as opposed to the generalisation across populations so common in stage theories. Cross cultural research into development has narrowed the focus to group differences, yet it is left to theories of aging to remind us of individual variation.

Thus the evidence of earlier chapters indicates that there is little room for variation within the profession; methodologically, empirically
or theoretically. Nonetheless, evidence for multiple perspectives is not solely intuitive, there have been a few studies aiming to characterise variation within the architectural profession, and these will be further elaborated in the following chapter.

It has been suggested that architectural education socialises architects into their role, and produces those aspects of the conceptual system which distinguish them from those who have not undergone such training. It can also be hypothesised that the same process which develops the general features of the architectural concept system may also have some influence on the specific 'type' of architect produced. Thus, if architects are socialised into 'sub-worlds' of the occupation during architectural education, then it follows that the specific institution in which this socialisation occurs will also exert an influence on the particular values, beliefs and conceptualisations which they adopt.

The present chapter will consider the ways in which architects may differ in their approach to architecture, and explores the extent to which the schools of architecture may play a role in the development of these differences. Section 3.2 takes up a theme which is common in the architectural literature; the distinction between the 'creative' and the 'practical' architect. The present chapter analyses the components of such a distinction and considers the roots of its existence in terms of personality, success, and the input of school specific values. It is possible that schools may play a role in this distinction. A stronger orientation toward 'art-architecture' or 'science-architecture' could lay the foundations for the architects' approach to design.

The 'creative-practical' distinction is often viewed as a dichotomy, or
at best two inter-related dimensions of approach to architecture. However, a more complex way of characterising architectural orientation lies in the identification of ideologies or values in architecture. Section 3.3 reviews the literature aimed at categorising these ways of thinking within the profession.

Section 3.4 turns to a key concept both within and outside the profession. Architects' work is often discussed, categorised and judged in terms of architectural style. Architectural style is a tangible product of intra-professional variation, and one which imposes its effects on us all. The choice of stylistic orientation, is doubtless rooted in a myriad of factors. It may be considered purely an aesthetic choice, perhaps related to personality. On the other hand social factors must also play a part; social era, fashion, peer pressure and client demands. Nevertheless, the present thesis is concerned with the relationship between the school of training and the appreciation of, and design within a certain style.

Consideration of the antecedents of differences in architectural orientation places the discussion within a familiar psychological paradigm, the nature-nurture debate. In common with the other areas in which this question is raised, individual as nature and school as nurture cannot be separated and an interaction of these factors must eventually be accepted.

Nevertheless, the following chapter explores the components of this equation in the hope of throwing more light on the shadowy field of architectural variation.
It is a commonly held assumption that there exist two kinds of architect, the creative and the practical. This distinction is often cited in the literature, but rarely explained in terms of its components or consequencies.

The term 'creative' is a misleading one, being used both in a generic sense to refer to a style of work which no architect would deny to be part of their occupation, and to a certain type of person to whom much research has been dedicated.

Thus creativity may be defined as being a part of an architect's job, in the sense that it requires divergent thinking to solve a novel problem and create a design solution, or it can be defined as an attribute which is possessed by some architects and not by others. It is this latter notion which has been the focus of discussion on differences in approach to architecture.

Cristopher Gotch (1968) illustrates the distinction based on his own pre-conceptions prior to his induction to the profession. He initially believed in the existence of an ideal architect, who was the well balanced 'Middle C', who lay between the 'High C' of the 'long haired aesthetes - pure artists to some, parasites to others,' and the 'low bass, the builders and those of similar ilk' (Gotch 1968 p148). However the reality, he now claims from his experience in architecture, is somewhat different,

'The ideal architect, that middle C, pipe smoking, bow tied, socially integrated personality, balanced equally between art and technique, would be, if he existed, a Superman. Most of us are either art-architects or science-architects.' (Gotch 1968 p153)
If these two prototypical types of architect are to exist, it must be assumed that these two extremes do not exist alone. Thus it is necessary to hypothesise two dimensions, one of creativity and one of practicality. Thus an architect may exist at any point along both dimensions independently. This allows for a creative architect who is either practical or impractical and similarly, a practical architect who may or may not be creative.

However, as Gotch has suggested it is optimistic to assume that there exist architects who are both highly creative and highly practical. It is more likely that architects can be identified who are either highly creative or highly practical, and striving for success on one dimension precludes success on the other. For example, most architects would agree that it is hard to be creative and remain within a tight budget.

If, as Prak (1984) believes, in practical terms the distinction between the two extremes of architect does exist, the question which thus presents itself is how creative architects can be distinguished from their practical colleagues.

Mackinnon (1962) found no difficulty in making such a distinction when asking five independent professors of architecture to nominate those architects they believed to be the most creative; and indeed found a high level of consensus. Additionally, he asked eleven editors of architectural journals to rate the nominated architects for creativity and compared this with the ratings by the architects themselves. The correlation of 0.88 between these two ratings shows the degree of agreement on the definition of creativity which exists within the profession. Sadly, he did not explore the reasons for their nomination,
leaving the definition of their creativity as a 'given' within the culture of the profession.

MacKinnon's study illustrates the most 'well-worn' of all the possible roots of individual differences, that of personality. In common with MacKinnon's work on the characteristics of the creative in general, his (1962) thesis was that basic personality and social background factors underlay the distinction between creative architects and their ordinary colleagues. He thus selected two further samples of architects to act as 'control groups'; architects who had worked with the 'creatives', and 'ordinary' architects who had no connections to the nominees.

Firstly, MacKinnon found that there was a tendency for the 'creative' architects to have a high opinion of themselves, and that this self-acceptance allowed for self criticism. They used a large number of favourable adjectives in self-description, notably; 'inventive', 'determined', 'individualistic', 'enthusiastic', and 'industrious'. This however, stands in contrast to the self-image of the less creative samples whose descriptors centred around their 'good character' and concern for others, e.g., 'responsible', 'reliable' and 'understanding'.

With reference to the professional values discussed in Chapter One of this thesis, such self description could indicate that the 'creative' architects are less likely to have internalised the professional values of service to society, than the artistic and aesthetic values associated with the creative side of the profession.

With respect to personality variables, two thirds of MacKinnon's 'creative' sample score as introverts, although they did express an interest in communicating with others. They were also verbally
skillful, and showed unusual mental associations on the word association task.

'Creative' architects showed higher average scores on the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway and McKinley 1945), indicating slightly increased tendencies towards the major psychiatric disturbances. However, MacKinnon points out that this result must be seen in context, his sample are not hospitalised patients and he states that the result is,

'less suggestive of psychopathology than it is of ... an openness to experience and especially to experience of one's inner life.' (MacKinnon 1962 p488)

One striking result is the high score which the 'creative' male architects had on the Mf (femininity) scale on MMPI, indicating the presence of a large number of qualities seen by American culture as feminine.

MacKinnon's (1962) study also confirms the results of previous studies regarding creative individuals' preference for stimulus complexity, and he concludes that,

'Creative persons are especially disposed to admit complexity and even disorder into their perceptions without being made anxious by the resulting chaos.' (MacKinnon 1962 p489)

In addition to examining the personality correlates of creativity, MacKinnon also investigated the social background of the creative architects in his study. He found that they had most often had an unusual amount of freedom granted to them when they were young, in the belief that they would act independently and responsibly. The relationship with their parents was unemotional and there was no tendency for the usual identification with one parent. Mothers often
had careers of their own and almost without exception one parent was of artistic temperament and ability. Family life tended to be isolated, being alienated from neighbours by differences in cultural, artistic and intellectual interests. Childhood was characterised by aloneness and shyness, and adolescence by little or no dating.

Thus it can be seen that these particular creative architects possessed certain different personality and social background characteristics than their non creative colleagues. However, there are a number of other factors which, if not the cause of the difference in approach between these opposites, certainly exacerbate the distinction.

The first of these factors must undoutedly be success. Indeed the relationship between creativity and success is such that one might easily question whether MacKinnon's experts were selecting the creative or the successful, for they are often the same thing.

This relationship is particularly important in architecture. A design which is judged to be creative will attract much publicity, and it is the publicity gained by an architect which is to some extent the measure of his or her 'success' in the eyes of the profession. This process is governed by the architectural journals.

In architecture, as in all disciplines, the 'state of the art' is conveyed by means of the journals. It is through this medium that the current trends are transmitted, and whilst no journal will publish the fact that a 'practical' architectural firm has completed an unexciting office development on time and within the budget, (a highly successful achievement with respect to the client and further business for the firm), all are keen to portray original and innovative designs
irrespective of their financial and constructional history. As Prak (1984) has noted, it behoves the architect to ignore the budget, as the cost of the building will be forgotten in years to come, whilst its architectural glories will live on.

Thus the architectural journals do much for 'creative' architects and very little for practical. It is by this process that creative architects become known, praised and subsequently re-employed, generally with the freedom bestowed on the well-known, and thus the cycle repeats itself.

The notoriety achieved by creative architects is also related to the second factor which ensures the furtherance of the creative-practical distinction, client demands. The kind of work in which architects are involved is to some extent dictated by the type of client who approaches them.

Thus reputation plays a part in the clients' choice of architect. Clients whose priorities do not lie in the aesthetic quality of the building will approach a practical firm, whereas the client requiring a monumental building will look for an architect who will make the building a landmark. The creative architect is sought after for the creative project; the well-known become more well-known.

The relationship between creativity and success is further precipitated by the high values society places on originality. Whilst successful completion of everyday projects brings financial security for practical architects, it is creative architects who are favoured with all the status our society attributes to the artistic. Practical architects
would like to be seen as artistic, but the reverse is never true,

'practical architects treat their artistic colleagues with respect, artistic architects treat their practical counterparts with contempt.' (Prak 1984 p15)

With all the status conferred upon creative architects it is hardly surprising that this is the role to which most architects aspire. As Allsopp (1974) comments,

'It is a peculiarity of our time, fostered by the art critics, that originality is greatly admired. Ambitious architects have yearnings to be original which resemble the yearnings of some religious people for martyrdom,' (Allsopp 1974 p73)

The above discussion has considered the influence of 'nature' on the development of the 'creative-practical' distinction between architects, in the form of personality traits, and some factors which maintain its momentum in the form of success, recognition, and the kind of projects commissioned. However, it can also be argued that 'nurture' in the form of education may play a part in the formation of this difference in approach.

The first and most global facet of the influence of training may be seen in the educational perspective of the schools of architecture. Whilst most schools would hope to produce architects who are both innovative designers and competent technicians, it is unlikely that both aspects of this balance are equally weighted. Thus it is quite reasonable to assume that certain departments place an emphasis on technical success, above aesthetic concerns. Indeed many schools of architecture make their strengths in building science a primary feature of the course. Conversely, some schools of architecture are renowned for their attempts to encourage the students' creativity. There is
little doubt in the mind of educators that creativity can indeed be
nurtured, if not taught (MacKinnon 1968; Mayer 1983).

At a more individual level, the influence of specific tutors may be
called upon as a possible explanation for differences in creative
development. Historically, such a relationship is demonstrated in the
work of 'masters and men'. It is often the case that notable architects
have been tutored by notable architects, (eg Johnson and Mies, Erith
and Terry). However, in most examples it has been an influence derived
from relationships more akin to apprenticeship than to the systems of
tutoring used by most current schools of architecture. In the one-to-
one relationships between architects working together, issues such as
selection and self selection also obscure effects which may have been
attributable to 'education'.

At any level of influence in education it is clear that the processes
of 'nurture' provided by the schools are neither necessary nor
sufficient to explain the difference between creative and practical
architects. Whilst the educational perspective of the schools of
architecture may set the students' expectations of their occupational
goals, such attitudes cannot account for the distinction. Clearly not
all students from a 'creative' school become creative architects, and
similarly not all students taught by creative tutors are themselves
creative.

On balance it is necessary to conclude that a tendency to design within
a creative or practical framework must be a product of a multiplicity
of factors. Not only should a creative architect have the talent and
inclination, but should also have had the appropriate educational stimulation. More cynically, it could be suggested that it is also necessary to have a combination of circumstances which allow for freedom in design, including finance and publicity.

In conclusion it is worth considering why the creative-practical distinction has been so important to architects, as it accounts for so little of the true variation amongst the profession. This may relate to the way in which architecture is commonly taught in the schools, by the use of architectural 'heroes'. Such a framework instills in the students the aspiration to be amongst the elite (Salaman 1971), although the majority will never be so.

The following section addresses a source of variation amongst the architectural profession which carries more explanatory power. Section 3.3 will examine two empirical typologies of differences in orientation in architecture (Blau 1980; Wilson 1985) and consider some of the possible effects of education on the development of differing beliefs and values.
3.3 Variation in Beliefs and Values

The previous section has examined a dichotomous division between architects; those who are 'creative' and those who are 'practical'. However, such a definition of differences within the profession is extremely limited, there being essentially a handful of elite, creative architects, the rest being deemed practical (perhaps in the absence of their success).

Chapter One discussed the beliefs and values of the architectural profession, concentrating on the 'characteristic' conceptions. However, as the introduction to the present chapter has noted, study of the architectural profession as a homogeneous body has deflected attention away from the necessary variation within its ranks. Every architect possesses a myriad of beliefs and values which places them within the network of architects as a whole. Therefore section 3.3 re-examines issues surrounding ideology and values, narrowing the focus to review research into the variety of views held within the profession.

Chapter 1.2 cited Lipman's widely quoted series of papers on the social commitment of British architects (Lipman 1969; 1970; 1971). Lipman concludes that the predominant view of influential members of the profession in the 1960's was essentially determinist, that their work had far-reaching effects on society as a whole. Lipman content analysed a series of works published in two major architectural journals. These included RIBA presidential inaugural speeches, RIBA conference speeches, and a series of papers by noted on architects entitled 'Architects' Approach to Architecture'. Two other papers addressing the nature of architecture were also included.

From these papers he identified eight areas of social orientation,
covering twenty-five example items, and noted the frequencies with which each item was mentioning. By far the most frequently mentioned item was that pertaining to 'improved formulation, implementation and continuity of local, regional and national planning policies' with one hundred and seventy-seven 'mentions', and the lowest being 'to introduce and increase social science studies in architectural education' with only eight.

The major problem with Lipman's data is that whilst he presents the frequencies of occurrence for those items he is studying, he does not present the total number of items from which these frequencies are derived. Thus, the percentage of all issues which were socially orientated is unknown. Likewise, no reference to any other themes in the data is made.

Therefore, in the search for the total picture of architectural beliefs, attention must be turned to the work of other authors. Judith Blau (1980) claims to have upheld Lipman's findings that social values were the most important to the architectural profession in the mid seventies. However, she also presents the rival orientations in architecture in a fairly comprehensive typology of beliefs.

The major part of Blau's study is devoted to the views of four hundred and sixteen architects from a variety of New York offices. Blau selected thirty-six quotations by architects, planners and critics, to reflect a range of attitudes prevalent in architecture at that time. Each participant rated the statements on a five point scale from strongly agree to strongly disagree. The ratings for each statement were factor analysed, and eight dimensions were revealed.
Blau's conclusions regarding the social commitment of the architects are derived from the amount of variance accounted for by the 'humanist' factor, twice that of the other factors. Blau believes that the importance of the humanist concerns shown by the architects in her study indicates that, although architects were not treating the users' needs seriously enough (according to their critics), they would do so in the future. She states that the architects were 'surprisingly' interested in the implications of the projects for their surroundings. Quotes such as 'Good buildings must relate to their surroundings' were endorsed by over three quarters of the participants. In common with Lipman's (1970) sample, the architects studied by Blau also believed in architectural determinism, i.e., that their designs were capable of influencing (or even determining), interpersonal social relationships.

Although the humanist factor accounts for more of the variance than any other individual factor it is the range of beliefs which is of interest to the present chapter.

The factor Blau terms 'Liberal Professional' indicates a progressive orientation to architectural practice and is characterised by items which emphasise the importance of team practice, and anti-elitist views. The 'Technical' factor 'reflects a straightforward approach to materials and technology' (Blau 1980 p353), comprising of the belief that 'good design most often is a technical solution' and 'honesty is expressed in exposed services'. The fourth factor Blau labels as 'social responsibility' although she admits that the similarity of the items loading on this factor is 'not obvious'. Blau states that the
meaning of this factor is based on the premise that architecture has aims which go beyond the architectural, including such items as 'Buildings should have a sense of humour' and 'An architect should refuse a commision from the Rhodesian Government.'

The fifth and sixth factors are named 'anti-minimalism' and 'anti-functionalism'. Blau interprets these as reflecting the fact that the 'dominant aesthetic is facing a large opposition in the architectural community', ie simply that Modernism is out of fashion.

The factor labelled 'Pragmatism' indicates the belief in a practical approach to architecture; that buildings should be designed to be lived in, and that architects should think of architecture as business rather than as art.

Although several statements about the formal qualities of design were included in the analysis, eg 'texture is extremely important', the only formal statements loading in the factor solution were those concerning 'Expressionism'. These aspects of form, 'flair, drama, excitement' and 'dynamic' form the eighth factor and are those which Blau believes to be particularly salient at the time of the study.

Blau's study demonstrates the range of orientations in architecture using a variety of statements of the profession's beliefs. However, this analysis is complemented by her work on architectural heroes. Blau also provided the architects in her sample with a list of eminent members of the profession and asked them to indicate those whose work they liked. This data was also factor analysed, resulting in four major factors, 'Subjectivism vs Bureaucratic', 'Purist', 'Meta-Art', and 'Camp'.
The most popular architects, e.g., Le Corbusier, Kahn and Wright, do not load highly on any of the factors. This is because they are admired by most of the participants, and therefore do not explain the differences of opinion amongst the sample.

'Subjectivism vs Bureaucratic', the factor accounting for the most variance, Blau believes reveals most about the architectural thought prevalent at the time of her study. This bipolar factor encapsulates the difference between the 'subjective and expressive' architecture of Aalto and Stirling and the 'formal and contrived' work of architects such as Speer, Stone and Lapidus. From the results, Blau infers that those participants who admire one of these two groups of architects will not admire the work of the other.

The second factor, 'Purist' has high factor loading for the architects Nervi, Niemeyer and Neutra. Whilst Neutra and Niemeyer are stylistically comparable, Blau believes that commonality between these three architects lies in their 'marked disregard, often contempt, for inhabitants and their needs,' (Blau 1980 p345).

The similarity between Wachsmann, Archigram and Superstudio, the architects loading highly on the 'Meta-Art' factor, lies in their assertion that architecture transcends art. Drawing on Sontag's (1967) definition of 'Camp', Blau links the work of Meier and Rudolph, whose work emphasises texture, surface and style.

Blau's two frameworks are complementary, however, she does not link their findings any more than to point out that the humanist orientation inherent in the statements regarding architecture relates to the
popularity of the architects identified with subjective, expressive architecture. Blau's concern is with the dominant opinions within architecture at that time, and their implications for the direction of the profession, rather than with intra-professional variation per se.

However, using architectural heroes as an index of orientation within architecture, Wilson's (1985; 1986) work is specifically directed toward the identification of different schools of thought amongst the profession. As part of a larger study, thirty British architects were asked to name the architects which they admired, and to sort a set of photographs of contemporary architecture according to their own personal preferences. Wilson found that three main groups of participants could be identified according to their stated heroes; Wright, Foster, and Aalto admirers. A fourth group was also present, consisting of those participants among whom there was no consensus, and these were termed 'Others'.

When the architectural preferences of each sub-group of admirers were examined two distinguishing factors were revealed. When the individuals' preference sorts were converted into a composite picture for each sub-group, not only could the admiration groups be distinguished according to the buildings they preferred more than the other groups, but by the actual number of buildings they liked more or less than the other groups ('level of discernment').

Those participants who admired Frank Lloyd Wright were the most critical of the four groups, evaluating only three buildings more highly than the other groups while they gave harsher judgements on eight. Similarly, the Foster admirers rated four buildings more
positively than the other groups and seven buildings more negatively. However, the architects who admired Aalto were more positive in their judgements giving the most favourable evaluations to ten of the buildings and the least to only two. This comparative 'generosity' towards the architecture they were shown was somewhat surprising since the Aalto admirers were the least likely of all the sub-groups to mention any other heroes. The group of participants admiring 'other' architects were found to be quite extreme in their judgements evaluating seven buildings higher and seven buildings lower than the other groups.

With respect to the actual buildings being judged, the Foster and 'Other' admirers were fairly similar in their judgements. However, the Wright and the Aalto admirers showed an almost opposite pattern of preferences. Whilst the Aalto group were not particularly discerning, they judged Venturi and Rauch's Brant House and Guild House more negatively than the other groups. On the other hand, whilst the Wright admirers were the most critical group they judged these same two buildings more highly than the other groups.

Wilson's (1985; 1986) work was only exploratory (and will be built upon in the present thesis), however it does demonstrate the utility of architectural admirations as a succinct summary of orientations within architecture. It also points to both qualitative (type of architecture preferred) and quantitative (level of discernment) differences in architectural evaluation.

With respect to the origins of variation in architectural orientation, the hypothesised antecedents must lie in areas similar to those
discussed in the preceding section. Factors inherent to the individual may be expected to have some impact on the way people view architecture, their attitudes to architecture possibly being linked to more general attitudes, (eg participative architecture and liberal views). Education is more likely to play a part in the shaping of architectural values than in developing the difference between creative and practical architects discussed in section 3.2.

Whilst the differences between those who are architecturally trained and those who are not, have been the focus of much research (see Chapter One), it is often only assumed that the differences arise as a result of education (Witfield and Wiltshire 1982).

However, Stringer's (1970) work on professional self-image sheds some light on attitudinal development. In a cross-sectional study of 263 architectural students at three schools of architecture, Stringer charted year differences in perceptions of the profession. Students were presented with a list of fifty statements regarding the talents, interests, values and points of view which an architect might possess. The students were asked to 'realistically' judge which statements they felt would describe them, as architects, a few years after they qualified.

A number of differences in architectural values were identified as a function of year of study. Stringer found that students in the first year were the most likely to endorse statements relating to their creative-aesthetic motivation. On the other hand, issues concerning an orientation towards others in one's work were increasingly deemed to be characteristic with each year sampled. There were, however, also a number of differences between the students in the third year and those
in the other years. Third year students were by far the most likely to agree with the negative statements regarding their abilities.

Such differences in architectural self-image over the period of training, point to an effect of education in general. However, Stringer (1970) also found differences in self-image between students at different schools of architecture, particularly between the students in the undergraduate years.

The students at the Edinburgh school were more apt to describe themselves as responsible to society and interested in philosophical speculation. They also perceived themselves as having broad interests and being quick thinkers, rather than paying attention to detail or being good with plans. At the Welsh school of architecture students saw themselves more negatively than the other students, indicating that as practising architects they would be distractible, inflexible, uninquiring, and insensitive to architectural form and elegance. However, they did express more responsibility towards the clients than the students at the other two schools. The Nottingham students, although having the 'least distinct' self-image of the three schools, were more inclined to see themselves as perfectionists, and were the most likely to endorse the importance of architectural, over other values.

Stringer's (1970) results show that it is possible to characterise schools of architecture by the values of the students. His work indicates school specific variations in architectural orientation, however, these are principally with respect to their students' personal abilities rather than their broader views of architecture.
Nonetheless, the effect of school affiliation on the relative importance of such issues as social responsibility in architecture, implies that schools of architecture may indeed be at least partially responsible for the variety in the belief systems of architects.

students.

It is possible that this influence is affected through the relationship between students and their tutors. Lipman (1970) believes that the socialisation into the profession's values occurs between tutor and student during studio time at the drawing board. It follows that each tutor's personal values and orientations are likely to influence the students they teach. However, it is interesting to consider whether the tutors' influence would be in the form of a 'composite' of their views, forming the 'ethos' of the school, or whether certain tutors impose more of their values on the students than others.

In summary it can be concluded that a number of different values and beliefs can be discerned amongst architects and can therefore be used to define intra-professional differences in approach to architecture. Previous work (Blau 1980; Wilson 1985, 1986) has also laid the foundations for the examination of variation amongst architects by reference to architectural heroes. Such analysis provides a succinct summary of orientation in architecture, with certain architects being linked to certain values and approaches. In the same way, the choice of architectural style is also indicative of the architects' perspective. Section 3.4 explores the physical consequences of intra-professional variation in the form of the architectural style in which architects chose to build.
3.4 Architectural Style

Until recently it would not have been feasible to define variation amongst architects in terms of the architectural style in which they chose to design. The Modern Movement was so truly 'international' that individual differences in design approach were small. However, following the advent of Post Modernism, the approach to the end of the eighties is characterised by a plethora of styles of architecture, each with its own following. Groat (1981) illustrates this stylistic divergence,

'With support for the Modernist values dwindling architects have scrambled to discover new guiding principles. Some have found refuge in historical revival or in the eclectic application of traditional styles; others have tried to transform the sleek qualities of Modernism into richly imagistic forms; and still others have attempted to invent totally new relationships of form and space.' (Groat 1981 p74)

Similarly, Attoe (1978) reports on the resultant stylistic confusion in contemporary architecture which he feels is developing,

'We have been told that form should follow function, that function should follow form, that less is more, that less is a bore, that buildings should be what they want to be, that they should 'express' structure, function, aspirations, construction methods, regional climate and materials etc, that a house should be of and not on the hill where it sits, and that ornament is a crime.' (Attoe 1978 p13)

The concept of architectural style, with all its variations, is used freely within the profession. A building is often discussed with reference to the style it represents. However, before exploring the possible antecedents of the decision to work within a certain stylistic paradigm, it is necessary to address the definition of stylistic movements.
The definition of styles has traditionally been the preserve of architectural historians, critics and journalists. Through the journals, their role has been to observe and document architectural trends. Prak (1984) for example, has asserted that the architectural journals do much to control the development of new styles and movements. It is through the journals that the 'good' new designs are presented and,

>alert the followers to what is new on the scene, and the avant-garde to the herd on their heels. The flood of publications has speeded up the rate of change.' (Prak 1984 pl01)

In this way, through journal presentation and widespread imitation of the 'latest' designs, new styles are created. However, it is often the case that the very process of documentation is intimately linked with the propagation of stylistic movements, with the authors' commentaries being fed back through the journals to architectural practitioners.

Jencks (1977) for example, has been extremely influential in the evolution of Post Modernism. By charting the development of this design idiom, he has played an important role in maintaining the momentum of the movement. Jencks (1982) has published the defining features of Modern and Post Modern architecture. Referring to thirty variables he points out the essential differences between the two movements on the grounds of ideological, stylistic, and design ideas. In stylistic terms, where Modernism is against humour, ornament, and historical references, Post Modernism is founded on these qualities. Modernism represents simplicity and purity, where Post Modernism represents complexity and eclecticism.

However, Post Modern architecture has been the subject of some controversy, and it is often talked of as though it were a passing
'fad'. This, however, is not unusual in the architectural literature for stylistic movements are often talked about in terms of fashion; the literature being replete with metaphoric references to the fashion industry.

For example Prak (1984) draws the analogy,

'The very special 'new models' designed by one of the famous houses in Paris or New York are only briefly worn by the smart set; thereafter you find them in the department stores, and by the end of the season in the sales,' (Prak 1984 p58).

Similarly Muschamp observes,

'last winter's cosmic-comical conceptual designs are forgotten with the appearance of the new spring line,' (Muschamp 1974).

However, more serious writers link the development of stylistic movements to changes in society. These authors insist that it is not simply fanciful reasons which lead to the development of a new style. Architecture is necessarily set within society and its culture, which is also changing, and new styles merely reflect the economic, social and political structure of the age. Architecture is seen not as a changing fashion but a neccessary reflection of the Zeitgeist of the time. Lawson (1980) believes that we should consider the architects' dilemma when faced with the task of designing for a society in flux. He states that the architect is,

'nw now not only uncertain of how well his design will work, but is uncertain of the nature of the world into which it must fit.' (Lawson 1980 p82)

Jencks (1980) defends Post Modern architecture against those critics who see it as a passing fashion. He writes,
I don't believe this to be the case, although fashion is certainly involved. Rather I think it [Post Modernism] is one logical result of the impasse in which Modernism, with its combination of elitism and obscurity, has left us. Modernism cut architectural expression off from the past, from many of its users, and from convention. Paradoxically, the only way forward was a return to a richer language based on shared stereotypes, since innovation, as it is now well advertised, depends on convention." (Jencks 1980 p5).

Broadbent (1979) has drawn the analogy between the process of changing 'fashions' in architecture and Kuhn's (1962) notion of paradigm shift. In the same way as Kuhn believed that the majority of scientists worked within the paradigm, Broadbent suggests that the majority of architects work within the current style. It is an innovative scientist or designer who converts the majority to the new point of view, and the acceptance of the majority which thus creates the new paradigm or style (Broadbent 1979).

Broadbent (1979) further points out that whilst Modernism aimed to put an end to stylistic changes, when its failures became apparent it too was replaced, by Post Modernism. In this sense Broadbent sees Post Modernism as a necessary stage in the theoretical development of architecture.

However, whilst it may have been a 'paradigm shift' which initiated the transition from Modern to Post Modern architecture in the first place, the meddy of architectural styles which have developed out of Post Modernism can no longer be seen in terms of one style replacing another. The situation of the eighties is complex even in Jencks' view. He states,

'confusion still reigns, not least among those who should give architects the lead--the critics.' (Jencks 1982 p12)

If, as architectural theorists would have us believe, stylistic
movements are a reflection of the age, it is interesting to consider the fact that the present era is characterised by not just one style but many. Perhaps this is a reflection of today's ethos of individualistic capitalism and free enterprise and architectural styles are determined by the whims of free market forces; provided there is a market for the most bizarre of styles, someone will be able to supply it!

Jencks (1980) takes a more cynical look in this direction at the motivations for Post Modern architecture,

'Negatively, there is a strong desire to speak to the gallery, achieve more commissions and follow a fashion that will bring undoubted commercial reward. Those who damn Post Modern Classicism as kitsch and consumer pabulum are pointing to an undoubted half truth, and always a present danger.' (Jencks 1980 p16)

However, if market demands do contribute to the predominant styles then it is on a general level, and certainly architects would rule out such reasoning for their personal choice of design approach. Indeed some architects become so involved with a certain style of design that their names become almost synonymous with the movement (eg Foster/High Tech). Allsopp (1974) is critical of the way in which designers emerse themselves within one style, resulting in a rather 'blinkerated' view of architecture,

'Cocooned within the movement, (which in fact has now become stationary), they have no total view of architecture and are often completely ignorant of all other kinds of architectural style.' (Allsopp 1974 p76)

It is the fact that there is such a variety of styles currently available, which makes choice of design approach such an interesting
source of variation within the profession. Further, that architects tend select and to design within one approach regardless of the project, suggests the relative stability of such a factor. One notable exception is Charles Moore, who has been both an eminent Modern, and currently, Post Modern architect.

The influences of 'nature and nurture' can again be considered in terms of their association with variation amongst the profession, in the form of architects' choice of design approach. Whilst certain authors have attempted to relate personality factors to appreciation of architectural styles (eg Henschen and Hershenson 1975), and considered whether people who appreciate certain architects' work are similar in character to the architects themselves (Henschen and Creaser 1976), such studies have been methodologically very weak, and no sound conclusions have been drawn.

On the other hand very little is known of the environmental influences on architectural preferences. Jencks (1977) has alluded to the relationship between architectural education and the appreciation of architecture in his writings on Post Modern architecture. Jencks (1977) asserts that the 'dual coding' present in Post Modern architecture makes it available to both architectural and 'lay' appreciation. However, it is only architectural education which allows members of the profession access to the 'single coding' of Modernist architecture, and hence appreciation of it.

However, Groat's (1978) work has shown that much contemporary architecture is displeasing to non architects regardless of the critics claims. Thus, since research continues to show disparities between
the appreciation of the architectural profession and the people for whom they design, it must be concluded that education plays at least some part in maintaining this division.

Section 3.3 considered the possibility that the views of certain tutors, or combinations of tutors, within the schools of architecture, could form an 'ethos' of the school, and thereby influence the students into various orientations within architecture. By the same token, it is reasonable to assume that schools of architecture are more oriented to certain styles of architecture than others, and thereby impose at least some influence on the students.

In summary, although the choice of architectural style must undoubtedly be an interaction of numerous factors, the present thesis is concerned with the relationship between school affiliation and the stylistic preferences of the students.
Summary of Chapter Three

Chapter Three turns attention to variations within the architectural profession, demonstrating the variety amongst architects and exploring a number of possible influences on architectural orientation. The role of the school of architecture at which the students train is considered in relation to intra-professional differences on a number of different levels. Firstly the oft cited differences between creative and practical architects is considered, followed by a review of the studies which investigate ideology and orientation in architecture. Finally, the choice of architectural style is considered as a tangible product of architectural variation. A number of factors which may be associated with the designers' choice of architectural style are considered.
Selecting an Appropriate Methodology

The general requirement of the methodology is that it provide access to the way architectural students think and feel about architecture. A procedure is required which will fulfill this ambition in the best possible way. Chapter four considers the methodological arguments which lie behind the choice of research procedure for this thesis.

The first methodological consideration is to select a mode of enquiry for the research which allows the participants' views to be fully expressed. Since access to thoughts and opinions may be gained through a range of procedures from the highly constrained survey questionnaire, where only yes/no answers are allowed, to the open ended interview, the following sections will discuss some of the issues which are relevant to the choice of methodology.

4.1 Elicited Versus Provided Constructs

Semantic differential scales are the most commonly cited use of provided constructs and are frequently employed in order to measure environmental perception and evaluation, with their essentially qualitative aims reduced to quantitative data on the rating scale.

The use of the semantic differential has been widely criticised (eg Canter et al 1985; Stringer 1977; Wohlwill 1977) and it is not so much necessary to reiterate the words of these authors as to examine the arguments behind its failings. This is particularly true as it is a general weakness found in various types of research, and not limited to the semantic differential. Repertory grids and sorting tasks can also be misused in this way.
The focus of criticism lies in the use of constructs chosen by the researcher and provided for participants to describe their feelings about various 'stimuli'. In the semantic differential this is in the form of bipolar semantic scales on which the participants are required to indicate their feelings. Providing constructs in a repertory grid study involves asking people to judge items (people, places) in terms of their similarity on the chosen dimensions. Likewise, a sorting procedure might require people to place items into piles which represent the categories which the researcher believes to be relevant.

It is the researcher's 'belief' which is open to question. Osgood at al (1957) demonstrate precisely this doubt in their elaboration of the means for selecting constructs for the semantic differential scale.

'It is the nature of the problem, then, that chiefly defines the class and the form of the concept to be selected....Usually, however, time and subject limitations do not permit complete coverage of all the relevant concepts in a given area, so the investigator must sample.....Sometimes the investigator may actually make a sampling analysis, but more often (in our experience at least) he simply uses 'good judgement' with respect to his problem.' (Osgood et al 1957 p77)

The problem is that 'good judgement' on the part of researchers is often not good enough. A priori assumptions regarding which factors are relevant to participants are often inaccurate, and this is particularly true when the field of enquiry is an area of expertise with which the researcher is unfamiliar. In cases such as these it is clear that respondents' expert knowledge or views must be represented through their own concepts and language. However, it is equally true of the more general way in which people perceive and interpret the world they live in, and it must be assumed that each is his or her own expert, and therefore should be treated as such.
This position was the basis of Kelly's Personal Construct Theory (1955), and in his writings Kelly stressed the methodological necessity to deal with people's own elicited constructs. By not doing so, Kelly suggested that research runs the risk of being outside the participants' 'range of convenience'. The range of convenience defines the limits of an individual's ability to respond to a question and still feel that the answer makes sense. Fransella and Bannister (1977) provide an example. If a person is asked to rate men and women as attractive or unattractive, and the person finds all men unattractive, then the request will make no sense. The men cannot be satisfactorily classified and in Kelly's terms, the individual is invited 'to commit a nonsense'.

Fransella and Bannister (1977) add that it is interesting to note that,

'in constructing the semantic differential, Osgood ignored the range of convenience rule and this enabled him to make some interesting statements about precisely those constructs which have the most enormous ranges of conveniences.' (Fransella and Bannister 1977 p7)

Kelly's (1955) original intention was to apply personal construct theory to psychological research by means of the repertory grid technique using elicited constructs. However, much of the research prompted by Kelly's ideas has re-tailored the repertory grid for use with provided constructs.

Adams-Webber (1970) suggests that this procedural modification,

'permits a higher degree of standardisation in administering the grid to groups of subjects, and thus facilitates systematic 'nomothetic' comparisons.' (p349)

Adams-Webber, considering this to be 'an important departure from Kelly's emphasis on the personal nature of each individual's system of
dimensions' (Adams-Webber 1970 p349), reviews the findings of a number of studies comparing the use of elicited and provided constructs.

In summarising this work, Adams Webber (1970) concludes that the use of elicited constructs tends to produce more extreme ratings. Seen from the other point of view, it can be concluded that provided constructs encourage 'dampened' or less certain responses. Nonetheless, with respect to all the studies, Adams-Webber concludes that elicited constructs were found to be more meaningful to the participants than those provided by researchers. He states,

'the findings reviewed here generally support Kelly's assumption that each individual relies on his own system of person constructs .......specifically, it seems clear in the light of the research that individuals prefer to use their own elicited constructs rather than provided dimensions.' (Adams-Webber 1970 p352).

4.2 'Beyond the repertory Grid': The Multiple Sorting Task

With respect to the present thesis, the methodology selected must rely on the students' own constructs. Since the students' own unique understandings are to be tapped it would be pointless to constrain the information they produce to that which is based on the a priori assumptions of the investigator. Thus any kind of technique relying on provided constructs would defeat the purpose of the study.

Although the repertory grid heralded an important development in research methodology, allowing for systematisation of elicited responses, there are also a number of aspects of this research tool which have scope for improvement.
The Multiple Sorting Procedure (Canter et al 1985) was developed specifically to overcome some of the weaknesses of the repertory grid whilst still drawing on the ideology of Personal Construct Theory. Indeed, the roots of the multiple sorting task are founded in a number of areas. Kelly's (1955) work contributes an emphasis on people's own personal understanding of the world, and hence the use of elicited constructs. Contemporary cognitive psychology points to the importance of categorisation in human information processing (eg Rosch 1977), and the early sorting procedures used by clinical psychologists provided a methodological model.

Broadly speaking, the Multiple Sorting Procedure allows the identification of the key concepts which are central to participants' conceptualisations of a particular research area. In categorising a number of elements (pictures, labels, objects, etc) according to their own concepts, participants are able to reveal the critical dimensions of judgement which they apply to the research area. However, by reference to elements assigned to each category, the Multiple Sorting Procedure further allows for the content and structure of these concepts to be revealed with respect to a range of instances.

The Multiple Sorting Procedure takes place in a group, or more commonly a one-to-one interview setting. Participants are asked to familiarise themselves with a range of items and to subsequently categorise them according to their own criteria. No limits are generally imposed upon the participants' categories, they are allowed as many or as few groups as they wish, and as many or as few representatives of each group as they wish. This differs to some other sorting procedures where participants are sometimes not only required to sort items according to
the researchers criteria, but are also required to adhere to a strict
distribution of elements. Canter et al (1985) state that the rationale
for a less restrictive procedure is,

' the belief that the meanings and explanations associated with an
individual's use of categories are as important as the actual
distribution of elements into the categories.' (Canter et al 1985
p88).

Canter et al (1985) present a general example of the instructions
given to participants in a Multiple Sorting Procedure. This 'prototype'
is shown below, the letters A-F indicating the aspects of the procedure
which are open to change depending on the research question.

I am carrying out a study of what people think and feel about
children (A). So I am asking a number of people chosen at random
(B) to look at the following pictures (C) and sort them into
groups in such a way that all the pictures in any group are
similar to each other in some important way and different from
those in the other groups. You can put the pictures into as many
groups as you like and put as many pictures into each group as
you like. It is your views that count.

When you have carried out a sorting, I would like you to tell me
the reasons (D) for your sorting and what it is that the pictures
in each group have in common (E).

When you have sorted the pictures once I will ask you to do it
again (F), using any different principles you can think of and we
will carry on as many times as you feel able to produce different
sorts. Please feel free to tell me whatever occurs to you as you
are sorting the pictures.

(From Canter et al 1985 p88-89)

Chapter 1.4 has addressed the advantages of the Multiple Sorting
Procedure over the repertory grid in some detail. However, in summary
Brown et al (1976) have shown that whilst the Multiple Sorting
Procedure maintains the advantages of the repertory grid, it also
overcomes some of its problems. In common with the repertory grid
technique, the Multiple Sorting Procedure relies on the participants' own, more meaningful elicited constructs. It also allows the analysis of aggregate data, whilst maintaining the individual content.

Nevertheless, Brown et al (1976) found that whilst the repertory grid focussed the participants' attention on the instrument itself, the Multiple Sorting Procedure allowed people to express their feelings on the actual topic of the research. Additionally, in a direct comparison of the two procedures, Brown et al found that the concepts generated from Multiple Sorting Procedure were richer.

4.3 Simulation

The choice of the multiple sorting procedure as the means of eliciting students' thoughts and feelings about architecture necessarily points the research in the direction of simulation. Simulation involves the production of mock environments in order to study the participants' reactions to them, where the use of real environments is impractical. Unless participants are to actually visit the buildings considered to be representative of contemporary architecture, and then sort them on the basis of what they have seen, some kind of simulation is required. It is necessary for the participants to 'project' themselves into a mock environment, and imagine that it is real.

Although simulation may not seem as desirable as exposing the participants to the real stimulus, there have been a number of studies which have compared people's reactions to real environments, and various types of simulation. Such studies have shown that the difference between response to real and simulated environments is not all that marked, especially when the simulation takes the form of
For example, Howard et al (1972) set out with the intention of comparing people's judgements of real and simulated environments, using three groups of fifty-nine undergraduate students who were shown either the real buildings, black and white or colour slides.

Four buildings were used in the study, the university library and arts centre (familiar public buildings), and two private houses (unfamiliar private buildings). The students were required to rate the buildings on a set of semantic differential scales representing Osgood et al's (1957) factors of Potency, Activity and Evaluation. 'With considerable trepidation', Howard et al (1972) conclude that slides do not produce exactly the same reactions as the real environments, the reactions to slides producing less extreme ratings, however, it is the colour slides which produce the closest approximation to the response to real environments.

Howard et al (1972) also add that the photographs taken on a sunny day produce less negative judgements than those taken when the weather was overcast.

A further note on the selection of items (photographs) for use in sorting tasks comes from Horayangkura (1978) who suggests that,

'a more interesting result could be obtained if the environmental displays to be categorised are far from identical and on the other hand, also not totally dissimilar' (Horayangkura 1978 p 560).

He also recommends that each environment selected for the study should have 'unitary meaning' ie that each environment should have one dominant feature.
Apart from being a reasonable approximation to the real environment, the use of colour photographs as the means of elicitation of responses from architects can additionally be justified by the fact that it is the primary way in which they become familiar with buildings, both old and new. It is very unlikely that an architect may visit all the examples of 'good' architecture all over the world, yet they are familiar with a good deal of it, as presented in the journals using photographs.

4.4 Verbal Versus Non Verbal Response

A further methodological controversy which warrants consideration is whether verbal responses are an adequate medium for people to express their views on certain issues. It is, again, semantic differential scales which have been the source of contention in this respect.

Hershberger (1972), who is in favour of the use of semantic differential scales for architectural evaluation, states that,

>'Because of their wide use in all cultures, words are probably the best means we have to study perceptions, thoughts and feelings' (Hershberger 1972 p6.4.3)

He believes that by obtaining a definitive set of semantic scales for measuring environmental meaning, architects will be able to,

>'predict (accurately and consistently) how people will comprehend and use the buildings which they design... before they are constructed' (Hershberger 1972 p6.4.1)

Nevertheless, there are several authors who believe that verbal labels such as those used in semantic differential studies, can be meaningless when applied to people's feelings on various subjects.
Horayangkura (1978) specifically aims to compare the utility of verbal and non verbal methodologies in the definition of urban environmental attributes. Using both verbal (semantic differential) and non verbal (sorting task) techniques Horayangkura (1987) addresses the argument that the dimensions of environmental construing should not be dependent on those aspects of the environment which are namable. Having made the comparison between the methods, Horayangkura (1978) states that,

'The non verbal technique was entirely dependent on each respondent's mental process and was not restricted by language in conveying responses through words. The non linguistic approach served as the main research tool because of its spontaneous nature in organising underlying dimensional structure in the complex environments.' (Horayangkura 1978 p559)

However, on close examination of this area of debate, it appears that there are two issues which should be distinguished. The first, which relates to the use of elicited constructs, is whether the verbal constructs provided by the semantic differential are relevant to the way the participants' feel about the environments. However, the second factor concerns whether verbal descriptions are adequate to express people's feelings at all. On these grounds the use of a verbal methodology, whether provided or elicited would be in doubt.

Therefore it is open to question whether Horayangkura would have found an 'elicited' verbal technique, rather than a 'provided' verbal technique, better than a non verbal technique. The problem with totally non verbal sorting techniques (or paired similarity judgements) is that whilst the participant is able to indicate similarities between items without having to express their verbal connections, this leaves the interpretation of those similarities down to the supposition of the researcher.
However, the Multiple Sorting Procedure allows for the analysis of both verbal and non verbal responses. In requiring the participants to explain the reasons for their categories the Multiple Sorting Procedure provides an elicited verbal interpretation of people's judgements of the items. On the other hand, the overt properties of the items within each category can also be examined, independently of the verbal labels assigned to them, providing an insight into any non verbalised connection which the participants may make.

4.5 The interview setting

Brown et al (1976) have suggested that one of the major benefits of the Multiple Sorting Procedure over the repertory grid is in its interactive nature. Whilst filling in of repertory grids becomes so task-oriented that people seldom comment on the topic of the research, the Multiple Sorting Procedure allows people to consider and comment on their feelings.

It is the fact that the Multiple Sorting Procedure takes place within what is essentially an interview setting, which allows the freedom to fully explore people's thoughts and feelings. Brenner et al (1985) believe the interview to be a valuable research tool, as it allows the exploration of the unique experiences and expertise of the respondents. In defining the interview, they state,

'An interview, then, is taken as any interaction in which two or more people are brought into direct contact in order for at least one party to learn something from the other.' (Brenner et al 1985 p3)

In the Multiple Sorting procedure, rather than having to simply assign a verbal label to a group of items, the interview setting enables the participants to give a full description of all the connections they see
between the items. The interview setting also makes it possible for any ambiguities in the participants' responses to be fully explored whilst the individual is still present, rather than guessed at by the researcher after the event. Similarly, the exact nature of the dimensions of judgement being used can be pin-pointed. For example, whilst two people may use the same construct to describe a group of items, the meaning embodied in that construct may be quite different.

Brenner et al (1985) warn that a problem with interviews is that, owing to their 'one-to-one' nature, there is ample opportunity for bias to occur. However, whilst in a conventional interview, the researchers' questions may be leading or inappropriate, in the Multiple Sorting Procedure the researcher is not there to question or prompt so much as to listen and clarify.

4.6 The 'Problem' of Qualitative Data

One oft cited problem with the use of interviews, or any open-ended data collection procedure, is in the generation of vast quantities of qualitative data, which produces analysis problems. Indeed Brenner et al (1985) go as far as to suggest that the use of qualitative data collection procedures has sometimes been avoided by researchers, as they are unsure as to how to handle the resulting data. However, they state that,

'it is now possible to produce systematic, quantitative summaries of responses that would not have been amenable to analysis in the past, when such data might have been dismissed as 'too qualitative' (Brenner et al 1985 p1)

As a result, Brenner et al (1985) suggest that the interview may now become a more popular research tool, owing to the more widespread use
of qualitative data analysis procedures, such as content analysis and Multidimensional Scaling Techniques (MDS).

The same conclusion can be drawn with respect to the Multiple Sorting Procedure. Content Analysis is required to systematise the verbal information provided by participants in describing the similarities and differences between the items sorted, and MDS is required in order to reveal the structure of the relationships between the items, contained in the categorical data.

Content Analysis

Mostyn (1985) outlines the basic aims of Content Analysis,

'Content Analysis is the 'diagnostic tool' of qualitative researchers which they use when faced with a mass of open-ended material to make sense of. The overall purpose of the content analysis approach is to identify specific characteristics of communications systematically and objectively in order to convert the raw material into scientific data' (Mostyn 1985 p117)

In terms of the actual process involved in content analysing the descriptive data, the researcher examines the raw material and searches for any consistencies in the themes or concepts which are represented. However, in order to access the reliability of the researcher's interpretation of the material, it is necessary for the process to be repeated by one or more analysts, as described by Bainbridge (1985),

'First several judges independently develop a set of categories. Then they attempt to use each others categorisation schemes. This both pools the inferences the judges have made about the important distinctions to make in analysing the material, and also tests whether different people can repeatedly make the same allocation of material to the categories. If not, then an analysis using
these categories cannot give reliable data and must be revised, again with the judges working independently during development, and coming together for assessment' (Bainbridge 1985 p207).

However, as Krippendorff (1980) has noted content analysis is not a simple matter of extracting the 'content' from the data as if it were contained within it, nor does it 'denote nothing more than counting qualities (words, attributes, colors)' (Krippendorf 1980 p22).

In analysing the content of the raw material it is necessary for the researcher to impose some interpretation of the content as a reflection of deeper phenomenon. Indeed, Mostyn (1985) lays out the stages of content analysis in the form of hypothesis generation and testing. The researcher sets up the conceptual categories for the content analysis on the grounds of a testable hypothesis. This is followed by reformulation of the theory on the grounds of the relationships found amongst the data.

However, if content analysis is not simply counting the occurrence of certain themes, then neither is the procedure a panacea for all qualitative data 'ills'; Mostyn points out that it has no special qualities to produce unexpected results. She quotes Berelson (1971), as suggesting that the procedure is really nothing more than 'close reading plus judgement, a traditional and time honoured method.' He concludes that,

'you rarely get out of it more than you put in and sometimes you get less. In the last analysis there is no substitute for a good idea,' (that is a testable hypothesis)' (Mostyn 1985 p130).
Multidimensional Scaling

It is the firm belief of a number of authors that Multidimensional Scaling techniques hold the most promise for complex psychological research. Forgas (1979) believes that by means of MDS procedures psychologists will be able to 'quantify and describe extremely complex psychological phenomena which would not be accessible to quantitative analysis otherwise.' (Forgas 1979 p253)

The main concept involved in the use of MDS procedures in the elucidation of complex relationships, is in the ability to represent psychological distances or similarities in terms of Euclidean distances. In this way MDS allows examination of the structure of various psychological concepts, using the 'physical' representation of distances between items as representative of the relationship between the psychological entities.

The use of MDS procedures answers the plea made by those social psychologists who reject the proliferation of hypothesis-testing experiments, in favour of more descriptive and field oriented studies (eg Harre and Secord 1972).

For as Forgas states, social psychology has been,

'too much concerned with the evaluative, hypothesis-testing stage of research, usually involving controlled experiments, to the neglect of the hypothesis-generating, or exploratory phase, and the integrative, theory-building phase.' (Forgas 1979 p253)

In this respect, the Multiple Sorting Procedure, teamed with content analysis and Multidimensional Scalogram Analysis (MSA) is ideal. Open-ended, elicited data can be collected and systematised in order to show
the structures inherent in people's conceptualisations. The analysis allows for description of complex relationships, and also generates theoretical structures which can be empirically tested in different situations to build up a cumulative body of knowledge.

Multidimensional Scalogram Analysis (Lingoes 1973; Zvulun 1978) is particularly suitable for the analysis of categorical data such as that generated by the Multiple Sorting Procedure since it,

'deals with each response as a categorical one comparing the categories with each other. No order is assumed between the various categories, nor is any similarity of meaning assigned to the categories for each of the variables' (Canter et al 1985 p 97-98).

In order to carry out an MSA on data derived from the Multiple Sorting Procedure, each individual's sorts are coded with a number to represent each of their categories, and it is these numbers which comprise the cells of the data matrix. Therefore, each of the items which are sorted has a 'profile' of scores which indicates the categories to which it was assigned by each participant.

The MSA analyses the categorical data produced by the participants in a sorting procedure, and plots the items sorted in geometric space in such a way that each participant's categories are represented as clear regions in the space. In effect, this means that those items which are frequently placed in the same groups, regardless of the verbal rationale, will be plotted closer together in the space, and those between which few similarities are drawn will be further apart.

One further advantage of such data analysis is that it is possible to aggregate the data for sub-groups of participants without losing the
individual content. In the context of the present thesis, this allows comparison between various groups of architectural students according to their year of study or school of training, whilst still relying on essentially idiographic data.

4.7 Reliability

The reliability of an instrument is a measure of its consistency in producing the same results when repeated under the same conditions (with the same respondents).

In a comprehensive review of measurement issues in the repertory grid technique, Fransella and Bannister (1977) discuss the application of reliability in the context of Personal Construct Theory (Kelly 1955).

One common criticism of the notion of the reliability of a test lies in the individual's interpretation of the reason for the repeated procedure. If people perceive the test as an investigation of their consistency, then they will be, and if they think the researcher is looking for growth, learning and diversity then that is what they will provide.

However, Kelly's objections to this measure is as a result of its incompatibility with the theory of Personal Constructs. Kelly (1955) claims that people are constantly changing and updating their personal construct system and therefore should not be expected to produce the same results twice. Fransella and Bannister (1977) quote Kelly's (1955) derisive definitions of both reliability ('that characteristic of a test which makes it insensitive to change') and validity ('the capacity of a test to tell us what we already know'). Fransella and
Bannister are critical of the application of tests of reliability to instruments which measure unstable characteristics. They point out that,

'since much of life is about change,..... [the reliability].... of a measure becomes fatuous when it is universally applied.' (Fransella and Bannister 1977 p82)

Nonetheless, there have been a number of studies directed at accessing the consistency with which people provide constructs in elicited repertory grid studies. Analysis of this work suggests that people are relatively consistent in the constructs they deem to be important in making judgements (eg Fjeld and Landfield 1961). Fransella and Bannister (1977) conclude that the constructs elicited from participants are not merely,

'an infinite pool from which (more or less randomly) constructs appear from one occasion to another.' (Fransella and Bannister 1977 p86).

With respect to the present thesis, it is hypothesised that architectural concepts will be the focus of change over time. Indeed, since the very aim of the present study is to examine the development of architectural concepts, it seems inappropriate to have a measure which does not elucidate change. Nevertheless, a test of reliability (or insensitivity to change) is included in Appendix A.
Summary of Chapter Four

Chapter Four explores the requirements of the methodology selected for the thesis. The methodological considerations which led to the development of the Multiple Sorting Procedure are discussed, for example, the need for elicited constructs, verbal and non verbal techniques, and the interview setting. The efficacy of simulation as a research strategy and the advantages of Content Analysis and Multidimensional Scaling Techniques for dealing with qualitative data are also outlined. Finally, Chapter Four considers whether the notion of reliability is applicable to the study of conceptual development.
5.1 Introduction

The multiple sorting task as a means of eliciting key concepts in various domains has already been well piloted. In conjunction with non metric MDS procedures (Multidimensional Scalogram Analysis) the Multiple Sorting Task has been shown to provide an insight into the conceptual structure of numerous sub-groups on numerous issues. This method has been tried, tested and productively used for at least a decade.

The application of the Multiple Sorting Task to architectural phenomena has also been well piloted. Groat (1979) and Wilson (1985) both successfully explored the conceptual systems of groups of architects using this methodology. Thus it is well established that such a procedure is suitable, practicable and valid for the study at hand. For these reasons the pilot study takes the form of a re-analysis.

There is one assumption of methodological interest which remains untested at the outset of this thesis. For the purpose of the present study it is necessary to demonstrate that Multidimensional Scalogram Analysis (MSA) of a group of people's single first sorts would be sensitive enough to show the inter- and intra-professional differences in architectural conceptualisations which are implicated from the literature.

Groat's (1979) study used the multiple sorting task with groups of American accountants and architects who were required to sort a selection of contemporary buildings. Although she compared the
architectural preferences, concepts used, and the underlying structure of certain concepts using the multiple sorting task, she never compared the overall structures generated by Multidimensional Scalogram Analysis for the two groups based on their first sorts. Wilson (1985) gathered data from a group of British architects, and found that some interesting structures were revealed by the 'first sorts' MSA's. In order to test the sensitivity of this procedure to various group differences, this pilot study will re-analyse the Groat and Wilson data in such a way that the two studies are comparable. Additionally, a further set of data was collected from twenty British mixed (non architectural) professionals, in order to complete the set of subsamples shown in Table 5.1.

Table 5.1

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>UK</th>
</tr>
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<tbody>
<tr>
<td>Architectural</td>
<td>20 architects (Groat 1979)</td>
<td>20 architects (Wilson 1985)</td>
</tr>
<tr>
<td>Non architectural</td>
<td>20 accountants (Groat 1979)</td>
<td>20 mixed professionals (New Sample 1985)</td>
</tr>
</tbody>
</table>

Table 5.1 Summary of the Samples Involved in the Pilot Re-analysis.

5.2 Methodology

Participants

Details of the four sample populations to whom the data applies are shown below.
a) American Accountants

Twenty American accountants in the Berkely area were selected from the phone directory and appointments were made to interview them.

b) American Architects

Twenty American Architects were selected to match the American accountants for age, sex, race and professional experience.

Both samples were interviewed in 1978 as part of Groat's (1979) study. Interviews were conducted out of work hours.

c) British Architects

Twenty British architects from practices in the Guildford area were interviewed as part of Wilson's (1985) study. The interviews took place in 1984, and were conducted at the architects' drawing boards during work hours.

d) British Professionals

The fourth sample comprised twenty British professionals from various fields of non architectural expertise. The interviews took place in 1985, and were conducted in the participants' own time.

Materials

All four samples were presented with the same set of colour photographs of contemporary architecture. These photographs were originally selected for Groat's (1979) study. Since the original aim of Groat's
study was to gauge the impact of Post Modern architecture, the buildings ranged in style from Modern to Post Modern, through Transitional architecture. The twenty-four photographs comprised of eight Post Modern, eight Transitional, and eight Modern buildings, as identified by architectural critics. Within this selection were six private houses, six religious buildings, six apartment blocks and six civic centres. Thus there were two photographs of each building type in each style. The buildings were all designed by noted architects.

Full details of these buildings and reproductions of the photographs used can be found in Appendix B.

Procedure

As discussed in Chapter Four, one of the most suitable procedures for investigating conceptualisations of architecture is the Multiple Sorting Task. This procedure avoids the constraints of pre-defined scales and allows open-ended free comment from the participants.

The Sorting Procedure was the same for each sample population. They were introduced to the aims of the study and handed the set of twenty-four photographs to examine. They were then instructed to sort the photographs into groups, in such a way that each group contained buildings which were similar to one another in some important way and different to the buildings in the other groups. They were asked to select any criteria which they felt was important in order to divide the buildings, and were allowed as many groups, and as many in each group as they wished. Participants were encouraged to express any ideas they had during the procedure, and to comment freely on their
Although in the original studies, the participants undertook a number of sorts, it is the first 'free' sort which forms the basis of the present re-analysis.

Once the sort was completed, each participant was asked to explain the reasons for each grouping, i.e. what the similarity between the buildings in each of the groups was. These descriptions were noted down.

Content Analysis

Each participant's descriptions of their groupings were content analysed by two independent raters. The inter-rater reliability for each sample is shown in Table 5.2.

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<thead>
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<th>Architects</th>
<th>Non Architects</th>
</tr>
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<td>British</td>
<td>0.88</td>
<td>0.92</td>
</tr>
<tr>
<td>American</td>
<td>0.82</td>
<td>0.89</td>
</tr>
</tbody>
</table>

Table 5.2 The Inter-rater Reliability for Each Sample in the Content Analysis of Constructs used in the Free Sort.

Thus, for each category generated by each participant the content analysis was able to define the 'construct' descriptive of the grouping being used. For example, if the participant used a grouping of 'churches' or 'offices' the construct in each case would be 'building type', i.e. the known or imagined function of the building.

Taking all the constructs in any one sort into account, an overall description of the participant's categorisations was established,
termed the 'category scheme'. Thus, for example, if all (or the majority of) the categories within a person's sort were in terms of 'building type' the category scheme would also be deemed 'building type'. In this way the content analysis of the data was able to identify each participant's category scheme for their free sort.

5.3 Results

Table 5.3 shows the number of participants from each sample using each of the category schemes as a means to divide the buildings, ie the overall way in which each sort was conducted.

<table>
<thead>
<tr>
<th>Sort criterion</th>
<th>US Architects</th>
<th>UK Architects</th>
<th>US Accountants</th>
<th>UK Professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Style</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Type</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Preference</td>
<td>0</td>
<td>7</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Form</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Size</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>By architect</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Attributed attitude</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Design Approach</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Location density</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Materials</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Mixed</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5.3 The Number of Participants in Each Sample Using Each of the Category Schemes.

Table 5.3 indicates that there are several differences in the type of category schemes used by the different samples to divide the buildings. With respect to inter-professional differences, none of the non-architects sampled used stylistic categorisations of the buildings, whilst the architects were less inclined to divide the buildings
according to building type. Cross-culturally, there is evidence to suggest that the British participants were more likely to mention their own personal opinions than were the Americans.

The American architects were, however, different to all the other groups in their greater use of 'style', and the American accountants were less inclined to use formal or size considerations than the other groups. The British architects on the other hand were the only sample using 'design approach'. This difference should, however, be treated with caution. Although both studies used the same hypothesised construct categories in the content analysis, the difference could be a product of the different raters' interpretations of this more abstract category. 'Design Approach' was used to denote divisions which implied the architects' design strategy, for example, the effects which the buildings were trying to create, or the influences which the architects believed that the buildings would have. It is possible that these descriptions could also be interpreted in terms of architectural style. This overlap will be discussed further below.

In summary, qualitative differences in the type of constructs used was a feature of the inter-professional differences found by Groat's (1979) study. The two British samples uphold this finding, with comparable construct use for the architectural and non architectural samples.

However, it is the content of these construct categories which are the focus of the pilot study. By means of MSA, the following section will examine the similarities and differences between the four populations with respect to the underlying structure of the concepts used in the sorting task.
5.4 Multidimensional Scalogram Analysis

In preparation for Multidimensional Scalogram Analysis (MSA) a data matrix was constructed from the categories generated by each group of participants' first sort. The form of these data matrices is shown in the sketch diagram in Figure 5.1.

Figure 5.1

<table>
<thead>
<tr>
<th>Participant No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building No.</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4 6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2 5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1 1</td>
</tr>
<tr>
<td>etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.1 Sketch Diagram of the Data Matrix Used for Multidimensional Scalogram Analysis of the Categorical Data.

Each participant is represented by a column of data, and each building by a row. Each of the participant's categories are coded; 1, 2, 3, etc, according to the number of groups they produced. (A number '1' does not have to indicate the same category for person '1' as number '1' does for person '2'.) Thus each building has a 'profile' of scores, running across a row, which indicates the categories into which it was placed by each participant.

The MSA program plots the buildings in n-dimensional space according to the principal of contiguity; the more similar the buildings' profiles are the closer together they are plotted in the space. The program attempts to arrange the points in such a way that each participants' categories can be represented as clear regions in the
plot. Each of the four groups of twenty participants' sorting data was analysed in this way using the MSA program. A worked example of the interpretation of an MSA structure from the points plotted by the program, referring to the students' own category descriptors is provided in Appendix C.

Results

Despite the differences in the category schemes used, ie in the rationale for the divisions of the buildings, discussed above, a similar structure can be found in the MSA plots for all the sample populations.

Figure 5.2

Figure 5.2. MSA Plot of the American Accountants' First Sorts Showing the General Groups of Buildings.
Figure 5.2 shows an example of this structure, that of the American Accountants. This figure shows three broad groups of buildings; a group of high rise appartments and offices on the right; smaller, more domestic buildings at the top left; and more complex, ambiguous buildings at the bottom of the plot. Although there are some variations with individual buildings, this basic structure can be identified in all of the MSA plots. However, although the underlying structures of the MSA plots appear very similar, it is when the interpretation of these plots is made that the similarities and differences between the samples' conceptualisations are revealed.

Figures 5.3 and 5.4 show the regions which reflect 'building type' in the structures of the two American sub-groups, regardless of professional affiliation. Single houses, multiple residences, churches, and offices of various kinds are identified. This structure can also be found in the plot for British professionals, but it is less clear for the British architects. It should be noted that this structure can be identified in the MSA plot for the American architects, regardless of the fact that only one participant used 'type' as an overt classification scheme. The overlap between categories such as style, materials, form, and type goes some way to explain this. For example, part of the features of style are dependent on the materials used, or certain formal aspects of a building are indicative of the building type (Krampen 1977).

Figures 5.5 and 5.6 show another between group similarity in the structures' interpretation; a straightforward dimension of size, which also crosses role group boundaries. These two plots, representing the British samples, clearly show a similar quantitative dimension of size,
Figure 5.3. MSA Plot of the American Accountants' First Sorts Partitioned According to Building Type.

Figure 5.4. MSA Plot of the American Architects' First Sorts Partitioned According to Building Type.
Figure 5.5. MSA Plot of the British Architects' First Sorts Partitioned According to Building Size.

Figure 5.6. MSA Plot of the British Professionals First Sorts Partitioned According to Building Size.
from 'small' to 'tall' for the non architects, and from 'small scale' to 'high rise' for the architectural sample. Once again similar structures are evident in the plots for the American samples. It is worth pointing out, however, that the architectural samples sometimes define 'small scale' slightly differently to the non architectural professionals. 'Small' or 'domestic' can mean to them the humanity of the scale rather than the actual size of the building.

The previous examples show that Multidimensional Scalogram Analysis of the first sort data is sensitive enough to elucidate certain similarities between the samples which occur in their reactions to the buildings regardless of inter-professional and cross-cultural differences.

However, there are two more structures which can be identified in the MSA plots, and these are only evident in the architectural samples.

Figures 5.7 and 5.8 illustrate the first of these structures, 'architectural style'. Three architectural styles are identified by architects from both sides of the Atlantic, these being 'Modern' architecture, 'Late Modern' or 'Transitional' architecture, and 'Vernacular' (UK) or 'Post Modern' (US) architecture depending on the terminology. It is interesting to note that these regions are ordered across the plots suggesting that the architects view these styles on a quantitative dimension, possibly in terms of their development over time.

The second structure which can only be clearly identified in the architectural samples' plots, relates to architectural form. Figures 5.9 and 5.10 show these similar structures for both groups of
Figure 5.7. MSA Plot of the American Architects' First Sorts Partitioned According to Architectural Style.

Figure 5.8. MSA Plot of the British Architects' First Sorts Partitioned According to Architectural Style.
Figure 5.9. MSA Plot of the American Architects' First Sorts Partitioned According to Architectural Form.

Figure 5.10. MSA Plot of the British Architects' First Sorts Partitioned According to Architectural Form.
architects. The architectural samples distinguish between buildings which are essentially geometric, those which are composed of repetitive elements, and those of sculptural form.

These two structures, relating to the architectural concepts of style and form, are not available in the non architects' MSA plots. Although one or two non architects did use formal distinctions, they were far less complex than those made by the architects, e.g. divisions according to 'horizontal' and 'vertical'.

5.6 Conclusions

The results of the pilot study can be viewed from two perspectives, content and structure. Firstly, with respect to content, the duality of the architects' structures is of great interest. Canter's (1977) notion of environmental role suggests that the differential training and experience which architects have with respect to the environment should result in a different set of architectural concepts. These differences can indeed be found between the conceptual structures of the architects and non architects, in the former's access to stylistic and formal constructs. However, there are also substantial similarities in the form of distinctions according to 'building type' and 'scale'.

Such a finding suggests a 'role hierarchy' whereby those architects whose first response is within their professional role, weight the structure toward an 'elite' conceptualisation. On the other hand, those who respond initially within their role as 'ordinary' observer, weight the structure towards a general view of the environment which crosses role boundaries. It is possible that those who begin the sorting procedure in one 'role' go on to the other 'role' in further sorts.
However, the starting point chosen is indicative of the role in which their initial reaction is made.

The similarities and differences in construct use have implications concerning the communication between architects and those who have not undergone design training. However, the implications of these findings, including role flexibility, have been discussed by Wilson and Canter (1986) and although they warrant further development, it is the structural or methodological considerations which concern the present thesis.

This re-analysis has demonstrated the sensitivity of Multidimensional Scalogram Analysis of the first sort data to reveal both similarities and differences in the underlying structure of architectural concepts between various sub-groups. The fact that the MSA plots for all the samples show a similar structure, despite cultural, temporal, sampling and interview differences, shows remarkable reliability in the method. Nonetheless, the analysis is sensitive enough to reveal inter-professional differences under these same disparate conditions.

Therefore it can be concluded that the methodology is highly suited to the present investigation of the similarities and differences which are associated with stage of architectural education and institutional affiliation.
Summary of Chapter Five

The pilot study examines the structures generated from Multidimensional Scalogram Analysis of a single 'free' sort.

Four sub-populations are considered, two architectural and two non architectural samples. The first sorts produced by the architects and accountants interviewed in Groat's (1979) study are re-analysed and compared to the British architects in Wilson's (1985) study, and a new sample of British non architectural professionals.

The results show that the single sort procedure combined with MSA is both sensitive and reliable enough to elucidate the similarities and differences between each sub-group.
CHAPTER SIX
Data Collection Procedures

In the preceding discussions, the rationale for the choice of methodology has been laid out, and the Multiple Sorting Procedure and related non-metric analysis for categorical data (MSA), have been shown to be reliable between professional groups in the revelation of the structure of architectural concepts, and yet sensitive enough to illuminate the cross-cultural and inter-professional differences between sub-groups.

The present chapter details the specific hypotheses, and the rationale for the choice of research domains for the thesis, and describes the data collection procedures for each stage of the investigation. Description of the analysis procedures is left for discussion with reference to the actual data.

6.1. General Objectives: Rationale and Hypotheses.

The mapping sentence shown in Figure 6.1 provides a summary of the research hypotheses. A mapping sentence is a tool used in Facet Theory, during the initial stages of research, for clarifying and structuring the research problem. The mapping sentence aims to identify and systematise all the relevant aspects of research domain.

The mapping sentence shown in Figure 6.1 contains five 'facets', labelled A to E and shown in the parentheses. Each facet contains a number of 'elements', and these are required to be mutually exclusive instances of the facet. Brown and Sime (1982) illustrate the nature of a facet by reference to the elements it contains. They define a facet as,
'a conceptual dimension whose constituents, termed elements, define the values on the dimension. Hence the facet sex is defined by two elements--male and female.' (Brown and Sime 1982 p74).

The facets in the mapping sentence are combined by 'connectives' in the form of ordinary language, thus giving a verbal statement of the domain of the study. Each element of each facet can be combined with each other element to form a 'structable', eg A1 B1 C2, etc.

Figure 6.1

Exploration of:

A
1 first
2 second
3 third
4 fourth
5 fifth
6 sixth

The extent to which students in the year of architectural education at a school of architecture have

B
1 Northern University
2 Southern Polytechnic

C
1 Qualitatively
2 Quantitatively

D
1 Similar
2 Different

architectural

E
1 concepts
2 evaluations
3 heroes

Figure 6.1. Mapping Sentence of Research Objectives for the Thesis.

The mapping sentence in Figure 6.1 shows that the present thesis is concerned with the extent to which cross-sectional samples of students, representing different year groups at two schools of architecture, show both qualitative and quantitative similarities and differences within three research domains: architectural concepts, architectural evaluations and architectural 'heroes'.

However, in addition to summarising the research domain, according to
the Principle of Contiguity (Foa 1958) the relationship between the elements of the facets in a mapping sentence also has empirical implications. Foa (1965) states that,

'variables which are more similar in their facet structure will also be more related empirically' (Foa 1965 p264).

Therefore it can be predicted that the empirical relationship between structables which have more elements in common will be greater than the relationship between those with fewer elements in common. Thus, with reference to the mapping sentence in Figure 6.1, an example of an empirical prediction on the basis of the Principle of Contiguity would be that students in the first year at the Northern University (A1 B1 C1 D1 E2) should evaluate architecture more similarly to the students in the second year at the Northern University (A2 B1 C1 D1 E2) than to the second year students at the Southern Polytechnic (A2 B2 C1 D1 E2).

However, the last facets in the present mapping sentence are not specifically intended to produce empirical predictions, but rather to define the domains in which the rest of the mapping sentence will be explored. The present study takes an exploratory, theory generating approach, and thus it is intended that for each of the three domains in Facet E, the thesis will explore the relationship between the other facets and provide an empirically defined mapping sentence which summarises the findings of the research. These mapping sentences will provide testable theoretical statements regarding the nature of architectural education.

Facet C of the mapping sentence indicates that the results in each of the three domains (concepts, evaluations, heroes) will be examined in terms of both qualitative and quantitative issues. Each section of the
results will be discussed in terms of both the structure and the content of the data. Chapters Seven, Eight and Nine address each of the research domains, firstly in terms of structural issues such as the average number of categories, heroes etc. Each Chapter then progresses to the content issues in the data, moving from the general to the particular, with the most detailed analysis of the data being presented last.


Chapter One has discussed the proposition that architects possess a set of characteristics which relate to their occupational status. It has been illustrated that as professionals, architects have a set of key concepts, and that these concepts, or ways of dealing with the environment are not shared with those outside the profession.

Whilst many have compared the conceptualisations of those within the profession with those without, few have examined the way in which these concepts develop. It can be assumed that it is during the extensive period of training, or socialisation, within the schools of architecture that this development takes place.

Therefore, it can be hypothesised than not only will the students at the outset of their training not possess these key concepts, whilst their final year counterparts will, but that the sequence of development of these concepts will be revealed from the cross-sectional analysis of the concepts used by each intervening year group.

Groat's (1979) work suggests that there are both quantitative and qualitative differences in the architectural concepts used by those who
have undergone architectural training and those who have not. It can therefore be expected that both these dimensions will demonstrate changes during the process of architectural education.

Further, the review of developmental theory presented in Chapter Two, suggests that the acquisition of professional concepts will follow a certain pattern, from simple concrete, tangible concepts to more complex, abstract ones. Development of the structure of architectural concepts should show increasing differentiation with each year sampled. Theories of student development indicate that conceptions of architecture should also become more multi-faceted, in comparison to the early stages of development, wherein simple dualistic thought prevails.

Whilst architectural education is assumed to lead to the emergence of 'an architect', with a characteristic way of thinking, Chapter Three has discussed some of the sources of intra-professional variation, and the assertion that the variation inherent in the views of the profession should be at least partially attributable to the school of architecture attended. It is very plausible that the same processes of socialisation within a particular school which instill the general professional concepts, also play a role in shaping the individual orientations of the architects.

2. Evaluative Judgements of Architecture.

The literature on environmental perception has repeatedly demonstrated the existence of an evaluative dimension in people's judgements of the environment. Of those researchers who have studied architects'
conceptualisations, most have pointed to the importance of subjective

However, the fundamental relationship between construing and evaluating
has theoretical as well as empirical roots. Blau (1980) defines
'meaning' in architecture as a concept which 'places a dual stress on
the importance of ideas as well as their subjective underpinnings.' She
continues,

'meaning in a specialised community is similar to other forms of
meaning ... in that it is only comprehensible in terms of both
cognitive and subjective elements' (Blau 1980 p334).

Jencks (1977) has suggested that the appreciation of various styles of
architecture is linked to the ability to read the 'language' they
present. He claims that whilst both architects and 'lay' people can
understand the 'dual coding' of Post Modern architecture and thus
derive enjoyment from it, only those who have undergone architectural
training can read the language of Modernism.

The analysis of the kind of buildings which architects and non
architects appreciate has been a popular topic for research. The
products of the architectural endeavour are in the public domain, and
since the 'failure' of Modern architecture many authors have been keen
to bridge the 'appreciation gap' between designers and the people who
use their buildings.

Thus it can be seen that there are theoretical, empirical and indeed
practical reasons for assessing the evaluative content of the
architectural concept system. Here again, whilst differences between
those who are design trained and those who are not have been frequently
illustrated it has only been assumed that these differences in
judgement arise as a result of the education process (Witfield and Wiltshire 1982).

Therefore, it can be hypothesised that the socialisation process which 'creates' the professional construct system also contributes to an evaluatory system which allows architects professional judgement of their own and their colleagues' work.

Thus it is expected that not only should there be a difference between the architectural evaluations made by students in the first and final years of training, but that this difference should be a product of a developmental sequence revealed by the architectural preferences of groups of students in each year of architectural education.

In the same context as the expectation of school specific variations in the development of architectural constructs, it can be hypothesised that through the same processes by which the school of architecture transmits the values of architectural judgement, it will also contribute the school's idiosyncratic values to the architects' views of 'good' and 'bad' architecture.

3. Architectural Heroes.

In common with all professions, there exist in architecture a number of prominent figures, and these architects become associated with different styles and orientations in architecture.

Previous research has demonstrated that the identification of 'heroes', ie those members of the profession who are admired, can be a useful heuristic for the study of orientations in architecture (Blau 1980; Wilson 1985; Wilson and Canter 1986).
The inclusion of this domain for the research has a number of advantages. The use of heroes as an index of orientation allows a succinct summary of the kind of architectural values held by the students at various stages of their education. It also has the major advantage of being a totally open ended measure, thus allowing the students to express their views on design approach and stylistic preference without being constrained by the limits of the researcher's architectural examples. Thus, whilst eliciting the students' architectural preferences with respect to the selection of photographs, it is possible to compare these results with the open ended expressions of preference by means of heroes.

The inclusion of this line of enquiry also aims to build upon Wilson's (1985) work to develop a model of orientations in architecture by reference to admired architects.

As illustrated in Figure 6.1, it is hypothesised that the development of a coherent conceptual and evaluative professional framework in architecture will be paralleled by changes in the type of architects who act as heroes for the students. Similarly, if the architects admired by the students are related to their overall orientations in architecture it should be expected that the admirations of the students will also be influenced by the ethos of the school of architecture at which they study.

6.2. The Schools

Two schools were available for the study, one Polytechnic and one University based. Although both schools are considered to be relatively technical in their orientation, the fact that they are positioned at
opposite ends of the country ensures the minimum possible overlap in 'environmental' influences on the students' conceptualisations. For example, it is unlikely that the students will visit the same exhibitions or attend the same lectures. It also excludes the possibility that tutors would be 'shared' between schools.

Thus, the two schools, referred to as the Northern University and the Southern Polytechnic, are of similar size and have similar educational objectives, yet are based in different types of institution, at different ends of the country.

6.3. The Participants

Fifteen students from each of five years of architectural training at both schools of architecture were asked to take part in the study. At the Northern University this represented samples of students from each of four years of the undergraduate course and a group of students in their final (sixth) year at the University on the one year diploma course. Students in the placement (fifth) year were not sampled.

Similarly, at the Southern Polytechnic fifteen students in each of three years of undergraduate study were sampled, and two groups of students in the fifth and sixth years, representing students doing the two year post graduate course. At the Southern Polytechnic the fourth year students are excluded, being on their placement year.

Therefore, a total of one hundred and fifty students were interviewed, seventy-five from each school. Additionally, several final year students at the Southern Polytechnic volunteered to talk about their work at length to provide the case studies reported in Chapter Eleven.
6.4. The Materials

The set of photographs used by Groat (1979), Wilson (1985) and consequently the present pilot study, were first selected in 1978 and represented the, then current, movement from Modern through Transitional to Post Modern architecture. However, since then, Post Modernism has developed a good deal further, and it was decided that a new set of photographs was needed to represent the architectural developments of the last decade.

Nevertheless, some of the original set were kept in order to anchor the results to previous findings. The photographs which were kept were Alvar Aalto's Vuoksenniska, Turner Brooks' Butterworth House, Mies Van der Rohe's Institute of Technology Architecture Block, Ricardo Bofill's La Muralla Roja, and Peter Eisenman's House VI. Le Corbusier's Notre-Dame-du-Haut was also kept, although a different photograph of this building was used. These buildings were selected as they were good representatives of the divisions which were made by the British architects in Wilson's (1985) study.

These six photographs were supplemented with a further twenty, selected with the help of an eminent professor of architecture from his personal collection of slides. The new set aimed to cover as many of the developments in architecture as could be represented in a manageable sized collection. Thus a total of twenty-six buildings were finally used covering a range of architectural styles. The contextual and the monumental are represented, along with most building types. The buildings range from the highly noted to the more obscure, although most are designed by 'famous' architects. The use of works by notable
architects allows for the comparison of developmental trends in the evaluation of their buildings as presented in the photographs, with the students' open-ended, reported admiration for their work as conjured up from their knowledge. The actual photographs used in the study are reproduced in Appendix D along with full details of the buildings.

6.5. The Interview

All the students were interviewed in 1986, the Northern students in their second term, and the Southern students in the third term. The interviews took place mainly in studio hours at the students' drawing boards.

Participants were first introduced to the researcher and the aims of the study. The were then asked the question, 'Are there any architects whom you particularly admire?'. In response to this question the participants produced as many or as few examples as they wished, and these were noted.

The students were then required to participate in the sorting task. Both stages of this procedure will be described more fully in below.

6.6. The Concepts Sort

Each student was presented with a set of photographs and asked to go through them to familiarise themselves with the buildings in the photographs.

They were then given the following instructions;

'As I mentioned before, I'm investigating the way architectural students think and feel about architecture, so I'd like you to try and treat the photographs as you would the building rather than this representation of it. What I'd like you to do, is to sort the buildings into groups so that all the buildings in each group are
similar to one another in some important way and different to the buildings in the other groups. You can choose any criteria you like to divide the buildings; there are no right or wrong answers, it is your opinions which count. Please take as long as you like, and feel free to comment at any time.'

The participants were allowed as long as they wished to perform the sorting task, and any comments which they made were noted down. At the end of the sorting session they were asked to explain why they had put each of the groups together and what were the similarities between the buildings in each case.

Most previous work has found that participants in the Sorting Procedure find it extremely difficult to categorise all the elements according to one category scheme, and this is certainly not their immediate inclination. It is common with the Sorting Procedure to specifically ask the participants to sort by only one criterion at a time. The fact that this is a difficult task, is demonstrated by their frequent use of 'don't know', 'don't fit', and can't classify' categories, which results in the loss of people's responses to sometimes quite large numbers of items.

The only reason for insisting on one criterion at a time, is for ease of analysis. In this study, where only one free sort is being used, it is vital to permit the participants free categorisation according to any criteria they choose, allowing for all their immediate thoughts on the buildings to emerge.

Therefore there are many 'mixed' category schemes produced by these students, and the analysis will concentrate on the use of the constructs used to describe the categories rather than the overall sorting criteria, or 'category schemes'. This provides a deeper insight
into the classification process, and minimises the amount of data which is lost.

6.7. Content Analysis

For each sort that each participant did there were a number of different groupings. The descriptions which the participants gave as to why the photographs had been placed together in a group were content analysed by two independent raters familiar with architectural terminology. The hypothesised content categories for the content analysis were broadly based on the past work by Groat (1979) and Wilson (1985), although some new content categories were generated.

The content analysis of the descriptions of why a group is placed together in a sort produce a label, termed a 'construct'. For example, 'These are together because they are all houses', would be labelled 'type'. If all the other categories in the sort were also designated 'type', e.g. the other groups were 'churches', 'offices', 'schools', the overall sorting criterion, or 'category scheme' would also be 'type'. In practice, however, this kind of consistency is rarely encountered.

<table>
<thead>
<tr>
<th>School</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern</td>
<td>.94</td>
<td>.93</td>
<td>.94</td>
<td>-</td>
<td>.94</td>
<td>.96</td>
</tr>
<tr>
<td>Northern</td>
<td>.89</td>
<td>.96</td>
<td>.96</td>
<td>.95</td>
<td>-</td>
<td>.90</td>
</tr>
</tbody>
</table>

(Overall reliability = 0.94)

Table 6.1 The Inter-rater Reliability Coefficients for the Content Analysis of the Sorting Data for all the Samples.
The tables of all the constructs generated by the content analysis can be found in Appendix E. The inter-rater reliability coefficient for each year group at each school are shown in Table 6.1.

6.8. The Preference Sort

So that all the participants' evaluations may be analysed, those who did not select personal preference as the overall criterion for categorising the buildings in the free sort were requested to do so at the end of the free sort session. The use of a Sorting Procedure for eliciting architectural evaluations rather than rank orders allows for the examination of the similarities between the buildings on an evaluative dimension. It also provides an opportunity to analyse the quantitative aspects of the sorting data, to compare the number of categories used in the two sorting tasks and the relationship of these measures to educational development.

Following the first free sort the students were given the instructions,

"Would you please now sort the buildings into groups according to your own personal preference. That is for instance, into groups of buildings you like, or dislike, and any groups in between you feel are necessary. Again, you may have as many groups as you like and as many in each group as you like."

6.9. Calibrating the Preference Sorts.

In order that the students' preferences for the buildings to be correlated the sorting data was coded in such a way that each building received a 'preference score' for each group of students. This 'score' is derived from the profile of categories into which it was placed by
the sub-groups of students. For example, if a student divided the buildings into dichotomous categories of 'like' and 'dislike' the buildings which were liked would each score a highest 'preference score' of zero. The buildings in the dislike group would each score the worst possible score of twelve. Thus the higher the score, the less liked the building is. A student using three groupings, i.e., adding a 'medium' or 'average' group, would have buildings scoring zero, six or twelve. In this way the distribution of groupings can be translated into a score and the students' relative liking or disliking of each building can be recorded in proportion to one another. Any buildings which were not judged, as they were designated 'unclassifiable', scored an average of six points.

Using this calibration procedure it was possible to calculate an average preference score for each building, for each of the sub populations. For example, each of fifteen first years students have a preference score for each building. The total of these divided by the number of students, i.e., fifteen, produces an average preference score for each building for the first years as a group.

Thus the average preference score for a building can range from the highest regard, zero, requiring all fifteen students to have placed it in their top group, to the lowest, twelve, if all fifteen had placed it in their lowest group. Each year's average preference scores for the buildings can be found in Appendix F.
CHAPTER SEVEN

Conceptualisations of Architecture

7.1 Introduction

The review of literature in Chapter One has outlined the view that architects utilise a different set of concepts, or conceptualise the environment differently to non architects. One of the major problems with such research has been the reliance on semantic differential scales (e.g. Canter 1969, Hershberger 1969). Even those researchers who have used multidimensional scaling techniques (e.g. Oostendorp and Berlyne 1978) have lacked the procedural open-endedness required for studying architectural concepts.

The aim of this chapter of the thesis is to examine the conceptual systems of architectural students at various stages of their education, using a multiple sorting procedure and nonmetric multidimensional scaling (MSA).

The theoretical background to the multiple sorting task has been discussed in Chapter Four. The use of this procedure in many previous studies has shown its general efficacy in the identification of conceptual structures. This method is particularly interesting when applied to architectural phenomena, taking this area of research beyond the pre-defined constraints of the semantic differential, and allowing for the exposure of individual differences where analysis of means fail. The pilot study has shown that the analysis of first sort data using MSA generates comparable structures between populations, yet is sensitive enough to reveal the differences between sub-populations.

The pilot study has also indicated that the chief differences in
conceptual structure between populations with differing architectural experience are likely to be found in the use of the concepts of form and style. It has been suggested that conceptual differences arise as a result of architectural education, whereby a set of key concepts are acquired through socialisation. This educational development has been shown in the adoption of professional values and self image during architectural education (Stringer 1970).

Groat's (1979) study identified two types of difference in the concepts used by architects and non architects. Firstly, a quantitative difference, that the architects used more constructs than the accountants, and secondly that those constructs were qualitatively different. The following chapter examines both quantitative (descriptive) and qualitative (content) variations in concept use as a function of both year of study and school affiliation.

The first section, 7.2, deals only with the descriptive issues concerning the number of categories, and the number of constructs used by the students in their free sorts. Section 7.3 will examine the nature of the constructs used in the sorts and their variation with year of training and school affiliation. Finally, section 7.4 will analyse the content of the categories in relation to the constructs using MSA-1, providing a deeper insight into the structure of architectural concepts. This section examines the structural development of the concept of style, which is used by each year group in an increasingly sophisticated way.
7.2 Quantitative Variation in the Use of Categories and Constructs.

i. The Mean Number of Categories Used in the First Sort.

The number of categories used by each student in their free sort can be found in Appendix G. Table 7.1 and Figure 7.1 show the mean number of categories used in the sorts for the ten groups of fifteen students according to their year of study and the school which they attend.

Table 7.1

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>6.13</td>
<td>7.87</td>
<td>6.53</td>
<td>7.00</td>
<td>-</td>
<td>5.07</td>
</tr>
<tr>
<td>Southern</td>
<td>6.20</td>
<td>6.60</td>
<td>9.27</td>
<td>-</td>
<td>7.47</td>
<td>7.73</td>
</tr>
</tbody>
</table>

Table 7.1 The Mean Number of Categories Used in the First Sort by the Students in Each Year at Both Schools.

It is evident from this table and from the graph in Figure 7.1 that although the differences are not great, for the students at the Northern University, the highest mean number of categories used are in the second and fourth year samples. The final years use the least number of categories in their sorts.

The Southern first and second year students have the lowest mean number of categories per sort, the most categories being used by the third year sample. The fifth and sixth year students use fewer than the third years, but more than the first and second years.

With respect to school differences, both groups of first year students have an almost identical mean number of categories per sort. However, whilst the students in the later years at the Southern Polytechnic use
Figure 7.1

Figure 7.1 The Mean Number of Categories Used in the First Sort by the Students in Each Year at Both Schools.

more categories, the students at the Northern University use less, reinforcing the hypothesis that time spent in training affects school specific variations.

The number of categories used to distinguish between the buildings can be linked to the notion of cognitive complexity. There is some debate as to whether more categories, showing greater differentiation, or less categories, demonstrating more connections, reflects the most 'complex' thought. However, these issues will be discussed more thoroughly with reference to the descriptive data in all three research domains.

It is worth noting that whilst the number of categories a student
chooses to use in the sort may seem a quite arbitrary measure, the 'reliability test', described in Appendix A, shows remarkable stability in the number of categories used over a three month test-retest period.

ii. The Mean Number of Different Constructs Used in the First Sort.

The number of different constructs used in the sort does not simply correspond to the number of categories. Firstly, a student may chose to use the same construct to describe all the groupings in their sort, for example, several different building types. Secondly, it is possible to use two constructs to group one category, for example, 'Post Modern buildings which I don't like' would be judged both as style and evaluation.

Thus, the number of different constructs in a sort is indicative of the extent to which the student was able, or willing, to carry the same category scheme through the sort, to encompass all the groups.

Table 7.2

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>2.40</td>
<td>4.47</td>
<td>3.20</td>
<td>3.50</td>
<td>-</td>
<td>2.33</td>
</tr>
<tr>
<td>Southern</td>
<td>3.07</td>
<td>3.07</td>
<td>3.93</td>
<td>-</td>
<td>3.33</td>
<td>3.93</td>
</tr>
</tbody>
</table>

Table 7.2 The Mean Number of Constructs Used in the First Sort by the Students in Each Year at Both Schools.
Figure 7.2 The Mean Number of Categories and Constructs Used in the First Sort by the Students at the Northern University.

Figure 7.3 The Mean Number of Categories and Constructs Used in the First Sort by the Students at the Southern Polytechnic.
Table 7.2 shows the average number of different constructs used per sort for each of the different year groups. Whilst the number of constructs per sort parallels the year differences in category use for the Northern students, the Southern students maintain a fairly consistent number of constructs per sort, nevertheless with slight peaks at the first and final year. These values are shown in relation to the mean number of categories used in Figures 7.2 and 7.3, showing that the mean number of categories used are clearly related to the average number of constructs used to describe them. This trend is more pronounced at the Northern University than at the Southern Polytechnic.

However, the meaning of this relationship is not as obvious as it may at first appear. There must necessarily be some relationship between these two measures; with few categories there can only be few different constructs. However, when there are more categories the interpretation becomes less clear. It is possible that if a student has many categories, it is more difficult to carry a category scheme through them all. This may indicate a poorer knowledge of the concept, with the inability to assign each element to a consistent construct category. Thus a ten category sort which is able to give, for example, ten different differentiations within one construct is a complex one. However, on the other hand, a ten category sort which uses ten different constructs is also complex in its attempt to cover many different types of description.
7.3 Architectural Concepts: Content Analysis of the Category Descriptors.

The following section analyses the pattern of construct use, according to year of study, referring to the type of constructs which the students choose to use in the free sort. The constructs labels were derived from content analysis of the sorting category descriptions given by the students, the procedure having been detailed in Chapter Six.

Before examining the constructs used in the free sorts, it is necessary to mention the use of 'don't know' or 'don't fit' categories. Table 7.3 shows the percentage of 'don't know' categories for each sample of students, that is the number of 'don't know' categories out the overall number of possible categories which the year group produced.

Table 7.3

<table>
<thead>
<tr>
<th>School</th>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td></td>
<td>5%</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
<td>-</td>
<td>3%</td>
</tr>
<tr>
<td>Southern</td>
<td></td>
<td>14%</td>
<td>6%</td>
<td>7%</td>
<td>-</td>
<td>5%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Table 7.3 The Percentage of 'Don't Know' Categories Used by the Students in Each Year at Both Schools.

Table 7.3 demonstrates that the percentage of 'don't know' categories are quite low for all the years with the possible exception of the Southern Polytechnic first years. Nevertheless, it can be concluded that on the whole the students were able to successfully categorise most of the buildings according to some criterion.

Tables 7.4 and 7.5 show the number of students in each year who use each of the constructs in their division of the buildings at the
Northern University and the Southern Polytechnic respectively. There is no distinction as to whether it is used to label one of their categories or all of them, simply that it is a construct which is deemed relevant in their associations of the buildings.

Table 7.4

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Construct used as part of category scheme</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Style</td>
<td></td>
<td>11</td>
<td>12</td>
<td>11</td>
<td>14</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>Form</td>
<td></td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>37</td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
<td>3</td>
<td>11</td>
<td>4</td>
<td>7</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Design Approach</td>
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<td>1</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>Materials</td>
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<td>8</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Type</td>
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<td>3</td>
<td>4</td>
<td>7</td>
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<td>18</td>
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<td>0</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Colour</td>
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<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
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<td>2</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Humanity</td>
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<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Era</td>
<td></td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>By architect</td>
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<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
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<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
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<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Language</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
<td>Tribute</td>
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<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 7.4 The Number of Students at the Northern University Using each Construct in the First Sort.

Tables 7.4 and 7.5 demonstrate that whilst quite a wide range of constructs are called upon to categorise the buildings, there are only six constructs which are consistently applied to the architectural examples provided by the students at both schools of architecture.

Eighty percent of the Northern students use some kind of stylistic similarity when categorising the buildings, and this is just as common in all the year groups sampled. At the Southern school, style is used by sixty-eight percent of the students. Again this is distributed across all the years, although it is only used by a third of the first
Table 7.5

Construct used as part of the category scheme 1 2 3 5 6 Total

<table>
<thead>
<tr>
<th>Construct used as part of the category scheme</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>5</th>
<th>6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Style</td>
<td>4</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>51</td>
</tr>
<tr>
<td>Design Approach</td>
<td>5</td>
<td>6</td>
<td>9</td>
<td>10</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>Form</td>
<td>11</td>
<td>5</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>37</td>
</tr>
<tr>
<td>Evaluation</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>9</td>
<td>33</td>
</tr>
<tr>
<td>Type</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Materials</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>Uniqueness</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Contextualism</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>By Architect</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Colour</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Era</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Environment</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Familiarity</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Scale</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Structure</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Language</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 7.5 The Number of Students at the Southern Polytechnic Using each Construct in the First Sort.

year students. In the first and second years such stylistic categories are usually restricted to descriptive identification of the styles rather than formal labelling. For example, the classical references of Post Modernism, and the traditional style of Vernacular architecture are the most frequently mentioned. In later years, formal labelling becomes more common, both of the major styles and the sub-stylistic divisions. For example, the category of 'Modernism' overlaps with 'Late Modernism', 'Brutalism', 'Rationalism', and 'Modernist Vernacular'.

'Architectural Form' is used as a descriptor by a total of forty-nine percent of the students at the Northern University, however, the majority of these are in the first three years of their training. At the Southern Polytechnic 'form' is used by thirty-seven percent of the students, the most frequent use being in the first year. Curves,
planes, geometry, and repetition of elements appear to concern both of
the sets of final years sampled to a lesser degree.

Whilst evaluative judgements alone are seldom made on groups of
buildings per se, the students quite frequently attach an evaluative
statement to other construct categories. Formal or stylistic groupings
may be described along with the students' value judgements. Examples of
such categories are 'Modern monstrosities', from a first year
student, or from a final year student, 'Functionalist, but
aesthetically pleasing.' Evaluative statements are made quite
frequently by all the students, however, both sets of first year
students were the least inclined to express their personal opinions.

The construct 'Design Approach' is a description of the strategy used
by the architect in achieving the design, or the architects' desired
outcome for the building. It is often similar to stylistic or formal
categories but contains an element of intentionality, or consideration
of the architects' perspective. This rather complex type of
categorisation was used by only one of the first year students at the
Northern University, but was used quite frequently by the final year
students. At the Southern Polytechnic the students made more Design
Approach categorisations, but again the use of this construct increases
with each year sampled. Examples of design approach classifications
include statements such as, 'These buildings have taken one image and
carried it through until its larger than life', 'The creation of a
small community feel', and 'Architecture used as propaganda for the
city.'

The only other constructs used with any consistency by the students in
both samples are 'materials', and 'building type'. These construct
descriptors entail quite simple statements regarding the building
materials, eg 'wood', 'concrete', 'brick', and the buildings' known or
imagined use, eg 'church', 'office', 'house'. It should be noted that
these constructs are used by none of the final year students at the
Northern University.

The preceding discussion has focussed on the number of students who use
each construct as part of their categorisation scheme. Only six
constructs are used with any consistency; style, design approach, form,
type, evaluation and materials. Some patterns can be discerned, with
style being used by all the years sampled, form, materials and type
being less commonly used by the students with more architectural
education, and the reverse being true for the more abstract
descriptors, for example 'Design Approach'.

In order to clarify any possible trends in the use of these constructs,
it is necessary to consider the actual percentage of construct use, ie,
to examine the actual number of categories within each sort which use a
certain classification. Therefore the use of each of the predominant
constructs are shown in Figures 7.4 to 7.9 as a percentage of all the
categories generated by the students in each year.

Figures 7.4, 7.5, and 7.6 show the percentage use of formal, building
type, and materials categories respectively. The common feature of
these three constructs is that they are predominantly used by the
students in the early years of their study. This confirms the
predictions of the above analysis, showing the number of students who
use these categories at all declines with each year sampled.
Figure 7.4 The Percentage of Categories Divided According to Architectural Form by each Group of Students at Both Schools.

Figure 7.5 The Percentage of Categories Divided According to Building Type by each Group of Students at Both Schools.

Figure 7.6 The Percentage of Categories Divided According to Materials by each Group of Students at Both Schools.
The graph in Figure 7.7 shows the percentage of categories which contained some evaluative element. Whilst evaluations are used throughout the years at both schools, there is a tendency for the most of the personal opinions to come from the second years at both schools, the third and fourth years at the Northern University and the graduate students at the Southern Polytechnic.

![Figure 7.7](image.png)

Figure 7.7 The Percentage of Categories Divided According to Evaluation by each Group of Students at Both Schools.

Tables 7.4 and 7.5 have suggested that the design approach classification was more likely to be used in the later years of their study. The actual percentage of categories using this concept, shown in Figure 7.8, also displays this progression. With the exception of the first years, a few students at the Northern University use this category throughout the years sampled. At the Southern Polytechnic, however, there is clearly a trend toward increasing usage with each year sampled.

The percentage of constructs relating to architectural style shown in figure 7.9, bears out the predictions of the previous analysis, being
widely used throughout the years studied, although the Northern University students are more likely to use this type of classification in the later years of their training.

Comparison of Figures 7.9 and 7.8 shows that whilst both sets of students rely quite heavily on stylistic categories, the lesser usage by the Southern Polytechnic students is compensated for by their
increased use of Design Approach. It is quite possible that this 'Design Approach' classification is a more abstract version of the stylistic categorisation, going beyond simple naming of styles, to explanations of the design strategies. This between school difference will be discussed more fully in section 7.4 in relation to the development of the concept of style.

In summary, the content analysis of category descriptors has revealed that the students deal with six major architectural concepts, and that the use of these concepts varies according to the length of time spent in architectural education. The more tangible, physical constructs such as form, type, and materials are acquired early in the students training, and are used less frequently as they are replaced by more abstract concepts such as Design Approach. This developmental trend accords well with the theoretical predictions of Chapter Two, and will be considered in detail in the Discussion.

Nevertheless, the tendency to evaluate the buildings and to use style as a distinguishing feature remains fairly consistent throughout the years of training. The frequent and consistent use of the concept of style at both schools provides a particular opportunity to develop the study a stage further. It makes possible the examination of the structure inherent in the qualitative differences between the use of style categories in different years of study. This provides deeper insight into the development of this particularly central construct.
The previous section of the analysis has shown that the concept of style is the most frequently and consistently used construct by the students at both schools of architecture. The following section will focus on the content of the construct of style with respect to the stylistic distinctions made between the buildings. Chapter 3.4 has discussed Jencks' (1982) broad definition of architectural style in terms of four major stylistic groupings: Modern, Post Modern, High Tech and Vernacular architecture.

Jencks (1982) provides a detailed analysis of the characteristics of Modern and Post Modern architecture. Referring to thirty variables he points out the essential differences between the two movements on the grounds of ideological, stylistic, and design ideas. In stylistic terms, where Modernism is against humour, ornament, and historical references, Post Modernism is founded on these qualities. Modernism represents simplicity and purity, where Post Modernism represents complexity and eclecticism. In the set of buildings used in the present study, a range of Modernist examples are included, from the work of such architects as Peter Eisenman (Building 23) to Mies van der Rohe (Building 21). La Piazza d'Italia (Building 22) provides an extreme example of Post Modernism, or what Jencks calls 'Radical Eclecticism'. The Portland Building (Building 4) and Johnson's AT&T (Building 2) illustrate the sense of humour inherent in Post Modern architecture, and softer historical references are found in the work of Taft architects (Building 5).

Jencks (1982) sees High Tech (or 'Slick-Tech') architecture as rooted in Late Modernism, an out-growth of the Miesian curtain wall. He
states that 'Structural logic became structural exaggeration--structure as ornament' (Jencks 1982 p50). A clear example of such structural exaggeration can be found in the Pompidou Centre (Building 17). Similarly, the slick glass aesthetic is represented by Foster's Sainsbury Centre (Building 1).

On the other hand, Jencks (1982) classifies neo-Vernacular architecture as a brand of Post Modernism, being essentially a reaction against Modernism. Neo-Vernacular is characterised by pitched roofs, 'natural' materials, personalisation, and variable massing giving the impression of construction over a number of years. Neo-Vernacular aims to 'capture a former communal language' (Jencks 1982 p150). Clear examples of the 'self-built' styling and natural materials are found in the domestic houses of Brooks (Building 24) and Megson (Building 19).

Therefore, it can be hypothesised that these four major stylistic distinctions will form the backbone of the structure of the concept of architectural style. The following analysis aims to chart the students' development of the concept within two schools of architecture, with reference to the concrete architectural examples in the sorting task.

In facet theory terms the research question is:

The extent to which categories of Modern Post Modern High Tech Vernacular architecture are differentiated in the first sorts of students in their

\[
\begin{array}{c}
\text{first} \\
\text{second} \\
\text{third} \\
\text{fourth} \\
\text{fifth} \\
\text{sixth}
\end{array}
\] year of training at the
\[
\begin{array}{c}
\text{Northern University} \\
\text{Southern Polytechnic}
\end{array}
\]
The percentage use of each construct from all possible categories in the sample groups’ sorts can be found in Appendix H. Consideration of the content of the categories will be fulfilled by means of multidimensional scalogram analysis (MSA). The basis of this analysis has been discussed in Chapter Four, and MSA will be used in this section in the same way as in the pilot study. That is, for each of the ten groups of students, MSA will plot the buildings in two dimensional space in such a way that the classifications made by each member of the sample can be represented on the plot as a clear region. The composite plot represents all the similarities and differences attributed by the students in each particular sample. The closer together two buildings are in the space, the more students categorised those buildings in the same groups, regardless of the stated reasons for that group. Regions of similar buildings can thus be identified, and the reasons for their connection can be discerned by referring back to the construct categories.

RESULTS

A) The Northern University

Figures 7.10 to 7.14 show the MSA plots, in two dimensions, for each of the five year groups at the Northern University. Sketch diagrams of the buildings have been drawn onto the plots for ease of interpretation.

The development of the concept of architectural style at the Northern University can be characterised by two facets, playing a modulating and a polarising role. A polarising role is played by a facet containing categorical distinctions, i.e., a facet which contains a series of unordered elements. With respect to the partitioning of the MSA/SSA
plot, a polar role creates an empirical structure in the form of 'wedgelike' regions emanating from a common origin.

A modulating role is represented by concentric circular partitions around a common origin. Whilst it is similar to the axial role played by an ordered facet, the modulating role is played by a simply ordered facet which is related to another facet, and is found as a further classification of a polarising facet. Both these facet roles are found in the first sort MSA structures for the third, fourth and final year students. This combination forms a structure known as a 'radex'.

1) THE POLARISING FACET

i. Modernism and Post Modernism

The Modern and Post Modern buildings are represented at opposite sides of the MSA plots, for all five years of Northern students. Essentially, these two movements are interpreted as opposites; both Modernism and Post Modernism occasionally overlap with Vernacular and High Tech, but not with one another. Although the first year students do not have a well defined boundary between any of the styles, the Modern and Post Modern categories are already quite strong in the first year plot (Figure 7.10).

These two categories, although not clearly differentiated, are set apart from the vernacular architecture in both the first and second year plots (Figures 7.10 and 7.11). The High Tech architecture, on the other hand, has yet to be extracted from the Modern and Post Modern architecture and formed into a category in its own right. Figures 7.12, 7.13, and 7.14 show this to be the case for students in the later years
Figure 7.10 MSA Plot of Northern First Years' First Sorts Partitioned According to Architectural Style.
Figure 7.11 MSA Plot of Northern Second Years' First Sorts Partitioned According to Architectural Style.
of training.

In defining Modern and Post Modern architecture, students in the first and second year of their training typically refer to contrasting qualities; colour as opposed to dull grey and white, curves and arches in contrast to planes and repetition. As the students are further into their training less physical descriptors are also used, and the styles are also defined in terms of qualities such as 'humane' and 'inhumane'. Occasional value judgements are expressed for or against the styles. Increasing educational experience leads to a variety of opinion amongst the students, and the two styles prompt opposing opinions. Modernism may be described as 'pure', or 'ugly'; and Post Modernism as 'fun', or 'tacky'.

**ii. Vernacular and High Tech**

Vernacular and High Tech architecture are identifiable as clear regions, again at opposite sides of the plots, for all the year groups, but are particularly strong in the later years of study. Vernacular architecture presents few conceptual problems for the first and second year students, being set apart from the other buildings in Figures 7.10 and 7.11, and often described as 'traditional' in style.

On the other hand, High Tech architecture presents the most definitional difficulty for students in the first two years of training. Where High Tech buildings are distinguished from Modern or Post Modern buildings they are often described as 'futuristic' or as 'expressing technology'. The first buildings in the present set to be acknowledged as High Tech are the Pompidou Centre and Farrell's TVAM.
The earliest definitions of High Tech are thus based on the presence of coloured piping, or external services. It is interesting to note that for the first and second year students, glass buildings such as Meier's Gallery and Foster's Sainsbury Centre are easily placed within the same region as other Modern buildings without the knowledge of architect or era. Interestingly, the reverse trend can be seen amongst students in the later years of training. These students occasionally place 'Modernist' buildings such as the Seagram building or Mies van der Rohe's ITT with the contemporary glass buildings in High Tech categories eg Foster's Sainsbury Centre. This is a clear example of what Lawson (1980) refers to as the reinterpretation of architecture according to contemporary criteria.

### iii Stylistic Sub-divisions

Whilst the MSA plot for the first years' categorisations is only partitioned according to the four main styles of the polarising facet, the plots for students who are further into their training contain readily identifiable sub-regions that reveal more differentiated stylistic judgements. The second year plot (Figure 7.11) shows the first of these sub categories to be used, whereby the Modern architecture is divided to account for those buildings considered to be symbolic, or human scale.

In the third year students' categorisations of the buildings (see Figure 7.12) both the Post Modern and the Vernacular regions contain sub groups linked by their reference to classical architecture. In the Post Modern region this accounts for buildings such as Clifton Nursaries and La Piazza d'Italia and in the Vernacular region the
Figure 7.12 MSA Plot of Northern Third Years' First Sorts Partitioned According to Architectural Style.
Quinlan Terry building. The remaining Vernacular architecture is termed by the students as neo-Vernacular. Interestingly, the third year students create a separate category named 'Slick-Tech/Modemism' to account for the glass buildings which border the High tech and Modern regions. These buildings are High Tech but not in the same way as the Pompidou Centre, and Modern, but not akin to the works of Rossi, Le Corbusier, or Eisenman.

The fourth year students do not make any further refinements to the High Tech or Post Modern categories. They do, however, make quite complex distinctions between the Vernacular and Modern buildings. The regions shown by the broken lines in Figure 7.13 show that the Modern architecture is not only divided to account for the 'expressionism' of Le Corbusier and Aalto's churches, but also to identify 'neo-Modernist Vernacular' in the form of Moore's Kresge College and Claude Megson's apartments. With the Modernist influences accounted for, the remaining buildings in the Vernacular region are also further divided to separate Quinlan Terry's classical revivalism from the remaining 'traditional vernacular'.

The final years, like the third years, create a sub category to account for classical influences in both the Post Modern and the Vernacular regions (Figure 7.14). Similarly, like the fourth year students, the final year students divide the Modern Vernacular from the 'traditional', and distinguish the 'late Modernism' of buildings such as Le Corbusier's Notre-Dame-du-Haut and Aalto's Vuoksenniska from the works of Rossi and Eisenman.
Figure 7.13 MSA Plot of Fourth Years' First Sorts Partitioned According to Architectural Style.
Figure 7.14 MSA Plot of Final Years' First Sorts Partitioned According to Architectural Style.
Figures 7.12 to 7.14 show that in addition to the polarising facet of architectural style, the plots derived from categorisations made by students in the later years of their training also include a modulating facet. The modulating facet refers to the typicality of the buildings within each style. Those buildings which are typical examples of the style are found toward the outer edges of the plot, and those that are more ambiguous toward the centre. This is clear from inspection of the students' stylistic categorisations, whereby the buildings placed toward the edges of the plot are those over which there is most stylistic agreement between the students. Similarly, those toward the centre of the plots are found to be more stylistically ambiguous by the students, with less agreement in their categorisations.

The circular partition shown in Figure 7.12 demonstrates that for the third year students the Sainsbury centre and the Pompidou Centre are the most typical of the High Tech buildings. On the other hand, the Seagram building, ITT and Meier's Gallery are further toward the centre of the plot owing to their occasional classification as Modern, ie they are not good exemplars of Modern or High Tech architecture. Similarly, Megson's appartments are placed inside the circular partition as they are judged to be typical of neither Vernacular nor Modern architecture. In the Post Modern region Johnson's AT & T building is an anomaly, with its only claim to Post Modernism being the pediment on the top; without this it could be firmly in the Modern region. The Botta house is another peculiarity, being judged occasionally as Modern or Post Modern, and certainly not being typical of either.

There are strong similarities between the structures of the fourth and
final years' conceptualisations of architectural style. The two radex structures found in the MSA plots for these groups of students (Figures 7.13 and 7.14) not only have very similar elements in the polarising facet, similar sub stylistic groupings being made, but the inconsistency of the students' judgements identifies the same buildings as typical and atypical of their style in the modulating facet. Both sets of students find the work of Aalto, Le Corbusier, Moore, and Megson atypical examples of Modern architecture. Similarly, Bofil's La Muralla Roja provokes a range of classifications indicating that for both sets of students it is atypical of its class.

Most of the buildings in the Post Modern region are placed near the edge of the plot, there being substantial agreement amongst the students regarding their classification. Both the fourth and the final year students find the work of Mario Botta hard to classify, hence this building is placed within the circular partition in both figures 7.13 and 7.14. However, whilst Quinlan Terry's classical revivalism is found at the outside of the fourth year students MSA plot (figure 7.13), this building is placed within the circular partition for the final year students (Figure 7.14). It is possible that the final year students' specific knowledge of Quinlan Terry's work leads to the conclusion that this is not truly Vernacular architecture since many of the final year students express animosity toward Terry's work.

The most interesting difference between the structures found in the plots for the fourth and final year students is found on the High Tech region. It is within this stylistic grouping that the final years make the most distinctions with respect to the modulating facet, typicality.
The Pompidou Centre and the Sainsbury Centre are the most typical High Tech buildings, shown at the edge of the plot (figure 7.14). The next most typical are ITT and the Seagram building, although these are less typical of High Tech architecture as they are occasionally classified as Modern architecture. The building placed nearest to the centre of the plot in the High Tech region is Meier's Gallery, which could be judged to be a member of the High Tech, Modern, or Post Modern categories, making it the least typical of its style.

B) The Southern Polytechnic

The MSA plots of the Southern first, second and third years' first sort categorisations show a similar polarising facet to that found in the Northern students plots. The structure revealed is based on the same four major stylistic groups, with various stylistic sub-divisions. They do not, however, contain a modulating facet as was present in the Northern third, fourth and final years' MSA structure. Rather than the radex of architectural style found in the advanced students' MSA plots at the Northern University, the plots derived from the graduate students at the Southern Polytechnic portray architectural style as a highly complex ordered facet. Unlike the qualitative, categorical model of architectural style presented by the polarising facet, an axial (ordered) facet implies quantitative distinctions along a continuum.
The polarising facet of architectural style is very similar for the first three year groups at both schools of architecture. The southern students also use the four basic styles to divide the buildings, and the Modern and Post Modern buildings are again found on opposite sides of the plot. However, the Southern students' divisions of the buildings were not quite so clearly stylistic as their Northern counterparts, since the Southern students use more 'Design Approach' categories. These categories can often be seen to be more complex definitions of style, with references to the intentions and design strategies of the architects. Examples of design approach categories with stylistic connections are: 'Designed to reflect the technology of our age' (High Tech), 'Sky scrapers trying to be different, but nobody's fooled' (Post Modern), and 'Extreme decoration, just for the sake of it' (Post Modern). On the other hand, examples which are used across stylistic distinctions include 'public displays of various kinds' and 'trying to create spaces for people, whether they succeeded or failed'.

The first year students define the Post Modern buildings in terms of their classical references and use of colour. The fact that they do not distinguish very often between Post Modernism and High Tech architecture is reflected in the lack of a clear High Tech region in Figure 7.15. These students label a large variety of buildings under the category of 'International Style', which range from the almost Post Modern to the almost Vernacular.

The second year plot, however, shows a much clearer differentiation between the Modern and Post Modern buildings, including the High Tech
Figure 7.15. MSA Plot of Southern First Years' First Sorts Partitioned According to Architectural Style.
buildings in one or the other of these stylistic groupings (see Figure 7.16). The Post Modern buildings are again defined in terms of the classical references used in their design.

The third years' categorisations of the buildings, represented in the MSA plot shown in Figure 7.17, reveal that whilst they do distinguish between the Modern and Post Modern buildings as two separate categories, these categories are not as coherent as they were for the second years, more links being made between buildings in different stylistic groups. The stylistic influence of the design approach categories is illustrated by the example quotes in each stylistic region. Vernacular can be thought of as 'small friendly spaces', Post Modernist design approach may be 'conjures up images from the past', High Tech is thought of as 'striving to be futuristic', and the Modernists are 'playing with planes'.

ii Vernacular and High Tech

It is very interesting to note that, in common with their Northern counterparts, the Southern students' earliest distinct stylistic category is made for the Vernacular buildings. The first year students' sortings have a clear group of Vernacular buildings labelled 'domestic' and containing Wivenhoe Park, Butterworth House, Port Grimaud and Todd House (Figure 7.15).

The second years' classification of the Vernacular buildings also contains the Modernist Vernacular of Kresge College, however, Quinlan Terry's revivalism has been categorised more frequently with the Post Modern buildings than with the Vernacular.

The third year students also define the vernacular region as quite
Figure 7.16. MSA Plot of Southern Second Years' First Sorts Partitioned According to Architectural Style.
Figure 7.17. MSA Plot of Southern Third Years' First Sorts Partitioned According to Architectural Style.
distinct, however Wivenhoe Park now assumes a familiar position in the MSA plot shown in Figure 7.17, between Post Modern and Vernacular architecture, in a region of its own termed Neo-Classical Vernacular.

In the same way as both sets of students have the least definitional difficulty with the Vernacular buildings, they also have the most 'difficulty' with the High Tech buildings. The High Tech architecture is rarely assigned to a category of its own, and the MSA plots for the students at the Southern school never have clearly differentiated High Tech region. Unlike the students in the North, there is always two types of High Tech for the Southern students, Post Modern High Tech, bordering on the Post Modern region and including buildings such as the Staatsgalerie, TVAM, and the Pompidou Centre, and Modern High Tech, accounting for the Sainsbury Centre, Museum fur Kunsthandwerk, ITT and the Seagram Building. Thus in the same way as the Northern students firstly defined High Tech in terms of colour and pipes rather than glass, it is these same formal features which are used to distinguish between the two types of High Tech architecture for the Southern students.

iii Stylistic Sub-Divisions

It is interesting to note that the selection of Modern buildings were the first to call for stylistic sub-divisions for the students at both schools of architecture. Whilst the Northern students' MSA plots are not sub-divided until the second year, the Southern first years make this same distinction between the two types of Modern architecture with which they were presented. They classify Notre-dame-du-Haut, Vuoksenniska, Kresge College, Wood St. Town Houses, and House VI as a
subset of the Modernist architecture (See Figure 7.15), even though they are unable to label the buildings according to the style they represent. In most cases the students simply state that they are the 'same style' or they 'go together'.

This intuitive distinction is particularly interesting when compared with the first years at the Northern University. Whilst the Northern students were able to be quite categorical about which buildings were Modernist and which were not, they did not sub-divide these building at all.

The Southern second years however, have named the differences between these buildings and the other examples of Modernist architecture, placing Vuoksenniska, Notre-Dame-du-Haut, and House VI in a sub-category named 'Individualistic', shown in Figure 7.16. Similarly, the third years also divide the Modern section according to individualism, placing Aalto and Le Corbusier's churches away from the main section of the Modern architecture as 'sculptural and individualistic' (see Figure 7.17).

The way in which the Southern students sub-divide the High Tech architecture has been discussed above. For example, in the MSA plot relating to the second year students' categorisations (Figure 7.16), whilst all the examples of High Tech architecture are in a region, they are pushed to the boundaries on either side, depending on whether they are associated with Modern or Post Modern architecture.
2) The Ordered Facet

The MSA plots relating to the categorisations made by the third, fourth and final year students at the Northern University revealed a radex of architectural style. However, the post graduate students at the Southern Polytechnic conceive of style in quite a different way. Comparison with the sorting data from the students in the later years of their training at the Northern University, illustrates a great deal more idiosynchracy in the Southern students' sorts. Indeed, the Southern final years show little consistency in their use of constructs, with the highest percentage of use going to style (27%), Design Approach (22%), and Evaluation (20%) (see Appendix H).

The resultant MSA plots, shown in Figures 7.18 and 7.19, show that not only does a different structure underlie these students' conceptualisations of architecture when compared to the Northern students, but this structure is highly similar for both the fifth and final year samples.

In both MSA plots, the Vernacular buildings are set aside, away from the other buildings, being classified as distinctly different from the other buildings. The remaining buildings, however, form a continuum from the bottom to the top of the plot, with the stylistic distinctions 'woven' into an order which represents stylistic developments in architecture, marked by the arrows in figures 7.18 and 7.19. These developments take the form of both a major, overall development from Modern to Post Modern architecture, and several developments within this scheme, for example, 'old High Tech' to 'new High Tech', 'Classic Modern' to 'New Modern', etc.
Thus, rather than conceiving of architectural style as a categorical scheme, represented in the plots by a polarising facet, the Southern graduate students' divisions of the buildings can be represented by an ordered, or axial facet indicating quantitative distinctions in terms of their historical or 'conceptual' development.

Figure 7.18

Figure 7.18. MSA Plot of Southern Fifth Years' First Sorts Partitioned According to Architectural Style.
The comparison between the each of the years at the two schools of architecture is an interesting one. The first three years at both schools are quite similar; both in their basic use of style, gaining clearer definition and increased precision as successive years are sampled; and in their decreasing reliance on formal and other physical criteria, to be replaced with more interpretive categories, evidenced in particular by the use of 'design approach'.
However, whilst the fourth and final years at the Northern University show further sophistication of the same underlying structure, the fifth and final years at the Southern Polytechnic show a striking change. The radex produced by the MSA on the Northern final year students' sorts was highly complex in its regions and its concentric circles. With the exception of the Vernacular buildings, the Southern final year students' MSA plots are highly complex in their lack of regions.

It is possible that it is coherence in the Northern students' stylistic categories, ie the agreement between them, which leads to the clear regions in the empirical structures. However, the complexity evident in the sorts of the Southern students would indicate more individual differences, ie less coherence of thought.

Another possible reason for the Southern final years' intricate, overlapping divisions of the buildings, may lie in their greater use of 'design approach' categories. These students use 'approach' classifications more than all the other samples, and in contrast to the Northern final years' predominant use of style. If design approach is simply a more complex, analytical view of style, pointing to the strategies in the designs, then these strategies will cross stylistic boundaries. These kinds of classifications would produce a less differentiated structure in the MSA plot, since more interconnections between the buildings would be made than they would be if relying upon stringent stylistic definitions.
Chapter Seven has shown that there is indeed a variation in the number of categories and constructs used in the free sort according to the year of study. These two related measures are stable over a three month test-retest period. The first and final years at both schools use a similar average number of different constructs, those students with the most are the third years at Southern Polytechnic and the second and fourth years at the Northern University. With respect to the type of constructs which the students used, a number of trends can be identified. Whilst architectural style and evaluative categories are used throughout the years sampled, the more concrete, physical descriptors, such as form, type and materials are used by the students in the early years of their training and are increasingly replaced by more abstract, interpretive constructs, eg design approach, with each year sampled.

During the first three years of study at both schools of architecture the structure of the concept of architectural style can be characterised by increasingly differentiated qualitative categories, playing a polar role in the MSA plots. In the last two years of 'in-school' training at both schools, the students' classifications reveal 'school specific' structures of architectural style. The strongest evidence for this difference lies in the similarity between the last two years sampled at both schools, even though they represent separate cohorts. At the Northern University the polarising facet of stylistic categories combines with a modulating facet of 'typicality', to form a radex of architectural style. At the Southern Polytechnic, the fifth and final year students' categorisations of the buildings, with the exception of the Vernacular, can be represented by an ordered facet of stylistic developments from Modern to Post Modern architecture.
8.1 Introduction

It is often suggested that architects design buildings for the critical acclaim of their peers rather than the approval of the public. However, while only thirteen of Blau's (1980) sample of principals in New York architectural firms rated peer approval ('Contributes to architectural thinking'; 'brings professional recognition') as important in the success of a project, they rated humanist ('serves people's needs') factors at twenty-five percent.

Nevertheless, despite the best intentions there still appears to be something of a 'gap' between architectural and public opinion. The study of architectural versus 'lay' evaluations has been a popular one and many studies, (several of which are reviewed in Chapter One), have found the predicted lay-professional difference in evaluations of architecture (e.g. Hershberger 1969; Groat 1979).

Since the 'failure' of Modern architecture, issues of communication in architecture have received more attention. Post Modernism, in particular has been promoted as a bridge between architectural and public opinion. Jencks (1977) claims that Post Modernism succeeds in gaining public approval where Modernism failed. The reason for this, he proposed, was that while Modernist 'language' can only be read by architects, the language of Post Modernism, or 'dual coding' enables it to be easily understood by architects and non architects alike.

In 1979 Groat set out to test the claims which the architectural
critics had made regarding Post Modernism. She found that despite the
dual coding Jencks identified in Post Modern buildings, they were found
throughout the range of ranked preferences of both the accountants and
the architects. It was the architects, however, rather than the
accountants who showed the greatest overall appreciation for the for
the Post Modern buildings.

While aesthetic awareness and level of knowledge can be called upon to
explain differences in appreciation, there are other factors which have
been identified. Working with Krampen's (1977) typology of formal cues
to building type, Young (1978) discovered that the ability to detect
building type, enhanced by architectural training, was related to
subsequent evaluations of the building. If enjoyment is related to
identification of building type, and architects have an increased
ability in identification, then it follows that architects should
prefer more buildings than non architects.

Whatever reasons are proposed for the architectural appreciation 'gap',
it is most likely that these differential values are gained through
professional socialisation within the schools of architecture. Hence it
is the task of the present chapter to examine the preferences held by
the students at two schools of architecture. Through their evaluation
of a range of buildings of various styles, it is possible to search for
cross-sectional differences in opinion which may characterise the
passage through a school of architecture, and to document any influence
which membership of a particular school of architecture may impose.

As with the preceding chapter, the descriptive issues concerning the
average number of categories produced within the sorts, will be
discussed before moving on to the content of the students' evaluations and specific year and school variations.

8.2 The Mean Number of Categories Used in the Preference Sort

Whilst intuitively there is a case for increasing knowledge resulting in the appreciation of more buildings, thus less groups, it is more likely that with increasingly sophisticated conceptual structures, finer-grained distinctions are necessary to represent the students' evaluations.

Thus the number of categories which students require in order to represent the gradient of their opinions could reflect the complexity of their conceptualisations. Thus one would expect the first year students to be content with fewer groups to represent their views, whilst the students in later years, should need increasing numbers of groups to fully illustrate their opinions.

Table 8.1

<table>
<thead>
<tr>
<th>Year</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern</td>
<td>2.93</td>
<td>3.20</td>
<td>4.07</td>
<td>-</td>
<td>3.27</td>
<td>4.20</td>
</tr>
<tr>
<td>Northern</td>
<td>2.87</td>
<td>3.73</td>
<td>3.21</td>
<td>3.73</td>
<td>-</td>
<td>3.07</td>
</tr>
</tbody>
</table>

Table 8.1 The Mean Number of Categories Used in the Preference Sort by the Students in Each Year at Both Schools.

The mean number of categories used in the preference sorts for each year group at each school are shown in Table 8.1 and represented in Figure 8.1. The variation in mean number of categories can be seen to follow an almost identical pattern to those of the free sort categories. The only exception to this is the greater mean number of
preference categories which the final years at the Southern Polytechnic use, compared to their free sort categories being comparable to the first year sample.

Figure 8.1

Figure 8.1 The Mean Number of Categories Used in the Preference Sort by the Students in Each Year at Both Schools.

Comparison of these results with the number of categories used in the free sorts raises some very interesting questions regarding the stability of this measure. It is also interesting to note that the low mean category use in the first year samples accords well with the predictions made in Chapter Two based on Perry's (1970) theory of conceptual development. Perry's theory holds that the students in the
early stages of their education see things in terms of black and white, right and wrong, rather than a range of evaluative judgements. However, the implications of the results of the combined descriptive data will be addressed in a later section of the thesis.

8.3 The Facet Structure of Preference Differences

It has been hypothesised that there will be two distinct facets from the preference data. Firstly, preferences for a set of buildings will reveal a pattern related to the particular school of architecture which the students attend. Additionally, there will be a second facet, derived from the proposition that as students experience more of their architectural education the process of socialisation will change their views, that is there will be an influence on the preferences according to the year of their study.

In facet theory terms the research question can be posed in the form of the following mapping sentence:

\[
A \quad \text{The extent to which students at the } \begin{cases} \text{Northern University} \\ \text{Southern Polytechnic} \end{cases} \\
B \quad \begin{cases} \text{first} \\
\text{second} \\
\text{third} \\
\text{fourth} \\
\text{fifth} \\
\text{sixth} \end{cases} \quad \text{in their } \begin{cases} \text{first} \\
\text{second} \\
\text{third} \\
\text{fourth} \\
\text{fifth} \\
\text{sixth} \end{cases} \text{ year of architectural education have } \begin{cases} \text{similar} \\
\text{different} \end{cases}
C \quad \text{evaluations of the buildings.}
\]
Chapter Six described the details of how the 'preference scores' with respect to the twenty-six buildings were calculated. For the present analysis these average preference scores for each year at each school were analysed by means of SSA-1.

The SSA begins with a matrix of the associations between items being analysed. From this a geometric representation of the relationships between the items as points in Euclidean space is given. The distances between the points in the space are the inverse of the rank order of correlations between the variables, thus the higher the correlation, the closer the points in the plot.

The SSA program represents the points in the lowest possible number of dimensions, while maintaining an acceptable coefficient of alienation (<0.15). The coefficient of alienation is a measure of 'goodness of fit' between the original associations and their spatial representation. The lower the coefficient of alienation, the better the fit. Thus if the coefficient of alienation allows, a two dimensional solution is preferable to a three, or even four dimensional solution not only on grounds of parsimony, but as Shepard et al (1972) point out, in terms of reliability.

In this case the points in the space are each sub-group of students, correlated according to the differences or similarities in their evaluations of the buildings which they were shown. Each sub-group represents a structable generated from the mapping sentence, eg Northern first years (A1 B1), Southern first years (A2 B1), Northern second years (A1 B2). According to the Principle of Contiguity (Foa 1958) in order for the hypotheses of the mapping sentence to be
confirmed,

'variables which are more similar in their facet structure will also be more related empirically. Using this principle...we shall predict that the relationship between (a1 b1 c1) and (a1 b1 c2) will be higher than the relationship between (a1 b1 c1) and (a2 b2 c2)' (Foa 1965 p264).

The proximity of structables comprised of similar elements in the SSA space allows partitions to be made, which form groups of items with similar conceptual content.

Figures 8.2 and 8.3 show the relationships between each year at each school with respect to their preferences for the buildings, partitioned according to the two facets being studied; school differences and year differences respectively.

Figure 8.2 shows that the year groups can indeed be partitioned according to facet A, showing a qualitative difference between the two schools. The first, second and third years are closer to the partitioning line, as they are more similar to each other. As the years progress they get further away from the 'boundary', showing that school differences are more pronounced toward the end of the courses, owing to the effects of school specific socialisation.

Figure 8.3 shows the same plot partitioned according to year of training. This shows strong year similarities regardless of school, especially in the early years. Indeed, the correlation between the two first year samples' evaluations of the buildings is higher than the correlation between the first and second years within each school. The final years present an anomaly to this pattern. Both final year samples are represented in regions attributed to students who are not as far into their education. Thus both sets of final years are more similar to the earlier years in some respects, yet further apart from each other than any of the previous pairs of year groups.
Figure 8.2 SSA Plotting Student Samples According to their Evaluations of the Buildings, Partitioned According to School Attended.
Figure 8.3 SSA Plotting Student Samples According to their Evaluations of the Buildings, Partitioned According to Year of Study.
These results show support for both hypotheses, i.e. that architectural education in general has a similar overall effect on the students, and that there is an influence of the school attended on the evaluations made by the students. However, it can be seen that the two processes show an interaction, with small school differences in the first years, a clear progression over the years within a school, and more pronounced school differences in the later years. Thus while the influence of general architectural education on the first, second and third years' architectural evaluations seems to run parallel at both schools, school specific values appear to be much greater in the students in the final or diploma years.

It is clear from this analysis that taking mean scores for the students in each of the schools, or pairs of year groups would not be useful owing to the school by year interaction. Thus the first facet, school differences, will be examined through a comparison of the two schools, one year at a time. This will be followed by an analysis of the differences between the years (Facet B) taken within each school at a time.
8.4 School Differences: A Between Years Comparison.

1 The First Years

The tables containing the absolute average preference scores for each pair of years and the difference between the scores are shown in appendix B. The rank order preferences of the two sets of first years are shown in Table 8.2. The stars which accompany some of the items are not a measure of significance in the traditional sense, rather they represent an average preference score difference. One star represents a difference of one point, two stars two points, and so on. The column in which they are placed represents the fact that it the students from that school who prefer the building to that degree.

Table 8.2

<table>
<thead>
<tr>
<th>Rank</th>
<th>Southern</th>
<th>Northern</th>
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<tbody>
<tr>
<td>1</td>
<td>Wivenhoe Park **</td>
<td>Portland Building **</td>
</tr>
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<td>2</td>
<td>Clifton Nursaries *</td>
<td>Butterworth House</td>
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<tr>
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<td>TVAM *</td>
<td>Kresge College *</td>
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<tr>
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<td>La Theatre</td>
<td>ITT **</td>
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<td>Viganello</td>
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<td>Port Grimaud</td>
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<td>Staatsgalerie</td>
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<td>10</td>
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<td>La Theatre</td>
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<td>11</td>
<td>Kresge College</td>
<td>Wood St. Townhouses</td>
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<tr>
<td>12</td>
<td>Viganello</td>
<td>La Piazza d'Italia</td>
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<td>Clifton Nursaries</td>
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<td>14</td>
<td>Pompidou Centre *</td>
<td>TVAM</td>
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<td>15</td>
<td>La Piazza d'Italia</td>
<td>Municipal Control Building</td>
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<td>16</td>
<td>Sainsbury Centre</td>
<td>Sainsbury Centre</td>
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<td>17</td>
<td>Notre-Dame-du-Haut *</td>
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<td>Museum fur Kunsthandwerk</td>
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<td>Seagram Building</td>
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<td>23</td>
<td>Carol M. Newman Library</td>
<td>Carol M. Newman Library</td>
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<td>24</td>
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<td>House VI</td>
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<tr>
<td>26</td>
<td>Galleratese 2</td>
<td>Galleratese 2</td>
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Table 8.2 The Ranked Preferences of the Buildings for the Two Sets of First Year Students.
As indicated by the number of stars in the rank preference table (Table 8.2) the opinions of the two sets of first years are not substantially different. The greatest differences are in the Southern students' placing of Quinlan Terry's Wivenhoe Park and the Northern students' placing of the Portland building at number one; both with a two point difference in absolute score. The students at the Northern University also rate ITT two points higher than the students at the Southern school.

There is also a slight tendency for the Southern students to rate TVAM, the Municipal Control Building, the Pompidou Centre, and Notre-Dame-du-Haut higher than the Northern students. The reverse holds for La Muralla Roja and Charles Moore's Kresge College.

However, these differences are relatively small, and the rest of the scores show few differences of opinion (Pearson Product Moment r=0.83). The similarity in their evaluations can be seen in the SSA plot in Figure 8.3 where the two first year groups are placed closest to each other on the left hand side. This clearly shows that before architectural training has had an influence there is a considerable degree of agreement between the two sets of students studying at different ends of the country. The difference which emerges between the years within a school shows the effect of architectural education in general and the disparity between the year groups at different schools shows the influence of the school which the students attend.

As noted in section 8.2, the two first year samples are more similar to each other, than they are to the second year students at each respective school, (Northern r=0.77, Southern r=0.58). If a
longitudinal interpretation is adopted, the low correlation between the evaluations of the Southern first and second year students would indicate how quickly the opinions of these particular students are shaped. The Northern University second years students are more similar to the first years, suggesting that there has been some change in their opinions, but not a substantial amount.

Although the first year students are likely to differ from the general public, owing to their interest in and awareness of architecture, it is these groups who are most likely to resemble 'lay' opinions. Examination of the average preference scores for each building shows that both sets of students are likely to appreciate two styles of architecture; Vernacular and Post Modern. The appreciation of Vernacular is displayed by high scores going to Butterworth House, Quinlan Terry's neo-Classical house, Port Grimaud, and Megson's two Vernacular housing projects. The Post Modern buildings which find the most favour are the Portland building and La Theatre, both of which would be considered 'extreme' Post Modernism by more experienced students. These are closely followed by Municipal Control Building, and Terry Farrell's TVAM and Clifton Nursaries.

ii The Second Years

The correlation between the two sets of second years reflects the differential values which the students have adopted from the particular schools which they attend (r=0.55). As mentioned above, the Northern second year students' evaluations are not substantially different from the first years (r=0.77), compared to the Southern students (r=0.58). In longitudinal terms, the fact that the Southern second year students
share more opinions with the third years (r=0.75) than with the first years, shows that a great deal of the school specific values at the Southern Polytechnic are shaped during the first year of study. The Northern students show less similarity between the second and third years (r=0.67) than between the first and second years, indicating that the initial changes in their architectural evaluations occur at a later stage, between the second and third years.

The second year students at the Southern Polytechnic express a far greater appreciation of Mario Botta's work. They also rate Clifton Nurseries, La Theatre, La Piazza d'Italia and AT & T substantially higher than the second years at the Northern University. It is not difficult to see a connection here, in the fact that all these buildings have some element of classical revivalism. The preference for these buildings and the fact that although these students do not rate Rossi's Galleratese 2 apartment complex highly, they do rate his work higher than do the Northern students, are characteristic of the rapid change which is seen in the preferences of the first two years at the Southern Polytechnic.

The Northern students on the other hand, are more likely to appreciate Vernacular architecture such as Todd House and Port Grimaud. Modernist works such as ITT and Vuoksenniska, and Graves' Portland building are also rated higher by these students than by the Southern second years. Of particular interest are the high ratings for the Museum fur Kunsthandwerk and Notre-Dame-du-Haut.

Le Corbusier's Notre-Dame-du-Haut is the most positively evaluated building by both the second and third year students at the Northern
school of architecture. One possible reason for this was revealed when talking to the students. Most architects have heard (if they have not visited the building) that it is an exquisite work of architecture. This building's reputation is built upon those who have visited it, since justice is not done to this building through photographs, (a criticism which could of course be levelled at the use of photographs to represent any building). The reason for the second and third years uncommon appreciation could be that the department recently took the students on a tour of Europe, and Notre-Dame-du-Haut was one of the venues.

Table 8.3

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<th>Rank</th>
<th>Southern</th>
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<td>1</td>
<td>Staatsgalerie **</td>
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<td>2</td>
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<td>Staatsgalerie</td>
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<td>Clifton Nursaries ****</td>
<td>Port Grimaud **</td>
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<td>26</td>
<td>Carol M. Newman Library</td>
<td>Galleratese 2</td>
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Table 8.3 The Rank Order Preferences for the Two Sets of Second Year Students.
With respect to the similarities between the second year students, both samples rate the Staatsgalerie and Kresge College highly. There is also substantial agreement at the lower end of the ranks; Venturi's Carol M. Newman Library, Eisenman's House VI and Bofil's La Muralla Roja are judged to be the worst of the buildings by the students at both schools. In the middle of the range, agreement is also reached on the High Tech buildings, such as the Sainsbury Centre and the Pompidou Centre.

iii The Third Years

The preferences of the two sets of third years are highly correlated (r = 0.71). The relatively high agreement between the two schools suggests that there is quite a strong comparable effect of architectural education regardless of the school attended at this stage.

As shown in Table 8.4, both samples of students rate Notre-Dame-du-Haut, Staatsgalerie and the Pompidou Centre highly, however the students the Northern University rate them higher in terms of absolute scores. The Northern students also favour Port Grimaud, the Portland Building, the Sainsbury Centre, and La Piazza d'Italia, while Southern students show greater appreciation of Botta's House at Viganello, and La Theatre.

Apart from the Southern students' lower ratings for the Seagram building and Megson's Todd House, the lower end of the preferences are remarkably similar. The Carol M. Newman Library, Galleratese 2, and House VI are all at the bottom of the rankings, and the third years do not appreciate Municipal Control Building and Butterworth House,
whereas the first and second years did.

Overall, it can be seen that there are certain buildings which find agreement between the students as worthy of appreciation or not, eg the Staatsgalerie and Notre-Dame-du-Haut versus Carol M. Newman Library and Galleratase 2, and a number which indicate the specific orientation of the school attended, eg appreciation of Botta's House at Viganello and La Theatre in the South versus Port Grimaud and the Sainsbury Centre in the North.

Table 8.4

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<th>Rank</th>
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<td>Carol M. Newman Library</td>
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</tbody>
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Table 8.4 The Rank Order Preferences for Two Sets of Third Year Students.
The correlation of $r=0.61$ between the preferences of the fourth years at the Northern University and the fifth years at the Southern Polytechnic, should be treated with caution, for while it could suggest that the school specific values are more pronounced than between the two sets of third years, these samples are in fact at quite different stages of their education, the Northern students being about to leave for their placement year, and the Southern students having just returned.

Table 8.5

<table>
<thead>
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Table 8.5 The Rank Order Preferences of the Southern Fifth Year Students and the Northern Fourth Year Students.
Nevertheless, the greatest difference in the absolute preference scores (see Table 8.5) is in the Southern students' most appreciated building, Botta's House at Viganello, with a four point difference compared to Northern students. They also show a far greater leniency toward Venturi's Carol M. Newman Library placing it at rank 18, and four preference 'points' higher than the Northern students. Differences of three preference score points can be seen in favour of Vuoksenniska and House VI at the Southern Polytechnic. The students at the Northern University do not rate many buildings favourably compared to their Southern counterparts, the notable exception being TVAM.

Whilst both samples rate the Pompidou Centre, the Staatsgalerie, Notre-Dame-du-Haut and Museum fur Kunsthanderwerk as some of the best of the sample there are differences in the absolute level of appreciation shown by the students. At the bottom of the rankings, where the Southern students do not rate the Sainsbury Centre and the Portland Building highly, the Northern students find Vuoksenniska, House VI, and Carol M. Newman Library, among the worst of the buildings. However, in the middle of the range there is agreement between these two groups of students on the relative merits of buildings such as the Municipal Control Building, Seagram Building, and the individual houses by Quinlan Terry and Turner Brooks.

V The Final Years

As discussed in the analysis of the correlations between all the years at both schools (Section 8.2) the final years' architectural judgements are somewhat unusual. Rather than a straightforward progression by year, the Southern and Northern final years are more similar in some
respects to the second and third year students. They also show the lowest between school correlation (r=0.30) indicating that it is these students who embody the greatest school specific values (see Figure 8.2).

Table 8.6

<table>
<thead>
<tr>
<th>Rank</th>
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<th>Northern</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Viganello *</td>
<td>Kresge College</td>
</tr>
<tr>
<td>2</td>
<td>Notre-Dame-du-Haut ***</td>
<td>Staatsgalerie ****</td>
</tr>
<tr>
<td>3</td>
<td>Kresge College</td>
<td>Wood St. Townhouses **</td>
</tr>
<tr>
<td>4</td>
<td>Vuoksenniska **</td>
<td>TVAM ****</td>
</tr>
<tr>
<td>5</td>
<td>Museum fur Kunsthandwerk **</td>
<td>Butterworth House **</td>
</tr>
<tr>
<td>6</td>
<td>Wivenhoe Park</td>
<td>Clifton Nursaries ***</td>
</tr>
<tr>
<td>7</td>
<td>Pompidou Centre</td>
<td>Viganello</td>
</tr>
<tr>
<td>8</td>
<td>House VI ***</td>
<td>Todd House</td>
</tr>
<tr>
<td>9</td>
<td>Wood St. Townhouses</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Galleratese 2 *****</td>
<td>La Piazza d'Italia ***</td>
</tr>
<tr>
<td>11</td>
<td>Butterworth House</td>
<td>Port Grimaud *</td>
</tr>
<tr>
<td>12</td>
<td>Todd House</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Sainsbury Centre</td>
<td>Wivenhoe Park</td>
</tr>
<tr>
<td>14</td>
<td>Staatsgalerie</td>
<td>Municipal Control Building **</td>
</tr>
<tr>
<td>15</td>
<td>ITT ***</td>
<td>AT &amp; T *</td>
</tr>
<tr>
<td>16</td>
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<td>Vuoksenniska</td>
</tr>
<tr>
<td>17</td>
<td>Seagram Building *</td>
<td>Portland Building **</td>
</tr>
<tr>
<td>18</td>
<td>Clifton Nursaries</td>
<td>Sainsbury Centre</td>
</tr>
<tr>
<td>19</td>
<td>La Muralla Roja **</td>
<td>Museum fur Kunsthandwerk</td>
</tr>
<tr>
<td>20</td>
<td>TVAM</td>
<td>Seagram Building</td>
</tr>
<tr>
<td>21</td>
<td>AT &amp; T</td>
<td></td>
</tr>
<tr>
<td>22</td>
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<td>Carol M. Newman Library</td>
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<tr>
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<td>La Muralla Roja</td>
</tr>
<tr>
<td>26</td>
<td>Portland Building</td>
<td>Galleratese 2</td>
</tr>
</tbody>
</table>

Table 8.6 The Rank Order Preferences for the Two Sets of Final Year Students.

At the Southern Polytechnic these values take the form of a greater appreciation of Botta's House at Viganello, Notre-Dame-du-Haut, Vuoksenniska, Museum fur Kunsthandwerk, House VI, and a five point difference in the average preference scores for Aldo Rossi's Galleratese 2, (See Table 8.6). The Northern students are characterised by their high ratings for the Staatsgalerie, TVAM, Clifton Nursaries,
Butterworth House, La Piazza d'Italia, and Port Grimaud. Again it is possible to see the stylistic influences in these preferences, with the Southern students appreciating Rationalist/Modernist buildings, and the Northern students firmly rooted in the Vernacular/Post Modern tradition. In these two samples of students, there are only five buildings which receive any level of agreement at all; Kresge College with the highest mutual acclaim, and Wivenhoe Park, Todd House, the Pompidou Centre and the Sainsbury Centre falling around the centre of the ranks.

In summary, although the two sets of students who are at the start of their courses have broadly similar tastes regarding architecture, those at the end of their training show considerable differences which represent the effect of the school which they attend. These differences are characterised by Southern students' appreciation of Rationalist/Modernist architecture and Northern students' interest in Vernacular/Post Modern architecture. The following section will examine the content of the variation in architectural evaluation between the year groups within each school.
8.5 Year Differences: A Within School Comparison.

It is the aim of this section to examine more fully the second facet described section 8.3, that is the content of the year differences in appreciation of architecture within the schools of architecture. Owing to the previously discussed school differences it is necessary to examine each school in turn, to document the architectural evaluations of the five years sampled at each school.

i The Northern University

There are four 'patterns' which can be distinguished in the data, reflecting the difference in preference for the buildings between the year groups sampled. The first pattern to be examined is the way in which some buildings which are not appreciated by the first years, are highly rated by the final years. A longitudinal interpretation would suggest an educational effect whereby students 'learn' to like buildings which they once thought were not worthy of admiration.

Figure 8.4 shows the pattern of preference for the buildings which show an increase in positive evaluation in each of the years sampled. It should be noted that a higher 'preference score' indicates a lower mean evaluation for the building. At the Northern University only two buildings follow this pattern, Farrell's TVAM, and Stirling's Staatsgalerie. Both these buildings show an overall increase in appreciation as the students are further into their course.

The reverse trend, whereby those buildings which are evaluated highly by the incoming first years, are rated substantially lower with each year sampled is shown in Figure 8.5. The lack of longitudinal data precludes the firm conclusion that these results indicate an ongoing
development, for example, this could be attributed to the cohort differences between the years, however given the high correlation of the two sets of first years' preferences, showing that there is a tendency for the early years to like certain buildings in both samples, it can be hypothesised that there is indeed a learning process by which a natural inclination to appreciate the work of architects such as Graves, is gradually eroded during architectural education. The increase in knowledge would allow for changes in opinion based on the fact that there are structural, aesthetic, humanist, or theoretical reasons not to like a certain building. The basis of the students' evaluations will be discussed in Chapter Twelve.
The only buildings which show significant decline in appreciation with each year sampled at the Northern University are the Portland Building, La Theatre, and ITT. There are three possible explanations which can be related to these three buildings respectively. The first is the loss of a sense of humour, or the realisation that unusual is not always a good thing. The second reason for a decline in appreciation may be due to increased knowledge of the project. The third is probably connected to the educational syllabus, the early years having only recently been taught about 'the purity of form', and the important contribution of the Modern Movement. These explanations are however, only hypotheses which will be considered more fully in
Steady increases and decreases in appreciation between the years are consistent with the theory of continuous development during architectural education. In previous sections however, it has been suggested that there is a second pattern of development within the schools, whereby the final years are similar to students in the earlier years in some respects. This similarity is reflected in the SSA plot shown in Figure 8.3, showing that the final years 'double back' across the plot. The buildings which relate to this pattern, being evaluated in a similar way by both the early and the later years, are shown in Figure 8.6 and 8.7.

Figure 8.6

Figure 8.6 The Mean Preference Score for Each Year Group at the Northern University with respect to Butterworth House (Bdg 24), Kresge College (Bdg 16), and Wivenhoe Park (Bdg 11).
The buildings shown in Figure 8.6 are liked by the students in the early years of training, disliked by the students in the middle years, and are 'rediscovered' by students completing their training. At the Northern University these buildings are Kresge College, Wivenhoe Park and Butterworth House, (shown in Figure 8.6). Also in this category are the two buildings by the New Zealand architect Claude Megson, Clifton Nurseries, Botta's House at Viganello, AT & T, and the Carol M. Newman Library.

Again there a number of possible explanation for this. The vernacular buildings seems to gain instant approval from the first years, a decline in appreciation in the middle years (perhaps from 'intellectual snobbery') and the confidence to 'know what you like' regardless, in the final year.

The reverse of this pattern can be seen in Figure 8.7 for the Seagram Building, the Pompidou Centre and Le Corbusier's Notre-Dame-du-Haut. These buildings do not appeal to the first and final years, but find approval in the middle years. It is possible that these evaluations are a result of the third years strict adherence to 'norms' of architectural appreciation, whereas the final year students have the knowledge and the confidence to judge from their own personal perspective. On the other hand, the second year students at the Northern School had only just been taken to the Chapel at Ronchamp and the Pompidou Centre during a tour of Europe, which may have influenced their opinions at that time.

In terms of the developmental theory discussed in Chapter Two, this pattern of preference upholds the predictions of Perry's (1970) scheme.
For example, the dualism of the students at the outset of their education could account for their perceptions of Vernacular or Post Modern architecture as 'good' and Modern architecture as 'bad'. The students in the middle years of architectural education would exemplify the stage of 'relativism' in Perry's scheme, the students perceiving there to be no one 'truth', as 'good' and 'bad' depends only on viewpoint. The final stages in Perry's scheme are termed 'commitment in relativism', and in this respect one could draw the analogy that although the final year students know the advantages and disadvantages of different styles of architecture, they have reached a stage where they are able to decide which one they like, in this case the Vernacular.
Evaluations of the remaining buildings do not vary in any distinct way. Whilst there are fluctuations in the appreciation of these buildings, the first and final years rate these buildings similarly, with no obvious differences in opinion in the middle years.

**ii The Southern Polytechnic**

Figure 8.8 shows the pattern of preferences for those buildings which incoming students at the Southern Polytechnic do not rate as highly as the students at the end of the course. This does not mean that in all the cases the buildings are actually liked, simply that they are rated more highly by the students in the later years than they are by the students in early years of training. There are more buildings which are

![Figure 8.8](image)

**Figure 8.8**

The Mean Preference Score for Each Year Group at the Southern Polytechnic with respect to Notre-Dame-du-Haut (bðg 20), House VI (Bðg 23), and Vuksenniska (Bðg 25).

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judged in this way by the Southern students than by the students at the Northern University. Buildings in this category are the Modern buildings; Notre-Dame-du-Haut, Vuoksenniska and House VI, which are shown in figure 8.8, and Galleratese 2, La Muralla Roja, the Seagram Building and Kresge College. Also showing this pattern of preference are the buildings designed by Meier and Botta.

Without exception, the buildings liked less with each successive year sampled at the Southern Polytechnic are all the 'obviously' Post Modern buildings. Clifton Nursaries, TVAM and La Theatre are demonstrated in Figure 8.9, however the Municipal Control Building, La Piazza d'Italia and the Portland Building are also evaluated less highly by the more experienced students. These buildings are rated

**Figure 8.9**

**Figure 8.9** The Mean Preference Score for Each Year Group at the Southern Polytechnic with respect to Clifton Nursaries (Bdg 7), TVAM (Bdg 8) and La Theatre (Bdg 9).
highly by the incoming students, however, the students in the later years do not like these buildings, describing them as 'tacky', 'lacking purity', and 'simple decoration'. The prevailing attitude of the Southern students is that these buildings are 'naive'. It is somewhat disturbing to note that although few of the advanced students at the Southern Polytechnic would design a Post Modern building, these are the ones which the incoming inexperienced students like, and by inference the general public.

The buildings which the first and final years share high opinions of at the Southern Polytechnic are the Vernacular buildings, Port Grimaud, Wivenhoe Park, Butterworth House and Todd House (see Figure 8.10).
These are almost identical to those buildings which showed this type of between years agreement at the Northern University, a longitudinal interpretation of which would imply the 'regaining in confidence' in earlier feelings about Vernacular architecture. This analysis suggests that the Vernacular buildings are instinctively appreciated by those lacking in architectural training, disliked by students half way through the courses, and 're-acknowledged' by the final years.

Those buildings which only the students in the middle years of their training appreciate, the Pompidou Centre and Stirling's Staatsgalerie, are shown in Figure 8.11.

Figure 8.11 The Mean Preference Score for Each Year Group at the Southern Polytechnic with respect to the Pompidou Centre (Bdg 17) and the Staatsgalerie (Bdg 15).
In summary, the cross-sectional data from both sets of students reveals evaluative differences which could be interpreted as a longitudinal development. The two schools show a distinct 'learning' pattern, whereby certain buildings gain approval and others lose their initial appeal. However, the two schools do not agree on many of these buildings, the Northern students appreciating Post Modernism more, and the Southern students less, with each year sampled. A second pattern can be found whereby the middle year students have opinions of the buildings which are not in agreement with the earlier or later years. Along with those buildings which are liked, and show no variation with year, it is those buildings which are liked by the first and final years alike, primarily Vernacular, which hold the most promise for 'lay'/professional agreement.
8.5 Preferences and Conceptualisations

It is the final task of this chapter to explore the relationship between the conceptual structures identified in Chapter Seven and the evaluations of Chapter Eight. This section explores the way in which personal feelings regarding the buildings are related to the overall way of thinking about architecture, which is developed during architectural education.

Blau (1980) defines 'meaning' in architecture as a concept which 'places a dual stress on the importance of ideas as well as their subjective underpinnings.' She continues, 'Meaning in a specialised professional community is similar to other forms of meaning... in that it is only comprehensible in terms of both cognitive and subjective elements' (Blau 1980, p334)

The overall systems of meaning then, encompass the conceptualisations of architecture, or the 'objective' frameworks of knowledge and ideas, with the 'subjective' evaluations. The semiotic tradition holds that knowledge of architecture and personal evaluations are inseparable. Many students in the present study were unable to separate their own views from less emotive judgements on style, form, etc, stating for example, 'Post Modern building which I hate', 'repetitive element, ugly', 'dehumanising Modernist towerblocks'.

Theorists such as Young (1978) and Jencks (1977) place the emphasis of differences in evaluation upon the interaction between the characteristics of the building (eg Modern vs. Post Modern, legible vs. illegible) and the characteristics of the individual (eg architect vs. non architect).
It has been of great interest to environmental psychologists to identify those objective features of the buildings which relate to positive subjective evaluations from architectural and 'lay' populations alike. The aim has been for the identification of some 'common ground', whereby the users' needs, the architect's objectives, and as many people's aesthetic tastes can be accounted for. However, it is not the task of this thesis to confront the users' requirements; rather to examine those objective features of the buildings which relate to architects' subjective judgements.

Analysis

In order to give an overall picture of the preferences of the one hundred and fifty architectural students regardless of their stage of education, the average preference scores for all the years at both school were analysed by means of SSA-1. The school and year differences are irrelevant at this stage, as it is only the patterns of relationship between the buildings which are important. Thus the focus moves to the relationships between the buildings, rather than the students, in order to identify those aspects of the buildings which are associated with similarities and differences in evaluative judgements.

Thus the buildings are plotted in two dimensional space, using smallest space analysis (described in Section 8.2). Those buildings which are evaluated in a similar way, whether disliked or liked, will be placed nearer together in geometric space. Those buildings whose relationship is inverse (eg if A is liked, B is disliked) will be placed the furthest apart in the plot. This enables the overt features of the buildings which are linked to their evaluations to be identified.
Results

Figure 8.12 shows the buildings plotted with respect to the evaluations of the one hundred and fifty architectural students. The partitions show that the buildings are easily divided into categorical regions according to architectural style (post Modern, Modern, Vernacular, and High tech). The three buildings which could be described as Rational; Botta's House at Viganello, Meier's Museum fur Kunsthandwerk, and Rossi's Galleratese 2, are shown as a subset of the Modernist grouping. Although Le Corbusier's Notre-Dame-du-Haut is described as Modern, this building is an anomaly where 'preferences' are concerned. Whether a student personally appreciates the building is usually irrelevant, for it is generally recognised as something 'special' and in a class of its own. Eighty percent of all the students in this sample placed Notre-Dame-du-Haut in their top category, whatever their stylistic orientation.

It was for this reason that it was removed from the analysis. The resultant plot is shown in Figure 8.13. The second SSA produces a clearer stylistic picture, with the Seagram Building now firmly in the High Tech/Slick Tech region. It is interesting that although the Seagram Building is a Modern building in terms of its historical background, the advent of High Tech has led to its reinterpretation (Bonta 1979).

Hence the overall finding is that, for these students, buildings do not tend to be judged on their individual merits, rather an overall system of judgement is applied, whereby certain styles of architecture
Figure 8.12

Figure 8.12. SSA Plot of Buildings with Respect to the Students' Evaluations, Partitioned According to Architectural Style.
Figure 8.13. SSA Plot of Buildings (Without Notre-Dame-du Haut) with Respect to the Students' Evaluations, Partitioned According to Architectural Style.
find greater or lesser favour depending on individual tastes.

Figure 8.14 shows two evaluative dimensions on the SSA plot. The fact that Vernacular and High Tech, and Modern/Rational and Post Modern are on opposite sides of the plot from one another, indicates that if one of these styles is admired, the opposite style is least likely to be appreciated. Therefore it is the styles adjacent to one another around the plot which are the most likely to be jointly admired then the styles at opposites. Thus, for example, if a person admires mainly Post Modern architecture, they may also admire some Vernacular and some High Tech, however they are unlikely to admire Modern architecture.

Chapter Seven illustrated that the clearest structure to be found in the MSA plots derived from the first sorts, was that of architectural style. In dividing the buildings, students were often unable to separate stylistic and evaluative judgements, eg 'Post Modern buildings which I do not like.' This link between the stylistic categories and the evaluations of them showed that the 'objective' judgements had a 'hidden' subjective element. In this analysis the reverse holds true, the subjective judgements having a clear objective framework. Thus in this sample of students, 'meaning' in architecture is undoubtedly an inseparable combination of stylistic differentiations and personal judgements.

In addition to adding further weight to the importance of architectural style in the students' conceptualisations of architecture, the results of this analysis further confirm the underlying structure of the concept of style discovered in Chapter Seven. Whether the buildings are categorised according to a variety of open-ended architectural
Figure 8.14. SSA Plot of Buildings (Without Notre-Dame-du-Haut) with Respect to the Students' Evaluations, Partitioned According to Architectural Style, and Demonstrating Two Orthogonal Evaluative Dimensions.
concepts, or according to the students' own personal preferences, the similarities and differences between the buildings are reflected in the same empirical structure. The categorical nature of the facet of architectural style plays a polarising role in the partitioning of both the MSA plots for each year group (except the Southern graduate students), and the SSA plot with respect to the evaluative data.

SUMMARY OF CHAPTER EIGHT

The number of categories used in the sorts for preference shows a similar pattern of variation between the years as the average number of categories and concepts used in the free sorts. The stability between these measures presents a case for their relationship to some psychological variable. The possible explanations for the fluctuations in the descriptive variables, will be considered in the Discussion.

The relationship between the preferences of each year group in each school show a clear relationship to the year of study and the school attended. If a longitudinal interpretation is adopted, the students' evaluations of the buildings can be seen to be affected both by the time spent in architectural education generally, and by the socialisation of school specific values.

The two sets of students at the outset of their training evaluate the buildings in a broadly similar way, however those approaching the end of their training show considerable differences in evaluations which are associated with the school they attend. These differences between the two schools are characterised by the Southern students' appreciation of Modernist/Rational architecture and the Northern
students' interest in Vernacular/Post Modern architecture.

There are certain buildings, notably amongst the Vernacular group, which the first and final years at both schools find worthy of appreciation. It may be these buildings which hold the most promise for 'lay'/professional agreement.

The empirical relationship between the concept of architectural style and the system of evaluatory judgement applied by the students is particularly strong, subjective judgements being strongly influenced by stylistic categories. Modern and Post Modern, and High Tech and Vernacular architecture form the two diametrically opposed dimensions of evaluation.
9.1 Introduction

The following chapter draws on the results of the students' admired architects, elicited at the start of the interview which is detailed in Chapter Six. On the grounds of previous work (Wilson 1985, Canter and Wilson 1986), it has been hypothesised that the identification of those prominent members of the profession, or 'heroes', who are admired by the students will provide a useful heuristic for exploring architectural opinion or 'orientation'. It has also been suggested that the students' choice of hero may be associated with the year of study or 'stage' of education, and with the particular school at which they are training, reflecting the ethos of the institution.

As with the preceding chapters, the analysis is arranged from the descriptive to the content issues. Firstly, sections 9.2 and 9.3 examine the mean number of heroes and the number of unusual or 'one off' heroes, mentioned by the samples of students in each year of their training at both schools of architecture. The last two sections of the chapter compare the content of the students' admirations, ie those architects who are admired, both between the years at each school (9.4), and across the years within the schools (9.5).

9.2 The Average Number Architects Admired

The first stage of the analysis of the admiration data is concerned with descriptive data, ie the average number of heroes mentioned by each student. Any variation in these numbers which can be attributed to stage of education or school affiliation will be examined.
Additionally, a small amount of data is available on sex differences. However, first it is necessary to consider those students who, for whatever reasons, stated that there were no architects whom they admired. Figure 9.1 shows the number of students in each year at both schools who did not mention any heroes. In both samples of first year students there were three individuals who had no heroes. It is possible that this reflects their lack of knowledge, since they often added that they 'didn't know enough yet', 'hadn't seen enough architects' work' etc. The fact that in the fourth year at the Northern University over one third of the participants had no heroes, and that there are some students in the final year at both schools with no admirations is of more interest. Additionally, eight of the eighteen

![Figure 9.1](image_url)

**Figure 9.1.** The Number of Students in Each Year at Both Schools who had no 'Heroes'.

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participants without heroes were female students. When the number of interviewees of both sexes is taken into account, then it can be seen that 27.8% of the female students at the Northern University had no heroes compared to 12.3% of the males. Similarly, at the Southern Polytechnic 18.8% of the female students had no admirations compared with 5.1% of the males. Both the above results will be considered more fully in relation to the results of the mean number of heroes.

i. Year Differences in the Average Number of Heroes

The Northern University

The total number of heroes mentioned by each year group of fifteen students at the Northern University is shown in Table 9.1 along with the range, mean, mode and median.

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<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
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<td>2/3</td>
<td>0</td>
<td>--</td>
<td>3/4</td>
</tr>
<tr>
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<td>3.0</td>
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</table>

Table 9.1 The Number of Heroes Mentioned by the Students in Each Year at the Northern University, and Related Statistics.

Figure 9.2 shows the mean number of heroes in each year at both schools of architecture. The Northern first year students name the least number of heroes. The second, third, and fourth years name more architects and maintain comparable numbers to one another. The final year sample, however, report more admired architects.
The between year differences in the number of heroes can most easily be explained by differences in knowledge of architecture. The first years students have had the least exposure to possible heroes and thus have a smaller 'pool' from which to choose, and consequently a smaller range of heroes. For instance, if a student has learned of only a few architects, they may only have admired one architect's work. By the final year, students may have encountered the work of hundreds of architects in order to discover four or five whom they admire.

This 'lack of knowledge' hypothesis would be supported by the fact that three of the fifteen first years claimed to have no heroes owing to lack of knowledge, (as mentioned above), and of those who did have a
hero, several mentioned the architect that they had recently studied in their project on facades.

However plausible this hypothesis may seem, there are other explanations which are worthy of consideration. It is quite possible that as the students develop a coherent conceptual system, it also allows for greater flexibility of ideas. Thus whilst the first years may have strong ideas regarding what they like and dislike, students in the later years may have developed an increased 'flexibility' or 'open mindedness' through their training. It is likely that this open mindedness is limited within a range which is acceptable to the views of the current architectural peer group, however, increased knowledge may have revealed the finer points of even seemingly 'bad' architecture.

The Southern Polytechnic

The total numbers of heroes mentioned by the five year groups at the Southern Polytechnic are shown in Table 9.2. Figure 9.2 shows the variation in mean number of admired architects across the years.

At the Southern Polytechnic the first year students again show the lowest number of admirations, increasing into the second and third years. However, the fifth years at Southern school show an unusual drop in the numbers of heroes mentioned. This is the year in which the students return to the school after their year out, and this 'loss of heroes' may reflect the disillusionment with architecture which is evident when talking to students, many of whom have spent their year out in various offices doing menial tasks such as tracing over other people's drawings.
Table 9.2

<table>
<thead>
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<th>Year (Southern)</th>
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<th>4th</th>
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<td>2.5</td>
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<td>1.5</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Table 9.2 The Number of Heroes Mentioned by Each Year Group at the Southern Polytechnic, and Related Statistics.

However, these variations in the number of architects admired by the students, could also be related to Perry's (1970) theoretical scheme of conceptual development. The stage which he describes as 'relativism' would be characterised by the belief that the value of architecture is dependent on an individual's point of view. This accords well with both the middle year reactions of no heroes, or many heroes.

Nevertheless, caution must be exercised in any of these conclusions as only cross-sectional data is available in the present study. It may be the case that these particular students are different in some way from their fellow students in the other years.

ii. School Differences in the Average Number of Heroes

The comparison of the numbers of heroes mentioned between the two schools can be seen most clearly in Figure 9.2.

It should be noted that the number of heroes mentioned by the first years is very similar at both of the schools. Thereafter the difference in the absolute number of heroes increases. This difference is one which can be explained by the greater number of 'novel' heroes mentioned by the students at the Southern Polytechnic (see section 9.3).
Apart from the absolute difference in the number of heroes, the relative difference in the pattern of admiration is also worthy of note. Whilst the average number of heroes per student increases almost linearly with each year sampled at the Northern University, the Southern students display a peculiar 'dip' at the fifth year.

This 'dip' has been discussed as a possible result of 'low morale' following the year out at the Southern school. However, if this is the case, the Northern students do not suffer this drop in heroes following their time spent in architectural practice. They do however, have a high proportion of students with no heroes at all in the fourth year, the year before the the students leave. This indicates that rather than being associated with the year away from the school, it is more likely that students at a certain stage of their education have less heroes. At the Southern school the average number of heroes is lower in the fifth year sample. However, at the Northern school while approximately one third of the fourth year students have no heroes at all, their more enthusiastic colleagues have a large number of heroes, thus the mean figure is not affected. These two findings, taken together, suggest that the variations are more consistent with the predictions of Perry's (1970) scheme of intellectual development. Both many, or no heroes could be associated with Perry's stage of 'relativism', whereby the students see many points of view, and do not commit themselves to one 'right' answer. The association between the present results and the theories of development reviewed in Chapter Two will be discussed in the concluding chapters of this thesis.
Figures 9.3 and 9.4 demonstrate the sex differences in the number of architects admired between the students attending both schools of architecture. Figure 9.3 shows that the female students at the Southern Polytechnic parallel the yearly fluctuations of the male students, but maintain an overall lower number of heroes. This difference is most pronounced in the undergraduate students. At the Northern school (Figure 9.4), however, the picture is slightly different. Whilst the female students at the start of their training have fewer heroes than the male students, this position is reversed at the 'peak' years of admiration, the third and final years.

Figure 9.3

Figure 9.3 The Mean Number of Heroes Mentioned by the Male and Female Students at The Southern Polytechnic.
Table 9.3 shows the overall mean number of heroes per year for both schools, divided according to sex differences. This data is portrayed in Figure 9.5 revealing a consistent tendency for the female students to admire fewer architects than their male counterparts, whilst following the same yearly variations.

Table 9.3

<table>
<thead>
<tr>
<th>Year (Overall)</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>4th+5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>0.92</td>
<td>1.83</td>
<td>2.50</td>
<td>1.00</td>
<td>1.33</td>
<td>1.17</td>
<td>2.80</td>
</tr>
<tr>
<td>Male</td>
<td>2.12</td>
<td>2.50</td>
<td>2.73</td>
<td>2.17</td>
<td>1.83</td>
<td>2.00</td>
<td>3.08</td>
</tr>
</tbody>
</table>

Table 9.3 The Mean Number of Heroes Mentioned by Male and Female Students Combined for Both Schools.
Figure 9.5 The Mean Number of Heroes Mentioned by the Combined Samples of Male and Female Students.

The explanation for the lower mean number of heroes mentioned by the female students can only be speculated. By the same arguments discussed above, it could be hypothesised that the female students are less interested in architecture, or more disillusioned than the males.

Another hypothesis which could explain these differences is that the female students are more selective in their tastes. Feminist architects suggest that most of today's top (male) architects are in fact designing for men. If sex differences in appreciation of architecture exist in the general population, rather than as represented by those women who are actively seeking a feminist architecture, then there may be a case for feminist architecture. Section 9.5 further examines the issue of sex differences, investigating whether there are any differences in which architects are actually admired by the male and female students.
Finally, the developmental stage theories could also be called upon to explain the sex differences. It is possible that the female students are at different stages of development to the male students, or that they progress at different rates. All these possibilities will be considered more fully in Chapter Twelve.

9.3 'Novel Heroes': Architects Admired by one Participant

A full list of the 'novel heroes', ie those architects who are mentioned by only one student, is available in Appendix I.

Out of a total of seventy-four different heroes mentioned by the students at the Southern Polytechnic, forty-two of them were only mentioned by one person, showing a large number of idiosyncratic admirations. Of those forty-two 'novel' heroes only six were mentioned by a student at the Northern school. Thus there were thirty-six architects that were quite unique to a student at the Southern Polytechnic throughout the sample. The corresponding numbers for the Northern University were twenty-four 'novel' heroes out of a total of forty-eight different heroes mentioned. Of the Northern students' twenty-four unusual heroes, six were mentioned by someone at the Southern Polytechnic, leaving them only nineteen truly novel heroes compared to the Southern students' thirty-six.

This can be interpreted from two viewpoints. Firstly, it could be hypothesised that the large number of novel heroes at the Southern Polytechnic is indicative of their wider knowledge, or broader tastes compared to the Northern students. On the other hand, the lower number of 'one off' heroes at the Northern school could demonstrate the cohesion of opinion amongst the students at this school. The question
of whether such unity of thought within school members is advantageous for the state of architecture must be left for a later, concluding section of the thesis.

<table>
<thead>
<tr>
<th>Year</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern</td>
<td>2</td>
<td>7</td>
<td>7</td>
<td>-</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Northern</td>
<td>8</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td>-</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 9.4 shows the number of novel, one-off heroes mentioned by the students in each year at both the schools of architecture, and demonstrates that the overall difference in the number of novel heroes between the two schools can largely be explained by the admirations of the final year students. The final years at the Southern Polytechnic, have an exceptionally high number of heroes in general, and unusual heroes in particular.

At the Northern University, the students do not show comparable increases in the number of 'novel heroes' with each year sampled. The first years' relatively high number of novel heroes can probably be explained by the fact that they had recently each had a different architect to study, and many named these practitioners as their heroes. The 'peak' of unusual heroes at the Northern school of architecture occurs in the third year sample.

The implications of these results, in conjunction with the findings of the descriptive data in previous chapters, will be considered in the Discussion.
The following section examines the content of the admirations, that is, those architects who are currently thought to be worthy of note by the students in this sample.

The section is divided in such a way as to enable comparisons between the year groups at the two schools of architecture. Each pair of year groups will be taken together, compared to one another, and any developments from year to year within a school will be noted. Tables 9.5 to 9.14 show the numbers of admirers for each hero in each sample of students. In order to examine the relationship between the admired architects, each year group's admirations will be analysed using Multidimensional Scalogram Analysis. The MSA plots are also shown in Figures 9.7 to 9.15.

Multidimensional Scalogram Analysis

In order to elaborate the simple frequencies of hero admiration, the relationships between the admired architects were analysed by means of MSA. The data matrices consist of columns of data relating to each participant and rows of data representing the architects admired. The value in the cells of the matrix represents whether each particular practitioner was mentioned by the participant or not, indicated by a 2 or a 1 respectively. An example of such a matrix is shown in the sketch diagram in Figure 9.6.

```
Participants ————
| 1 2 1 2 2 2 |
| 2 1 1 1 2 2 |
| 2 1 2 2 2 1 |
| 1 1 1 1 1 2 |
```

Figure 9.6 Example data Matrix for MSA on Architects Admired
MSA-1 allows the geometric representation of the relational data contained in these matrices. The programme plots the points, in this case the admired architects, in geometric space such that for each participant's categorisation of those architects whom they admired, the program attempts to arrange the points in such a way as to create a clear region of those admired and those not admired. The program finds the best arrangement of the points so that each respondent's categories may be represented as regions on the same plot. If the individual admirations of each of the participants is overlayed on the MSA plot, the relationship between the admired architects can be seen. Thus each line enclosing a set of noted architects represents one participant's admirations.

Therefore, as will be seen in the following examples, the MSA plots show the division of the heroes into groups according to their followers. Not only does the MSA show the numbers of supporters; heroes with a strong following will have more lines enclosing them, but it also shows the inter-relationship between the heroes. Those heroes who are liked to the exclusion of others, will have no lines which join them to other heroes or hero groups. Heroes who are admired in conjunction with one another, will be placed together in the plot with shared enclosing lines. 'Ringed' heroes are those who have been mentioned by a participant as their only hero.

i. The First Years
Tables 9.5 and 9.6 show the number of supporters for each of the admired architects at the Southern Polytechnic and the Northern University respectively. The pattern of admirations for the first years
at the Southern Polytechnic can be seen in the MSA plot shown in Figure 9.7. Three small groups can be identified. Three Gaudi admirers, three Frank Lloyd Wright admirers and a third group made up of a cluster of architects, including Foster, Rogers, Neutra, and Aldington. One of the Gaudi admirers also mentioned Frank Lloyd Wright.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rogers</td>
<td>3</td>
</tr>
<tr>
<td>Gaudi</td>
<td>3</td>
</tr>
<tr>
<td>Wright</td>
<td>3</td>
</tr>
<tr>
<td>Neutra</td>
<td>3</td>
</tr>
<tr>
<td>Aldington</td>
<td>2</td>
</tr>
<tr>
<td>Foster</td>
<td>2</td>
</tr>
<tr>
<td>Goff</td>
<td>2</td>
</tr>
<tr>
<td>Graves</td>
<td>1</td>
</tr>
<tr>
<td>Lutyens</td>
<td>1</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>1</td>
</tr>
<tr>
<td>Soane</td>
<td>1</td>
</tr>
<tr>
<td>Meier</td>
<td>1</td>
</tr>
<tr>
<td>Aalto</td>
<td>1</td>
</tr>
<tr>
<td>Architectonika</td>
<td>1</td>
</tr>
<tr>
<td>(No Heroes)</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 9.5 The Number of Students in the First Year at the Southern Polytechnic who Admire Each of the Architects.

Figure 9.8 shows the relationship between the admirations of the first year students at the Northern University. In the MSA plot four groups emerge: the Gaudi admirers, the Frank Lloyd Wright admirers, those who support Le Corbusier and those who admire the work of Mackintosh. Three of the groups are linked, but only through the views of one participant.

It is particularly interesting to note the similarities between the students attending the two schools at this stage, notably in the admiration of Frank Lloyd Wright and Gaudi. This will be discussed further in Section 9.6.
Figure 9.7 MSA plot of Architects Admired by the First Year Students at the Southern Polytechnic.
Figure 9.8 MSA plot of Architects Admired by the First Year Students at the Northern University.
Table 9.6

<table>
<thead>
<tr>
<th>Architect</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Le Corbusier</td>
<td>4</td>
</tr>
<tr>
<td>Wright</td>
<td>4</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>3</td>
</tr>
<tr>
<td>Gaudi</td>
<td>2</td>
</tr>
<tr>
<td>Kroll</td>
<td>1</td>
</tr>
<tr>
<td>Gropius</td>
<td>1</td>
</tr>
<tr>
<td>Alderman</td>
<td>1</td>
</tr>
<tr>
<td>Aalto</td>
<td>1</td>
</tr>
<tr>
<td>Breuer</td>
<td>1</td>
</tr>
<tr>
<td>Hershberger</td>
<td>1</td>
</tr>
<tr>
<td>Maier</td>
<td>1</td>
</tr>
<tr>
<td>Ungers</td>
<td>1</td>
</tr>
<tr>
<td>Graves</td>
<td>1</td>
</tr>
<tr>
<td>Krier</td>
<td>1</td>
</tr>
<tr>
<td>No Heroes</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 9.6 The Number of Students in the First Year at the Northern University Who Admire each of the Architects.

At this stage of their education the students must rely on the few architects whom they have studied to act as their heroes. This could explain the low number of heroes, and the focus on historical architects. However, if these historical admirations are a reflection of the course structure, then interesting differences can be seen between the two schools.

The differential support for Mackintosh, can be most easily explained by the fact that he is something of a 'local hero' for the Northern students, however the other admirations reveal a more systematic difference.

Among the heroes at the Northern University there is a prevalence of Modern Movement architects. It appears that the first years at this school have started their education with a historical perspective of the International Style. Presumably for this reason, the following for Le Corbusier is more evident at the Northern school. On the other hand, the students at the Southern Polytechnic appear to have a greater
knowledge of the High-Tech and Post Modern architects, as evidenced by their mentioning of Foster, Rogers, Meier and Aldington.

ii. The Second Years

The second year students have a broader range of admired architects than the first years. However, the MSA plots shown in Figures 9.9 and 9.10 show that both samples of students have more overlap in their admirations, i.e. rather than forming separate 'schools' of admiration, their admirations are interlinked.

In common with the first year students, one strong similarity between the two year groups is in their support for Frank Lloyd Wright, although there are more admirers at the Southern Polytechnic and less at the Northern University than there were in the first year samples. Admiration for James Stirling is evident in both samples, although at the Southern Polytechnic this is in conjunction with other heroes, forming a group of Post Modernist architects, (see Figure 9.9). In contrast, the students at the Northern University name Stirling as a separate hero, again probably owing to the local connection, (see Figure 9.10).

There is a small, but distinct group of Foster admirers amongst the Southern students. If a longitudinal interpretation is adopted, the admirations of the Southern students would indicate that their knowledge of High-Tech and Post Modern architecture has been expanded and consolidated during the last year. The fact that Meier and Botta have two and three admirers respectively is a sign of their developing popularity. The Northern students on the other hand, 'still' show the
Figure 9.9 MSA plot of Architects Admired by the Second Year Students at the Southern Polytechnic.
Figure 9.10 MSA plot of Architects Admired by the Second Year Students at the Northern University.
most admiration for the Modern Movement architects. Le Corbusier, Venturi, Eisenman and Kahn are all mentioned by these students. However, with Stirling and Meier gaining a relatively large number of supporters, there is obviously some difference in the admirations of the second and the first year students at the Northern school. This can be most easily explained by the fact that the second years had recently made a trip to Europe, where they visited the Staatsgalerie and Meier's Museum für Kunsthandwerk amongst other buildings.

Table 9.7

<table>
<thead>
<tr>
<th>Architect</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wright</td>
<td>5</td>
</tr>
<tr>
<td>Graves</td>
<td>4</td>
</tr>
<tr>
<td>Botta</td>
<td>3</td>
</tr>
<tr>
<td>Foster</td>
<td>3</td>
</tr>
<tr>
<td>Stirling</td>
<td>3</td>
</tr>
<tr>
<td>Gough</td>
<td>2</td>
</tr>
<tr>
<td>Rossi</td>
<td>2</td>
</tr>
<tr>
<td>Grassi</td>
<td>2</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>2</td>
</tr>
<tr>
<td>Meier</td>
<td>2</td>
</tr>
<tr>
<td>Neutra</td>
<td>1</td>
</tr>
<tr>
<td>Reitweld</td>
<td>1</td>
</tr>
<tr>
<td>Rogers</td>
<td>1</td>
</tr>
<tr>
<td>Moore</td>
<td>1</td>
</tr>
<tr>
<td>Farrell</td>
<td>1</td>
</tr>
<tr>
<td>The Kriers</td>
<td>1</td>
</tr>
<tr>
<td>Palladia</td>
<td>1</td>
</tr>
<tr>
<td>Speer</td>
<td>1</td>
</tr>
<tr>
<td>Gregotti</td>
<td>1</td>
</tr>
<tr>
<td>Bofil</td>
<td>1</td>
</tr>
<tr>
<td>Erith</td>
<td>1</td>
</tr>
<tr>
<td>Terry</td>
<td>1</td>
</tr>
<tr>
<td>Scarpa</td>
<td>1</td>
</tr>
<tr>
<td>(No Heroes)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 9.7 The Number of Second Year Students at the Southern Polytechnic who Admire Each of the Architects.
Table 9.8

<table>
<thead>
<tr>
<th>Architect</th>
<th>Mentions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meier</td>
<td>5</td>
</tr>
<tr>
<td>Stirling</td>
<td>4</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>3</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>3</td>
</tr>
<tr>
<td>Wright</td>
<td>2</td>
</tr>
<tr>
<td>Rogers</td>
<td>1</td>
</tr>
<tr>
<td>Aldington</td>
<td>1</td>
</tr>
<tr>
<td>Otto</td>
<td>1</td>
</tr>
<tr>
<td>Eisenman</td>
<td>1</td>
</tr>
<tr>
<td>Gaudi</td>
<td>1</td>
</tr>
<tr>
<td>Venturi</td>
<td>1</td>
</tr>
<tr>
<td>Aalto</td>
<td>1</td>
</tr>
<tr>
<td>Kahn</td>
<td>1</td>
</tr>
<tr>
<td>Moore</td>
<td>1</td>
</tr>
<tr>
<td>Alexander</td>
<td>1</td>
</tr>
<tr>
<td>Bofil</td>
<td>1</td>
</tr>
<tr>
<td>Adam</td>
<td>1</td>
</tr>
<tr>
<td>Ungers</td>
<td>1</td>
</tr>
<tr>
<td>(No Heroes)</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 9.8 The Number of Students in the Second Year at the Northern University who Admire Each of the Architects.

Once again, Mackintosh has local support from the students at the Northern University, however is not mentioned by the Southern students, who show an interest in Rationalist architects, such as Rossi and Grassi. This is a tendency which was found to be to be one of the differential characteristics of the evaluations made by the students at this school of architecture, discussed in Chapter Eight.

iii The Third Years

Tables 9.9 and 9.10 show the number of third year students who mention each of the architects at the Southern and Northern schools of architecture respectively. The MSA plot in Figure 9.11 shows that the relationship between the admirations of the third years at the Southern Polytechnic are similar to the second years in the integration of their
admirations. However, the heroes mentioned by the Northern students produce an unusual pattern of distinct groupings of heroes in the MSA plot (Figure 9.12).

Table 9.9

<table>
<thead>
<tr>
<th>Architect</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stirling</td>
<td>4</td>
</tr>
<tr>
<td>Botta</td>
<td>4</td>
</tr>
<tr>
<td>Russian Constructivists</td>
<td>2</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>3</td>
</tr>
<tr>
<td>Wright</td>
<td>3</td>
</tr>
<tr>
<td>Bofil</td>
<td>2</td>
</tr>
<tr>
<td>Meier</td>
<td>2</td>
</tr>
<tr>
<td>Foster</td>
<td>2</td>
</tr>
<tr>
<td>Rogers</td>
<td>2</td>
</tr>
<tr>
<td>Berlage</td>
<td>2</td>
</tr>
<tr>
<td>Scarpa</td>
<td>2</td>
</tr>
<tr>
<td>Mies van der Rohe</td>
<td>2</td>
</tr>
<tr>
<td>Gropius</td>
<td>2</td>
</tr>
<tr>
<td>Grassi</td>
<td>2</td>
</tr>
<tr>
<td>Lutyens</td>
<td>2</td>
</tr>
<tr>
<td>Stern</td>
<td>1</td>
</tr>
<tr>
<td>Palladio</td>
<td>1</td>
</tr>
<tr>
<td>Hertzberger</td>
<td>1</td>
</tr>
<tr>
<td>van Eyck</td>
<td>1</td>
</tr>
<tr>
<td>Dudok</td>
<td>1</td>
</tr>
<tr>
<td>Alberti</td>
<td>1</td>
</tr>
<tr>
<td>Mather</td>
<td>1</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>1</td>
</tr>
<tr>
<td>Piernassi</td>
<td>1</td>
</tr>
<tr>
<td>Gaudi</td>
<td>1</td>
</tr>
<tr>
<td>Hoffmann</td>
<td>1</td>
</tr>
<tr>
<td>Aalto</td>
<td>1</td>
</tr>
<tr>
<td>Rossi</td>
<td>1</td>
</tr>
<tr>
<td>(No Heroes)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 9.9 The Number of Students in the Third Year at the Southern Polytechnic who Admire Each of the Named Architects.

The Southern students' only distinct group of admirers is comprised of two students who mention Bofil. The remainder are divided in their support for Botta, Stirling and the Russian Constructivists. The latter group is in itself unusual, but these students have other uncommon admirations, such as for the Dutch architects Berlage and Dudok. The occurrence of Italian architects such as Piernassi in the

265
Figure 9.11 MSA plot of Architects Admired by the Third Year Students at the Southern Polytechnic.
Figure 9.12 MSA plot of Architects Admired by the Third Year Students at the Northern University.
list of heroes is associated with the Southern students' interest in Rational architecture. The results indicate that the third years at the Southern Polytechnic have been introduced to a number of architects outside the mainstream. It is in the third year sample that Mackintosh has a first Southern admirer which, along with the naming of Lutyens, demonstrates some interest in the Arts and Crafts. Figure 9.11 also illustrates quite a strong group of admirers for Botta and Stirling.

Table 9.10

<table>
<thead>
<tr>
<th>Architect</th>
<th>Admire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frank Lloyd Wright</td>
<td>4</td>
</tr>
<tr>
<td>Graves</td>
<td>3</td>
</tr>
<tr>
<td>Meier</td>
<td>3</td>
</tr>
<tr>
<td>Rogers</td>
<td>3</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>3</td>
</tr>
<tr>
<td>Iain MacRae</td>
<td>1</td>
</tr>
<tr>
<td>Emberton</td>
<td>1</td>
</tr>
<tr>
<td>Botta</td>
<td>1</td>
</tr>
<tr>
<td>Farrell</td>
<td>1</td>
</tr>
<tr>
<td>ARUP</td>
<td>1</td>
</tr>
<tr>
<td>Stirling</td>
<td>1</td>
</tr>
<tr>
<td>Bruce Goff</td>
<td>1</td>
</tr>
<tr>
<td>Aalto</td>
<td>1</td>
</tr>
<tr>
<td>Hollein</td>
<td>1</td>
</tr>
<tr>
<td>Johnson</td>
<td>1</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>1</td>
</tr>
<tr>
<td>Cullinan</td>
<td>1</td>
</tr>
<tr>
<td>Mies van der Rohe</td>
<td>1</td>
</tr>
<tr>
<td>Gropius</td>
<td>1</td>
</tr>
<tr>
<td>I.M. Pei</td>
<td>1</td>
</tr>
<tr>
<td>Aldington</td>
<td>1</td>
</tr>
<tr>
<td>(No Heroes)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 9.10 The Number of Students in the Third Year at the Northern University who Admire Each of the Architects.

In contrast, the third years at the Northern University have the least related set of admiration groups of all the samples, with distinct groups in the MSA plot which represent the admirers Frank Lloyd Wright, Meier and Graves. In addition to these three main 'schools' of thought, the Northern third years also comprise a group of individuals whose admirations are idiosyncratic, shown in the center of the plot in Figure 9.12.
The fourth years at the Southern Polytechnic leave the school for their year in practice, and so are not included in the present study. However, the Northern students stay at the school until the end of the fourth year, and leave to return only for one post graduate year. The fourth year students' heroes are shown in Table 9.11.

<table>
<thead>
<tr>
<th>Architect</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stirling</td>
<td>4</td>
</tr>
<tr>
<td>Hollein</td>
<td>3</td>
</tr>
<tr>
<td>Meier</td>
<td>2</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>3</td>
</tr>
<tr>
<td>Rogers</td>
<td>2</td>
</tr>
<tr>
<td>Botta</td>
<td>2</td>
</tr>
<tr>
<td>Cullinan</td>
<td>2</td>
</tr>
<tr>
<td>Foster</td>
<td>1</td>
</tr>
<tr>
<td>Gehry</td>
<td>1</td>
</tr>
<tr>
<td>Wright</td>
<td>1</td>
</tr>
<tr>
<td>Horter</td>
<td>1</td>
</tr>
<tr>
<td>Erskine</td>
<td>1</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>1</td>
</tr>
<tr>
<td>Venturi</td>
<td>1</td>
</tr>
<tr>
<td>Rossi</td>
<td>1</td>
</tr>
<tr>
<td>Graves</td>
<td>1</td>
</tr>
<tr>
<td>St. Elia</td>
<td>1</td>
</tr>
<tr>
<td>Co-op Himmelblau</td>
<td>1</td>
</tr>
<tr>
<td>(No Heroes)</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 9.11 The Number of Students in the Fourth Year at the Northern University who Admire Each Architect.

The MSA of architects admired by the fourth year students at the Northern University is shown in Figure 9.13, demonstrating that there is more integration between these students' heroes, than in the third year sample. Stirling and Meier have groups of supporters, although not as many as in the previous year group, and they are admired in conjunction with other architects. Mackintosh has a cluster of supporters, similar to those of the second years, and it is by this year group that Cullinan is first admired.
Figure 9.13 MSA plot of Architects Admired by the Fourth Year Students at the Northern University.
v. The Fifth Years

Table 9.12

<table>
<thead>
<tr>
<th>Architect</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meier</td>
<td>4</td>
</tr>
<tr>
<td>Botta</td>
<td>3</td>
</tr>
<tr>
<td>Aalto</td>
<td>2</td>
</tr>
<tr>
<td>Gehry</td>
<td>1</td>
</tr>
<tr>
<td>Ando</td>
<td>1</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>1</td>
</tr>
<tr>
<td>Dixon</td>
<td>1</td>
</tr>
<tr>
<td>Scarpa</td>
<td>1</td>
</tr>
<tr>
<td>Erskine</td>
<td>1</td>
</tr>
<tr>
<td>Tyrwhitt-Drake</td>
<td>1</td>
</tr>
<tr>
<td>Fehn</td>
<td>1</td>
</tr>
<tr>
<td>Lutyens</td>
<td>1</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>1</td>
</tr>
<tr>
<td>Foster</td>
<td>1</td>
</tr>
<tr>
<td>Palaria</td>
<td>1</td>
</tr>
<tr>
<td>Ungers</td>
<td>1</td>
</tr>
<tr>
<td>Stirling</td>
<td>1</td>
</tr>
<tr>
<td>Colquoun &amp; Miller</td>
<td>1</td>
</tr>
<tr>
<td>Slolari</td>
<td>1</td>
</tr>
<tr>
<td>Hawksmoore</td>
<td>1</td>
</tr>
<tr>
<td>(No Heroes)</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 9.12 The Number of Fifth Year Students at the Southern Polytechnic who Admire Each Architect.

It is during the fifth year of training that the Northern students take their year out in practice. However the Southern fifth years are at the start of the diploma course. Five of these students have heroes who are not admired by other students. These architects are found at the top left hand side of the MSA plot shown in Figure 9.14, and include Slolari, Dixon, Palaria and Ungers. Two of the Southern students mention Aalto as a hero, three form a distinct admiration group for Botta, and Meier takes the greatest consensus of four student admirers. The MSA of admirations for the fifth year students shows a lack of coherence of opinion. It is possible that this lack of agreement reflects the impact of having been away from the school and their peers for a year. However, there is a further factor which could disrupt the
Figure 9.14 MSA plot of Architects Admired by the Fifth Year Students at the Southern Polytechnic.
coherence of this sample of students. At this stage in their education it is quite common for students to change institutions, and the diversity found amongst this year may be accounted for by those students who have come from other schools with different orientations. The possibility of this effect on the results will be discussed more fully in Chapter Twelve.

vi. The Final Years

Whilst the Southern school has two years to 'reshape' their students into a coherent group, the Northern students return for only one year. The MSA plot showing the Southern students' admirations (Figure 9.15) displays quite a high level of coherence. Clear groups of support can be seen for Botta, Scarpa, and Le Corbusier. There are also several points in the centre of the plot representing architects who are admired by the students from the three main groups; for example Aalto, Gaudi and Hollein. Five individuals admire only one architect, and these are shown in the small circles on the right of the plot. Following the trend noted in the third year sample at the Southern school, there are a large number of Italian architects mentioned by these students. This tendency, which is not shown at the Northern school, must confirm this orientation which specific to the school at the Southern Polytechnic. The full list of the Southern final years' heroes is shown in Table 9.13.

The Northern final years admirations are shown in Table 9.14 and their inter-relationship is demonstrated by the MSA plot in Figure 9.16. This MSA plot shows a very interesting configuration which combines clear admiration groups, (Farrell/Botta, Meier, Stirling, and Mackintosh/Lutyens) with a group of architects in the centre of the
Figure 9.15 MSA plot of Architects Admired by the Final Year Students at the Southern Polytechnic.
Figure 9.16 MSA plot of Architects Admired by the Final Year Students at the Northern University.
plot who are admired by students from a combination of these groups. It should be noted that this is the first year that the Northern students have returned from their year in practice and compared to the returning year at the Southern Polytechnic their admirations are not as diverse.

Table 9.13

<table>
<thead>
<tr>
<th>Architect</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scarpa</td>
<td>5</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>4</td>
</tr>
<tr>
<td>Botta</td>
<td>3</td>
</tr>
<tr>
<td>Kahn</td>
<td>3</td>
</tr>
<tr>
<td>Aalto</td>
<td>3</td>
</tr>
<tr>
<td>Rogers</td>
<td>2</td>
</tr>
<tr>
<td>Cullinan</td>
<td>2</td>
</tr>
<tr>
<td>Wagner</td>
<td>3</td>
</tr>
<tr>
<td>Gaudi</td>
<td>1</td>
</tr>
<tr>
<td>Petila</td>
<td>1</td>
</tr>
<tr>
<td>Schinkel</td>
<td>1</td>
</tr>
<tr>
<td>Mies van der Rohe</td>
<td>1</td>
</tr>
<tr>
<td>Meier</td>
<td>1</td>
</tr>
<tr>
<td>Gregotti</td>
<td>1</td>
</tr>
<tr>
<td>Purini</td>
<td>1</td>
</tr>
<tr>
<td>Ungers</td>
<td>1</td>
</tr>
<tr>
<td>Co-op Himmelblau</td>
<td>1</td>
</tr>
<tr>
<td>Wilson</td>
<td>1</td>
</tr>
<tr>
<td>Pickson</td>
<td>1</td>
</tr>
<tr>
<td>Rossi</td>
<td>1</td>
</tr>
<tr>
<td>Bernini</td>
<td>1</td>
</tr>
<tr>
<td>Borromini</td>
<td>1</td>
</tr>
<tr>
<td>Wren</td>
<td>1</td>
</tr>
<tr>
<td>Hawksmoore</td>
<td>1</td>
</tr>
<tr>
<td>Hollein</td>
<td>1</td>
</tr>
<tr>
<td>O.M.A</td>
<td>1</td>
</tr>
<tr>
<td>Hadid</td>
<td>1</td>
</tr>
<tr>
<td>Adams, Poole &amp; Douglas</td>
<td>1</td>
</tr>
<tr>
<td>Sharoun</td>
<td>1</td>
</tr>
<tr>
<td>van Eyck</td>
<td>1</td>
</tr>
<tr>
<td>Lethaby</td>
<td>1</td>
</tr>
<tr>
<td>Webb</td>
<td>1</td>
</tr>
<tr>
<td>Reed &amp; Learner</td>
<td>1</td>
</tr>
<tr>
<td>(No Heroes)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 9.13 The Number of Final Year Students at the Southern Polytechnic who Admire Each Architect.
Table 9.14

<table>
<thead>
<tr>
<th>Architect</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stirling</td>
<td>5</td>
</tr>
<tr>
<td>Meier</td>
<td>4</td>
</tr>
<tr>
<td>Farrell</td>
<td>3</td>
</tr>
<tr>
<td>Graves</td>
<td>1</td>
</tr>
<tr>
<td>Hollein</td>
<td>3</td>
</tr>
<tr>
<td>Venturi</td>
<td>2</td>
</tr>
<tr>
<td>Botta</td>
<td>4</td>
</tr>
<tr>
<td>Isozaki</td>
<td>1</td>
</tr>
<tr>
<td>Piano</td>
<td>1</td>
</tr>
<tr>
<td>MacCorick &amp; Jamieson</td>
<td>1</td>
</tr>
<tr>
<td>Foster</td>
<td>1</td>
</tr>
<tr>
<td>Lutyens</td>
<td>2</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>3</td>
</tr>
<tr>
<td>Rogers</td>
<td>1</td>
</tr>
<tr>
<td>Wright</td>
<td>2</td>
</tr>
<tr>
<td>Hershberger</td>
<td>1</td>
</tr>
<tr>
<td>Co-op Himelblau</td>
<td>1</td>
</tr>
<tr>
<td>Johnson</td>
<td>1</td>
</tr>
<tr>
<td>Moore</td>
<td>1</td>
</tr>
<tr>
<td>Erskine</td>
<td>1</td>
</tr>
<tr>
<td>Cullinan</td>
<td>1</td>
</tr>
<tr>
<td>Robert Krier</td>
<td>1</td>
</tr>
<tr>
<td>No Heroes</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 9.14 The Number of Students in the Final Year at the Northern University who Admire Each of the Architects.

In summary, this section has illustrated the variations amongst the architects who act as heroes for the students in each different year group, and the coherence, or lack of it, amongst the students' admirations. Although there is only cross-sectional data available, and the actual number of admirers are small for most architects, section 9.6 will examine the variations in heroes admired between the groups at both schools.
9.5 The Major Admiration Groups

Section 9.4 has provided an overall picture of the relationships between the architectural practitioners who act as heroes for the students in each year at both schools of architecture. Section 9.5 will examine the general trends which can be distinguished between the groups of students who comprise the 'major admiration groups', i.e. those groups of followers who number five or more in the combined sample.

1 School Differences in the Architects Admired

The most simple comparison to be made is in the overall frequency with which the heroes are mentioned at each school. The most frequently mentioned heroes at both the Northern and the Southern schools are shown in Table 9.15, in their order of popularity.

<table>
<thead>
<tr>
<th>Position</th>
<th>Southern School</th>
<th>Northern School</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Botta</td>
<td>Meier</td>
</tr>
<tr>
<td>2nd</td>
<td>Le Corbusier</td>
<td>Stirling</td>
</tr>
<tr>
<td>3rd</td>
<td>Frank Lloyd Wright</td>
<td>Frank Lloyd Wright</td>
</tr>
<tr>
<td>4th</td>
<td>Meier</td>
<td>Mackintosh</td>
</tr>
<tr>
<td>5th</td>
<td>Scarpa</td>
<td>Le Corbusier</td>
</tr>
<tr>
<td>6th</td>
<td>Rogers</td>
<td>Rogers</td>
</tr>
<tr>
<td>7th</td>
<td>Stirling</td>
<td>Botta</td>
</tr>
<tr>
<td>8th</td>
<td>Foster</td>
<td>Hollein</td>
</tr>
<tr>
<td>9th</td>
<td>Aalto</td>
<td>Graves</td>
</tr>
<tr>
<td>10th</td>
<td>Graves</td>
<td>--</td>
</tr>
<tr>
<td>11th</td>
<td>Gaudi</td>
<td>--</td>
</tr>
</tbody>
</table>

Table 9.15 The Rank Order of Popularity of the Heroes at Both Schools, (Those Admired by Less than Five People are Excluded).

Table 9.15 shows that several of the same architects appear at the top of the ratings at both schools. Thus, there is reasonably high agreement on a number of architects' worth from the students at two schools of architecture, situated at opposite ends of the country.
Notable exceptions to this can be seen in the high placing for Mackintosh at the Northern school and for Scarpa at the Southern Polytechnic. However, while both sets of students may recognise these architects as worthy of admiration, it is the differential number of supporters which reveals some of the school differences.

When the two schools are taken together, it can be seen that there are seventeen architects who are admired by five or more students. The present section compares the characteristics of the students in each of the admiration groups, and provides a summary of the information regarding overall differences between the schools and the years in their admirations for each architect.

Table 9.16

<table>
<thead>
<tr>
<th>Architects Admired</th>
<th>Southern</th>
<th>Northern</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richard Meier</td>
<td>10</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td>Frank Lloyd Wright</td>
<td>10</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>11</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>James Stirling</td>
<td>8</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>Mario Botta</td>
<td>13</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Richard Rogers</td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>C. R. Mackintosh</td>
<td>2</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Michael Graves</td>
<td>5</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Norman Foster</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Alvar Aalto</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Carlos Scarpa</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Antoni Gaudi</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Hans Hollein</td>
<td>1</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Ted Cullinan</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Terry Farrell</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Edwin Lutyens</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Aldo Rossi</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 9.16 The Number of Students from Each School who Comprise the Major Admiration Groups.

The overall number of students at each school of architecture who admire each of the major heroes are shown in Table 9.16. This data,
collapsed across years, removes any of the fluctuations in admiration over the years in both the courses. What it does show is any obvious tendency for heroes to be mentioned by one school or the other.

Thus, while the Southern students are more likely to admire Foster, Botta and Scarpa, the Northern school shows greater support for Stirling, Mackintosh, Meier and Hollein. This displays a tendency for the students at the Northern University to admire Post Modernist architects more than the students at the Southern Polytechnic, and also their interest in the local architects Stirling and Mackintosh. These trends will be discussed more fully in section 9.6.

It should be noted that both sets of students have comparably high numbers of supporters for the 'classic' architects Frank Lloyd Wright and Le Corbusier.

**ii Year Differences in the Architects Admired**

Table 9.17 shows the number of students in each year from both schools who admire each of the major heroes. When the data is combined in this way the interactions between school and year are lost; these will be elaborated in section 9.6. The overall figures then, give an indication of the trends across the years for both schools taken as a whole.

As the figures for the fourth and fifth years represent only fifteen students' opinions in each case, the combined number of admirers for both these years is shown in column six. This combined figure gives a more representative indication of the number of admirers for each hero at this stage of the students' education.
### Table 9.17

<table>
<thead>
<tr>
<th>Admired Architects</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>(4+5)</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richard Meier</td>
<td>2</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Frank Lloyd Wright</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>James Stirling</td>
<td>0</td>
<td>7</td>
<td>5</td>
<td>4</td>
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<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mario Botta</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Richard Rogers</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>C.R. Mackintosh</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Michael Graves</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Norman Foster</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
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<td>Alvar Aalto</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Carlos Scarpa</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Antoni Gaudi</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Hans Hollein</td>
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<td>1</td>
<td>3</td>
<td>0</td>
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<td>4</td>
</tr>
<tr>
<td>Ted Cullinan</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Terry Farrell</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Edwin Lutyens</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Aldo Rossi</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 9.17 The Number of Students in Each Year who Comprise the Major Admiration Groups.

Table 9.17 indicates that the high initial support for Frank Lloyd Wright decreases with each year sampled and similarly Gaudi claims his admiration from what is a predominantly first year sample. Similarly, Graves', Foster's, Rogers' and Le Corbusier's admirers are primarily found in the first, second and third year samples. The opposite trend can be seen in admiration for Botta, Hollein, Scarpa, Cullinan and Farrell.

The consensus opinion on the remaining architects in the table is fairly evenly spread across the year groups sampled, the lower numbers for the first years in each case perhaps reflecting their lack of experience.
Section 9.2 has demonstrated that the female students in the sample are likely to mention less heroes on average than the male students, and are more likely to have no heroes at all. It is the aim of this section to investigate which architects the female students choose to be their heroes, when indeed they do make a choice, and to discover whether there are any sex differences in this selection.

Table 9.18 shows those architects who were nominated by the women in this study, the percentage of female support and the corresponding male percentage. All the other architects have 100% male support. Hollein is included in the table, as he has a larger all male following than the remaining heroes.

From the available data, it can be tentatively concluded that the women in the present study are more likely than men to admire Frank Lloyd Wright, Aalto, Mackintosh, Lutyens, Gaudi, Graves and Kahn, displaying an interest in the Arts and Crafts and the 'organic' architects. However, one area of caution with these results must be noted. The female sample is comprised predominantly of students in the early years of their training, and are thus subject to the previously suggested effects of year of study. However, when controlling for year of study, there are only Frank Lloyd Wright and Gaudi who are subject to this confound.

Those architects' whose work the women in the sample are less likely to admire are the more 'hard' geometric approaches of Meier, Rogers, Botta, Le Corbusier, Stirling, and Hollein. Here again it is Hollein and Botta which may be subject to confounding variables, being not
generally associated with the early year students in the sample as a whole. Those architects who are as likely to be admired by male or female students are Foster, Rossi, Scarpa, Farrell and Cullinan.

Table 9.18

<table>
<thead>
<tr>
<th>Admired Architects</th>
<th>% Support Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frank Lloyd Wright</td>
<td>23.1</td>
<td>16.0</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>15.2</td>
<td>10.4</td>
</tr>
<tr>
<td>Meier</td>
<td>11.5</td>
<td>21.7</td>
</tr>
<tr>
<td>Aalto</td>
<td>11.5</td>
<td>6.6</td>
</tr>
<tr>
<td>Graves</td>
<td>11.5</td>
<td>7.6</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>11.5</td>
<td>17.9</td>
</tr>
<tr>
<td>Gaudi</td>
<td>7.7</td>
<td>5.7</td>
</tr>
<tr>
<td>Foster</td>
<td>7.7</td>
<td>7.6</td>
</tr>
<tr>
<td>Botta</td>
<td>7.7</td>
<td>17.0</td>
</tr>
<tr>
<td>Stirling</td>
<td>7.7</td>
<td>18.9</td>
</tr>
<tr>
<td>Iutyens</td>
<td>7.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Scarpa</td>
<td>7.7</td>
<td>6.6</td>
</tr>
<tr>
<td>Kahn</td>
<td>7.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Rogers</td>
<td>7.7</td>
<td>12.3</td>
</tr>
<tr>
<td>Neutra</td>
<td>3.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Architectonica</td>
<td>3.9</td>
<td>0</td>
</tr>
<tr>
<td>Berlage</td>
<td>3.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Mather</td>
<td>3.9</td>
<td>0</td>
</tr>
<tr>
<td>Dixon</td>
<td>3.9</td>
<td>0</td>
</tr>
<tr>
<td>Sharoun</td>
<td>3.9</td>
<td>0</td>
</tr>
<tr>
<td>Van Eyck</td>
<td>3.9</td>
<td>0</td>
</tr>
<tr>
<td>Wagner</td>
<td>3.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Krier</td>
<td>3.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Aldington</td>
<td>3.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Venturi</td>
<td>3.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Cullinan</td>
<td>3.9</td>
<td>4.7</td>
</tr>
<tr>
<td>Rossi</td>
<td>3.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Farrell</td>
<td>3.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Hershberger</td>
<td>3.9</td>
<td>1.9</td>
</tr>
<tr>
<td>(Hollein</td>
<td>0</td>
<td>7.6</td>
</tr>
</tbody>
</table>

Table 9.18 The Percentage Support for Each of the Architects Mentioned by the Female Students and the Corresponding Male Percentages.
The previous section focussed on the aggregate figures for admirations at both schools. It is the task of section 9.6 to investigate the cross-sectional variations in admiration of the architectural practitioners between the schools and the years, and to show the differences, similarities and 'year-by-school' interactions present in the data. It should be noted, however, that these variations are only intended to represent an indication of the possible trends owing to the cross-sectional nature of the data. It is also intended only to explore the relative numbers of admirers in each year at both schools, since in most cases the actual numbers of students mentioning a hero are rather low. Figures 9.17(a) to 9.17(o) show the number of students in each year, at two separate schools of architecture, who admire each of the architects. The similarities and differences between the schools, the variations across the years, and the interactions between the two will be discussed in the next two sections.

### Differences between the Schools and Years.

The cross-sectional patterns of admiration over the years point to several possible differences between architects admired by the students at the two schools. The first and most simple comparison is the differences which are consistent between the schools regardless of year. As detailed in chapter eight there is a tendency for the Southern students to have a greater interest in the Rationalist architects and this is reflected in the overall difference in the number of respondents who mentioned Rossi as their hero.
Similarly, at the Northern school there are more students who admire Mackintosh, (Figure 9.17a). This is not surprising since, as previously discussed, Mackintosh is a traditional 'local' architect for these students. This appreciation of Mackintosh is consistent throughout the years sampled at the Northern University, with the exception of the third year students, fewer of whom admire his work. Of particular interest is that there appears to be a trade off between the admiration of Mackintosh and Lutyens. Those students who are admirers of the Arts and Crafts movement, and who study in the North, mention Mackintosh, but do not tend to mention Lutyens. However, their peers at the Southern Polytechnic mention Lutyens, (see Figure 9.17b), in turn ignoring Mackintosh. The only students who admire both these architects' work are in the final year at the Northern University.

Apart from these two obvious differences there are many more which take the form of an interaction between the years and the schools. The
simplest of these are the architects who have a similar number of admirers in the early years at both schools, yet have quite different patterns of admiration with each year sampled. Figures 9.17c and 9.17d show a greater interest in Kahn and Aalto in the later years at the

Figure 9.17c

The Number of Students in Each Year at Both Schools who Admire Kahn.
Figure 9.17d The Number of Students in Each Year at Both Schools who Admire Aalto.

Southern Polytechnic which is not revealed in the corresponding figures for the Northern University. On the other hand, there is greater appreciation of Farrell and Hollein (Figures 9.17e and 9.17f) in the

Figure 9.17e The Number of Students in Each Year at Both Schools who Admire Farrell.
Figure 9.17f The Number of Students in Each Year at Both Schools who Admire Hollein.

Later years at the Northern school which is not manifested in the students at the Southern school.

One of the most popular architects in the study is Richard Meier. The number of students mentioning this architect are shown in Figure 9.17g.

Figure 9.17g The Number of Students in Each Year at Both Schools who Admire Meier.
In the middle years of training the high regard for his work is represented by admirers at both the schools of architecture. However, at the Northern University there are also admirers of his work in the later years, whilst the final years at the Southern Polytechnic have far fewer Meier supporters. The peak number of admirers in the Northern second year sample can possibly be explained by their recent trip to Europe where they visited Meier's Museum fur Kunsthandwerk.

The clearest interaction of year and school can be seen in the number of students who admire Stirling, (Figure 9.17h) and both second year samples have supporters for Stirling. Chapter Eight has suggested that at the Southern school the students in the early years of their training appreciate Post Modern architecture, but not Modern architecture, whilst at the Northern University this is quite the reverse. This same pattern is revealed in the students elicited admirations. However, whilst the Northern students are 'slow' to admire many Post Modernists, Stirling appears to be an exception. Here again

Figure 9.17h

Figure 9.17h The Number of Students in Each Year at Both Schools who Admire Stirling.
this could be simply explained by the students European visits, or by
the local reputation of Stirling. Thus whilst both of the second year
samples have representative supporters of Stirling, the level of
support in the final year samples shows large school differences, with
no Southern students mentioning Stirling at all.

Figure 9.17i

Figure 9.17i The Number of Students in Each Year at Both Schools who
Admire Foster.

Figure 9.17j

Figure 9.17j The Number of Students in Each Year at Both Schools who
Admire Rogers.
The other simple, yet opposite interaction between year and school is found for those heroes whose eventual admirers number the same at both schools, despite differential admirations in the early years. One such hero is Foster (Figure 9.17i) who is more likely to be admired at the Southern school by the students in the early years of their training. Foster's High Tech counterpart Rogers, displays an analogous pattern of admiration, shown in Figure 9.17j, whereby the Northern students 'discover' Rogers later in their training.

The first year sample at the Northern University has four Le Corbusier admirers and this number decrease with each year sampled (perhaps as they discover Post Modernism). The Southern students, however, have few Le Corbusier admirers in the first year and (with the exception of the students in the fifth year) increase their allegiance to him with each year sampled (Figure 9.17k).

Figure 9.17k The Number of Students in Each Year at Both Schools who Admire Le Corbusier.
Although many differences can be identified between the two schools, there are also some interesting similarities. The recent 'craze' over Mario Botta’s work has affected the students at both ends of the country. This architect's work is rated as highly as both the established traditional heroes, (e.g. Frank Lloyd Wright, Aalto) and the

Figure 9.171

Figure 9.171 The Number of Students in Each Year at Both Schools who Admire Botta.

Figure 9.17m

Figure 9.17m The Number of Students in Each Year at Both Schools who Admire Wright.
established 'new' contemporary architects (e.g., Stirling, Foster, Rogers). The number of students who admire Botta increases with each year sampled at both schools (see Figure 9.17). The majority of admirers of Frank Lloyd Wright are found in the early years at both schools, although interest in his work at the Southern school declines more consistently with each year sampled than at the Northern school (Figure 9.17m). Thus, while support for Frank Lloyd Wright

![Figure 9.17n](image)

**Figure 9.17n** The Number of Students in Each Year at Both Schools who Admire Gaudi.

![Figure 9.17o](image)

**Figure 9.17o** The Number of Students in Each Year at Both Schools who Admire Graves.
Wright is indeed widespread, it is mainly from the students in the early years of training. Other such examples can be found in the admiration of Gaudi (Figure 9.17n), and Graves (Figure 9.17o). Graves is a particularly salient example of this phenomenon. In the later years at both schools there appears to be a certain 'snobbishness' over Graves work. Chapter Eight has shown that in the final year his Post Modern work is scorned by the students, or appreciated simply for its humourous quality.

The problem with the interpretation of Graves' admirers is in this architect's change of style. It is possible that one set of students are admiring his early Modern architecture (eg Northern students) while the others were admiring his later Post Modern work (eg Southern students).

If a longitudinal interpretation of this data is shunned owing to its cross-sectional nature, a possible explanation for the increases in support for an architect over the years could be that a hero is established within the final year sample, and is gradually 'filtered down' through the earlier years. However, the opposite effect whereby, for example, the first years have noticed Graves, and this trend will be 'filtered up' to the final years is hardly as convincing. The fact is that the cross-sectional data does make intuitive sense if interpreted longitudinally.

This pattern of 'learning' who is fit to be admired and who is not, is paralleled by the variations detailed in Chapter Eight with respect to the evaluations of the buildings presented in the photographs, and seems to be part of the process of architectural education. The
characteristics of the evaluative system of judgement which is related to architectural education in general and to the school at which the students train will be reviewed in the Discussion.
Summary of Chapter Nine

In order to gain an insight into the students’ orientations in architecture, the participants were asked about the architects they admire. The results show that whilst the Southern students have more heroes overall, particularly unusual ones, the overall trend is for the students in the middle of their training to mention fewer heroes than their male colleagues. These findings accord well with the predictions of Perry’s (1970) theory of conceptual development.

Analysis of the architects mentioned by the female students shows a tendency to admire more Arts and Crafts and 'organic' designers, as opposed to the hard geometric approaches favoured by their male colleagues.

The inter-relationships between the admired architects demonstrated in the MSA plots shows both distinct followings for certain architects, and the extent of the cohesion of opinion amongst the students in each year group.

Examination of those heroes whose support increases and decreases with each year sampled shows the same stylistic orientation, for year and school demonstrated in Chapter Eight. With each year sampled at the Northern University more students mention Post Modern heroes whilst fewer mention Modern architects, and at the Southern Polytechnic the reverse holds true. There are also a number of architects whose supporters are found in the earlier or later years of training at both schools.
CHAPTER TEN

Preferences and Admiration

Introduction

Section 8.6 has demonstrated that in parallel with the development of the architectural concepts, the students develop various standards of evaluation, giving an overall system of meaning which distinguishes them from the general public. This chapter examines the relationship between the admirations expressed for certain architects' work, discussed in Chapter Nine and the preferences shown for the buildings discussed in Chapter Eight.

Wilson (1985) found that there was indeed a relationship between architects admired and evaluations of a set of buildings for a sample of British architects, allowing sub-groups of participants to be identified according to their heroes. Four different 'types' of architect were identified. The first three were clear cut cases of followers of a particular architect's work; Frank Lloyd Wright admirers, Aalto admirers and those who admired the work of Foster and Rogers. These three groups were mutually exclusive. The fourth group was made up of architects who did not admire any of these architects and chose an individual idiosyncratic hero. However, the actual sample size was only twenty-five, thus the number of supporters for each of the three major admiration groups was rather small, and the assumed idiosyncracy of the remainder may well simply reflect the low number of interviewees. The present study provides an opportunity to expand these findings with a larger sample.

The second advantage of the present study is the need for a more
contemporary analysis of architectural trends. Although the data for the 1985 study was collected in 1984, the majority of the architects interviewed were well established and had completed their training some years ago. Whilst it is important to examine the predilections of the architects of today, the students in the present sample represent the architects of tomorrow, and thus give us an idea of the kind of architecture we can expect for our cities in the future.

The findings of the 1985 study indicated that sub-groups of architects could be defined on two dimensions. Firstly with respect to the tendency to rate certain buildings more positively or negatively than the other admiration groups, and secondly according to the actual number of buildings rated higher or lower, ie the level of 'discernment'. While these results showed some interesting trends, the small sample size precluded further analysis and the development of any theoretical models regarding the opinions of such architectural sub-populations.

Thus the present thesis allows for a follow-up of potentially interesting results of an earlier study, using a larger sample size and taking into account the influence which the elapsed time period and changing fashions have had. It also aims to establish a testable model of architectural judgement.
Section 9.5 has detailed the characteristics of the 'major' admiration groups in the present study, that is those groups of supporters who number five or more. Since this chapter concentrates on the general relationships between admirations and preferences, no distinction will be made according to the year of study or the school attended by the individuals who comprise the groups. Table 10.1 re-summarises the total number of admirers for each of the major admiration groups.

<table>
<thead>
<tr>
<th>Architect</th>
<th>Total Number of admirers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meier</td>
<td>26</td>
</tr>
<tr>
<td>Wright</td>
<td>23</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>22</td>
</tr>
<tr>
<td>Stirling</td>
<td>22</td>
</tr>
<tr>
<td>Botta</td>
<td>20</td>
</tr>
<tr>
<td>Rogers</td>
<td>15</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>15</td>
</tr>
<tr>
<td>Graves</td>
<td>11</td>
</tr>
<tr>
<td>Foster</td>
<td>10</td>
</tr>
<tr>
<td>Aalto</td>
<td>10</td>
</tr>
<tr>
<td>Scarpa</td>
<td>9</td>
</tr>
<tr>
<td>Gaudi</td>
<td>8</td>
</tr>
<tr>
<td>Hollein</td>
<td>8</td>
</tr>
<tr>
<td>Cullinan</td>
<td>6</td>
</tr>
<tr>
<td>Farrell</td>
<td>5</td>
</tr>
<tr>
<td>Lutyens</td>
<td>5</td>
</tr>
<tr>
<td>Rossi</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 10.1 The Overall Number of Students Who Comprise the Major Admiration Groups.

Thus, each admiration group consists of a number of people who have expressed an admiration for one of the seventeen architects. However, it is important to note that these admiration groups are by no means mutually exclusive, thus there is no claim here for 'pure' groups of admirers, as there was in the 1985 study (see Chapter Three). It is possible for an individual to be a member of one or more groups depending upon how many heroes they listed in the interview. Some
overlap between the groups is to be expected as, for example, those who admire Farrell are also quite likely to admire the work of Graves. The degree of overlap between each of the pairs of admiration, shown in Appendix J, is not extensive between specific pairs of groups. However, not only are overlaps of this nature to be expected, but if admirations were only confined to one or another architect, and there were no degrees of overlap, it would be impossible to look for dimensions of architectural admiration, as dichotomous groups would emerge. It is precisely because of the overlap in views, that variations can be found which associate one architect with another and certain styles of buildings with others.

For each 'hero' group, the individual admirers' preference scores for each of the buildings have been averaged, giving a composite score for that group, in the same way as the mean preference score for each year group were calculated (see Chapter Six). The tables of mean scores for each building for each of the seventeen admiration groups can be found in Appendix K.

In order to discover the way in which the admiration groups are related to one another with respect to their evaluations of the buildings, SSA-1 was used to analyse the preference data. Working with Pearson Product Moment correlations SSA-1 plots the admiration groups, in two-dimensional space in this instance, so that those admiration groups whose mean ratings of the buildings are more similar to one another are placed nearer together in the space.

Figure 10.1 shows this plot. The partitions drawn on the plot refer to the style of architecture in which each of the admired architects designs. It is clear that the students have views on the buildings
Figure 10.1 SSA Plot of the Students' Heroes with Respect Each Group's Evaluations of the Buildings, Partitioned According to the Architectural Style of the Designers.
which are highly related to the style of architecture designed by the architects they name as heroes. It is worth noting that since the groups are not mutually exclusive, the distance between the two points in the space represents not only the tendency for the people who admire architects whose work is of a similar style to like buildings of similar style, but also the tendency for someone who admires one architect, to also admire a stylistically similar designer. Thus, for example, if a person likes Graves and Farrell, their opinions have been counted twice, and the groups will be nearer to one another than groups which do not contain overlapping participants. However, as previously stated, the overlap in admirations is not that large, and so the results reflect a substantial amount of agreement between different groups of participants, owing to their admiration for architects whose work is of a similar style.

The regions of stylistically similar architects shown in Figure 10.1 form a radex, revealing categories of architects who design Post Modern, Rational, High Tech, Modern and Arts and Crafts architecture. The architects in the centre of the plot are those who are likely to be admired in conjunction with other architects of any style. Their designs reflect this generality of style, appealing to students of all predilections. Slight tendencies can be seen for these architects to be closer to some 'camps' than to others. Meier is closer to the Modern and High Tech regions and Stirling is closer to the Post Modern and High Tech regions. Frank Lloyd Wright's position in the centre of the plot tends towards the Arts and Crafts.

An interesting comparison can be drawn here between, for example, the
general appreciation of Meier as a hero by those who follow any style, and the use of typicality in the conceptualisation of style by the Northern students, illustrated in Chapter Seven. These students conceived of one of Meier's buildings, Museum fur Kunsthanderwerk, as being the least typical of its stylistic category. It therefore follows that if Meier's work is atypical of a certain style of architecture, then more of those who admire a variety of other architectural styles would also appreciate his work.

Thus it can be concluded that the students are quite consistent in their appreciations. The tendency to admire a style of architecture and a certain architect's work are indeed related; preferences for buildings are deeply rooted in stylistic categories.

It is the intention of section 10.3 to discover the similarities and differences between the evaluations made by the admiration groups, with reference to particular examples in architecture.
10.3 Stylistic Evaluations of the Sub-Populations

Section 10.2 has shown that architects who build within similar architectural styles, have admirers who feel similarly about a selection of photographs of buildings. This section aims to compare the evaluations made by the hero groups with respect to their preferences for the range of buildings they were shown. This analysis provides the reasons for the differences in opinion between the groups of supporters.

The Analysis

The same data matrix used in section 10.2 was analysed using SSA-1, only in this case it is the buildings, rather than the heroes which are to be plotted in two dimensional space in such a way as to represent the associations between the buildings according to the way in which they were evaluated by the admiration groups. Thus, those buildings which are judged in a similar fashion, whether liked or disliked, will be closer together in the plot, and those that are judged in opposition to one another will be further apart.

Figure 10.2 shows the two-dimensional SSA plot of the associations between the buildings. Since the program is working with a sample of the data which provided the stylistic relation to evaluations discussed in Chapter Eight, it is not unexpected that the predominant relationship between the buildings is stylistic, ie that the students evaluate the buildings according to the style. However, the intention of this section is to discover how the plot of buildings can be partitioned according to the evaluations of the buildings made by the groups of admirers identified in section 10.2.
Figure 10.2 SSA Plot of the Buildings with Respect Each Admiration Group's Evaluations, Partitioned According to the Architectural Style.
The Partitioning

Owing to the fact that certain buildings such as the Staatsgalerie, Botta’s House at Viganello, Kresge College, Clifton Nurseries, and Notre-Dame-du-Haut, are liked by almost all the admiration groups, little is to be gained from concentrating on the actual buildings liked and disliked by the admiration groups per se.

Earlier work by Wilson (1985) has indicated that the relative likes and dislikes between the groups provided the most promising basis for the comparison of sub-groups opinions. Thus it is necessary to identify those admiration groups who give each building the highest or lowest mean preference score relative to the other groups, i.e. which are the most or least critical of them, irrespective of the absolute evaluation.

The tables in Appendix K show that each building has seventeen scores, one from each of the admiration groups. From these seventeen groups, the two who gave each building the highest and lowest score relative to the others were selected.

Table 10.2 summarises the buildings which are rated highest and lowest by each of the admiration groups. (Code Numbers can be found in Appendix E). Tables 10.3 and 10.4 show this same data collapsed for the group clusters established from the SSA plot in section 10.2, shown again in Figure 10.3 labelled according to the admiration group numbers. Thus Group One, the Post Modernists, contains the Farrell, Graves and Hollein admirers. Group Two, the Rationalists, contains those students in the two groups who admire Rossi and Botta. Group Three are the High Tech admirers comprising of the Foster and the
Figure 10.3

Figure 10.3 SSA Plot of the Students' Heroes with Respect Each Group's Evaluations of the Buildings, Partitioned According to the Architectural Style of the Designers.
Rogers admirers. Group Four contains the admirers of Modern architects mentioning Aalto, Le Corbusier and Scarpa. Group Five are those who admire the Arts and Crafts architects, Mackintosh, Gaudi, Lutyens, and Cullinan.

Table 10.2

<table>
<thead>
<tr>
<th>Admiration Group</th>
<th>Buildings liked more than the other groups</th>
<th>Buildings liked less than the other groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meier</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Wright</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>13 21</td>
<td>5 15</td>
</tr>
<tr>
<td>Stirling</td>
<td>none</td>
<td>16 21</td>
</tr>
<tr>
<td>Botta</td>
<td>10 15</td>
<td>11 12 19</td>
</tr>
<tr>
<td>Rogers</td>
<td>17</td>
<td>6 10</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>24</td>
<td>1 2 3 8 9 10 15 22</td>
</tr>
<tr>
<td>Graves</td>
<td>2 4 7 9 22</td>
<td>18 25 26</td>
</tr>
<tr>
<td>Foster</td>
<td>1 8 9 17 19 21</td>
<td>none</td>
</tr>
<tr>
<td>Aalto</td>
<td>3 6 16 20 25</td>
<td>4 7 11 24</td>
</tr>
<tr>
<td>Scarpa</td>
<td>10 14 19 23 25 26</td>
<td>4 8 9</td>
</tr>
<tr>
<td>Gaudi</td>
<td>3 11 13 23 26</td>
<td>2 10 17 20</td>
</tr>
<tr>
<td>Hollein</td>
<td>2</td>
<td>none</td>
</tr>
<tr>
<td>Cullinan</td>
<td>6 12 16 20</td>
<td>13 17 22</td>
</tr>
<tr>
<td>Farrell</td>
<td>1 4 5 7 8 12 15 18 22 24</td>
<td>3 13 14 20 23 26</td>
</tr>
<tr>
<td>Lutyens</td>
<td>5 7 9 11 18</td>
<td>1 6 14 21 23</td>
</tr>
<tr>
<td>Rossi</td>
<td>14</td>
<td>5 7 12 16 18 19 23 24 25</td>
</tr>
</tbody>
</table>

Table 10.2 The Buildings Rated More Positively or Negatively by each Hero Group relative to the Other Groups.

Table 10.3

<table>
<thead>
<tr>
<th>Group of Heroes (Fig 10.3)</th>
<th>Buildings liked more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Post Modernists</td>
<td>1 2 4 5 7 8 9 12 15 18 22 24</td>
</tr>
<tr>
<td>2 Rationalists</td>
<td>10 15 14</td>
</tr>
<tr>
<td>3 High Tech</td>
<td>1 8 9 17 19 21</td>
</tr>
<tr>
<td>4 Modernists</td>
<td>3 6 10 13 14 16 19 20 21 23 25 26</td>
</tr>
<tr>
<td>5 Arts and Crafts</td>
<td>3 5 6 7 9 11 12 13 16 18 20 23 24 26</td>
</tr>
</tbody>
</table>

Table 10.3 The Buildings Rated the Most Positively by Each of the Stylistic Hero Groups.
Table 10.4

<table>
<thead>
<tr>
<th>Group of Heroes</th>
<th>Buildings liked less</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Fig 10.3)</td>
<td>----------------------</td>
</tr>
<tr>
<td>1 Post Modernists</td>
<td>3 13 14 18 20 23 25 26</td>
</tr>
<tr>
<td>2 Rationalists</td>
<td>5 7 11 12 16 18 19 23 24 25</td>
</tr>
<tr>
<td>3 High Tech</td>
<td>6 10</td>
</tr>
<tr>
<td>4 Modernists</td>
<td>4 5 7 8 9 11 15 24</td>
</tr>
<tr>
<td>5 Arts and Crafts</td>
<td>1 2 3 6 8 9 10 13 14 15 17 20 21 22 23 26</td>
</tr>
</tbody>
</table>

Table 10.4 The Buildings Rated the Most Negatively by Each of the Stylistic Hero Groups.

The central space is comprised of three admiration groups, Meier, Stirling and Frank Lloyd Wright. As Table 10.2 shows, the supporters of these three architects have few strong feelings regarding the buildings. Since Meier, Frank Lloyd Wright and Stirling are often admired in conjunction with designers of other styles, it follows that the buildings preferred by their admirers will not distinguish between the groups. Indeed, the average preference scores for these groups of supporters fall into the highest or lowest groups for only two of the twenty-six buildings, the Stirling admirers liking Kresge College and the Seagram Building the least compared to the other groups.

If the combined relative evaluations of the buildings for each group of architectural heroes, shown in Tables 10.3 and 10.4, are mapped onto the SSA plot, the comparative evaluations made by each group of admirers can readily be seen.

Figure 10.4 shows those buildings which are disliked by the Post Modern and Modern heroes' admirers (groups 1 and 4), more than by any other group. Those buildings which the Post Modernists dislike the most, are predominantly those in the Modern region of the plot, along
Figure 10.4 SSA Plot of the Buildings with Respect Each Admiration Group's Evaluations, Partitioned According to the Buildings Rated Most Negatively by the Modernists and Post Modernists.
with Claude Megson's 'Modern Vernacular' Wood St. Town Houses. In complete contrast, the buildings which the Modernist admirers like the least are in the Post Modern region, along with Butterworth House and Wivenhoe Park, which may be considered 'Post Modern Vernacular'.

Thus these two groups are quite opposite in the selection of buildings they feel the most strongly against. Neither of the groups feel strongly against the High Tech Buildings. It is possible that this is a region where their tastes could be reconciled, even if it is not a style which either like the most.

Figure 10.5 shows those buildings which these same groups judge positively relative to the other groups. Again there is near perfect division with the Modernists appreciating the Modern region more than the other admiration groups, and the Post Modernists rating the Post Modern buildings more highly.

As noted with reference to the buildings which these two groups of admirers were the most critical of compared to the other admiration groups, the Modern and Post Modern advocates create a 'split' in the Vernacular region of the plot (Figure 10.5). The Post Modern admirers are more likely to appreciate the section of the Vernacular region nearest to the Post Modern region, ie Port Grimaud and Butterworth House. Conversely, the Modernists include Kresge College and Megson's wood in the groups of buildings they prefer relative to the other admiration groups.

Referring back to Figure 10.3, it is now clear why these two groups of admirers (4 and 1) are on opposite sides of the SSA plot, owing to completely opposite evaluations of the buildings.
Figure 10.5 SSA Plot of the Buildings with Respect Each Admiration Group's Evaluations, Partitioned According to the Buildings Rated Most Positively by the Modernists and Post Modernists.
Figure 10.6 shows those buildings disliked by the Arts and Crafts and Rationalist architects' admirers (groups 5 and 2). These two groups of admired architects are also be found on opposite sides of the original plot (Figure 10.3). Figure 10.6 shows that, when compared to the evaluations of the other admiration groups, the Rossi and Botta admirers are the most critical of the buildings on the left hand side of the plot and the Arts and Crafts architects' admirers are the most critical of the buildings on the right hand side of the plot.

At this stage the stylistic distinction needs some clarification. It has already been demonstrated from the division between the Modern and the Post Modern supporters, that the Vernacular architecture is not a completely cohesive category. The upper region of the vernacular was preferred by the Post Modernists, hence it is closer on the plot, and the lower region is preferred by the Modernists. This indicates that a sub division is necessary between the Vernacular buildings. This is consistent with the students' own stylistic divisions, discussed in Chapter Seven, whereby a region of the Modern Vernacular was distinguished.

The split in the Post Modern and the Modern regions which has been revealed by the views of the Arts and Crafts and Rationalist architects' supporters (Figure 10.6) leads to further sub-divisions. The Post Modern Clifton Nursaries and Municipal Control Building are the least acceptable of the Post Modern buildings to the Rationalists; the Portland building is not held in lowest esteem by either of these groups; and the remaining Post Modern buildings are disliked more by the Arts and Crafts architects' admirers than by the admirers of the other heroes.
Figure 10.6 SSA Plot of the Buildings with Respect Each Admiration Group's Evaluations, Partitioned According to the Buildings Rated Most Negatively by the Arts and Crafts and Rationalist Admirers.
In the Modern region the division appears to centre around the group of 'organic/sculptural' Modern buildings. The Rationalists like Vuoksenniska less than the other groups, and the Arts and Crafts admirers are the most critical of Notre-Dame-du-Haut. These two groups do however agree in their relative dislike for House VI.

The High Tech group, (3) are not included in the analysis of the most negatively rated buildings, since they only rate two buildings lower than the other groups, ie Venturi's Carol M Newman Library and Botta's House at Viganello, (see Table 10.2). They do however, rate a number of buildings more highly than the others, and combined with the neighbouring Rationalist group who are inclined to judge few buildings more positively than the other groups, they form a group who are the least critical of a quite different set of buildings than the Arts and Crafts admirers. Figure 10.7 shows which buildings judged more positively by the supporters of these two groups than by admirers in the other groups. In the same way that the Modern and Post Modernist architects' admirers were opposite in their evaluations about a horizontal axis on the plot, the High Tech/Rational and Arts and Crafts admirers differ in their opinions about a vertical axis. The Arts and Crafts admirers are the least critical of the groups with respect to Clifton Nurseries and the Municipal Control Building in the Post Modern region, all the Vernacular buildings, and the 'organic/sculptural' section of the Modern buildings. The Rationalists and The High Tech admirers are the least critical of the right hand section of the Post Modern region, and the Modern and the High Tech buildings. The only buildings which neither group rate higher than the other groups are Aalto's Vuoksenniska and Graves' Portland building. They do however, agree on their relatively higher scores for La Theatre.
Figure 10.7 SSA Plot of the Buildings with Respect Each Admiration Group's Evaluations, Partitioned According to the Buildings Rated Most Positively by the Arts and Crafts and Rationalist/High Tech Admirers.
In summary it can be seen that it is possible to identify groups of students who admire certain styles of architecture and the architects who design within them, and that these predilections are based on two orthogonal bi-polar dimensions, that is from High Tech to Vernacular (Arts and Crafts), and from Modern to Post Modern. These findings confirm the stylistic dimensions predicted from the analysis of the preference data in Chapter Eight.

The analysis of each sub-group's opinions of the buildings has allowed for a more comprehensive and subtle division of the stylistic regions, with the Post Modern, Modern, and Vernacular regions requiring sub-stylistic divisions.

The two measures of 'admired architects' and 'buildings preferred' have been found to be are highly related, showing some degree of validity for both measures. By ascertaining the architects who are admired by an individual it is possible to predict, on the basis of empirical findings, the style of architecture which that architect will be the most or least critical of relative to their colleagues. The relationship of the admirations and preferences to the designs which they themselves produce will be examined in Chapter Eleven.

Wilson (1985) hypothesised that in addition to comparative evaluations of styles buildings, a further factor may be useful in determining the opinions of architectural sub-groups, namely, 'level of discernment'. The following section addresses the variation in the absolute level of criticism of the admiration groups when evaluating architecture, ie the comparative harshness or leniency of the judgements between the sub-groups.
10.4 The Level of Discernment

Wilson (1985) has claimed that not only should the types of buildings which a group of admirers like more or less than the other sub-groups be taken into consideration in defining sub-populations, but there should also be a measure of the 'level of discernment' which a group displays. Chapter Three reviewed the findings of the previous study and concluded that, amongst other problems, the small number of respondents (twenty-five) and hence admiration groups (three) precluded any detailed analysis.

For each of the buildings, the two admiration groups whose average preference score was higher or lower than the other groups was selected as the most or least appreciative. Obviously, with only four admiration groups in the 1985 study, the probability of being the highest or lowest rater for a building was greater than in the present study, with seventeen admiration groups. Thus the admiration groups in the present study cannot be thought of as more or less critical than those in the previous study. It is not the absolute number of buildings distinguishing the groups which is of importance, but the number of 'strong feelings' compared to the other groups.

Table 10.5 shows the absolute number of buildings which each admiration group rates relatively higher or lower than the other groups. Column three shows the difference in these scores, i.e., the number of buildings rated higher, minus the number of buildings rated lower. Thus the absolute number of buildings appreciated more or less than the other groups shows the strength of the feelings, and the difference score indicates the direction of the bias of their views. The two taken together indicate the 'level of discernment'.
Table 10.5

<table>
<thead>
<tr>
<th>No. of buildings liked</th>
<th>More</th>
<th>less</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richard Meier</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Frank Lloyd Wright</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Le Corbusier</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>James Stirling</td>
<td>0</td>
<td>2</td>
<td>-2</td>
</tr>
<tr>
<td>Mario Botta</td>
<td>2</td>
<td>3</td>
<td>-1</td>
</tr>
<tr>
<td>Richard Rogers</td>
<td>1</td>
<td>2</td>
<td>-1</td>
</tr>
<tr>
<td>Mackintosh</td>
<td>1</td>
<td>8</td>
<td>-7</td>
</tr>
<tr>
<td>Michael Graves</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Norman Foster</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Alvar Aalto</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Carlos Scarpa</td>
<td>7</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Antoni Gaudi</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Hans Hollein</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Ted Cullinan</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Terry Farrell</td>
<td>9</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Edwin Lutyens</td>
<td>5</td>
<td>7</td>
<td>-2</td>
</tr>
<tr>
<td>Aldo Rossi</td>
<td>2</td>
<td>9</td>
<td>-7</td>
</tr>
</tbody>
</table>

Table 10.5 The Number of Buildings Rated More or Less Positively by Each of the Admiration Groups.

These measures can be plotted in two dimensions, shown in Figure 10.8, to give a model of the level of discernment of the groups of student admirers, according to their response to this set of photographs. It is important to note that this pattern must necessarily be linked to the photographs which they were shown. For example, the Mackintosh and Rossi admirers were the most critical of the buildings in this set. It is possible that this position could be reversed by selection of photographs containing examples which are more in keeping with their preferences (see Section 10.3).

Figure 10.8 shows that those who have no strong feelings either way are the Meier and the Frank Lloyd Wright admirers, as previously discussed in section 10.3 with reference to the results of the SSA. This
Figure 10.8

Bias
(No. of Buildings Liked More/Less Than Other Groups)

Negative

Even

Positive

-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7

Strength of Opinion

(No. of Buildings Liked or Disliked)

Rossi

Mackintosh

Lutyens

Farrell

Aalto & Gaudi

Scarpa

Botta

Foster

Graves

Le Corbusier

Hollein

Le Corbusier

Rogers

Figure 10.8 Model of Evaluations Made by Members of each Admiration Group According to the Strength of Opinion and the Bias of their Views.
analysis showed these admiration groups to be placed in the centre of the plot, indicating that their work is acceptable to the proponents of several architectural styles. Thus these 'classic' architects are admired for work which is not easy to label stylistically, and could fall into a number of stylistic categories. Accordingly, their admirers are not strongly for or against any of the buildings in this range of examples.

The next group to be identified are the mildly favourable responders, the Hollein admirers. This group's average preference scores identify one building which they rated more positively than the other groups, Johnson's AT & T, and none that they liked less.

The mildly unfavourable responders are the Rogers and the Stirling admirers. The Rogers group like Botta and Venturi's work less than the other groups and not surprisingly the Pompidou Centre more. The Stirling admirers, however, are not the highest in their esteem for the Staatsgalerie. Whilst they do rate it highest in their own rankings, there are two groups of admirers who rate this building higher in terms of absolute scores, the Botta and the Farrell admirers. Stirling's group of supporters do not, in fact, rate any of the buildings more highly than the other groups, and as previously stated in section 10.3 rate only two buildings lower, Kresge College and the seagram Building. Again this lack of strong opinions is compatible with the placement of these groups near the centre of the SSA plot in Figure 10.1.

The Le Corbusier admirers could be termed the mild 'even' or 'unbiased' responders. These participants rated two buildings higher (ITT and the Seagram Building) and two lower (Staatsgalerie and
Municipal Control Building) than the other groups. Although they did rate Le Corbusier's Notre-Dame-du-Haut as their most appreciated building, the Cullinan and Scarpa supporters liked this building more in absolute terms.

Thus it can be seen that even though the Le Corbusier admirers rate their hero's building the highest of those they had to choose from, their level of criticism, or discernment is higher than that of the Scarpa admirers. Their highest average preference score, for Notre-Dame-du-Haut, is lower than the Scarpa admirers' average preference score for this building even though they rank it in third place.

The next four groups have slightly stronger feelings about the buildings, but are still quite evenly balanced. The Botta admirers are the most appreciative of Stirling's Staatsgalerie, as previously mentioned, and also rate their own hero's building higher than the other groups. They are the most negative group with respect to the Vernacular buildings; Wivenhoe Park, Port Grimaud and Todd House. It is somewhat surprising that the Botta group is so lenient on the other buildings, with the Rationalist influence apparent in Botta's work, and the Rossi admirers being so critical in their judgements. However, it appears that those who admire Rossi are the 'purists', and thus the most critical, while those who admire Botta's work are not necessarily Rationalists, and also have Modern or Post Modern stylistic preferences.

The Aalto and the Gaudi admirers are placed on the centre line of the model, indicating that they have fairly strong feelings regarding the buildings. However, this strength is well balanced with four buildings
appreciated more and four less than the other groups. As demonstrated in Figure 10.4 the Aalto admirers are critical of certain Post Modern and Vernacular buildings and supportive of Modernist buildings, in this case Museum fur Kunsthandwerk, Carol M newman Library, Kresge College, and their own hero's building Vuoksenniska.

The group of students who admire Gaudi are the most severe of all the groups in their evaluations of AT & T, the Pompidou Center, Botta's House at Viganello, and Notre-Dame-du-Haut. Whilst most of the admiration groups rate Le Corbusier's chapel at Ronchamp amongst their most highly appreciated buildings, the Gaudi admirers rank it at tied twelfth place. The only lower opinion of this building comes from the Farrell and the Graves supporters who rate it joint seventeenth. However, these two groups, although lower in ranks are higher in their absolute scores, thus are generally less critical than the Gaudi admirers. The lower rating for Notre-Dame-du-Haut from these admiration groups may be partially explained by their stylistic preferences. However, since this is a building which is generally not appreciated by first year students, the explanation may lie in the greater number of first years who comprise these hero groups.

The Cullinan admirers also have fairly strong opinions, tending slightly to the positive. They are the most critical of three buildings, La Piazza d'Italia, the Pompidou Centre, and ITT. They are the most positive of the groups about four buildings, Port Grimaud, Notre-Dame-du-Haut, Kresge College and Carol M newman Library. This is indicative of their hero's connections with both Modern and Vernacular architecture. As Jencks (1982) states Cullinan has 'left Modernism with
reluctance'. He cites Cullinan's Westmoreland Road housing scheme as an example which 'mixes a modernist slab morphology with a traditional walk up.' He states that Cullinan 'dislikes the neo-Vernacular label applied to his work' and 'keeps one foot in Modernism.' Such composite stylistic definitions are validated by the preferences of his admirers.

The Graves admirers are amongst the intermediate group in the strength of their feelings, however, the bias is definitely positive toward this set of photographs. Whilst one building, Megson's Wood St. Town Houses, receives the lowest mean preference score from this group, four Post Modern buildings, including the Portland building, are appreciated the most by the Graves admirers.

Those students who admire Lutyens have 'strong' positive and negative reactions to the buildings which they were shown. They appreciated five buildings more than the other groups, and were the most critical of seven. Along with the Sainsbury Centre, their criticisms were centred on the Modern buildings. One interesting discrepancy between two of the Arts and crafts admiration groups is worthy of note. Whilst the Lutyens admirers are the most critical of the Modern buildings, the Mackintosh admirers are more critical than all the other groups of the Post Modern buildings.

The Foster admirers can be seen to have feelings which are almost as strong as those of the Lutyens admirers, however, in contrast their ratings are all more positive than the other groups. This could indicate that this group is not at all discerning. Alternatively, it could be suggested that the selection of photographs in this study was biased toward styles which are popular with students who admire High Tech architecture. Since there were only two or three buildings which
could be defined as 'pure' High Tech, the latter hypothesis seems unfounded. Especially since the buildings which these students appreciated more than the other groups not only include the Sainsbury Centre and the Pompidou Centre, but TVAM and the Seagram Building which are borderline Post Modern and Modern respectively, and Megson's Todd House and La Theatre, which are clear examples of their own styles.

The Scarpa admirers are just as positive about the buildings in this selection as the Foster admirers, however they also rate three buildings the most negatively. Of all the groups they are the most lenient on the Modern buildings, while they are critical of Post Modernism in the form of The Portland Building, La Theatre, and TVAM.

The Farrell admirers have strong opinions of the buildings compared to the other groups, tending slightly to the positive side in their evaluations. This group are the most critical of seven buildings, not surprisingly all Modernist examples, and exceed all other groups in their appreciation for nine Post Modern and Vernacular buildings. Farrell's TVAM is amongst them, but Clifton Nursaries finds the most favour with Graves' and Lutyens' admiration groups.

The final two groups are clearly the most discerning, or the most critical, of the architectural examples they were shown. The Rossi and the Mackintosh admirers have strong feelings on the buildings compared to the other groups and they are almost all judged more negatively than by the other groups.

The Rossi admirers are the most appreciative of Galleratese 2 and
Figure 10.9 Sketch Diagram of the Dimensions of Model of the 'Level of Discernment'.

Figure 10.10 Sketch Diagram of the Dimensions of Stylistic Appreciation.
Museum für Kunsthandwerk, and perhaps in the absence of any of their hero's work, the Mackintosh admirers give the highest rating to Butterworth House. The majority of the Rossi's nine least generous scores go to Vernacular architecture, whilst the students admiring Mackintosh are more harsh than any of their colleagues on eight of the Post Modern buildings.

In summary, Chapter Ten has made it possible to answer Wilson's (1985) plea for a typology of evaluations made by architectural sub-populations. Sub-groups' opinions can be characterised by both the strength of their views relative to their peers and the direction of these views from the most to the least discerning. These two dimensions are shown in the sketch diagram in Figure 10.9. In addition, section 10.3 has identified two bipolar stylistic dimensions around which opinions may be focussed. These are shown in the sketch diagram in figure 10.10. These models taken in parallel can be used to define sub-groups of architectural evaluation where the groups are defined in terms of those architects who are admired.
Summary of Chapter Ten

The seventeen architects who are admired by five or more students form the major admiration groups. Analysis of the average preference ratings for each group of admirers shows that the more similar the style in which the heroes design, the more similar are the followers' evaluations of the buildings.

The plot of heroes can be divided into six stylistic regions, of High Tech, Modern, Arts and Crafts, Post Modern, Rational, and general architects. Examination of the buildings rated most and least highly by each group confirms the predictions of stylistic preference, with the followers of Post Modern architecture, for example, rating the Post Modern buildings most favourably, and the Modern buildings most harshly.

Analysis of the number of buildings rated most or least harshly indicates the level of discernment, showing both the strength of feeling and direction of bias of each group of admirers. Such an analysis allows a model of architectural evaluation related to the present set of photographs.
11.1 Introduction

The results of the preceding chapters have suggested a number of patterns of conceptual development during architectural education. It has been demonstrated that the concepts used in the students' conceptualisations of architecture vary both quantitatively and qualitatively between each year at the two schools. The increasingly sophisticated structure of these concepts has also been shown with reference to the key concept of architectural style.

Chapter Eight has demonstrated that the way in which the students evaluate architecture is not only inextricably linked to architectural style, but varies as a function of both length of time spent in training and school affiliation. Analysis of the students' architectural heroes has confirmed these trends in the stylistically based evaluation of architects' work. Chapter Ten has proposed a model to predict architectural judgement based on a knowledge of students' heroes.

However, whilst these findings are of considerable interest in themselves, the question remains as to whether the concepts used in the sorting task and the evaluations of the buildings in the present set of photographs are related to the designs which the students themselves produce.

The following chapter presents four case studies of students at the Southern Polytechnic. Each student volunteered to spend more time talking about their work. Each interview lasted between three quarters
of an hour and two hours. The students were asked to talk about their feelings about the school in general and the way their work may have been influenced. They also talked specifically about their designs and the way in which they had arisen. The students were asked to 'talk through' their portfolios, and were involved in the Multiple Sorting Procedure, using the same photographs as the main body of the thesis, sorting the buildings as many times as they felt able to produce different criteria. These sorts enabled MSA to be run on each participant's data, producing a plot for each individual's conceptualisations of the buildings. The students were also asked to provide their architectural heroes and to evaluate the buildings in the same way as in the main study.

11.2 Cathy

Cathy is a particularly interesting example for the case studies since she did not do all her training at the Southern Polytechnic and was able to comment on the way in which the two schools had influenced her work.

Cathy got a good first degree from Newcastle University, and moved to the Southern Polytechnic to do the diploma course. She claims that both are good schools, but in different ways. Of these differences she states,

'The comparison is quite easy. There are different attitudes. The attitude at Newcastle was very professional, a dead line was a deadline.'

This she believes to be not so true of the Southern school where, 'The staff haven't got a good attitude', and she feels this does nothing to
encourage the students to get down to work as they might. With respect to the architectural training, she continues,

'Newcastle were interested in design, but more biased towards construction. They turn out people who can actually build. Not that they don't here, but at Newcastle they're more practical.'

On the other hand, she says of the Southern school,

'Design wise they are open-minded and more inspiring than Newcastle. My Newcastle work was good and sound but not all that good design wise, not outstanding or anything. Here I can be a bit more open-minded, a little more interesting. Not wacky though, I'm not a wacky designer.'

This comparison of the Southern school as lacking the technical emphasis, but allowing greater design freedom, was echoed by another student who had moved to the diploma course from Belfast.

Cathy's first sort was done according to building type, which is reflected in the MSA structure in figure 11.1. Chapter Seven has demonstrated that using building type is quite unusual in the final year. However, it does reflect her interests, 'I'm only really interested in housing' she admits. Indeed, three of her categories were 'Housing', 'Looks like housing', and 'Individual houses.'

The plot in figure 11.1 shows the buildings can be divided essentially into 'housing', and 'not housing'. These are then sub-divided into individual housing on the left and offices, exhibitions, and churches on the right.

During the interview Cathy produced a large pile of housing projects she had worked on during her year out, most of which had been built. She seemed proud of the work, even though she explained that 'they're
Figure 11.1 MSA Plot of Cathy's Sorts Partitioned According to Building Type.
nothing special you know, its different when its for real!

This building type orientation reappears in her preference sort. Whilst evaluating the buildings Cathy moderated her judgements according to the buildings' function. For example she claims that, 'You can't do much with offices, you can't like them, but they have to be there'. Similarly, she created a group which 'look spectacular' but modified this with 'horrendous to live in!'

When asked about her 'heroes', Cathy first mentioned Lutyens, who she thinks is 'outstanding'. She adds

'Of the modern architects, probably Stirling. I like the Staatsgalerie very much.'

She also named Frank Lloyd Wright as a great influence, especially on her interiors,

'I love the art nouveau architecture, you can't do it now, but I'm very much influenced by it.'

The architects she mentions place her in the 'Arts and Crafts' region of the model of architects admired, proposed in Chapter Ten. Such admirations would predict that Cathy would like the Vernacular buildings most, the least appreciated styles being High Tech and Rationalism. Her opinions of High Tech are divided between 'neither here nor there' and 'dislike', with the Pompidou Centre, the most typical High Tech building of the set prompting the remark, 'This doesn't work as a building, and doesn't fit the surroundings.' Of Rationalism she states, (again referring to habitation),

'I don't like Rationalism full stop. I don't understand the theory, its just a shame to house people in it.'
Figure 11.2 MSA Plot of Cathy's Sorts Partitioned According to her Preferences for the Buildings.
Figure 11.2 shows the MSA plot partitioned according to Cathy's preference sort. In the top left hand corner are her favourite buildings, Botta's House at Viganello, the Staatsgalerie, Kresge College, and Museum fur Kunsthandwerk, which she describes as 'not pretentious or using things for the sake of it.' Other buildings she 'likes the look of' are also on the left and as predicted are Vernacular. Notre-Dame-du-Haut is also on the left but at the bottom, since she does not 'like the look of it', but likes the way it was designed. Cathy did not appreciate the rest of the buildings, and these are found on the right hand side of the plot shown in Figure 11.2.

The designs Cathy discussed during the interview are particularly interesting in the apparent changes they undergo during the time she has spent at the Southern Polytechnic. Cathy's designs reflect both her personal appreciation of the Vernacular, and the influence the Southern Polytechnic has had on her work, seemingly changing the style of her designs from Post Modern Vernacular to Modern Vernacular, perhaps even with a hint of the Rationalism she claims to despise! They also show the emphasis on housing evident in the sorting data; she has chosen all the housing options.

Figures 11.3 to 11.5 show the designs from the first project Cathy worked on when she arrived at the Southern school. She claims that this style is very typical of her Newcastle work. The designs are for a large house on a prestigious site on the harbour, in an area with a strong Vernacular 'feel'. Cathy says of the design, 'It's nice'. Lots of people who aren't architects have said they like it.' This was characteristic of her Newcastle work. She adds,
Figure 11.4 Elevation From Cathy's First 'Prestigious House' Design: 2

ELEVATION FROM BOOM TOWER
'The Newcastle work looked nice, and was special because it was the sort of buildings people would like to use.'

The second project of her training at the Southern school was a set of six terraced houses to fit into a small site, each with a garden. Elevations of her designs are shown in Figures 11.6 and 11.7. This project, she believes, 'signified a big change in orientation'. She describes an example in these elevations, 'rather than decoration, the interest is made with shadows and planes coming in and out.'

The following house designs show that Cathy has cemented this change in style (Figure 11.8). When asked if she could describe how the change in orientation came about, she replied that it was a simple progression of ideas. She admits that the second project creates quite a different atmosphere to the first, but thinks that the changes were a natural development in the way she was thinking. Is it possible that being at the Southern school had any influence on this progression?

'I suppose it probably did, but then it seems so inevitable, I might have done it if I'd stayed.'

Cathy hopes that the way she designs incorporates both the aesthetics and the construction of the building. Construction is still an issue with her, from her Newcastle days, but has been far superceded by formal considerations.

The initial motivation for her ideas varies. She explains that,

'Sometimes there's an obvious starting point, other times you have to really scratch around. With the first house, it had to be lifted because the site floods, really obvious, but a starting point.'
Figure 11.6 Elevation from Cathy's First Terraced House Design: 1
Figure 11.8 Elevations From Cathy's Second Terraced House Design
'think of the outside and the inside at once. I used to do the plan and then elevate it, and then I tried it the other way around. You can't really elevate until you know how the materials and structure works. You have to keep thinking about it all at once. You should do it all together.'

In practice she says that she designs the form of the building, and then thinks of the construction. Formal considerations are of prime importance in the fourth project, shown in figures 11.9 and 11.10. Cathy started the museum project with a strong formal plan. This axial plan followed from the axial site, and she first concentrated on the arena and the central atrium and started to fit the rest around the circulation. Although she claims that the elevations 'still need a lot of work done on them', the changing style of her work is clearly presented.

A particularly interesting insight into the way in which Cathy's work has changed over the two years at the Southern Polytechnic is allowed by Cathy's own dissatisfaction with the first house she designed at the Southern school. By the middle of the final year, she had changed her ideas to such an extent that she decided to redesign the original project (see Figures 11.11 and 11.12). The plan and the 'Frank Lloyd Wright' interiors remained much the same.

'I moved the dining room to the central space but that's all I did to the plan. The stairs are better in the second one, I made something of them.'

Thus it was the overtly stylistic qualities of the elevations with which she was no longer satisfied. She explains the changes,

'In the first one I tried to take the character of the area, the warehouse look with boarding, the top floors continuing out. Then I thought of more subtle ways of relating it to the area. Not so literal. I took plain white surfaces and the nautical look.'
west elevation

Figure 11.11 Elevation From Cathy's Second 'Prestigious House' Design: 1
Figure 11.12 Elevations From Cathy's Second 'Prestigious House' Design: 2, 3, 4

north elevation

- east elevation

south elevation
The change is dramatic, and to an outsider clearly a 'Southern' design. The Modernist influence is evident in Cathy's work where once it was Post Modern. Cathy's work is very difficult to categorise since her orientation in architecture seemed to be still in a state of 'flux'. Both her preferences in architecture and her own designs show signs of both her former and present orientations. However, she appears to be leaving the Vernacular and Post Modern work, whilst keeping her arts and crafts heroes, resulting in her appreciation of, and design within 'Modernist Vernacular', and even High Tech.

11.3 Simon

Simon is unusual amongst these case studies since he was still only a second year when the interview took place, and yet he had already developed a great deal of sophistication in his work, and certainly some very strong ideas.

Since he was twelve or thirteen Simon had wanted to be an architect, and he 'wasn't going to let anything stop him.' Despite disappointing 'A' level results he got into the Southern school and claims that now, at last, everything is 'coming together' for him. During the summer following the first year, he worked with some ex-Portsmouth students in their local practice, and one of the design he worked on was due to be published that year.

Simon is used as an example here because of his interest in the more 'extreme' version of what has been identified as part of the influence of the Southern school, ie Rationalism.
Simon himself claims that the stylistic influence is intuitive. He explains,

'It seemed like destiny. It seems that a lot of it is greater than coincidence. It's intuitive. Sometimes I'll dream it all drawn up, right at the start, and although it goes through some changes and gets slightly adjusted, the finished thing is almost as I'd seen it.'

Undoubtedly his association with the ex students who follow Rational architecture has done much to encourage his interest in this style. He continues,

'Obviously I read the architects who reinforce the style, but I'm sure the intuitive style came first. It just seemed right. I looked at the architects concerned with my train of thought, Botta, Rossi, Grassi. I was also slightly interested in classical Palladian architecture, even before the Rationalism.'

Simon explains,

'I got into Rationalism at the end of the first year. Its logical construction, simple and easy to understand, a paring down process into the most simple and understandable rules. It is not liked here. They call it facist architecture.'

It is interesting that Simon feels there is animosity to his work as, conversely, some of the other students feel that they are pushed towards Rationalism. Overall the students interviewed during study do indeed portray divided opinion amongst the staff. Whilst the Rational influence is a strong presence within the school, there is also violent opposition.

For this reason, Simon believes his designs,

'have to be absolutely perfect in every detail, to over come the fact that they're Rational. For example, in one, I had the door hung the wrong way round, so that the access was blocked, and they made a lot of that. The next thing I did was worked through to precision, all the structure, lighting, everything. That's the way it has to be.'
Simon believes those who are against Rationalism are being short sighted,

'You see its not something in the architecture that's fascist, its the associations that people have. It's them transferring their knowledge of what happened onto the architecture. Just because Speer used it then, doesn't mean that it means the same now.'

All the sorts Simon did with the set of photographs have some kind of stylistic component. Style is very important to Simon, along with his own views on it. His stylistic sorts are quite complex, and the resultant MSA plot is shown in figure 11.13. As the MSA plot demonstrates, his opinions of the buildings are very well defined. His sorting is a curious combination of stylistic, personal and objective judgements.

On the left are the buildings which he considers to to be 'good examples' of 'modernish' architecture, and the adjacent region, the bad examples. Nevertheless, he personally likes the 'objectively' bad examples of this kind of architecture more than the 'objectively' good examples of the other styles of architecture which are placed on the right of the plot.

Thus, in Simon's MSA structure there is a personal evaluative dimension which goes from left to right around a vertical axis, and an objective evaluative dimension on the right hand side of the plot about a horizontal axis. In the latter divisions Simon judges the good and bad examples of Modern and Post Modern architecture. The furthest examples from the buildings Simon personally likes are the Post Modern and Vernacular buildings. Simon classes both these styles as Post
Figure 11.13. MSA Plot of Simon's sorts Partitioned According to Architectural Style, and Subjective and Objective Evaluations.
Modern; the Vernacular buildings as bad examples, and the Post Modern buildings as good examples. However, the 'good' and the 'bad' are both bad, when it comes to his own personal opinion.

From the model proposed in Chapter Ten, his admiration of the Rationalist architects Rossi, Grassi, and Botta, predict most favour for those buildings which could be described as Rational, followed by the Modernists, with the least appreciation going to Post Modern and Vernacular architecture. This has been illustrated by the MSA structure derived from the sorts he did.

The stylistic element to his sorts reflects the stylistic emphasis Simon uses when discussing his own work. Interestingly, the objective/subjective distinction in his own evaluations is one which he feels is missing in architecture generally, and in his critics in particular.

'Personally, I speak my mind. With respect to the designs I say some people can wear different glasses. They can look at it objectively, even if they don't like it. But some just won't accept it.'

The first of Simon's designs to be discussed is the 'Cube House', shown in Figures 11.14. He says of the design,

'The brief was to design a house from an eight metre cube. I wanted to use the inherent geometry of the cube. It was as though it had come from out of space and wedged into the hillside and from then on, time broke it up. Wherever there is a piece that has moved, there's glass. I wanted to show the irregularity of nature compared to the regularity of the cube. It was the contrast with the landscape. I didn't want to use the usual nine square plan, as it was too traditional, so I split it in terms of function. I wanted no sense of order, although inherently there is of course.'
In describing his designs, Simon uses three themes of rational architecture, 'Axes, geometry, and order'. He describes it as 'stripped classicism'. These architectural aspects are discussed with reference to Simon's Art Gallery elevations, shown in Figures 11.15 and 11.16. Simon describes the design as 'simple', comprising of,

'a central axis, and a grid creating the spaces. That grid is then projected out into the collonade. The collonade, incidentally is classically wrong. I was having trouble with that then, but I think I've solved that now. You see there should be a central column, but having a central column signifies death, so didn't have it. What I should have done is move the two of them inwards and closed them up. On the whole I'm pleased with it.'

Simon elaborates on Rational architecture, explaining that it is an,

'architecture of shadows, it is not form or elements that break up the building, but the shadows.'

He points out the effects of shadows in all his designs. For example, in a further house design, he explains,

'The entrance is set in. The shadows define the entrance and create privacy when you enter.'

This particular project Simon described as a 'turning point', adding, 'No it wasn't, but it could have been!' In the face of much criticism of the Rational approach, he spent a good deal of time exploring other approaches, 'starting from scratch', as he considered it. After a lot of 'wasted time' he went back to his old approach. He believes that there is a pattern to developing a style,

'It's like in the first year you find something, in the second you perfect it, and in the third year you use it and carry it through.'
Figure 11.15 Plan and Elevation From Simon's Museum Design: 1
Having settled on his approach Simon is, for the time being, happy with it. He concludes,

'I like the designs to look as through they can stand up, almost timeless. They are not 'styles' they are logical form. It's a fair and reasonable approach. It's an architecture that's understood; it's for today and tomorrow, and the past is there too.

11.4 Nick

Nick has studied at the Southern school throughout his architectural training. He is very confident, yet highly critical of his work. He is quick to point out its shortcomings and those things he would change.

Particularly interesting is his approach to the start of the projects. Whilst Cathy's starting point was 'obvious' or 'scratched around for', and Simon's appear in completion, Nick seems to be wholly intuitive, and yet very pragmatic. He explains,

'I don't spend a lot of time thinking about projects, I work by trial and error. Not being able to think of the wrong thing is worse than doing the wrong thing quickly, and sorting it out.'

As with all the students interviewed, Nick found it hard to explain where the initial ideas came from. With respect to the museum project, Nick talked of the start of the work,

'Well the first thing was the axis. I thought I had to take it into account. I wanted something broken down into chaos by time; but nothing seemed to be coming. I was just playing with the site and I painted some stripes across it.'
This rough sketch is shown in Figure 11.17 and it was this idea which formed the basis of the finished design.

'If you do something like that, at least you can change it, and you don't have to sit around waiting for divine inspiration to hit you. When I'd got the stripes I knew what they were for, I just had to work out how to do it. It was a coherent idea organised in principal, if not in reality. I had a lot of difficulty with the outside of it because of the site. Eventually I drew a wiggly line around the outside. I don't think you need to justify things all the time. People are always asking you to justify it, it leaves no room for instinct. Most good architects were instinctive, look at John Soane.'

Nick has no time for the theoretical debates of architecture, which he believes have too much emphasis at the Southern Polytechnic.

'The school is very concerned with questions such as, 'what is architecture?'; the debate about how one should design. But it doesn't really matter in the end. It's like the Falklands war; very pointless. There's no need to champion a cause. You don't need to know why.'

The unfinished plan for the museum design is shown in Figure 11.18. Although it is not yet finished, and despite other people's criticisms of the work, Nick shows uncharacteristic confidence in its outcome. Nick cites this as an example of his interest in 'conflicting disciplines'. He states,

'I want order to co-exist with anarchy. For example there is the exact same distance between these brick walls, and then the anarchy of this aimless wandering wall, with bits taken out.'

Another example of the 'order and anarchy' comes in the form of the prestigious house design project. This is not a design which Nick is happy with as, 'It didn't do very well, and there are bits I don't like any more.'
Figure 11.17 The 'striped site' acting as Nick's starting point.
Figures 11.19 and 11.20 show the elevations for this project, and Figure 11.21 one of the plans. The row of glass windows were scaled brick to glass to represent a classical frieze. This, and elements of the plan, are the first things Nick would change.

'The plan isn't distinct enough, and the places aren't practical enough. It was a pointless adherence to a principle.'

The dissatisfaction does not stop there,

'It's got thick walls, I like thick walls, but in this case the walls don't actually support the roof, so the only reason to have them was because I like them. They didn't like that a lot! I suppose they're not really justified. I think it was really pointless now. The roof is supported by columns, I should have just made them walls, because it causes all sorts of problems; the structure was a real headache.'

Nick's first sort was, like many final year students', in terms of style, with an element of his own personal evaluations. This stylistic structure is shown in Figure 11.22. Its lack of clarity is owing to the second and third sorts which he produced based on size, and whether the buildings were part of the public or private domain. The partitioning for these sorts is shown in Figures 11.23 and 11.24.

Nick's concern with style is reflected in his commentary on the stylistic influences and expressions in his own work. He is critical of all the buildings in the set apart from the Vernacular buildings, echoing his highly critical stance on his own work. Thus his perfectionism in his own work parallels his criticism of others.

The focus on Vernacular buildings in the preference sort is again consistent with the predictions of the admirations model, his heroes being Kahn and Cullinan.
Figure 11.19 Axonometric From Nick's 'Prestigious House' Design
MATERIALS:

WALL: TO BE BRICKWORK, PAINTED EXT.
WITH A SPECIALLY PREPARED EXTERIOR QUALITY PAINT IN COR-
PORATION THAT IT MAY GLEAM IN THE SUN.

PLINT: CONCRETE TO BE CLAP-LED IN CAST-IN-
PLACE CONCRETE, LEFT ROUGH IN FINISH.

ROOF: TO BE FABRICATED IN PRE-
MILED STEEL, PAINTED RUSTY RED.

WITH HARDWOOD FRAMES IN TILT-
MECHANISMS.

Figure 11.20 Elevations From Nick's 'Prestigious House' Design

ELEVATION TO HARBOR MOUTH

ELEVATION TO YARD

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Figure 11.21 Plan From Nick's 'Prestigious House' Design
Figure 11.22 MSA Plot of Nick's Sorts Partitioned According to Architectural Style.

Figure 11.23 MSA Plot of Nick's Sorts Showing Dimension of Size.
Figure 11.24 MSA Plot of Nick's Sorts Partitioned According to Public/Private Domain.

Figure 11.25 MSA Plot of Nick's Sorts Partitioned According to his Preferences for the Buildings.
Cullinan's work is a combination of the Vernacular and the Modern. Therefore admiration of his work should predict Nick's preference for Modern and Vernacular architecture. His preference sort reveals just this, with the most respect going to the 'practical Vernacular' of Wivenhoe Park and Port Grimaud, and the 'person oriented forms' of the 'organic' Megson's Wood St. Townhouses and Todd House, Butterworth House, Kreege College, Vuoksenniska, and Notre-Dame-du-Haut which is, 'in a class of its own'.

The model also predicts that High Tech and Post Modern architecture should find the least favour with Nick, and again this is the case. His reaction to the High Tech buildings in the set is scathing, 'This is bleak architecture, none of it is human scale.'

He also shows no respect for Post Modernism in general, which has 'a cheap style imposed on the buildings', yet Nick still recognises the contribution of certain isolated examples, most prominently the Staatsgalerie which he views as 'something of an exception.'

Nick's appreciation of Vernacular should indicate no tendency toward Rationalism in his architectural preferences. Figure 11.26 shows the house Nick designed in the Rational option. He says of it,

'It's very stark and rational. I don't think much of it. Elements of the plan and organisation appeal but externally it's real puke. I designed it like that partly as an experiment to see what it's like to design like that, and in order to get a high pass, which I did. It's definitely not my style, but I like the windows, having windows that are not sash windows, but the pattern of shadows look as though they are.'

The emphasis Nick draws in third sort on public and private goes beyond
Figure 11.26 Elevation From Nick's Rational House Design
the buildings' use, and reveals another of Nick's concerns, the 'image' of 'public' and 'private' space. He refers to his design for back-to-back single person flats and terraced housing. He was interested in having screen walls with light wells behind them,

'I'm really into walls! I think they provide the privacy which having land in front of your house doesn't really afford.'

Nick appears to be open to many influences on his work. However, he claims that the influences are not confined to those the school provides,

'For example, pop videos. If I see a video I like, I think how can I use something of its quality?'

He concludes that,

'I design a lot instinctively. I suppose there is an unconscious influence from others. If I see somebody adopt an approach that's interesting, I'll try it when I get home.'

11.5 Pete

Pete has studied at the Southern school throughout his architectural training, and is an interesting example owing to his interest in structure and materials. This is evident both in the way he sorts the buildings and in the way in which he talks about his own designs.

None of Pete's sorts are strictly defined in their concepts, and contain elements of materials, style, evaluations, and contextual considerations, producing no one interpretation of the MSA structure shown in Figure 11.27.

However, materials are used quite consistently as part of each category description. Even in the preference sort, groups of buildings Pete
Figure 11.27 MSA Plot of Pete's Sorts Partitioned According to Architectural Style/Design Approach.
does and does not like are referred to using such statements as 'I don't like the materials' and 'I like some of the claddings he uses'. Accordingly, it was material and structural concerns which Pete discussed regarding his museum designs, which were not available to include here.

'The important thing was how to make the structure, the connections came next. There was a problem in how to join it all together and make it waterproof. I used a steel roof with glass, so you still get the mass of the building linked together with glass. You walk into this room with huge windows and the glass balcony. There is glass on top of these concrete beams. I usually have ideas about bits of the building and bring them together to make some sense in structural terms.'

The second project Pete discussed was a re-design of an urban area at the end of a main street. Pete hopes his designs will 'lead people down from the town', but of more salience to him was the problems he encountered raising the railway tracks. He explains,

'I've put the railway up on pillars; unbolted it and raised it. It's a concrete and steel structure, and it has to be quite high in order to get a bus underneath it. I'm using the railway as a covered space rather than a building. Waiting for a train is like waiting for a bus, you just need a cover.'

Nevertheless Pete's constructional interests are not accompanied by a serious interest in the technicalities. His attitude is relaxed and 'artistic' even though his designs are technically biased. For example of the museum he states, 'I just got the bits I needed and joined them up, that's where these crazy shapes come from.' and of the station project, optimistically, 'It will all hold together eventually!' There is a High Tech element to Pete's designs, and his heroes reflect his, including both Rogers and Meier in those architects whom he
admires. He is also interested in Modernist work such as Wagner's, and when asked to define his own style, placed it closest to Modernism. His friends however, chipped in, 'constructivist with a small 'c', or High Tech with a very small 'h'!' 

Pete's heroes predict a dislike for Post Modernism. Indeed, the only Post Modern building which received recognition from Pete in the preference sort is La Piazza d'Italia, which he 'stumbled upon' quite by accident when he was in the States. Nevertheless, it was not the style which impressed him, but the scale. However, unusually for a High Tech/Modernist, he does not find Vernacular architecture offensive, 'provided it is kept to small scale'.

Although Rationalism is not as disliked as Post Modernism, it is not amongst Pete's stylistic preferences. He thinks that 'it only looks good on paper'. He also mentions that, 'this kind of building can't work with the materials, it gets tatty'.

Pete is the first student to cite one of the lecturers as a direct influence on their work. He feels that this particular tutor has influenced his 'approach to urban design'. This theme is mentioned in the sorts with respect to the 'settlements' of Wood St. Townhouses, Kresge College, and La Muralla Roja, and the 'symbolic urban gestures' of La Piazza d'Italia and the Staatsgalerie.
11.6 Summary and Discussion

All the students discussed in the case studies have shown a direct relationship between the divisions they made in their sorts of the buildings and the way in which they talked about their own work.

For Cathy, a focus on building type reflects her own interest in housing design. Simon's emphasis on style is the main constituent of his sortings, and also the factor which he believes to be the basis of judgements of his work. Interestingly, his subjective and objective evaluations are ones he would like to see applied to his own work. For Nick, a concern with private and public space, translates into formal features of his designs. Clive discusses each of many aspects of his work, which are also used to divide the buildings. His principle concern is with structure and materials which comprise the most consistent descriptions in his sorts.

In each case study the predictions of architectural preference from the heroes mentioned support the model proposed in Chapter Ten. The only anomaly to this model is Cathy, who seems to be designing 'ahead' of her changing evaluations. Her old Vernacular/ Post Modern heroes accord with her old work, but the Southern Polytechnic work shows clear Modern influences, and whilst she does not like High Tech architecture, she designs it!

Cathy, like many of the Southern students, includes elements of Rational architecture in her designs even though she claims to deplore the movement.
This tendency to rate rational and Modern architecture more highly than the Northern students was identified as a feature of the Southern students' evaluations in Chapter Eight. The case studies show that these influences are present even in the work of those Southern students who do not rate the Rationalists highly.

In summary, the kind of concepts used and distinctions made by the students in the free sort are echoed in both elements of their designs and the way in which they discuss their work. The students design broadly within the architectural style of their heroes, although school-specific influences are to be expected. The evaluations made of the buildings support the model of architectural preferences presented in Chapter Ten.
12.1. A System of Architectural Constructs

The results have shown that both sets of students do indeed employ a system of architectural constructs in order to categorise the buildings, and that construct use within this system is subject to variation according to the length of training which the students have undergone.

The concepts used by the students at the outset of their courses are more physical and tangible in nature, for example, descriptions of the form of the buildings, the materials which the buildings are made of, and the purpose for which the buildings are used.

On the other hand, students approaching the end of their training are likely to use more complex, abstract concepts, e.g., design approach. The use of evaluative concepts to divide the buildings remains fairly constant throughout the years sampled. However, evaluative statements are rarely used alone when categorising the buildings, and most frequently take the form of evaluations based on elements of the other constructs, for example, 'horrible concrete buildings', 'tacky Post Modernism', 'ugly repetition'.

Thus, a student may make an objective (value free) or subjective (value laden) judgement of the category to which a building belongs, based on concrete or abstract qualities of the building.

The way in which the constructs vary in use according to the sub
samples of the study can be summarised in the following mapping sentence,

The extent to which students in the first second third year at the Northern School make subjective evaluations of each building's group membership based on their concrete qualities.

However, there is one construct, architectural style, which is used consistently and frequently by all the year groups sampled at both schools. Indeed, the only difference between the two schools in the use of architectural constructs lies in the Southern post graduate students' greater use of design approach categories at the expense of 'straight' stylistic divisions. The way in which the Southern students use design approach categories indicates that they are interpreting the concept of style in a more analytic way. That is, rather than just naming styles, the students were explaining what the architects were hoping to achieve, etc.

The difference in construct use between students at the start and completion of their courses accords well with the findings of previous studies of the constructs used by design professionals. Those researchers who have employed open-ended procedures, allowing participant generated constructs, have found a qualitative difference in the constructs used by architects and non architects.
For example, Leff and Deutsch (1973) found that the non architects in their study tended to characterise environments in terms of ethno-demographic factors such as generational and lifestyle characteristics of the occupants of the setting. Leff and Deutsch (1973) conclude that in contrast, the design professionals,

'experience environments more in terms of one particular salient abstract dimension of meaning,' (Leff and Deutsch 1973 p290).

Similarly, using the Multiple Sorting Procedure, Groat (1979) found that whilst architects conceived of architecture in terms of abstract and inter-related concepts such as design approach and architectural style, the accountants in her study used more tangible, physical descriptors such as building type in order to categorise the buildings.

Interestingly, the architects in Groat's study were frequently inclined to use architectural form to classify the buildings, as were the architects who participated in a similar study by Wilson (1985). Since architectural form is not a construct applied to buildings by 'lay' samples, the results of the present thesis indicate that the first year students have been socialised fairly quickly into the use of this concept. However, the final year students, who would be expected to compare with the qualified architects in the previous studies, were less concerned with the formal qualities of the buildings.

Nevertheless, the present study, when taken with the findings of Groat's (1979) and Wilson's (1985) studies, shows great consistency in the use of architectural constructs between totally different samples of architects. Using the same procedure in different countries, in different years, and with a different set of photographs, the three
studies show that the concepts used by the architectural profession when dealing with architecture are remarkably stable. This demonstrates the existence of a system of concepts which is shared amongst the profession, despite diverse educational backgrounds.

If the architectural profession deals in a shared set of constructs, then it follows that there accompanies a shared language for communicating within this occupational culture.

Salaman (1979) claims this shared language separates those inside the community from those outside. This creates a barrier through which outsiders cannot penetrate, and Salaman claims that this is often encouraged by the members,

'The distinctive and discrete culture is complacently paraded as a source of pride and delight available only to those fortunate and clever enough to have gained entry to the occupation.' (Salaman 1979 p187)

A common vocabulary is required in order to communicate ideas throughout the whole architectural community. New concepts and designs are transmitted through the architectural journals and cannot be communicated by photographs alone. Nevertheless, architects are often accused of elitism in their work and the architectural vocabulary creates a further barrier to cross-disciplinary understanding. The use of excessive architectural jargon serves to further mystify the profession.

The linguistic division between architects and those in related professions leads to a situation whereby those who are not 'native speakers' can be identified with ease. Prak (1984) makes the analogy,
'a few minutes conversation are sufficient to identify... Scots, Welshmen, Irishmen, Cockneys, or Aussies for an Englishman... to be one of the boys you have to speak their language with their accent.' (Prak 1984 p59)

The preceding discussion has considered the difference in construct use between the students at the outset and conclusion of their training. This difference was considered with respect to the parallels which can be drawn to the constructs used by architects and non architects. However, the change in the type of constructs used by the students, implied by the cross-sectional data, can also be considered with reference to the developmental theory reviewed in Chapter Two.

Chapter Two provided a review of several prominent developmental theories in order to make some predictions regarding the nature of conceptual development in architectural education.

The transition from dealing in concrete concepts to more abstract and complex aspects of the world is one of the recurrent themes in theories of development. The architectural students' use of concrete, tangible concepts such as materials, size, etc, prior to dealing with complex and abstract classifications parallels conceptual development in childhood. In Piagetian terms (Flavell 1963) the infant's manipulation of physical objects represents the earliest stage, the sensorimotor period. During this stage the infant is concerned only with the tangible, and lacks the ability to represent objects in their absence. As the child develops, so too does the ability to represent not only physical objects, but abstract, non physical entities.

Hart and Moore's (1973) exposition of spatial development is based on Piaget's stages and details this same transition in terms of spatial
and environmental knowledge.

A similar transition underlies theories of moral development (eg Kohlberg 1963, 1969) whereby the individual relies less on physical outcomes to determine moral behaviour. The final stages of Kohlberg's theory see the individual working within the far less tangible framework of a personal moral code.

The theories of conceptual development during college, reviewed in Chapter Two, all agree that a primary feature of development lies in the students' increasing ability to free themselves from beliefs in the existence of one 'truth', and to adopt the more abstract reality of multiple perspectives.

Other research pertinent to the development of architectural concepts are those studies which address concept acquisition in childhood. From the vast array of naturally occurring concepts encountered in daily life, research has repeatedly shown that it is concrete categories such as furniture and animals which are among the first that children learn, (eg Klausmeier et al 1974).

Since architectural education can be considered to be a totally new socialisation process for the students (Berger and Berger 1976), it follows that the first concepts to be attained are based on simple physical criteria. Thus the shape (form), materials and size of the buildings would be the most simple concepts to acquire.

The acquisition of architectural concepts will be considered further in section 12.4, in relation to the concept of architectural style.
Chapter 12.1 has focussed on those constructs which vary in use as a function of the students' stage of education. However, at all stages of education, at both schools of architecture, it is architectural style which is the most consistently used construct.

Chapter One has discussed evidence to suggest that the predominant concern of contemporary architects lies in their role as social engineers, in contrast to the aesthetic motivations of their predecessors. Lipman (1970) and Blau (1980) have proposed that the most salient feature of the architectural value system in the 1960's and 1970's was a determinist belief in the social responsibility of architecture. In contrast to the findings of these authors, the students in the present study show remarkably little interest in the 'social role' of architecture. Only five of the seventy-five students used any constructs relating to 'humanity', and issues such as contextualism were raised by equally few.

Lipman's (1971) conclusion that a purely aesthetic role is no longer sufficient for architects' professional endeavour seems unfounded in the present sample. Whilst some students used phrases reflecting 'humanitarian' concerns in relation to certain buildings, these descriptions were usually evoked to justify their stylistic preferences, rather than to demonstrate concern for the user.

The creation and appreciation of architectural style has been shown to be the most important concept for the students of the eighties. It is possible that the architects sampled by Lipman and Blau, having trained and practiced through the Modern Movement, had been forced to create a social role for themselves, since the aesthetic side of their work had
been deemed unnecessary. In contrast, Post Modernism and the eclectic styles of the eighties may have reinstated artistic concerns for today's architectural students.

The following section focusses on the students' conceptualisations of architectural style. The consistency of use for this central construct allows an opportunity to examine the content and structural changes in its use during the process of architectural education.

12.2 The Facet Structure of Architectural Style: A Developmental Analysis.

The Multiple Sorting Procedure permits a deeper insight into both the categories used in stylistic judgements, and the content of those categories in terms of architectural examples. The use of MSA reveals the structure of the concept, producing a composite geometric representation of the relationships between the buildings as perceived by each group of students.

The MSA plots discussed in Chapter Seven have demonstrated the way in which the structure of the concept of style is increasingly sophisticated with each year sampled, and have shown both similarities and differences between the conceptualisations of the students at the two schools of architecture.

From the data collected at the Northern University, the most striking result of the analyses is that the construct of architectural style is built on the same basic framework for each year group. Four broad stylistic divisions are made by all the students, and these four styles; Modern, Post Modern, Vernacular and High Tech, form the basis
of the students' divisions in every case. These stylistic divisions form a polarising facet and this basic structure, apparently acquired in the first year of training, underlies even the most advanced students' judgements.

Although the stylistic groupings become more highly differentiated with each year sampled, and sub-stylistic groupings are increasingly identified, the four main regions contain almost the same buildings from the first to the final year. For example, Butterworth House (Building 24) and Megson's Todd House (Building 19), identified as clear examples of Vernacular architecture according to Jencks' (1982) definition, are indeed consistently classified as Vernacular architecture by the students.

This basic 'four style' framework equally applies to the stylistic structures derived from the undergraduate students' sorts at the Southern Polytechnic. However, whilst the structural development of the concept of architectural style runs parallel at both schools during the undergraduate years, it is the students nearing the completion of their training whose conceptualisations reflect a school specific structure.

The MSA plots representing the categorisations of students in the third, fourth, and final years at the Northern University are somewhat more complex than those of the first and second years. Whilst maintaining the polarising facet of stylistic categories, they also include a modulating facet resulting in a radex. By referring to the consistencies and inconsistencies in the students' classifications it can be concluded that this modulating facet reflects the typicality of the buildings within each stylistic category.
On the other hand, the plots relating to the Southern diploma students' sorts reveal a quite different conception of architectural style. Whilst Vernacular architecture is seen as a distinct stylistic group, the Modern, Post Modern, and High Tech buildings are represented along a continuum from Modern to Post Modern. The presence of this ordered facet indicates that rather than conceiving of architectural style as a categorical concept, these students represent style in the form of a combination of architectural developments, from old High Tech to new High Tech, from old Rational to new Rational, etc.

The parallel development of the structure of architectural style during the undergraduate years at both schools suggests some similarities in the acquisition of professional concepts. However, the difference between the post graduate students' conceptions of architectural style are clearly school specific.

Whilst the MSA structures derived from the sorts done by the two groups of final years at each school are quite different, they are almost identical to those derived from the students one year behind them. This same underlying structure, evidenced by two separate cohorts within each school provides the most convincing evidence of the effect of school affiliation.

Finally it is worth considering a number of possible explanations for the different structures produced by the MSA on the advanced students' sorts. It is possible that lack of coherence in the Southern students' opinions could produce a less differentiated structure. For example, if all the students within one year group put the same buildings into the
same categories regardless of the stated reasons, this agreement demonstrates a coherence of opinion, and results in distinct regions in the MSA plots. On the other hand, if the students categorised the buildings in a number of different ways, this would produce a less differentiated structure.

Thus it could be hypothesised, for example, that the Southern students are more diverse in their conceptualisations. This would be supported by the large number of idiosynchratic heroes mentioned by the students at the Southern Polytechnic. It is also more common to find students in the diploma years at the Southern school who have transferred from different undergraduate courses.

Nevertheless, the Northern students' agreement is still based upon a categorical model of style in contrast to the Southern students' framework. It has been suggested that the construct 'design approach', which is used more often by post graduates at the Southern Polytechnic, is in essence a more analytic conception of style. The Southern students use of this construct may go some way to explaining the complexity of the MSA structure. That is, whilst some design approach categorisations parallel stylistic groupings, eg 'sky scrapers trying to be different (Post Modern), others cross stylistic boundaries eg 'creating urban spaces'. Such cross-stylistic groupings would 'pull' the buildings into a more integrated structure.
12.3 The Definition of Stylistic Movements

With the exception of the ordered facet of stylistic developments shown in the MSA plots of the Southern post graduate students' sorts, the structure of the concept of style is very stable. This consistency in the students' conceptualisations of style allows an exploration of the way in which styles are defined by the students in this study.

Chapter Three has illustrated that the definition of stylistic movements has conventionally been the preserve of the architectural critics. These writers observe and comment on developments in architecture and chart the emergence of new 'movements'. Using the students' categorisations it is possible to discover whether the students define architectural styles in the same way as the architectural critics.

Chapter Seven hypothesised that in acquiring the concept of style the students would 'learn' to make the distinction between four major styles, derived from the literature. The mapping sentence which was proposed is shown below.

The extent to which categories of architecture are differentiated in the first sorts of students in their year of training at the

The stylistic structures generated from the majority of the students' free sorts, and all the students' preference sorts, are clearly
categorical, and are indeed built upon these four major stylistic groups.

The circular relationship of the four major styles around the plot reflects the perceived similarities between each style to the one adjacent to it, and the dissimilarity between each style and the one opposite it. For example, it is possible to have a Vernacular building with either Modernist or Post Modernist influences, but not a Vernacular building which has High Tech influences. Similarly, it is possible to have a Post Modern building with Vernacular, or High Tech influences, but not (by definition) a Post Modern building which is Modern.

Therefore, the borderlines between each style and the one adjacent, clearly show the existence of stylistic 'combinations' of Modern Vernacular, Post Modern Vernacular, Modern High Tech, and Post Modern High Tech. The mapping sentence is thus more accurately restructured to include two stylistic facets; Modernism and its 'replacement', Post Modernism, and High Tech and Vernacular, reflecting the future and the past. This reformulation is shown in the second mapping sentence.

The extent to which categories of architecture are differentiated in the first sorts of students in their year of training at the

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<td>Modern</td>
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[Northern University] [Southern Polytechnic]
It is particularly interesting to re-examine Jencks' (1982) definitions of High Tech and Vernacular architecture in the light of empirical findings. Jencks' assertion that Vernacular architecture is a reaction against Modernism would not predict the overlap between these styles, labelled by the students as Modernist Vernacular.

Charles Moore's Kresge College is one of the buildings labelled as Modernist Vernacular by the students. Jencks (1982) himself acknowledges Moore's 'interest in Vernacular...together with his Modernist background' (Jencks 1982 p116), yet he defines this work as Post Modern. On the other hand, the 'radical eclecticism' of La Piazza d'Italia is supported by the students' consistent categorisation of this building as highly typical of Post Modern architecture.

Quinlan Terry's Wivenhoe Park is perceived to be the 'most Post Modern' of the Vernacular buildings. Although placed within the Vernacular region of the plots, the students do distinguish this building from the other Vernacular architecture. Jencks (1982) classifies Terry's work as 'revivalism', and is scathing in his attack,

'He builds large country houses for the English upper class, in an era when such houses are thought not to be created anew, and has the temerity to produce them without irony, without acknowledging either that the Modern Movement existed or that the British empire has ceased...the results are more incongruous than if they had been built entirely in fibre glass, because they imply that time has stopped somewhere around 1780,' (Jencks 1982 p143).

This distaste for Terry's work was echoed by some of the students in the present study, particularly at the Northern University. Nevertheless, Jencks' definition of revivalism fits well with the ethos of both Vernacular and Post Modern architecture and thus accords well with the way the students conceptualise Terry's building.
However, Jencks classifies Spoerry's Post Grimaud within this same class of architecture, a connection not made by the students, the majority classifying this development as Vernacular rather than Post Modern.

The major discrepancy between Jencks' (1982) definitions and those made by the students in the present sample is in Jencks' notion of Late Modern architecture. Those buildings which the students classify as High Tech are defined by Jencks as Late Modernism. Jencks holds that High Tech architecture developed out of Modernist architecture. Given his belief in the incompatibility of Modernism and Post Modernism (Jencks 1977), the close relationship which the students see between High Tech and Post Modern architecture is inconsistent with Jencks' definition.

Nevertheless, the third year students at the Northern school do use the term which Jencks coined for the slick glass aesthetic, 'Slick-Tech'. This term is used by Jencks when referring to the work of architects such as Norman Foster, a man who 'makes an expressive virtue of the wobbly flat' (Jencks 1982 p70).

In summary, Jencks' (1982) stylistic definitions fail to predict the empirical relationships between Modern and Vernacular architecture, and Post Modern and High Tech architecture expressed in the students' conceptualisations.

However, the empirical testing of the critics dictates is not a new endeavour. Groat (1979) specifically examined the critics claims for Post Modernism, and tested their accuracy. She found that far from the 'dual coding' of Post Modernism resulting in their legibility to the
non architects in her study (Jencks 1977), the non design trained professionals evaluated both the Modern and the Post Modern buildings in a similar way.

Indeed, whilst critics and theoreticians have debated the advantages of the new Post Modern architecture, the students' conceptualisations confirm the views of the 'man in the street', that Modern architecture is not 'dead'. Whilst Modernism is no longer the dominant aesthetic on architecture, the paradigm shift which Broadbent (1979) discusses has not happened. The categorical model of style indicates that Modern architecture is seen as one of a number of possible current styles. The students made few references to Modernism as an historical movement, whatever their personal views. Ironically, the students who were most likely to conceive of Modernism as one end of an architectural continuum, were those students who were most likely to design it.

12.4 Concept Acquisition

The previous section has demonstrated that the analysis procedures used in the thesis are particularly suitable for the definition of various architectural styles and the relationships between them. These definitions have been considered in relation to architectural criticism. However, the stylistic definitions inherent in the students' judgements also allow a more psychological analysis of the way in which buildings are allocated to various categories. Thus the development of this categorisation process over the years of training may provide an insight into the way in which the concept of architectural style is attained.
Chapter Four explored the roots of the Multiple Sorting Procedure, and pointed to contemporary cognitive psychology to illustrate the importance of the categorisation process in human information processing.

One of the most important contributions to the definition of naturally occurring concepts has been made by Rosch (eg Rosch and Lloyd 1978). Her work stood in contrast to previous research which was based on experimentally defined concepts, such as patterns or nonsense syllables.

Prototype Theory (eg Rosch and Lloyd 1978) centres on the notion of a prototypical instance of a certain category, against which other potential members can be compared. Prototype Theory applies particularly well to the classification of architectural style since it allows instances to fall along a dimension of typicality, and accounts for the 'fuzzy regions' where two categories border. Dimensions of typicality, and fuzzy regions can be found in the MSA plots of the students' categorisations of the buildings.

Considering model of prototypicality, it is worth reconsidering the MSA plots derived from the sorts of the more experienced students at the Northern University. In addition to the categorical, polarising facet of architectural style, these plots contain a modulating facet relating to typicality. Thus, those buildings plotted towards the centre of the radex were perceived to be the least typical of their class. Therefore, in searching for 'prototypes', the most typical buildings will be found at the edges of the plots.

Of the present selection of buildings, the Vernacular appeared to be
the most easily classified by the students. The Vernacular grouping was the first distinct category to emerge in the students' classifications. It is possible that this class is a particularly simple one to acquire, being essentially defined with reference to materials and size. On the other hand, the sub-set of buildings selected for the present set may be particularly good exemplars of the Vernacular, since they are consistently plotted at the outside of the radex of architectural style, (see for example Figure 7.13).

At the opposite extreme, acquisition of the concept of 'High Tech' appears to present a number of problems for the students. The Pompidou Centre is the closest to a prototypical High Tech building, being not just the first, but the building most consistently classified as High Tech. However, the students' classifications of the remaining High Tech buildings are somewhat erratic. This region is the last to be differentiated from the other styles by the Northern students, and the Southern students divide the group into Post Modern, and Modern High Tech in all three undergraduate samples. The confusion arises between the 'Slick-Tech' buildings such as Foster's Sainsbury Centre and the exposed services and coloured piping of buildings such as TVAM.

If the concept of style is acquired firstly on the basis of simple physical criteria, eg material, then had the students established that coloured piping is equated with 'High Tech', for example, the glass structures would not fit the concept. This would be particularly true if early definitions portrayed 'glass boxes' as characteristic of Modern architecture. This confusion can be seen in the early years at both schools, and seems to be overcome with increasing knowledge.
However, it is also worth noting the way in which students in the later years of education, who have acquired the concept of style, still place Modernist works such as the Seagram building along with its contemporary counterparts. This is a clear example of what Bonta (1979) describes of the reinterpretation of architecture according to the Zeitgeist of the time.

Nevertheless, it seems plausible that if physical criteria are used to assign buildings to the High Tech category in the early years, the concept has not been successfully attained, and the students will 'fail' with certain exemplars. On the other hand if the concept has been learnt at a more abstract level, based for example on reflecting modern technology, the categorisation would be more successful.

Finally it is worth considering stylistic definition from a broader perspective. Whilst it is easy to compare the critics' definitions with the shared conceptualisations of the architectural profession, the two cannot be truly seen as independent. Practitioners may extract and perpetuate the design features which create a movement, whilst the critics document its development. On the other hand, the writings of the critics, historians and journalists help guide architects' acquisition of stylistic concepts. The shared conceptualisations of the students must be a product both of psychological processes of concept acquisition, and of the influence of architectural educational as a purveyor of occupational culture.
12.5 The Relationship Between Style and Evaluation

It has always been a concern for architecture to define the qualities which comprise a 'good' building, and many authors have expounded their own versions of these factors. The most widely quoted of the historical writings is Wotton's (1624) dictum 'commodity, firmness and delight.'

Contemporary writers are still concerned with defining the uses and requirements of buildings. Following Canter's (1970) call for a theory of function in architecture, Hillier et al (1972) outline the four functions which they believe buildings should fulfill.

Firstly, they define a building as a climate modifier, acting as a complex environmental filter between inside and outside modifying, by increasing, decreasing and specifying, the sensory inputs into the human organism. The second function of a building is as a container of activities. Hillier et al (1972) suggest that it is possible for a building to both inhibit and facilitate activities, perhaps occasionally prompting or determining them. The building also locates behaviour, and in this sense can be seen as a modification of the total behaviour of society. The third function of a building is as a symbolic and cultural object, in terms of both the intentions of the designer, and in the interpretations of those who encounter it. The final function of a building in Hillier et al's (1972) terms is as 'an addition of value to raw materials (like all productive processes), and within this it is a capital investment, a maximization of scarce resources over time.' (Hillier et al 1972 p29.3.12)

Echoing Hillier et al's requirements, Broadbent (1975) insists that a building must provide the spaces required for the actions which take
place within. He states that the building must act as an effective environmental filter, creating an acceptable internal climate.

Broadbent (1975) requires of a building that people derive 'visual pleasure', i.e., that it contains features which are symbolically relevant to the culture for which it is built. The building should make use of materials in such a way as to provide the most 'value' from the raw materials. Finally, Broadbent (1975) adds the requirement that buildings should take full account of the impact which they have on their physical surroundings.

He adds that 'this may not be an exhaustive list, although it seems adequate at the moment.' (Broadbent 1975 p77).

It was the need to evaluate the work of his own office which prompted Caudill (1971) to devise a more explicit definition of the factors which create a 'good' building. The eighteen requirements he identified are shown below.

1. Is there a concept (underlying idea), and are the spaces grouped, sized, and shaped to reinforce this concept?
2. Do the spaces have affinities which allow people and things to flow with efficiency?
3. Have the shelteral considerations and environmental controls been recognised?
4. Does the building work in a generic sense as a school helps to teach and a hospital helps to cure?
5. Is the plant—buildings and ground—imaginatively conceived?
6. Have the major operational problems (security, maintenance, routine operation) been considered for the future as well as the present?
7. Is there propriety in the forms and spaces reflecting the concept?
8. Do the forms and spaces possess the spirit of the times without being fadish?
9. Do the forms—major and minor, together with their connections—take advantage of up to date technology?
10. Does the composition of form and space contain both variety and unity projecting an aura of architecture?
11. Are the forms meaningful—from mass to details?
12. Is there a systematized integration of structure, mechanical and electrical?
13. Are the forms 'lean and clean', without sham, yet nothing wanted?
14. Do the spaces permit efficient operation capitalizing on the idea of maximum effect with minimum means?
15. Has industrialised building method been given serious consideration by saving time and labour on the site?
16. Is there a realistic solution to the budget problem?
17. Can this building be changed economically, either through conversion or expansion, to meet future requirements?
18. Can this building through its elimination of waste, dignity through restraint, and simplicity of construction, be classified as 'most for the money'?

(Caudill 1971 p 141-143)

The above examples confront the factors which should be used to gauge the success of an architectural project. However, the results of the present study show that the students, in reality, do not evaluate the buildings according to any of these factors.

The students at these two schools of architecture do not judge buildings on their individual merits, but rather evaluate buildings according to the broad stylistic movement to which they belong. Thus for example, if a student does not like Post Modern architecture, whilst there may be good and bad examples of the style, the whole style will generally be condemned.

This result is particularly interesting since the students rarely state that style is to blame for their negative reactions. Thus, whilst some students will condemn the style with statements such as 'tacky Post Modernism', or 'ugly Modern buildings', it is often the case that reasons given for their evaluations are based on other criteria, such
as user requirements, construction, or materials.

Nevertheless, when the students' evaluations of the buildings are analysed using SSA, the overt features of the buildings which are judged in a similar way indicate that architectural style underlies the students' judgements.

The strong relationship between the students' conceptualisations and evaluations of architecture supports Blau's (1980) assertion that meaning in architecture is 'only comprehensible in terms of both cognitive and subjective elements,' (Blau 1980 p334).

The results have shown that this is indeed the case for the students in the present study. Not only were the students unable to make objective classifications without associating them with subjective responses, but they were also unable to make subjective judgements of the buildings without relying on the objective criterion of style.

It is possible that the students evaluate the buildings on the basis of two levels. Firstly, those styles they like are selected from those they do not, and judgements of a building's success in terms of other criteria could then be applied in order to distinguish between the 'good' and the 'bad' examples.

This position could be represented by the mapping sentence below:
The extent to which a building is considered to be successful on the basis of its features:

<table>
<thead>
<tr>
<th>Modern</th>
<th>Vernacular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Modern</td>
<td>High Tech</td>
</tr>
<tr>
<td>(Neither)</td>
<td>(Neither)</td>
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A1  A2

Very Successful

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Very Unsuccessful
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The implications of this model would, however, be quite disturbing. One could discover that a follower of Post Modern architecture would rate a structurally unsound, functionally useless Post Modern building more highly than a reasonably successful building of another style!

Indeed, in the case studies reported here, Simon sorted the buildings precisely in this way. Having identified the 'good' and the 'bad' examples of each style in objective terms, he then announced his own opinions, his stylistic judgements overriding the objective judgements, so that bad examples of the style he followed were preferred to the good examples of those he did not (see figure 11.13).

The alternative explanation of these findings lies in the students' belief in 'biased' information. Thus whilst a student at one school might believe Post Modern buildings work with sound materials and will 'stand the test of time', students at the other would believe the same of Modern buildings.
This position would result in students making seemingly objective judgements about construction, materials, form etc, but their beliefs in these objective qualities being inextricably linked to the architectural style of the buildings.

It would be of great interest for future research to address these issues in the evaluation of buildings. Using stylistic definitions generated for the current set of buildings, a simple questionnaire based on the above mapping sentence would indicate the relationship between these evaluative criteria.

Given the importance of style in conceptualising and judging architecture, it is worth considering the possibility that the students' focus on architectural style is a methodological artefact.

It could be argued that the students' use of stylistic categories is a product of the photographs selected for the study. The photographs were deliberately selected to represent the range of architectural styles, and this selection was done by an eminent professor of architecture. It could be suggested that the shared conceptual framework within the architectural education system resulted in architectural style being the 'obvious' categorisation scheme required of the students.

If one wished to overcome the initial reliance on stylistic framework which the students appear to impose on the buildings it would be feasible to ask the students to sort or evaluate sets of buildings within one style. Under these circumstances it would be interesting to see whether the students conceive of the buildings according to different criteria, or whether they break the style down into stylistic sub categories, as seen in the development of the polarising facet of
architectural style.

With respect to the evaluations of the buildings, it would also be interesting to discover whether the students would condemn the whole set of buildings, or whether they would employ the 'secondary' criteria to judge the buildings.

12.6 A Model of Stylistic Preferences

The results of the thesis have shown architectural style to be the single most important concept for the profession. Not only is style the construct most frequently used to classify the buildings in an objective way, but the students' own personal evaluations were based upon stylistic categories.

It is interesting to compare the stylistic structures generated from these two different measures; the MSA plots derived from the categorisations of the buildings in the free sorts and the SSA plots of the students' evaluations of the buildings.

These two different analyses of two different sets of data show the structure of the concept of style to be very stable. With the exception of the post graduate students at the Southern Polytechnic, the structure of the concept remains the same and this lawful facet (Levy 1985) of architectural style can be represented by a categorical, polarising facet comprised of four basic stylistic regions, discussed in section 12.3.

The actual structure of the MSA plots indicates that it is possible for buildings to exist which are combinations of the styles adjacent around
the plot but not across it. As outlined in section 12.3 it is possible to have Post Modern High Tech and Post Modern Vernacular. Similarly it is possible to have Modern High Tech and Modern Vernacular. However, the combination of Modern Post Modern and High Tech Vernacular cannot, in theory exist since these styles are conceptual opposites.

However, the results show that this same model also applies to stylistic preferences. Thus, if a person likes one style of architecture, they may also like the style of architecture adjacent round the plot, but not those opposite. For example, someone who likes the Post Modern buildings should also like the Vernacular buildings, particularly the Post Modern Vernacular, and the High Tech buildings, but particularly the Post Modern rather than the Modern High Tech. They will not however, appreciate the Modern buildings, and those buildings 'bordering' the Modern regions.

This general model of architectural evaluation within the profession will be considered more fully in conjunction with the specific preferences of each sub group of students according to their architectural heroes, (see section 12.9).

The empirical structure of the concept of style has further implications. The SSA space in which the buildings are plotted can be thought of as representative of the full scope of architectural examples, only some of which (ie those in the present set of photographs), are actually represented in the space. Therefore the 'gaps' in the space imply buildings which could theoretically exist, but have not been included in the present set. This concept was briefly introduced with respect to the possible existence of buildings in the
centre of the plot of styles. Whilst it is possible that the 'hole' in the centre of the plot is representative of the impossibility of 'combination' buildings, it may be that they can exist, and if enough examples were provided some would eventually fit the description. For example, Meier's Museum fur Kunsthandwerk is placed closest to the center 'hole' of the plots as it is variously described as Post Modern, Modern and High Tech. If buildings could be designed to fit the middle of the plot it is interesting to consider whether they would be appreciated by everyone, or no-one!

The models of architectural style can thus be used to predict people's architectural preferences. Thus if one set of buildings are appreciated by a client, it is possible for the architect to have an indication not just of the buildings in the present set which the person will like and dislike but also the buildings in the gaps.

12.7 The Appreciation Gap

The premise that architects use a different evaluative criteria with respect to architecture has been predicted from theories of occupational culture (Salaman 1974), demonstrated by empirical study (eg Hershberger 1969), and is increasingly becoming an issue for public debate. The 'appreciation gap' between designers and the people who live with their work has once again come to the public eye, owing to the interest shown by the Prince of Wales.

It can be suggested that the views of the students in the first years of study approximate the views of the general public. Although students who have just started a course in architecture will be different in their awareness and interest in architecture from a true 'lay' sample,
they should not have been too influenced by the training per se.

The results have shown that the two groups of first years make remarkably similar evaluative judgements of the buildings. The fact that they evaluate the buildings so similarly, even though they are at schools of architecture at different ends of the country, suggests that these students may indeed be representative of the general public, or at least that they are representative of first year students. Nevertheless, if there is a difference in the type of architecture which is appreciated by those with and without training, then it should be expected that the students at the outset of the courses will value different buildings to the students in the final years.

Smallest Space Analysis of the evaluations made by each year group of students shows that their value judgements do alter as a function of year of study. In fact, the two sets of first years studied are more similar in their judgements than the first and second year students within each school. Such findings point to the way in which the students are quickly socialised into a pattern of evaluations which has been imposed by the school which they attend.

If it is accepted that the cross-sectional differences in appreciation of the buildings are indicative of the learning process, then it is interesting to note the size of the correlations between each year group. Such an analysis shows the periods during the education process in which the students undergo the 'most' socialisation. The correlations of the SSA demonstrate that the greatest initial changes in evaluation occur between the second and the third year at the Northern University, and the first and second year at the Southern Polytechnic.
Nevertheless, this process of socialisation brings with it, not solely the views of the profession, but a set of values specific to the school of training. Analysis of the buildings which show developmental trends in evaluation revealed that there were certain buildings which showed linear increases and decreases in appreciation with each year sampled. These buildings accounted for the effects of architectural education within a school of architecture.

However, whilst the opinions of the final year students at both schools were different to the less 'educated' samples, they were also very different to one another. At the Northern school the students became more positive in their evaluations of the Post Modern buildings with each year sampled, whilst at the Southern school they became more negative.

Previous research on the evaluations made by design professionals has generally adopted an experimental versus control group paradigm, whereby groups of architects are compared to various 'lay' samples. The fundamental problem with this approach lies in the assumed homogeneity within the samples. Wilson (1985) has shown that the variation of opinion found within the profession is as great as inter-professional differences in architectural evaluation. The present thesis has argued that differences in appreciation of architecture within the profession may arise as a function of the school of architecture attended, and the results of the study indicate that school affiliation is indeed related to the students' evaluations of the buildings. The architectural predilections of the students at the two schools of architecture can be summarised by the Southern students' interest in Rational/Modern architecture and the Northern
students' appreciation of Post Modern architecture.

Thus it can be concluded that the students' evaluations of the buildings show differences associated with both year of study and school affiliation. The students in the first year of the two courses evaluate the buildings in a very similar way, and systematic changes in evaluation can be seen with each year sampled. Similarly, school differences in evaluation can also be identified, becoming increasingly more pronounced with each year sampled.

Therefore the empirical data support the mapping sentence which was originally proposed to account for school and year differences in evaluation of architecture. This mapping sentence is shown below.

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\text{second} \\
\text{third} \\
\text{fourth} \\
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\text{sixth}
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The extent to which students in the year of their training

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\begin{array}{c}
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\text{Northern University} \\
\text{Southern Polytechnic}
\end{array}
\]

at the are in their evaluations

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\begin{array}{c}
\text{C} \\
\text{similar} \\
\text{different}
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of the buildings.

However, if the appreciation gap between architects and non architects, and indeed between architects of different persuasions, is to be bridged it is necessary to search for the types of buildings which do not show inter- and intra-professional variation in evaluation.

The buildings which indicated the most promise for both lay and professional agreement proved to be the buildings in the Vernacular
set. It was these buildings which gained instant approval from the first year students at both schools, and thus by inference, members of the general public. However, although the students in the middle years of training did not like these buildings, the final year students had regained an appreciation for this style. This relationship held true at both schools of architecture, whilst the reactions to Modern and Post Modern architecture were related to the school attended. If these buildings appeal to both architects and non architects regardless of school differences, then there appears to be room for inter-professional and even intra-professional agreement.

The inclusion of photographs from the previous studies by Groat (1979) and Wilson (1985) allows a comparison with evaluations made by other architecturally trained samples. Whilst the rank order preference positions give some indication of the evaluations made of each building, it should be noted that their positions were relative to a different set of buildings in the previous studies.

Notre-Dame-du-Haut was the most highly appreciated building by both the American and British architects in the previous studies. In this respect the Southern students are similar, rating Le Corbusier's chapel at Ronchamp the second highest in their regard. For the Northern students, however, this Modernist work is ranked twelfth. Similarly, the strict Modernism of Eisenman's House VI ranks at number eleven for both of the previous samples, and gains a similar degree of appreciation from the Southern students at rank eight. On the other hand, whilst both previous samples rated La Muralla Roja in their top ten, the present samples do not rate this building so highly, particularly at the Northern school where it is second only in
disregard to Rossi's Galleratese 2.

In general terms, the Southern students tend to agree with the previous samples' positive judgements of the Modernist works. This tendency towards Modernism is strongest in the American sample. For example, whilst the American sample rate Vuoksenniska at third place, the contemporary Southern students at fourth, and the previous British sample at eighth, the Northern students rate this building much lower, at rank sixteenth.

Similarly, whilst the British sample from Wilson's (1985) study rated Butterworth House at rank three and the Northern sample ranked it at fifth position, the American and Southern samples ranked this building lower in their list at ninth and eleventh positions respectively.

In summary whilst the Northern and previous British sample are more likely to appreciate Post Modern architecture, the Southern and American architects are more likely to appreciate Modern architecture. It can be suggested that the previous samples' support for Modernism is related to the era in which they trained. Thus it would be expected that the American sample would be the most disposed toward Modernism followed by the British 1984 sample, and finally the students of the 1980's. With the exception of the Southern students, the acknowledgement of Modernist architecture has decreased gradually with each sample (1978, 1984, 1986).

12.8 Architectural Heroes

The analysis of architectural heroes was selected as an open-ended index of the students' orientation in architecture. Previous work by
Wilson (1985) has shown that identification of the participants' architectural heroes forms a useful framework for examining variation in architectural evaluation within the profession. It was thus hypothesised that the practitioners named by the students would vary as a function of both school attended and year of study.

With respect to the linear increases and decreases in interest in certain styles of architecture, the heroes mentioned by the students show the same stylistic variations with year and school as the evaluations made of the buildings in the photographs. For example, at the Northern school of architecture, admiration for the Post Modern architects Farrell and Hollien can be seen predominantly in the later years, indicating an increased interest in Post Modern architecture. Similarly the students admiring the Modern architects Aalto and Kahn are found in the final year at the Southern Polytechnic. Support for Le Corbusier is high amongst the Northern first years, but low amongst the Southern first years. In contrast the majority of his admirers are found in the final year at the Southern school, whilst none of the Northern final years mention Le Corbusier as a hero.

The reverse trend can be identified in support for Stirling. At the Northern school the number of students who admire his work increases with each year sampled, whilst at the Southern school there is a decrease in the number of followers.

Thus overall, the students at the Southern Polytechnic mention more Modern and/or Rational architects with each year sampled, and fewer Post Modern architects. Similarly, at the Northern University the students mention more Post Modernist and fewer Modernist architects.
with each year sampled.

Therefore, whilst evaluation of the photographs reveals the styles of architecture which were appreciated by the students, the request for heroes provided an open-ended check on the students' orientations. By asking for the students' heroes, it is possible to allow the students to express architectural interests which may not have been represented in the selection of photographs. The agreement between the findings derived from these two different measures points to the validity of the research procedures.

However, whilst the same developmental trends in stylistic evaluation were demonstrated within the schools, there were also certain architects whose admirers consist predominantly of students at the start of their education at both schools, and find fewer supporters amongst the more experienced students. For example, Frank Lloyd Wright and Gaudi find their support from those students who are near the start of the courses. Further, admiration for the work of Graves, Foster and Rogers is primarily found amongst the undergraduate students at both schools. On the other hand, the work of Mario Botta appears to have influenced the more experienced students at both schools.

Although only 22.7% of the architectural students were women, analysis of the heroes they mentioned indicates a tendency for the female students to admire different architects to the male students. When year differences were controlled for, the women in the study were more likely to admire architects who design Arts and Crafts and 'organic' architecture, compared to the male students' admiration for the more hard, geometric approaches. If such differences generalise for
architectural students, it would be very interesting to further investigate the architectural preferences of a number of non design-trained sub-groups.

Although previous studies have investigated personality (eg Henschen and Hershenson 1975) and experiential (eg Horayangkura 1978) correlates of architectural evaluation, few conclusions have been drawn. With the current controversy regarding the most appropriate styles of architecture for public appreciation, it would be very interesting to examine any variation in stylistic appreciation which does actually exist. For example, on the basis of a Swiss case study, Prak (1984) claims that 'apparently you do need an education to appreciate exposed concrete,' (Prak 1984 p52).

Chapter Nine examined not just the consensus of admiration for the architects but also the variety. When asked which architects they admired, a number of students mentioned 'heroes' which were quite unique and not mentioned by other students at either school. The Southern students mentioned far more 'novel heroes', and it is necessary to consider why these students have such a variety of heroes compared to the students at the Northern University.

One explanation may be that these students are exposed to more examples of non mainstream architects' work than their Northern counterparts, and therefore have more opportunity to find work which they like. It is possible then, that these differences relate to some aspect of the curriculum at the schools, eg that the Southern students have more optional specialist courses.
A second possibility would be that these students are simply less coherent in their opinions. That is, that the Northern students are exposed to as many examples of architects' work, but they are more likely to agree on those which are worthy of admiration. Here again it is possible that this is a function of the opinions of the staff. If there is a greater range of opinion amongst the Southern tutors, whilst certain tutors might influence all the students to some extent (eg Rationalists), it would also be expected that different tutors would influence different students (see Section 12.12).

12.9 A Model of Intra-Professional Variation

Previous work has indicated that the followers of certain architectural heroes can be distinguished by the type of architecture they evaluate more highly compared to their colleagues (Wilson 1985).

Wilson's (1985) study asked a sample of thirty-four architects to provide their architectural heroes. Three mutually exclusive groups of admirers were identified, for Foster, Aalto and Frank Lloyd Wright. As discussed in Chapter Three, the sample size was small, and it was not possible to distinguish whether the identification of only three coherent groups of admirers was due to the small numbers of participants or the narrow focus of their admirations.

These three heroes are also mentioned by the students in the present study, however, they are far from the most popular. This suggests that the predominant influences in architecture have indeed changed over the last decade. The architects in the previous sample were mostly older established professionals, and their heroes probably reflected the architects admired at the time of their education.
The present study identifies seventeen architects who have a following of five or more students. Smallest Space Analysis of each admiration groups' evaluations of the buildings shows that the more similar the style of architecture associated with the hero, the more similar are the followers' evaluations of the buildings. Thus the plot of heroes can be divided into regions according to the style in which the architects design. Three architects are found in the centre of the plot, Frank Lloyd Wright, Stirling and Meier. These architects are more general, their work being appreciated by followers of a number of styles.

Examination of the average preference scores attributed to the buildings by the students in each admiration group confirms the predictions of the model of stylistic evaluation. Thus, for example, the students who admire Post Modern architects are the most positive about the Post Modern buildings in the set, and the most negative about the Modern buildings. Students who admire Arts and Crafts architects are the most harsh in their judgements of the High Tech and Rational architecture.

Such findings allow the prediction of stylistic orientation, and thus the types of buildings appreciated, from knowledge of an architect's heroes. However, it has also been demonstrated that the overall strength of the reaction for or against the photographs in this particular set is related to the architects admired. For example, a student who admires Foster or Farrell would be the most positive about the most buildings in the set, whilst a student who admired Rossi or Mackintosh would respond most negatively to this selection of
buildings.

As discussed in section 12.6, once the dimensions of judgement which apply to the instances represented in the plots have been identified, it is possible to also draw conclusions based on the 'gaps' in the plot.

Thus, the SSA of heroes plotted according to the preferences of their admirers shows where the 'missing heroes' are located, within the empty spaces. One could therefore suggest that since there is a lack of a cult figure to represent Modern Arts and Crafts, for example, some publicity of design within this style would soon lead to the architect's notoriety. On the other hand, the gaps may be logical necessities as were the composite buildings discussed in section 12.6 (eg Modern Post Modernism), that is that the combinations may not be possible, or that there may be no call for such a 'product'. For example, it may not be possible to fill the gap between Scarpa and Gaudi.

However, it is interesting to note that the heroes plot is not empty in the centre. Whilst buildings may not exist which are combinations of all styles, certain architects are thought of as representative of more than one style, eg Stirling. The fact that these architects appeal to the admirers of a number of styles, may be based on the variety of their work, or because it is sufficiently different from the general stylistic groupings.
12.10 The Sample of Photographs

From a methodological point of view, it is possible to use the 'gaps' in the SSA and MSA plots of the buildings, along with the 'double check' of the students' heroes, to assess how well the set of photographs chosen for the study represents the scope of current architecture.

On the whole, the photographs selected were representative of the styles followed by the students. This successful coverage was, of course, due to the involvement of a professor of architecture, who had a strong feel for the styles of architecture currently followed by students. For example, if he had not suggested the inclusion of a Rossi building in the set, the views of the students would certainly have indicated its omission. The most notable differences between the set of photographs used and the heroes mentioned was in the students' interest in the work of historic architects, eg Lutyens, Mackintosh, and the classical architects favoured by the Southern students. Such architecture was not represented in the set, since contemporary architecture formed the focus of the original study.

However, the SSA plot of heroes with respect to their followers' ratings of the buildings reveals that the Arts and Crafts architects fit quite readily into the model, aside contemporary 'Vernacular' heroes such as Cullinan. It would be interesting to discover how the students would incorporate historic works into the stylistic scheme. One indication that this would be feasible comes from the occasional mistaken idea that Wivenhoe Park and Port Grimaud were 'true' rather than neo Vernacular. However, even if they were true Vernacular, these
buildings would still fit the overall scheme. The inclusion of true classical or gothic architecture, for example, would probably introduce too much variation and change the entire structure of the plots.

Examination of the MSA and SSA plots demonstrates that the most 'isolated' architectural examples are indeed the Vernacular buildings. The borderline between the High Tech and Post Modern regions is represented by TVAM and the Staatsgalerie. The overlap between High Tech and Modern architecture centres on the Miesian glass boxes of the Seagram buildings and ITT. Similarly the juncture between Modern and Vernacular has representative buildings from Claude Megson and Charles Moore. The Post Modern and Vernacular sections, are however, both tightly configured, and towards the outside edges of the plot. This indicates that the buildings lack intra-stylistic variation and are all good examples of their style. The building which shows the most stylistic ambiguity is Quinlan Terry's Wivenhoe Park (see section 12.3). If the set was to be altered in any way for future research it would be improved by including more diverse representatives of Post Modern and Vernacular architecture.

A final confirmation of the stylistic biases of the set comes from analysis of the number of buildings liked more or less by each admiration group. Chapter Ten has demonstrated that it is the admirers of Foster who rate the most buildings more highly than the other groups, indicating that the set is somewhat biased toward their preferences. Conversely, those who admire Mackintosh and Rossi are highly negative about the buildings in the present set, perhaps indicating the omission of buildings to their tastes.
12.11 Conceptual Development and Cognitive Complexity

The results of the thesis suggest that the salient features of the theories of conceptual development during college years do indeed apply to architectural education. These theories (Perry 1970; Hunt 1971; Kitchener and King 1981) hold that in the early stages of development the students believe in the existence of a single, objective truth, leading to a simple dualistic view of the world.

At this stage the students would be likely to evaluate architecture as either 'good' or 'bad', depending on the viewpoints which have been expressed by figures of authority who are thought to 'know the truth'.

Analysis of the mean number of categories used in the preference sorts shows that the students at the start of their education do indeed use fewer categories to represent their views. Their evaluative categories thus reflect the least ambiguity in their judgements of good and bad architecture.

The students in the middle of their training use the most categories when dividing the buildings according to their own evaluative schemes. This accords well with the later stages of conceptual development wherein the theorists propose that students acknowledge many approaches, and believe that 'good and bad' must depend on the perspective of the viewer. Thus Perry's (1970) stage of relativism would bring the need for more categories to represent the range of evaluations required.

Perry (1970) calls his final stage of development 'commitment in
During this stage Perry suggests that the students are aware that there is no single truth and that evaluation is dependent upon the individual's viewpoint, but they have reached a stage where they are able to commit themselves to their own personal perspective.

This stage is also supported by the quantitative data, there being a drop in the number of categories used to express evaluation by the final year students at the Northern school, and the fifth year at the Southern school.

These variations in the number of categories used are paralleled by similar fluctuations over the years for the number of heroes mentioned. Here again it would be expected that the first years would have narrower, more rigid ideas of which heroes should be admired, the middle year students would admire a greater number of architects and the students at the end of their training would be the most likely to have narrowed the focus of their admirations. Whilst this pattern holds for years one to five, the final years at both schools have the most heroes.

The quantitative data indicates some support for the predictions made by theories of conceptual development, it is necessary to heed the warnings made by Chapter Two. Whilst the mean number of categories etc, reflect the expected variations, individual differences in rates of progression and end points of development should be expected.

Interestingly, it was found that the female students in the study were more likely to have no heroes, or to mention fewer architects as their heroes. The results chapters have discussed the possibility that today's architecture is male dominated and male oriented, and that this
may be the cause of the female students' apparent lack of interest in architecture. On the other hand it is possible that these students are not just lacking heroes because there are no styles which they like, but have fewer admirations as they have reached Perry's stage of commitment sooner than their male colleagues.

Whilst the number of evaluative categories and architectural heroes show parallel fluctuations with year of study, the other quantitative measures derived from the sorting procedure show similar variations.

Thus, for each group of students in each year, the mean number of categories used to divide the buildings in both sorts were highly similar. Additionally, the number of constructs used to judge the buildings in the free sort was highly related to the number of categories used. In a test-retest study of first year students (Appendix A) both these measures were found to be relatively stable over a three month period.

The consistency of these variables suggests that the number of constructs and categories a student uses in dividing the buildings is related to their 'conceptual level'.

One explanation for such variations would be in terms of differences in cognitive complexity. Cognitive complexity essentially reflects the level of processing which is used by a person in order to structure their world.

Bieri (1966) states that,

'Cognitive complexity may be defined as the tendency to construe social behavior in a multidimensional way, such that a more cognitively complex individual has available a more versatile system for perceiving the behaviour of others than does a less cognitively complex person.' (Bieri 1966 p14)
The concept of cognitive complexity does not need to apply exclusively to social behaviour, the way in which an individual construes any aspect of their world can just as easily be thought of as complex or simple.

Bieri (1966) claims that as children develop, their means of categorising and construing the world will become more complex. He points out that in parallel with developments in the individual's processing strategies, there will be developments in the complexity of the stimuli to be processed. Thus people match the complexity of their 'response' to the complexity of the incoming stimuli.

The development of the child can once again be drawn upon to model the educational development of the student. Thus, as more complex constructs are encountered during education, the cognitive complexity of the processing strategy should also increase.

Bieri's (1966) formulations apply particularly well to the variables identified in the present study. He distinguishes between two aspects of cognitive complexity, differentiation and articulation. Differentiation refers to the discrimination between stimulus dimensions, ie the number of different construct dimensions employed by the person. On the other hand, articulation refers to the number of discriminations within a stimulus dimension, ie the number of divisions within a construct, or the categories of that dimension. This can be directly compared to the descriptive measures of the present study, the number of different constructs used to describe the buildings reflecting differentiation, and the number of categories used relating to articulation.

If the number of constructs and categories used by the students is
representative of articulation and differentiation, then there is
evidence to suggest that the two are related, and that the students'
level of cognitive complexity at a given point of their education is
consistently reflected in the categorisations they make.

Intuitively, it would be expected that cognitive complexity would
continue to increase throughout training, as more complex concepts are
encountered. However, complexity does not increase consistently with
each year sampled, there being a 'dip' in the number of constructs,
categories and heroes at both schools.

However, the preliminary findings of the present thesis indicate that
both cognitive complexity (eg Bieri 1966) and conceptual development
(eg Perry 1970) would be fruitful theoretical foundations on which to
base future analysis of development during architectural education.

12.12 Educational development and Socialisation

The most reasonable interpretation of the cross-sectional differences
in architectural evaluation and orientation is as part of the
educational process. Thus, students can be seen to learn which
buildings they are supposed to like and dislike, according to a system
of architectural evaluation. This system is determined both by
standards of judgement common to architectural education as a whole,
and to the school at which the students are training.

However, some alternative explanations of the findings could also be
proposed. It is possible that, for example, a number of the students in
the final year at a school have discovered the work of Botta, and that
the rumours of his work have slowly 'filtered' down through the years.
Thus, the appearance is that an increasing number of students in each
year admire a certain architect's work. However, the problem with this
explanation comes when the reverse trend is examined. It is less
plausible that a number of students in the first and second year at a
school have become excited about the work of Gaudi, and as a result one
or two of the students in the later years have decided to 'reconsider'
his work.

It is also possible that it is solely increasing knowledge of a project
which accounts for the difference between the students in the early and
later years of study.

Thus, the notoriety of the buildings used in the study means that some
students, notably those in the later years, will be judging the
buildings in a different way to the students in the early years. That
is to say that whilst the first year students must judge a building by
its picture in the photograph, the final years can judge the building
according to their knowledge of it, prompted by seeing the photograph.
If this was considered to be a serious methodological concern then two
solutions would be open to future research. The students could all be
taught about a selection of buildings, so that they were all armed with
the same background information. This however, would be a rather
impractical solution.

On the other hand, a set of obscure buildings could be presented to the
students, so that none of the students could use differing amounts of
knowledge about the projects. This however, would mean that all the
students would be judging a picture, and the research would lose the information which can be gained from the students' knowledge of the buildings. This would also mean that valuable cross references to the hero data would be lost, owing to the absence of notable architects' work. Nonetheless it would be interesting to see if the same predictions of stylistic preference from the students' heroes are upheld using the work or unknown architects in a set of buildings.

However, both solutions seem to be excessively 'experimental' in their orientation. Buildings are encountered with which people are differentially familiar. More importantly, gaining more information on which to base their judgements is an integral part of architectural education. Therefore it would be artificial to 'control out' a vital facet of the inevitable differences between the students during their education.

Additionally, the difference between the schools in the development of their evaluations of Modern and Post Modern architecture suggests that if it is increasing information about the buildings which causes the differences then they are being presented with biased information according to the school they attend!

If schools influence the opinions and designs of the students to such an extent, it is worth considering some of the implications this holds. Since the school at which the students trained has an influence on the style of architecture which they appreciate, it can be concluded that, in general, people's evaluations of architecture are to some extent determined by external or 'environmental' factors. If architects' opinions can be influenced during education, then it is interesting to
consider the possible role of environmental education for non architects. Rather than demanding that architects design buildings which the public appreciate, the public could be educated to appreciate the buildings they design! Through education in a broader range of styles, non architects would understand, and thus have opened up to them the full range of styles from which to decide on their preferences, as is the case for architectural students.

The most obvious source of influence during education comes from the views of staff. The staff within the schools of architecture teach options in which they have an interest, and the present results indicate that it only takes the views of a small, but consistent number of tutors to influence the designs of the students. The case studies have shown that the influence of Rational architecture at the Southern school is very strong. Although some of the students believe that they only designed that way in order to get a high pass on a certain project for a certain tutor (eg Nick), Rational influences are evident in other work. Similarly, although Cathy claimed to dispise Rational architecture, she too was using aspects of the style in her designs.

If the predispositions of the tutors at a school of architecture can have such an all pervading impact on the designs of the students, and thus on the shape of our cities, it is necessary to confront the issues of staff selection. Whilst the need for 'academic freedom' should support the presence of people with all kinds of views in all our universities, some would question whether the subjects they are teaching are desirable for the students to learn.
It is clearly not only architecture whose educational idiosyncrasies can impose their effects on society. Since the work of all the professions can only be judged from within, the 'lay' person is at the mercy of current opinion in many areas. For example, treatment in a number of medical fields (eg breast cancer) can be presented to the patient as the 'best' alternative, based solely on a particular surgeon's views.

Similarly, in clinical psychology, the views of the university staff have a direct effect on the training of Freudian, Behavioural or Cognitive therapists. Such variety should in theory allow more choice, but often the 'client' is not in a position to make a decision. The physically and mentally ill, like the building users, have neither the power nor the information that they require.

Nevertheless, despite the fact that debate is confined within the professional community, to have a variety of schools of thought allows the field to progress. Without differences of opinion, neither science nor architecture would progress (Broadbent 1979).

Further, it can be suggested that it is not desirable for architecture to be without variety, for if architects were to submit to the current demand for Post Modernism, cities would suffer from the same malaise created by their predecessors. In ten or twenty years time people may feel as negative about the 'new Internationalism' of Post Modern architecture as they do now about Modern architecture.
12.13 Methodology

Within the discussion chapter a number of specific methodological considerations have been raised. For example, the effects of knowledge on categorisation, and the selection of a representative sample of buildings for the study. However, it is the final task of the thesis to review the general requirements of the methodology considered in Chapter Four, in order to assess whether the chosen procedures fulfilled their aims. Chapter Five tested the sensitivity of the first sort data, when analysed using MSA, in order to illuminate inter- and intra-professional differences in conceptualisation of architecture. The preliminary indications were that this strategy was indeed both sensitive and 'reliable' enough for the research endeavour. The results of the main research amplify the findings of the pilot study. The first sort data contained enough information, when aggregated for the students in each year group, to reveal the similarities and differences between the students in each year of training. The analysis procedures are also powerful enough to show not only the similarities in the development of the structure of the concept of architectural style, but also the difference in facet structure evident in the sorts of the Southern post graduate students.

Chapter Four outlined the claim that MDS procedures are highly suitable for handling complex qualitative data sets, representing conceptual relationships in terms of Euclidean distances. However, a further raison d'être for the use of MDS came from Forgas (1979) who calls for a halt to the hypothesis-testing paradigm in social psychology in favour of theory generating, explorative research. In this respect the MSA and SSA plots presented in the thesis form testable models
generated from explorative data. The discussion has pointed to a number of theoretical positions derived from the results of the thesis which are open to further empirical study.

The methodological requirement which was particularly emphasised in Chapter Four was the need to deal with elicited, participant generated data in the study of professional concepts. Only by working with the students' own thoughts and feelings can any insight be gained into their conceptual make-up.

Distributing questionnaires, or presenting architects with semantic scales may be missing the very essence of their responses. If for example, the present study had utilised a questionnaire devised on the basis of Lipman (1970) and Blau's (1980) findings regarding the importance of social or humanitarian values in architecture, the students would doubtless have fulfilled the researcher's expectations. However, the true lack of interest in these issues shown by the students in the present study would not have been revealed. By generating the research themes assumed to be of importance to a particular sub population, psychologists are participating in a self-fulfilling prophecy.

In comparing the Multiple Sorting Procedure to the repertory grid Brown et al (1976) reported that the Multiple Sorting Procedure placed less emphasis on the instrument and more on the research topic. Brown et al's (1976) conclusions that 'being a subject can be fun!' (Brown et al (1976 p4) was borne out by the present study. People generally did enjoy taking part in the study and freely commented on their opinions of the buildings and the relationships between them.
Kelly (1955) has argued that by using the participants' own constructs it is possible to remain within the person's range of convenience. That is, the participant is never forced to judge an item according to an inapplicable construct. It has also been suggested that by using photographs in a sorting, the respondent need not generate a label to explain the similarities they perceive if they do not find it appropriate. Thus, by combining an elicited verbal, and a non verbal technique, responses in the Multiple Sorting Procedure need not be misunderstood.

The results of the study have shown that very few students did find it necessary to create categories for similarities which they could not verbalise. However, Multidimensional Scalogram Analysis of the categories without labels still takes these distinctions into account. MSA of the sorting data allows for the interpretation of the plots according to both the students' own verbalised associations, and also according to any non verbalised features of the buildings which are manifest in their associations.

The findings concerning the evaluation of the buildings have been validated by the 'heroes' data and vice versa. These two different procedures reveal the same developmental trends. In terms of reliability, the constructs used by the students in this and in previous studies are stable enough to conclude that they are not arbitrary within the profession. Indeed Appendix A has demonstrated that almost identical constructs are generated on two occasions. Similarly, the relationship between the number of categories generated by the students in two different sorts illustrates the consistency of the Multiple Sorting Procedure.
However, in terms of the need for reliability in the structures generated from the MSA, it is worth reiterating Kelly's (1955) view that reliability is inapplicable when studying the nature of change. The structures generated by the Multiple Sorting Procedure and Multidimensional Scalogram Analysis show both similarities and differences between the years, revealing both stability and development.

In conclusion, the thesis has demonstrated the value of the Multiple Sorting Procedure and non-metric multidimensional scaling (MSA) in the study of conceptualisations. The selected procedures ably fulfilled their methodological 'brief', and illustrate the potential of this approach for future research.
1. Architectural education instills a system of constructs for conceptualising architecture. This system is acquired during the years of training and develops from concrete, tangible constructs such as materials, building type and form, to more abstract constructs such as design approach. These basic developments in concept use can be seen for the students at both schools of architecture, and compares with the concepts used by the qualified architects studied in previous research (Wilson 1985, Groat 1979). Similarly, the development of architectural constructs accords well with the predictions of developmental theory, both in terms of the ease with which more concrete concepts are learnt, and in terms of the development in 'cognitive readiness' to cope with less physical entities.

2. Architectural style is the concept which is most central to architects' conceptualisations of architecture. This concept is used most frequently by the students at both schools, regardless of the stage of education. Multidimensional Scalogram Analysis of the free sort categorisations reveals that architectural style is the overt feature of the buildings which is associated with the students' judgements of the similarities and differences between them, regardless of their stated classifications. The predominance of stylistic concerns amongst the students stands in contrast to the 'social commitment' of architects reflected in previous studies.
3. Multidimensional Scalogram Analysis of the sorting data shows that the underlying structure of the concept of style is increasingly sophisticated with each year sampled, and reveals both similarities and differences between the students at the two schools of architecture.

For the undergraduate students at both schools, style is represented by a categorical, polar facet containing four styles, High Tech, Vernacular, Post Modern and Modern architecture. At the Northern school increasing complexity is demonstrated by the inclusion of a second, modulating facet reflecting the typicality of the buildings within each style, and resulting in a radex. At the Southern school of architecture the post graduate students' sorts reveal a different structure. With the exception of the Vernacular buildings, the students' conceptions reveal an ordered facet, representing a series of interlinking architectural developments.

4. The facet structure of style revealed by the SSA and MSA plots is remarkably stable. This structure provides a model of architectural style based on four major movements. The circular relationship of the four major styles around the plots reflects the perceived similarities between each style and the one adjacent to it, and the dissimilarity between each style and the one opposite it. Thus, it is possible to have a Vernacular building with Modern or Post Modern influences, but not a Vernacular building which has High Tech influences. Similarly, it is possible to have a Post Modern building with Vernacular or High Tech influences, but not a Post Modern building which is Modern.
5. The relationship between the styles which is perceived by the students allows for the definition of architectural styles. The 'fuzzy' regions between each style indicate the existence of Post Modern Vernacular, Modern High Tech, Modern Vernacular, and Post Modern High Tech. The latter two styles are not predicted from Jencks' (1982) analysis of stylistic developments.

6. Contrary to the claims of the architectural literature, Modern architecture is not perceived by the students as an historical movement, but rather as part of a 'palette' of possible current styles from which to design. Modernism is consciously supported by many students who admire and design within this style, either in its pure form or mixed with High Tech or Vernacular.

7. The structure of architectural style reveals that the students conceptualisations accord well with theory of the human categorisation process. The 'fuzzy' instances and dimensions of typicality predicted from Rosch's analysis of naturally occurring concepts (eg Rosch and Lloyd 1978) can clearly be seen in the students' classifications of the buildings. The Vernacular buildings formed the first distinct category to emerge in the students' classifications. The High Tech architecture presented the most definitional problems for the students. Successful acquisition of this concept relies on more abstract theoretical criteria rather than more tangible material features.
8. Whilst a number of objective criteria for evaluating buildings appear to be used by the students, analysis reveals that rather than judging buildings on their individual merits, the students' personal evaluations are made solely on the grounds of architectural style.

9. The model of architectural style revealed by the SSA plots of the students' evaluative judgements indicates that admiration of a particular style will predict an interest in styles adjacent around the plot, and a dislike for styles opposite. Thus for example, a proponent of Modern architecture may also like Vernacular or High Tech architecture (particularly the bordering combination styles), but will express a dislike for Post Modern architecture.

10. The stylistic orientation of the students is associated with the school at which they are training. Whilst the two sets of first year students are highly similar in their evaluations of the buildings, school specific differences become stronger with each year sampled. At the Northern school the students evaluate Post Modern architecture more positively, and the Modern architecture more negatively with each year sampled, whilst at the Southern school the reverse is true.

11. Large differences in architectural evaluation were found as a function of architectural education in general and school of training in particular. However, the buildings which hold most promise for both inter- and intra-professional agreement are those classified as Vernacular. These buildings were more positively evaluated by the students in the first and final years at both schools.
12. Generally, the heroes mentioned by the students show the same variations in stylistic preferences according to year and school as demonstrated by the evaluations of the buildings. There are certain architects whose admirers are found predominantly in the early (eg Frank Lloyd Wright, Gaudi) or later (eg Botta) years of training. Similarly, the results indicate that the female students are more likely to mention Arts and Crafts, or 'organic' designers compared to the hard geometric approaches favoured by the male students. The students at the Southern school of architecture were found to have more heroes than their Northern counterparts, and more unusual heroes in particular.

13. The combined data reveals seventeen architects who have five or more admirers amongst the students. SSA of each group of admirers' evaluations of the buildings demonstrates that the more similar the style of architecture associated with the hero, the more similar are the evaluations of the followers. The heroes can be divided into six groups, Arts and Crafts, Post Modern, High Tech, Rational, Modern, and a general region containing architects admired by followers of different styles. Examination of the buildings rated most and least highly by each group of supporters compared to their colleagues bears out the predictions of the model of stylistic evaluation. Thus, for example, the admirers of a Post Modern hero rate the Post Modern buildings more positively and the Modern buildings more negatively than the other groups.
14. Examination of the number of buildings which each group of admirers rated more positively or negatively than the other groups carries two implications. The fact that the buildings are differentially evaluated by these admiration groups may indicate that the selection of photographs are 'biased' toward certain styles of architecture, and do not represent the admirations of followers of other styles. On the other hand, if the photographs are taken to be representative of current architecture, then the followers of Rossi and Mackintosh can be seen to be the most critical of today's styles.

15. The quantitative results derived from the procedures used in the thesis show very similar trends across the years, indicating that the number of categories and constructs used, and the number of heroes admired are probably related to conceptual development. In support for Perry's theory of conceptual development (1970) the students in the early 'dualistic' stages of development do have fewer heroes and use fewer categories to express their personal evaluations. Additionally, the average number of categories and heroes increases and decreases as Perry (1970) would predict for stages of relativism and commitment in relativism. Similarly, the articulation and differentiation of cognitive complexity may be called upon to explain the variations in quantitative measures. Both these theories, however, do not account for some of the discontinuities found in the data.
16. The chosen methodology and analysis procedures were found to be highly suitable for the study of architectural concepts. Sensitivity to both stability development were demonstrated in the structural analysis of the concept of style. The open-ended explorative procedures allowed the formulation of testable models based on the students' own elicited system of constructs.
REFERENCES


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A 'Test Re-test' Study

In order to establish the reliability of the Multiple Sorting Procedure, or indeed as argued in Chapter Four, its sensitivity to change, a group of students were asked to repeat the sorting task on a subsequent occasion, three months later.

Fifteen students in the first year at the Northern University initially participated in the study. Three months later, ten of these students were available for retesting. Thus it is possible to compare the concepts generated by the free sort, and structures generated by the MSA for those ten students on the two separate occasions.

The Number of Concepts Used

Table I shows the concepts used in the sorts by the ten students on the first occasion (T1) and for the subsequent 're-test' (T2). Each construct is represented by a symbol, the key for which is presented below Table I. The figures in brackets represent the number of categories which were created according to that construct. For example, 'building type', (eg 'churches', 'offices', 'flats'). A half value represents a sorting category which is based on two constructs, eg 'Post Modern buildings which I don't like'.

On both occasions all but one of the students chose to sort the buildings according to more than one category scheme, that is no overall sorting criterion was applied to the buildings, and sorts which
combined different constructs were produced in order that all the buildings be categorised.

Table I

<table>
<thead>
<tr>
<th>Student number</th>
<th>Concepts used at T1</th>
<th>Total Number of categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T1 F (2), T (1), S (1), DK (1)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>T2 F (5), E (1), DK (1)</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>T1 F (5)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>T2 S (4)</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>T1 M (2), T (1), St (1), S (1), F (1)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>T2 DA (2), S (3), F (1)</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>T1 S (4), Dk (2), C (1), F (1), M (1),</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>T2 M (2), S (3) C (1), F (1), T (1), DK (1)</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>T1 S (4), T (3), E (1)</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>T2 E (2), F (3), S (1), DA (1), Cx (1), DK (1)</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>T1 T (4), S (3)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>T2 T (2), S (5), M (1)</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>T1 F (6), S (1)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>T2 F (3), S (1), Dk (2)</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>T1 S (3), F (.5), E (.5)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>T2 S (2), Dk (1)</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>T1 F (2), S (1), Dk (1)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>T2 F (1.5), S (2), M (.5) Dk (1)</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>T1 S (4), F (2), E (1)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>T2 S (2), M (1), E (1), U (1)</td>
<td>5</td>
</tr>
</tbody>
</table>

Table I. Concepts used in the free sorts in a sample of ten first year students at T1 (Feb 86) and T2 (Apr 86).

F= Form     DA= Design Approach     M= Materials
T= Type     Dk= Don't Know         St= Structure
S= Style    E= Evaluation         C= Colour
Cx= Context U= Uniqueness

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The final column of Table I shows the number of categories each student produced in their sort at T1 and T2. These numbers can be seen to be very similar to one another for all the students, and the average number of categories per sort, 6.2, is exactly the same, on both occasions.

As the number of categories produced in a sort is found to be fairly consistent for an individual, the analysis of variations in the number of categories used in the main thesis could be interpreted as a 'reliable' measure. If a developmental perspective is taken, however, it can be suggested that the students have not changed very much over the three month period, an idiosyncratic number which they used on one occasion. Whilst the number of categories produced is representative of the individual, whether it is a valid measure of cognitive complexity remains untested.

The Type of Constructs Used

Table II summarises the number of students who use each of the constructs as part of their categorisation scheme, and shows the percentage use of each construct by the composite group of students.

As indicated by table II the number of students using style as part of their categorisations is constant between the two 'testing' periods, whilst the number of students using form and type, has decreased and design approach and materials has increased. These figures are reflected in the percentage of categories using each construct. Style remains the most frequently used at 36% and 37% for T1 and T2 respectively, whilst form categories drop from 32% to 23%.
Additionally, the students are slightly more inclined to use design approach, and evaluative categories at T2, and less inclined to mention the buildings function.

Table II

<table>
<thead>
<tr>
<th>Concept</th>
<th>Number of students using the concept</th>
<th>Overall percentage use of construct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
</tr>
<tr>
<td>Style</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Form</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Design Approach</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Evaluation</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Type</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Materials</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Structure</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Colour</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Uniqueness</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Context</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Don't Know</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Table II. The number of students using each construct and the percentage construct use for all the sorts.

If the constructs used by the two cross sectional samples of students in the first and second years are compared to the change in construct use in the longitudinal sample, the same trends can be seen.

Table III shows the percentage construct use for the subset of first years used for the longitudinal sample, these same students three months later, and finally the cross-sectional sample of second years.
Table III

<table>
<thead>
<tr>
<th>Concept</th>
<th>Overall percentage use of construct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>Style</td>
<td>36%</td>
</tr>
<tr>
<td>Form</td>
<td>32%</td>
</tr>
<tr>
<td>Design Approach</td>
<td>0%</td>
</tr>
<tr>
<td>Evaluation</td>
<td>4%</td>
</tr>
<tr>
<td>Type</td>
<td>13%</td>
</tr>
<tr>
<td>Materials</td>
<td>5%</td>
</tr>
<tr>
<td>Structure</td>
<td>2%</td>
</tr>
<tr>
<td>Colour</td>
<td>2%</td>
</tr>
<tr>
<td>Uniqueness</td>
<td>0%</td>
</tr>
<tr>
<td>Context</td>
<td>0%</td>
</tr>
<tr>
<td>Don't Know</td>
<td>6%</td>
</tr>
</tbody>
</table>

Table III The number of students using each construct and the percentage construct use for all the sorts.

Table III shows that for the well used constructs, which show patterns across the cross sectional samples, the majority of the re-test figures fall midway between the first sampling and the cross sectional second year sample, indicating that these students are changing in way which is consistent with the difference between the two cross sectional samples. Such an analysis indicates the reliability of construct use amongst the students, the validity of the cross-sectional data as representative of longitudinal changes, and the sensitivity of the sorting task to developmental changes.

The MSA Structures

The Multiple Sorting Procedure was carried out as described in Chapter Six. The data from the ten students who were available for the re-test, were extracted from the original data matrix, and analysed using MSA.
A) The Concept of Style at T1

Nine of the ten students used style as a concept in at least part of their categorisation scheme, and style accounted for 36% of the constructs used. Thus the resultant MSA plot (Figure 1) is biased towards style. However, their classifications of style are not consistent between individuals and a number of buildings fall on the borderlines. For example, Stirling's Staatsgalerie is placed on the borderline between High Tech and Post Modern. Similarly, ITT falls between the Modern and the High Tech. This is probably related to the students' knowledge of this building, with those who know it placing it in the Modern category, and those who don't reinterpreting this building as High Tech. The Post Modern region contains a sub-section which is classified as 'classically influenced'.

B) The Concept of Style at T2

When the students were asked to perform the sorting task again, style was still used by 90% of the participants, accounting for 7% of all the constructs used. The MSA structure derived from the sorts is shown in Figure 2.

Stirling's art gallery has now been categorised as typically Post Modern by the students. This shows a move away from defining High Tech from pipes, and towards the 'smooth glass' definition. Interestingly, both the Modern buildings which are smooth glass are also placed in the High Tech category. Since there should not have been a decline in
Figure 1. MSA Plot of the Ten First Year Students' Sorts at T1, Partitioned According to Architectural Style.
Figure 2. MSA Plot of the Ten First Year Students' Sorts at T2, Partitioned According to Architectural Style.
knowledge of the concept, and thus the definition of Modernism, the students' confidence in reinterpretation must have increased. The categorisations according to the classical influences, a subset of the Post modern group, has become broader with Botta's Viganello, and the Municipal Control Building found in the same group as La Piazza, Clifton Nurseries, and La Theatre.

Conclusions

Reliability

The evidence for the reliability of the multiple sorting task is very strong. These students show similar concepts on the two occasions and the structures generated by the MSA program are very similar indeed. Both plots show a stylistic structure, the later one showing a little more sophistication in the definition of style.

Sensitivity

The second sorting task picked up on some slight changes in the conceptual structure produced by the MSA program. The slight changes which have occurred may be due to the time which has elapsed since their last attempt at the sorting task. On the other hand there is a possibility that the effects are due to a practice effect of the multiple sorting task. The development of the 'classical influence' category, however, indicates an increase in knowledge of the concept rather than practice at having made the connection more obvious.
Cross-Sectional Vs. Longitudinal Data

The longitudinal data shows a tendency for the first year students to be increasingly similar to the cross sectional sample of second years. On most of the concepts which vary according to year in the cross-sectional study, the longitudinal T2 sample fit between the first and second year following the same trend. This gives an indication that the cross sectional data is representative of longitudinal data.
APPENDIX B

Photographs used in the Pilot Study


5. La Muralla Roja, Ricardo Bofill and Taller de Arquitectura, Calpe, Spain. 1969-83.


14. Marin County Civic Centre, Frank Lloyd Wright, San Raphael, California, 1959-64.


20. Chicago Civic Centre, Murphy, Chicago, 1964.


APPENDIX C

The Interpretation of MSA Output

1. The Input Data

Once the participant has completed the sorting, their groupings and descriptions are noted down. Each photograph in the sorting set is numbered on the back for ease of processing.

The participants' descriptions of the reasons for their groupings, ie the similarities between the buildings in each group are noted down along with the numbers of the photographs in each group.

Thus for example, one Northern fourth year student's sort was as follows:

<table>
<thead>
<tr>
<th>Group</th>
<th>Description</th>
<th>Building Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Modern Movement</td>
<td>6, 14, 25, 23, 20</td>
</tr>
<tr>
<td>2</td>
<td>High Tech</td>
<td>13, 17, 21, 1</td>
</tr>
<tr>
<td>3</td>
<td>Post Modern</td>
<td>2, 3, 4, 5, 7, 8,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9, 10, 15, 22</td>
</tr>
<tr>
<td>4</td>
<td>Private Houses</td>
<td>11, 24, 19</td>
</tr>
<tr>
<td>5</td>
<td>Housing Schemes</td>
<td>12, 26</td>
</tr>
<tr>
<td>6</td>
<td>Modern Housing Schemes</td>
<td>16, 18</td>
</tr>
</tbody>
</table>

The sort is converted into a column of data within a data matrix. Thus, each column of a data matrix refers to one participant's sort, and the whole matrix represents the subset of participants to be analysed, in this case the fourth year students at the Northern University. Each row
of data refers to a building and contains a 'profile' of numbers which represent the groups into which each particular building was placed by all the participants within the year group.

In the example above each building would receive the code number of the group to which it was assigned. The code numbers refer to the groups created by each individual participant, and therefore a code number '3' for student number 1 need not refer to the same category description as code number '3' for student number 2.

The matrix is compiled as shown below, and analysed using MSA-1.

<table>
<thead>
<tr>
<th>Student Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building 1 2 3 4 5 etc</td>
</tr>
<tr>
<td>Number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>etc</td>
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<td>4</td>
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<td>16</td>
<td>6</td>
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</tr>
<tr>
<td>17</td>
<td>2</td>
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<td></td>
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</tr>
<tr>
<td>18</td>
<td>6</td>
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<td></td>
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</tr>
<tr>
<td>19</td>
<td>4</td>
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</tr>
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<tr>
<td>26</td>
<td>5</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. The Output

The computer printout of the MSA output file for a year group of fifteen students contains 16 plots. One overall plot is provided, showing the position of each building in relation to the others, represented in the plot by its code number.

Within each plot there are, in this case, 26 points representing 26 buildings. The overall plot, for the fourth year students, is shown in Figure 1.

![Figure 1. Overall MSA Plot of Twenty-six Buildings for the Fourth Year Students.](image-url)
The plot shows the building code numbers, or the number of each row of data down the matrix. For ease of interpretation the plots in the thesis have had pictures of the buildings drawn over the points to show where the buildings are positioned.

The remaining 15 plots are 'item plots', and the first plot refers to the first participant's sort, ie column one, the second to the second participant and so on. These plots show the same relationship between the buildings, however, rather than indicating the building code number, each point is shown as the code number of the group to which the building was assigned by a participant.

Since the overall plot is the best possible representation of all the participants' sorts, the item diagrams will show how each person's sort contributes to the overall structure. So for example, the item plot for the student's sort shown above, and who was part of the group who made up Figure 1, is shown in Figure 2.

By referring back to this student's data, it can be seen that the large group of buildings on the left, designated by 3's, are a group of 'Post Modern' buildings. Moving clockwise, the 4's and 5's are private houses and housing schemes, the 6's Modernist housing schemes, the 1's are buildings of the Modern Movement, and the 2's are High Tech. The negative numbers simply indicate the boundaries of the regions.

The categorical nature of these groupings and their position around the plot indicate that the plot is divided into segments as with a polarising facet (see Chapter 7).
The overall interpretation of the plot, in terms of its facet structure and the labels assigned to the regions, is thus derived from consideration of the groupings made by all fifteen students.

Whilst it is possible to interpret the plots according to the students' own descriptions, it is worth noting that other interpretations are possible. One advantage of the Multiple Sorting Procedure, outlined in Chapter Six, lies in the ability to deal with the students' own verbalised reasons for the similarities and differences between the
buildings. Further, however, non verbalised associations between the items can also be revealed in the MSA plot. An example of this is found in the strong stylistic structure inherent in the students' architectural preferences (Chapter Eight).
APPENDIX D

Photographs used in the Sorting Task

3 Richard Meier. Museum fur Kunsthandwerk, Frankfurt, West Germany.


2 Philip Johnson/Burgee Architects. AT&T Building, New York City, USA 1978.

5 Taft Architects. Municipal Central Building, Quail Valley Utility District, Missouri City, Texas, USA. 1978-80.


9 Ricardo Bofill. Le Theatre, Ville Nouvelle of Marne-la-Vallee, France. 1979-83.


26 Ricardo Bofill and Taller de Arquitectura. La Muralla Roja, Calpe, Spain. 1969-83.


APPENDIX E

Constructs Used in the Free Sort

The following tables show the constructs generated by the content analysis of each participant's sort.

The key to the symbols is shown below:

F=Form   E=Evaluation   S=Style
L=Language M=Materials   H=Humanity
T=Type   U=Uniqueness   DA=Design Approach
Ct=Context Mx=Mixed

Sorts which were dominated by two constructs to an equal extent are denoted by '/', eg S/F=Style and Form.

<table>
<thead>
<tr>
<th>Student No</th>
<th>Yr 1</th>
<th>Yr 2</th>
<th>Yr 3</th>
<th>Yr 4</th>
<th>Yr 6</th>
</tr>
</thead>
<tbody>
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APPENDIX H

Percentage of Categories Divided According to Each of the Major Architectural Constructs.

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APPENDIX I

The Architects Mentioned by One Participant

1) The Northern School

Adam Alderman
Alexander ARUP Associates
Bofil Breuer
Eisenman Emberton
Gehry Goff
Horta Isozaki
J. Johnson P. Johnson
Kahn Kroll
MacCormick and Jamieson
MacRae Mies
Otto Pei
Piano St. Elia
Rossi Ungers

2) The Southern School

Adam, Poole & Douglas Alberti
Ando Arquitectonica
Bernini Borromini
Coop Himmelblau Colguhoun & Miller
Dixon Dudok
Erith Farrell
Fehn Gehry
Hadid Hertzberger
Hoffmann Hollein
Kriers Lethaby
Mather Moore
OMA Pallaria
Petila Pickson
Piernassi Purini
Reed & Learner Reitwald
Scharoun Schinkel
Slolari Soane
Speer Stern
Terry Tyrwhitt-Drake
Webb Wilson
Wren
The Number of Students who Overlap in each of the Admiration Groups.

The following table indicates the number of students who admire certain architects in conjunction with others. The overlap indicated between the same two hero groups shows the number of students who admired that architect only.

| Hero     | No. | M | W | C | S | B | R | M | G | F | A | S | G | H | C | F | L | R |
|----------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Meier    | 26  | 9 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Wright   | 23  | 3 | 10|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Corb     | 22  | 1 | 5 | 3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Stirling | 22  | 6 | 3 | 2 | 4 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Botta    | 20  | 6 | 1 | 2 | 7 | 3 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Rogers   | 15  | 1 | 5 | 4 | 2 | 2 | 1 |   |   |   |   |   |   |   |   |   |   |   |   |
| Mackintosh| 15 | 3 | 2 | 2 | 0 | 0 | 0 |   |   |   |   |   |   |   |   |   |   |   |   |
| Graves   | 11  | 0 | 0 | 0 | 3 | 3 | 2 | 1 | 2 |   |   |   |   |   |   |   |   |   |   |
| Foster   | 10  | 1 | 0 | 2 | 1 | 1 | 3 | 1 | 2 | 2 |   |   |   |   |   |   |   |   |   |
| Aalto    | 10  | 3 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |   |   |   |   |   |   |   |   |
| Scarpa   | 9   | 0 | 1 | 3 | 2 | 3 | 0 | 1 | 0 | 0 | 1 | 1 |   |   |   |   |   |   |   |
| Gaudi    | 8   | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 3 |   |   |   |   |   |   |
| Hollein  | 8   | 3 | 0 | 0 | 3 | 3 | 0 | 1 | 0 | 2 | 0 | 0 | 0 |   |   |   |   |   |   |
| Cullinan | 6   | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 2 |   |   |   |   |
| Farrell  | 5   | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 1 |   |   |   |
| Lutyens  | 5   | 2 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Rossi    | 5   | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
## APPENDIX K

The Average Preference score for each of the Buildings as Rated by each Admiration Group.

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