

**University admission
based on tests and interviews:
implementation and assessment**

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Stockholm 2005

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*"Personally I am always
ready to learn, although I do not
always like being taught."*

*Sir Winston Churchill, 1874-
1965*

Abstract

Admission to higher education has far-reaching implications and an impact not only on individuals, but also on society. In most developed countries, admission to university studies remains a key issue in higher education: the admissions system determines who will have access to higher education and raises the issue of equal opportunity, in terms of *e.g.* age, gender, and social class. Traditionally, admission to university studies in Sweden has been centralised, but in recent decades, universities have been permitted to reserve a specified number of undergraduate places for individual admission of selected students. Such a system was introduced to the dental course at the Dental School, Karolinska Institutet, in 1993. The main objective is to seek out, from a pool of applicants with good academic standards, highly motivated students with the potential to become good dentists. The overall aim of the thesis was to assess the relationship between individual student selection adopted at the Dental School and subsequent student achievement, including professional competence. It also presents an overall impression of the selection procedures, as perceived by successful applicants and by members of the selection committee.

The specific aims of the thesis were to assess the outcome of an individualised admissions system for dental undergraduates in terms of: student drop-out rates, academic performance during the preclinical years and professional competence of dental students in their final undergraduate year. Students admitted through traditional modes served as a control group.

The results are based on data from the first three rounds of admission using the system. During the first years of the undergraduate course, the results of three major integrated examinations, designed to disclose both comprehension and academic ability were analysed to give an early indication of students' potential to become 'good dentists'. The individually selected students achieved better results than those accepted through traditional modes. After three intakes, there have been few or no drop-outs among the individually selected students. With respect to professional competence, faculty members who were clinical supervisors in the comprehensive care clinic and knew the students well assessed all the final-year students from the same three rounds of admission. The assessors were uninformed of the means by which the students had originally been admitted to the undergraduate course. Assessment by means of a specially designed protocol comprised seven different criteria and one overall – global – rating. Students originally admitted by individual selection seem to be more professionally competent than students admitted by traditional means. With respect to the relationship between student selection procedures and academic achievement, both interviewed students and the admissions committee are of the same opinion: that the individualised admissions procedure has a positive influence on students' academic achievement and professional competence. The

students feel specially selected for their potential to become good dentists and the committee members agree that this awareness lead the students to aspire to higher achievements. It is concluded that motivation and commitment are important determinants of student achievement and that these criteria are more readily disclosed through tests and interview than through traditional modes such as matriculation grades and aptitude tests.

Keywords: admissions procedure, dental undergraduate course, student selection, interviews, assessment, professional competence, motivation, perceptions of students and admissions committee members.

Sammanfattning på svenska

I de flesta länder är frågor rörande antagning till högre utbildning viktiga eftersom antagningssystemens utformning avgör vem som kommer att antas och därmed få tillgång till högskoleutbildning. Detta leder i sin tur till frågor om allas lika rättighet oavsett t.ex. etnisk eller social bakgrund, ålder och kön. Antagning till högre utbildning har således stor betydelse för såväl den enskilda individen som för samhället.

Traditionellt har antagning till högre utbildning i Sverige varit centraliserad, men under de senaste årtiondena har universitet och högskolor, under förutsättning att vissa kriterier uppfyllts, haft rätt att anta ett begränsat antal studenter genom särskilt urval (urvalsgrunden andra särskilda prov). En sådan antagning infördes 1993 vid tandläkarutbildningen på Karolinska Institutet, med målsättningen att anta motiverade studenter med en potential att bli bra tandläkare.

Det övergripande målet för denna avhandling var att utvärdera studieresultat och professionell kompetens hos de individuellt antagna studenterna, samt att undersöka hur denna urvalsmetod uppfattas av dessa studenter och av lärare verksamma i antagningskommittén. Studenter antagna på traditionellt sätt via betyg och högskoleprov utgjorde kontrollgrupp. Resultaten baserar sig på data från de tre första antagningsomgångarna med denna uppsats- och intervjubaserade antagningsform.

Efter tre antagningsomgångar hade få eller inga individuellt antagna studenter avbrutit utbildningen. De individuellt antagna studenterna nådde bättre resultat på tre integrerade tentamina under terminerna 1-4 än de studenter som antagits på traditionellt sätt. Alla studenter oavsett antagningsform bedömdes med avseende på professionell kompetens under den sista terminen av tandläkarutbildningen. Bedömningen gjordes av kliniska lärare, som kände studenterna väl, men som inte visste på vilket sätt studenterna antagits till utbildningen. Studenter som antagits genom den uppsats- och intervjubaserade antagningen bedömdes ha bättre professionell kompetens i relation till de kriterier som bedömdes jämfört med studenter antagna genom betyg eller högskoleprov.

Såväl studenter antagna via det individuella antagningsförfarandet som ledamöter i antagningskommittén anser att denna antagningsform har en positiv effekt på studenternas studieresultat och på deras professionella kompetens som blivande tandläkare. Genom att studenterna bedömts av ledamöterna i antagningskommittén att vara motiverade för studierna med en potential att bli bra tandläkare känner studenterna sig särskilt utvalda. De individuellt antagna studenterna och ledamöterna i antagningskommittén anser att denna vetenskap

leder till att dessa studenter presterar bättre under studietiden jämfört med övriga studenter.

Slutsatsen är att motivation och engagemang är viktiga faktorer för studieframgång. Dessa faktorer kan lättare upptäckas genom ett individuellt antagningsförfarande baserat på uppsats och intervju än genom betyg och högskoleprov.

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Preface

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals:

I. Röding K.

The Baltic dental programme at The Faculty of Dentistry of The Karolinska Institute: first evaluation. *Eur J Dent Educ.* 1997;1:30-34.

II. Röding K.

A new admission procedure to dental education at The Karolinska Institute. An initial evaluation. *Eur J Dent Educ.* 1997;1:114-122.

III. Röding K.

Professional competence in final year dental undergraduates: assessment of students admitted by individualised selection and through traditional modes. *Eur J Dent Educ.* 2001;5:12-16.

IV. Röding K.

Perceptions of admission committee members: Some aspects on individual admission to dental education at Karolinska Institutet. *Eur J Dent Educ.* In press. Accepted for publication 9 May 2004

V. Röding K, Nordenram G.

Students' perceived experience of an admission based on test and interview: Some aspects on individual selection to dental education at Karolinska Institutet. *Eur J Dent Educ.* Submitted August 2004.

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Introduction

Admission to university studies has been and remains a key issue in higher education policy, not only in Sweden, but also in most developed countries. The issue has engaged politicians and researchers, not least during the post-war expansion of the education system. When the number of eligible applicants exceeds the number of available undergraduate places, the admissions system, *i.e.* the procedures by which undergraduate students are selected from a large pool of applicants, determines who will have access to higher education. This raises the issue of equal opportunity, in terms of *e.g.* age, gender, and social class (Kim, 1998) and practical considerations such as the dimensions of the higher education system and allocation of resources (SOU 2004:29). In other words, the admissions system has far-reaching implications and an impact not only on individuals, but also on society (Ds 2000:24).

Over the past few decades, admission to higher education has been the subject of a number of enquiries, commissions, and legislation in Sweden, see Appendix.

Every admissions system has three closely interrelated components: student recruitment, requirements for admission, and the method of student selection. This thesis addresses the latter, with special reference to the relationship between the method of student selection and subsequent student achievement, including professional competence and how the participants perceive a special selection procedure.

Relationship between student selection procedure and student success: current concepts

Student selection plays a vital role in the successful outcome of higher education. In the pedagogical literature, several studies on the so-called correlation between selection methods and study success (Henriksson and Wolming, 1998; Salvatori, 2001) show the greatest prognostic value for grade scores and "aptitude" tests. In the review of the reliability and validity of admissions tools, Salvatori (2001) found overwhelmingly clear evidence that pre-admission academic grades predict subsequent in-course academic performance in all professional disciplines.

However, the covariance between selection instruments such as grade scores or aptitude tests and various measurements of study success is usually around 30-50%, *i.e.* 50- 70% of study success remains unaccounted for (Öckert and Regnér, 2000; Wedman, 2000; Ferguson *et al*, 2002). Among undergraduates in different health professions, Salvatori (2001) found that matriculation scores could account for between 13% up to 40% of the variance in academic achievement. Naeme *et al* (1992), in a study comprising 782 medical students at

the University of Newcastle, Australia, did not find matriculation grades to be predictive of withdrawal or graduation with honours. In a recent Swedish Commission report (SOU 2004:29), it is stated that only 25% of an individual's future educational success can be predicted from matriculation grades or scores from an aptitude test.

Several explanations have been proposed. Öckert and Regnér (2000) for example suggest that such selection criteria do not reflect the individual student's commitment and motivation.

At the University of Newcastle, Powis *et al* (1988, 1994, 1998, 2003) and others (Vinson *et al* 1979) have shown that medical students selected after a battery of psychometric tests and semi-structured interviews achieved better both academically and in clinical practice compared with those admitted on academic ability alone, such as matriculation grades. Schmidt and Hunter (1998) show in a review that the use of different aptitude tests, structured interviews seem to offer a positive complement to the prognosis, at least in relation to structured employment interviews.

Research related to the measurement of human ability and function is called psychometric research, and includes the use of different selection methods. The psychometric method tries to explain the situation by more and more complex models, where new factors are added to one another, and by refining techniques for analysing single variables and their correlations (Wedman, 2000). As these models become increasingly complex, they become more difficult to manage, mathematically and statistically, highlighting the fact that reality is so complex that it cannot be reduced by simple statistical models (Wedman, 2000; Fulop, 2001). A further complicating factor is that human qualities or abilities are commonly assessed using rating scales which are inappropriate for statistical analysis by methods designed for quantitative data (Svensson¹, 1998).

Studies evaluating different selection methods have yielded contradictory results, some showing a positive relationship between interview scores and academic achievement and others disclosing no significant difference between the achievements of students admitted on the basis of interviews and those admitted without (Edwards *et al*, 1990; Lindblom-Ylänne *et al*, 1996). A contributing factor to the disparity of results from different schools may be that even within the same country, selection methods vary from one university to another, reflecting differences in the structure and philosophy of the educational system (Ebach and Trost, 1997; Gaengler *et al*, 2002).

With respect to health professions, the outcomes of selection methods are readily measured in terms of undergraduate academic performance, whereas professional competence is much more difficult to measure (Salvatori, 2001). In a systematic review of factors believed to be significant predictors of success in medicine, Ferguson *et al* (2002) found that few studies had examined pre-

admission criteria as predictors of postgraduate medical competence and that more work is needed to identify these selection criteria. Salvatori (2001) and Sandow *et al* (2002) report that while matriculation grades are the best predictor of academic performance, the relationship between matriculation grades and clinical performance is less clear. They both conclude in a similar way: that there is a need for further research into more reliable and valid ways of assessing non-cognitive characteristics of applicants.

In a review article of international practices of dental student selection, Gaengler *et al* (2002) cited the need for research to improve the predictive power, reliability and validity of currently used methods of student selection. A similar approach is reported by Ebach and Trost (1997) in their overview on admission to medical schools in Europe.

Concerns about selection of medical students have been regularly expressed over a number of years in publications by academics, clinicians and medical school administrators (Powis, 2003). Powis (2003) claims that many medical schools are reluctant to abandon “the high marks criterion” for selection for the following four reasons: high matriculation grades are a suitable indicator of brightness; the marks method is the fairest selection method; there is no consensus as to what other attributes of importance should be sought in the applicants; and there is currently no system powerful enough to supersede the mark method.

Powis (2003) suggests this reluctance by many universities to try any other method of selection in order to test alternative hypotheses has hindered advances in the field. Powis *et al* (2004) consider that universities have an ethical obligation to explore and evaluate better processes for recruiting, selecting and supporting students, and to study those aspects of their future careers that matter rather than those that are easy to measure.

This brief overview of the current status of selection methods highlights a number of unresolved issues that are obstacles to more widespread adoption of alternative selection methods to the traditional “high marks criterion”.

This thesis was undertaken in order to explore some of the above issues, with specific reference to evaluation of the individual selection method for dental undergraduate places introduced at the Dental School, Karolinska Institute, Stockholm, in 1993. The thesis addresses primarily the relationship between the method of student selection and subsequent student outcomes or achievements, not only levels of academic achievement in preclinical examinations, but also the level of professional competence achieved in the final year comprehensive clinical care setting. Because only a limited number of places were allotted to individual selection, it was possible to compare the achievements of students admitted by traditional methods with those of individually selected students in the same rounds of admission. The thesis also addresses an important but largely

overlooked aspect of individual selection systems, namely a critical evaluation, based on qualitative studies, of the major phases of selection procedures, as perceived by both parties: participating applicants and the members of the admissions committee.

Aims

General aim

The overall aim of the thesis was to assess the relationship between individual student selection and student achievements and to explore the perspectives of those involved in the selection process.

Specific aims

I

To describe the development of an individualised admissions system for dental undergraduates and to assess the outcome of the system, in terms on student drop-out rates and academic performance during the preclinical years of the course.

II

To assess two modes of admission to the dental undergraduate course, in terms of professional competence of dental students in their final undergraduate year.

III

To generate an overall impression of the Admissions Committee's and some students' perspective on an individualised admissions procedure in order to generate further knowledge about the content of the procedure and its outcomes.

Individual student selection to dental education at Karolinska Institutet

Education of dentists in Sweden has been state-run since 1885. The Royal Dental School in Stockholm was an independent academy from 1923 to 1964, when it became part of Karolinska Institutet. The Dental School at Karolinska Institutet is Sweden's oldest dental undergraduate centre.

Background

In October 1991, the Faculty Board of the Dental School in Stockholm decided to apply to the Ministry of Education and Science for permission to select students through an individualised system, and in 1992 received consent for individualised selection of one-third of the students. Within the faculty, it was decided that an appropriate time to introduce the new system would be parallel with the introduction of a new dental undergraduate curriculum, in the fall of 1993.

There were several factors favouring the introduction of individualised admission. During the late 1980s, Swedish dental schools experienced problems not only with recruitment of undergraduate students but also with high student withdrawal rates (Tandläkarlinjen på 80-talet, 1989). It was argued that for identifying highly motivated students, the centralised system, based on matriculation grades and a University Standard Aptitude Test (USAT), would be less effective than an individualised admission system. It was further argued that an individual student selection system could more readily identify students with the potential to become good dentists, and exclude students lacking attributes considered essential in a good dentist.

According to Glick (1994), see further discussion in Paper II, one of the most common misconceptions about admissions processes is the objective: it is not to seek out academically outstanding students, but rather those students who have the potential to become good practising professionals. The prospective applicant will spend only relatively few years as a student and the rest of his/her working life practising as a doctor or dentist (Physicians for the twenty-first century, 1984). Students may acquire adequate scientific knowledge and technical skills during their preclinical training, but lack the personal attributes essential for good interpersonal communication and interaction with patients in the clinical setting (Glick, 1994; Murden *et al*, 1978).

Antonovsky (1987), Bullimore (1992) and Albanese *et al*² (2003) have a similar approach to the prime aim of selection: to identify academically able students,

who have an appropriate understanding of the coming clinical career, the ability to cope with the course and with subsequent professional life. In a university there is always the temptation to select the student with academic ability rather than one with the potential to become a competent, independent doctor ten years hence (Bullimore, 1992).

Internationally, educators in the health service have advocated similar approaches to individual selection of undergraduate students. According to Rognstad (2002), the availability of more detailed information about the content of a program may help the potential student to “self-select” or make an informed decision about whether to accept a place and embark on a clinical career. When an alteration to the admissions process became necessary at the University of Waterloo School of Optometry, it was concluded that the ideal optometry admission interview should gather information from candidates, verify information in the application, provide information to candidates and select students by appraising their people skills, professional skills and attitude orientation (Spafford, 2000). The Medical School at University of Wisconsin recognised the need for changes in the admissions procedure, in order to ensure that all students admitted to the course have a realistic understanding of the demands a career in medicine presents and that they possess the interpersonal skills needed (Albanese *et al*², 2003).

In order to improve recruitment and minimise withdrawals from the dental undergraduate course at Karolinska Institutet, it was assumed that individualised selection would be based primarily on the following three factors: high motivation, relevant information about the undergraduate course and realistic expectations about the course and the practice of dentistry. The assumptions were based on the following:

- although the individually admitted students’ levels of academic achievement on entry (matriculation grades) might not be as high as those of students admitted as dental undergraduates through traditional modes, once admitted, highly motivated students would be less likely to withdraw from the course before graduation;
- during the selection process, applicants would be provided with important relevant information about the course: this could help the applicants to make a more informed decision about their preference for the course, and their choice of profession;
- an interview during the selection process would disclose among other things, whether an applicant’s expectations of the course were realistic.

The selection procedure

In 1991, the Dental Faculty Board commissioned a Steering Committee to design an admissions system that would fulfil the major goals described above. Two systems in Swedish universities were of special interest: medical and physiotherapy undergraduate education at Linköping University (Askling *et al*, 1991, Areskog *et al*, 1992; Holmberg, 1992) and medical undergraduate education at Karolinska Institutet (Hindbeck *et al*, 1994).

In order to fulfil the task the Steering Committee drew not only on the experience of other universities in Sweden, but also on selection systems applied nationally and internationally in other fields, such as the police force and aviation pilot training. Of particular interest was the pilot selection system, because of the major emphasis on personal attributes deemed essential to meet the demands of many years of practical aviation. A psychology consultant, who had designed pilot selection systems in Sweden and in other countries, therefore participated in the process of designing the admissions system to the dental course.

The task of the Steering Committee was to identify specific personal qualities which are important in a superior practising dentist. Sade *et al* (1984) has described the work to determine which qualities are important but cannot be taught in medical school. The relative importance of 87 clusters of positive traits of a superior physician, based on a previously published list, was determined by asking faculty members to rate them. The faculty was asked to rate each cluster of qualities for the degree to which it can be taught and they were also asked to rate each cluster of qualities for its importance in a superior physician. The importance and the teachability ratings were combined into a non-teachable-important index (NTII), that provides a rank order of traits that are important but cannot be taught easily. The NTII was generated with a practising physician in mind even though the top of the list comprises qualities one might seek in a candidate for nearly any profession, such as “is emotionally stable”, as well as physicians more interested in teaching or research than in provision of patient care. The list gives equal attendance to importance and to non-teachability, see Table 1.

The work of the Steering Committee finally resulted in a list comprising attitudes such as endurance, tenacity in fulfilling a goal, emotional stability, integrity, and personal motivation. The Admissions Committee later transformed the list into an interview protocol.

As part of the design process, a model was developed and tested in selection of Baltic dental students to a special course at the Dental School. The first round of admission took place in the fall of 1991. This is further described in Paper I. The principles of the new individualised admissions system, the work of the Admissions Committee (AC), and the criteria applied are described in detail in

Paper II. The following is a brief presentation of the three stages in the selection procedure, and of the work of the Admissions Committee (AC).

Table 1. Qualities of a Superior Physician. (Examples from the list; Sade *et al*, 1984)

	<u>Importance</u>	<u>Teachability</u>	<u>NTII</u>
	Rank	Rank	Rank
Is emotional stable himself	4	7	1
Is a person of unquestionable integrity, is highly principled	11	9	2
Is forthright, intellectually honest	10	16	3
Is naturally energetic and enthusiastic	10	2	4
Is unusually intelligent, mentally quick; is bright, keen	57	1	5
(...)			
Is able and willing to learn from others (colleagues, nurses, students, etc.)	14	39	14
Is conscientious; strives for perfection in his work	30	21	15
Is wise, thoughtful, able to get at the heart of a problem; able to separate important points of detail	20	35	16
(...)			
Is imaginative, creative; has originality	70	3	20
Finds medicine and its still unsolved problems an intellectual challenge	32	38	21
Is considerate of others; is alert to patients convenience and comfort; is courteous and tactful	19	41	22
(...)			
Is a modest, essentially humble person, Aware of his own limitations and tolerant of The opinion of others	61	13	33
(...)			
Is an active contributor to medical literature	85	65	85
Is productive in research	87	57	86
Consults regularly with drug representatives to stay abreast of new drugs and medications	83	76	87

In stage 1, the student must meet the general and specific academic requirements set by the university. Applicants who fulfil these requirements and have attained a certain minimum matriculation grade or USAT score, are eligible to proceed to stage 2.

In stage 2, the prospective students are invited to the Dental School for a day, during which they are required to write three separate assignments: a self-description, a personal motivation, and an essay on one of three given topics, not requiring any specific knowledge of dentistry or medicine. For the remainder of

the day the applicants are offered more detailed information about the dental course and the dental profession.

Assessment of the written assignments is the task of the AC, which consists of 7 experienced faculty members, one of whom is chairman. The AC has the support of an experienced consultant psychologist and a senior administrator. Prior to the implementation of the new admissions system, the AC members and three reserves initially underwent one full day of interview training. At the same time desirable attributes for a good dentist were also discussed and formulated. Since then the AC has undergone training every year, allowing time for self-reflection about experience gained and to achieve further knowledge of the field.

The AC members work in pairs (one male and one female). Each of the three pairs independently reads one-third of the written assignments. An administrator has given the written assignments a code number and subsequently the AC members do not know the names of the applicants during the assessment. Each AC member assesses the three written parts independently, using a previously determined assessment system for the three written sections. The assessment for the essay includes: the ability to handle the subject and organise the text, analytical skills, and linguistic ability. The AC member also gives the applicant an overall score and may make written comments about the applicants' written assignments. After reading through the material, each pair meets, discusses each applicant in turn, and agrees on a rating. When the three pairs have completed their assessments, the full AC is convened. Applicants with the lowest ratings are excluded. Those with higher ratings are eligible to proceed to the third stage.

In the third stage, the remaining applicants are called to interview. The senior administrator randomly assigns the interviewers. Each applicant is interviewed separately by two AC members, usually on the same day. The duration of the interview is about 30 minutes. Before the interview starts, the interviewer has access to the applicant's given name and self-description but not to his/her matriculation grades, scores from the USAT-test, or of any of the other written assignments and the surname of the applicant is not known to the interviewer.

After the interview the interviewer completes the purpose-designed protocol. The protocol includes two sections: one relating to the interviewer's impression of the applicant and one relating to other information about the applicant of interest for admission. The following attributes are assessed: maturity, judgement, responsibility, stress-tolerance, self-confidence, co-operation, and independence. The other section includes: motivation for choice of career, suitability for the profession, relevant work experience, communication skills, sensitivity, tolerance and linguistic ability. The attributes are rated on an ascending scale from 1 to 5. The interviewer gives the applicant an overall rating score. The interviewer can also note other findings of interest in his/her own words.

After completion of the interviews, the AC meets for a final discussion of each applicant. At this stage there has been no prior discussion among members of the AC. The two interviewers who have interviewed the applicant give their final assessments. Applicants awarded the highest scores by both interviewers are accepted. Applicants who have received the lowest scores are excluded. When the number of suitable applicants is less than the number of available places, fewer applicants are admitted by this mode. However, when the number of suitable applicants exceeds the number of available places, a reserve list is also compiled after an evaluation of the applicants other merits. During the whole procedure the applicants are referred to their code numbers and their full names are unknown to the AC.

Material and Methods

Introduction

In order to assess the relationship between selection method and student success, with a special reference to individual student selection, a combination of quantitative and qualitative methods has been used. The first and second papers are based on quantitative methods. In the third paper a qualitative approach has been used in order to define students' professional competence in relation to criteria assessed. In the fourth and fifth papers interviews were conducted with teachers and students taking part in the individualised student selection in question and the interviews were analysed using a qualitative method.

The aim of a quantitative method is to describe, quantify and determine whether there is a causal relationship or not. In order to be able to generalise the results *i.e.* to extrapolate the results with certainty to an entire population, random sampling is used to select the material to be investigated. This makes a statistically certain result possible. The main strength of the quantitative method is reliability, whereas the validity of the method depends on whether the questions have been correctly formulated.

Sometimes a research topic cannot be adequately addressed by quantitative methods *e.g.* when a complex or human phenomenon is to be investigated. In order to do justice to human phenomena a shift of perspective is necessary and qualitative methods are needed (Nordenram and Norberg, 1997; Thulesius *et al*, 2004). Instead of the conventional use of a questionnaire, conducting interviews with a specially selected group of subjects can disclose new, important factors. The aim of the interview and the subsequent analysis is to highlight what is important for a person in a given situation and in a given social situation (Strang, 1998). The strength of qualitative methods is validity whereas the reliability must be assessed in the context of the conditions prevailing at the time of the interview and can therefore not really be studied as a separate entity (Svensson and Starrin, 1996).

Another key dimension is the difference between deductive and inductive approaches. The deductive approach is theory-driven and research is undertaken with an *a priori* theoretical view. A hypothesis is generated and the aim of the research is to nullify or support the hypothesis. The inductive approach is data-driven – facts derived from the research are used to generate theory (Fulop, 2001). Although qualitative analysis does not emphasise number or breadth, there is a difference between knowledge drawn from most of a sample and knowledge drawn mainly from a few separate individuals (Malterud, 1998).

Table 2. Description of main features of and differences between qualitative and quantitative research methods.
(Modified after Strang, 1998)

Qualitative	Quantitative
Observation	Experiment
Interview	Survey
WHAT is X?	How MANY X?
Classification	Quantifying
Theoretic selection	Statistic method
Inductive method	Deductive method
Understand	Explain
Describe	Predict
<i>Strength: Validity</i>	<i>Strength: Reliability</i>

In interpretational studies, the researchers themselves can be regarded as research instruments: the interpretations are based on pre-understanding (Nordenram and Norberg, 1998). Pre-understanding is the knowledge we carry with us before we start on a research project. As a rule, pre-understanding is an important element in the researcher's motivation for undertaking a research task (Malterud, 1998; Marshall and Rossman, 1999). While no longer directly associated with the Dental School, the interpreter in the present studies has extensive prior knowledge of both dental education and admissions procedures, and was previously not only actively involved in the initiation and implementation of the individualised admissions system at the Dental School, but also a member of the admissions committee for several years.

Rather than being considered incompatible, quantitative and qualitative strategies should be seen as complementary (Pope and Mays, 2002). Although quantitative variables are applied to predict *e.g.* student retention and different study success continue to dominate education research, the qualitative approach to scientific inquiry holds considerable promise as a means of identifying and exploring non-cognitive variables, such as self-efficacy and motivation (Campbell and Dickson, 1996). As shown above, although the procedures differ due to the fact that different data are used and different questions are being asked, the underlying principles are much the same. Qualitative studies can also be added to quantitative ones to gain a better understanding of the meaning or implications of the findings (Malterud², 2001; Fulop *et al*, 2001). By combining qualitative and quantitative approaches, the shortcomings of both strategies can be offset (Malterud¹, 2001). The objectives for both strategies or methods are to explore new relationships and processes. According to Thulesius *et al* (2004), it would be of interest to see more application of inductive methods within quantitative research as well.

This is the methodological approach underlying this thesis.

Subjects

In Paper I, the subjects comprised 18 Baltic dental students from two rounds of admission. These students were admitted using an admission procedure that comprised an essay of three different sections and interviews by an Admissions Committee. The procedure forms the basis for the admissions procedure described in the following papers.

In Paper II, III and V all students come from the same cohort of students *i.e.* they represent the same rounds of admission.

In Paper II all dental students from the same three rounds of admission to the Dental School, Karolinska Institutet, were included, n=169, of whom 60 were admitted by individualised selection. The remaining 109, admitted by traditional modes, matriculation grades and the scores from the USAT, served as a control group.

Paper III included all dental students from the same three rounds of admission, n=128: 48 (37.5%) had been admitted by the individual admissions system (IS-group) and 80 (62.5%) through traditional modes (TM-group), mainly from the same rounds of admission. The TM-group formed the control group.

The subjects in Paper IV comprised the current Admissions Committee to the dental course *i.e.* seven faculty members actively involved in undergraduate teaching. The members were given verbal information by the author about what participation in the study would entail, in order to give their informed consent. As a former colleague and teacher at the Dental School, the interviewer was well-known to the members of the committee.

Paper V comprised ten selected graduating dental students, five male and five female, who had been admitted through the individualised admissions procedure five years previously. The participants, from two different admission rounds, were randomly selected among those selected through tests and interviews. The students were informed verbally by the author about the aim and the process of the study. The students knew the author/interviewer as a former teacher and Assistant Dean at the Dental School. All ten students gave their informed consent to participate in the study.

Assessment methodology

In Paper II, three different objectives were investigated:

1st objective: to select highly-motivated students, using the drop-out rate for the first three semesters as a tool;

2nd objective: to select students with the potential to become good dentists.

As the students at this stage had only just begun clinical training, fulfilment of the second objective was assessed through performance in three major integrated

examinations, designed to disclose “excellence in both comprehension and academic abilities”. In the integrated examinations, the series of steps by which a student recognises and defines a specific problem, and then proposes a solution, which draws on academic, theoretical knowledge from several fields, simulates the process of clinical decision-making required of the general dental practitioner.

3rd objective: to select students whose academic performance, assessed in terms of the results of a traditional major examination, would equal that of students admitted by traditional modes.

The material comprised all students accepted at the same intake. Thus the study includes data from the entire population. Since the study is based on data from all individuals in the respective cohort statistical hypothesis testing is not relevant. The presentation is based on descriptive data.

In Paper III, faculty members who knew the students well assessed the professional competence of all final-year students from three rounds of admission. The faculty members, 13 in all, were uninformed of the mode (IS or TM) by which the students had originally been admitted to the undergraduate course. The participating faculty members were tutors in the comprehensive care clinic, who had supervised the clinical work of the students over a period of 1 to 3 semesters.

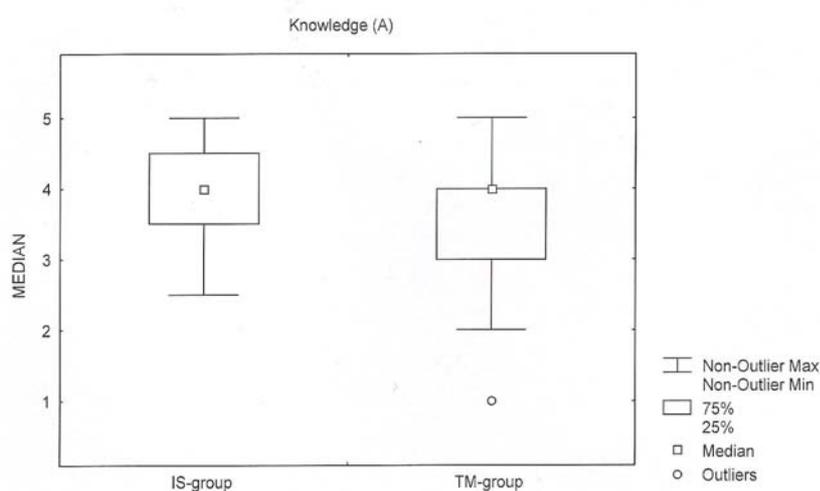
A specially designed protocol was used, comprising seven different criteria, to be graded on a scale of 1 to 5, and one overall – global – rating on a scale of 1 to 7. The seven criteria were knowledge, initiative, responsibility and judgement, patient contact, clinical skills, co-operative approach, and commitment and motivation. The overall rating was to be based on the seven different criteria. The protocol had originally been developed by psychologists involved in individual admission of medical students at Karolinska Institutet (Ritzén *et al*, 1999). Before being applied in this study it was adjusted by the author and critically reviewed and tested in a pilot study. Some further modifications were performed after the pilot study. An inter-rater reliability test was later performed. The assessors were also asked to verify which (1 or more) of the seven criteria they considered most important for the overall rating.

The scale used in the above described protocol is an ordinal one, *i.e.* the “distance” between two categories is not known. It could not be assumed that the intervals were equal, and therefore categories were ranked only. One can only assume that higher categories or values represented “more” of the attribute. Arithmetic calculations or operations should not be used using this kind of data (Svensson¹, 1998). Data from ordinal scales should not be analysed by parametric statistics (Merbits *et al*, 1989). Ordinal scales are best operationalised by calculating the median value of the assessors who are trying to assess the same criterion. The Box-plot describes the distribution including minimum,

maximum, lower and upper quartile, median, and outliers. For an example see Figure 1. Data have been analysed by ranking statistics.

Reliability coefficients between raters were estimated by proportions of most frequent assessment for each criteria used and for overall rating.

Figure 1. Box-plot: Knowledge



Analyses of interviews

In Paper IV a qualitative method was applied in order to elicit the lecturers' perceptions of an admissions procedure based primarily on tests and interviews and to disclose whether they perceived this admissions procedure to have influenced the selected students' academic achievements during the dental undergraduate course. Seven semi-structured interviews were conducted using an interview guide. The interviews were tape-recorded and transcribed *verbatim* by the author. The narratives were analysed by a phenomenological method inspired by Giorgi (1985) and modified by Malterud (1998, 2001²) into a pragmatic procedure comprising four stages of reading:

- 1) an initial reading to get a *sense of the whole* and to identify themes,
- 2) the structural phase to identify *expressed meaning units*,
- 3) to *abstract* the content of the expressed meaning units into the language of research as *transformed meaning units*,
- 4) to synthesise the *meaning of the content* – the researcher's interpretation of the phenomenon.

By highlighting the meaning units the reader begins a systematic procedure known as coding. In order to categorise the material, a matrix is used, see example in Table 3. The work in this phase focuses on the individual code group as a unit. In the final phase of the analysis the parts are assembled in order to

ensure that the patterns still agree with the context from which they were collected (Malterud², 2001). The knowledge from each separate code group is summarised in text form.

Table 3. Code group “Motivation” from the interviews with the Admissions Committee members (Paper IV)

The numbers in the columns’ text refer to where the different parts of the text belong in the interviews.

CODE	Interviewee						
	1	2	3	4	5	6	7
H. Motivation	17: Are committed to what they do, what one does is important.	8: Realistic assessment of themselves and the workload. Can deal with setbacks, find solutions and continue on.	4: That one really intends to achieve what one claims to want. Genuine self-image, not an unrealistic externally imposed image.	11: To achieve the goal one aspires to even if it involves hard work.	13: Interest, engagement. That it is the applicants’ own choice, not imposed by someone else. Has independently sought information about the course.	9: Motivation leads to better results. Feel stimulated by the task and a determination to complete it.	14: Work towards a vision. The vision is the goal and if one is motivated one works towards it. To achieve this, it is necessary to have a vision.
- Can motivation be assessed by another person? If yes, how?	18: Yes. Assess tenacity and motivation for choice of course.	10: Yes. Assess purposefulness and how they react to setbacks.	5: Can be assessed by others, if I did not believe this I would not be participating in this form of selection.	11: It is possible to assess whether the choice is one’s own, what is attractive and what the applicants know about the course and professional life as a dentist.	18: It is possible to assess this.	11: Difficult to assess, but self-description discloses capacity for empathy; a network of signals in this form of selection for admission.	15: Others can assess whether the goal is realistic and whether the attitude is realistic. This is related to the age of the individual.

Validation of the results is achieved by systematic scrutiny of the matrix, which can be read horizontally or vertically. Reading horizontally allows the descriptions and concepts to be related to a cross-section of the material, and reading vertically provides data from the individual interview. Miles and Huberman (1994) have also described the use of matrices. They believe that displaying reduced data in a systematic way as a matrix facilitates understanding and focuses and organises the information coherently.

Validity is finally enhanced by independent assessment of the matrix of each interviewee by so-called feedback validity (Svensson and Starrin, 1996). The interviewees receive the full, unidentified matrix and should be able to identify their own column of coded and abstracted answers.

In Paper V the same analytical method was used as in Paper IV in order to elicit student perceptions of some aspects of an individualised admissions procedure and to disclose whether they perceived that the procedure had influenced their academic achievements during the course. The tape-recorded interviews were transcribed *verbatim* by professional secretaries.

Due to the fact that the interviewees had graduated from the Dental School, validation was enhanced by independent assessment of the matrix by another researcher familiar with both qualitative research and admissions procedures. This may be described as a modified form of feedback validity or expert validation. The researcher received the transcribed interviews and the full, unidentified matrix and was asked to combine each interview with the column of coded and abstracted answers. This method for expert validation was devised by the author of the present thesis.

Results

Paper I

The Baltic students completed the same minimum clinical requirements as the regular students. There were no withdrawals or deferrals. The 18 students originally selected completed the full course requirements within the prescribed time.

Paper II

Drop-outs

After 1-3 semesters, drop-outs accounted for 3.3% (n=2) of the students admitted through the individualised admission system, 16% (n=12) of the matriculation grade group and 22.2% (n=8) of the USAT-group.

Integrated examinations

In the three integrated examinations during the first two years of study, the individualised group had a higher pass rate than the other two groups. The average failure rates were: 2.3% for the individualised group, and 9.7% and 14.3% for the matriculation grade and the USAT-groups, respectively.

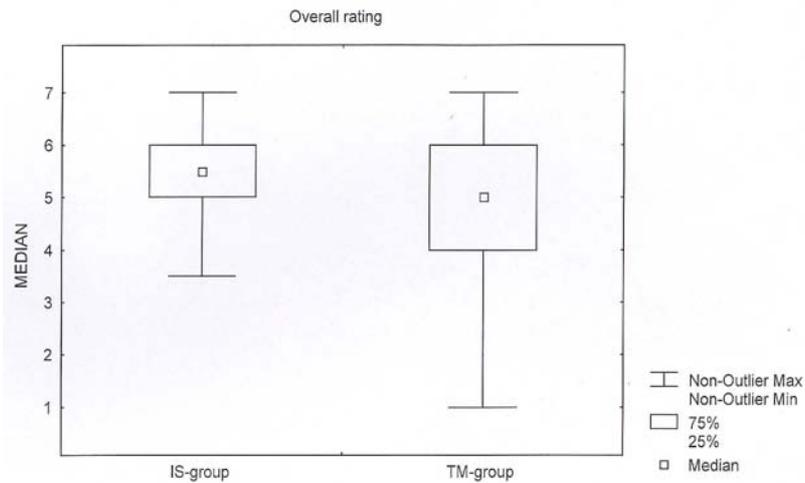
Traditional examination

In one traditional examination halfway through first year, the failure rate was 10% for the individualised group, 20.5% for the matriculation grade group and 8.3% for the USAT-group.

Paper III

In Table 4, results on the different scales are presented. The median value for the overall rating of professional competence was 5.5 for the Individualised Selection group (IS-group) and 5.0 for the Traditional Mode group (TM-group). The inter-quartile range (IQR) was 6.0-5.0 for the IS-group and 6.0-4.0 for the TM-group. The range (min-max) for the IS-group was 3.5 and for the TM-group 6.0. See Figure 2.

Figure 2. Box-plot: Overall rating for professional competence



In all seven criteria, the median score values for the IS-group were equal to or higher than for the TM-group. The IS-group also had a higher and narrower inter-quartile range in all but two criteria, and a narrower range in all but one criterion.

Eleven out of 13 faculty members nominated “responsibility and judgement” as the most important criterion, followed by “knowledge”.

All inter-rater reliability coefficients were between 0.56 and 0.70. The lowest coefficient was for the overall rating and the highest coefficient was for one of the 7 criteria used, “co-operation”. This analysis was undertaken after the publication of the paper.

Table 4. Median values, inter-quartile range (IQR), range (min-max) and outliers for all the criteria used.

Criteria assessed	IS-group				TM-group			
	Median value	IQR	Range (min-max)	Outlier	Median value	IQR	Range (min-max)	Outlier
A) Knowledge	4.0	4.5-3.5	2.5	-	4.0	4.0-3.0	3.0	1.0
B) Initiative	4.0	5.0-4.0	2.5	2.0	4.0	4.0-3.0	3.0	1.0
C) Responsibility and judgement	4.5	5.0-4.0	2.0	2.0	4.0	4.5-3.0	3.5	1.0
D) Patient contact	4.0	5.0-4.0	2.0	-	4.0	4.5-3.5	3.0	-
E) Clinical skills	4.0	4.0-3.0	2.0	-	4.0	4.0-3.0	3.0	1.0
F) Co-operation	4.0	5.0-4.0	2.0	-	4.0	5.0-3.5	3.0	-
G) Commitment and motivation	4.5	5.0-4.0	2.0	-	4.0	5.0-4.0	2.0	2.0 & 1.0
Overall rating	5.5	6.0-5.0	3.5	-	5.0	6.0-4.0	6.0	-

Paper IV

By allowing the interviewees to identify their own responses in an anonymous, matrix (as presented in Table 2) the results of the interview could be validated (Svensson and Starrin, 1996). Six out of the seven, *i.e.* 85% of the interviewees, were able to identify themselves in this way. None of the interviewees declared that they wanted to alter or complement the catchwords in their responses.

There were 7 narratives. Twelve code groups, A-L, were identified:

- Perception of the admissions procedure
- The composition of the admissions committee
- The selection procedure
- The interviews
- Discussions among faculty regarding admissions procedure

- Assessment of the applicants
- Undergraduate performance in relation to mode of admission
- Motivation
- The students' attributes
- Do the selected students resemble the members of the admissions committee?
- Is there an "unwritten agreement" between the faculty member conducting the interview and the selected student?
- Whether this form of admission is suitable for other undergraduate courses?

A condensed description of the findings in Paper IV is presented in the following. Most committee members describe the work with the selection process as engaging, important and instructive. At the same time several point out that it is a difficult task and has an important bearing on the applicants' future.

All the members agree that the composition of the committee is appropriate: there are equal numbers of men and women, various disciplines of dentistry are represented as well as diverse perspectives. All members/interviewees point out that the psychologist is an important resource, providing excellent support for the work of the committee group.

All members except one consider the interview to be the most important phase of the selection process, or at least as important as any other part of the selection procedure. One of the longest-serving members of the committee now considers the essays to be more important than the interviews. The other longest-serving committee member states that it is important to be aware of the feelings aroused in the interviewer and that the psychologist has encouraged the committee members to acknowledge their responses with confidence. The committee members describe the interview as a challenge, to encourage the applicants to talk about themselves. Several committee members consider it important to assess the quality of the dynamics of the interview. Motivation, realism, stress tolerance, capacity for empathy, and level of maturity are attributes that the committee members seek to identify in the applicants. All the committee members are gratified by the surprisingly high level of consensus within the committee with respect to both the written essays and the interviews.

All the committee members believe that this form of admission has some influence on undergraduate achievement by the selected students. Several comment that the students consider themselves specially selected for their special potential and therefore see this as a positive effect on undergraduate performance. According to some members the students want to live up to those expectations or aspire to high achievement because someone has shown faith in them. All the committee members spontaneously use the word "motivated" when they describe the applicants.

Several of the committee members define motivation by saying that the individual him/herself has the drive to achieve his/her goals that this is the individual's own choice and therefore there is a determination to carry out the task, even if there are occasional setbacks. All the members are of the opinion that it is possible to assess an applicant's motivation, by assessing *e.g.* tenacity, realistic goals, sense of purpose, motivation underlying the choice of course and how the applicant has previously coped with setbacks. Most of the lecturers observe that the students selected in this way are committed, empathetic, motivated and have a realistic concept of themselves, the undergraduate course and their chosen profession.

None of the committee members gives credence to the idea of an "unwritten agreement" between the faculty member conducting the interview and the selected student. The reason is that the committee members do not recall later on which students they interviewed, with few exceptions, and very few students make themselves known to the committee member who interviewed them. Several committee members believe however, that the students remember who interviewed them.

Most of the committee members believe that this form, or a somewhat modified version, would suit other university courses, particularly within the health sciences, or within fields in which there is contact with people in a dependent relationship. Some point out that it is of advantage both to the individual applicant and to the tertiary institution to meet before admission. It is believed to be rather strange not to have such a preadmission interview for prospective undergraduates; this would never be acceptable in the case of an applicant for employment.

Paper V

The findings are briefly described in the following. A full description can be found in Paper V. By allowing another researcher to identify and combine the different transcribed interviews with the anonymous matrix, the results of the interviews could be validated. The other researcher was able to identify all ten interviews, *i.e.* 100%.

There were 10 narratives. Eleven code groups, A-K, were identified:

- Perception of the admissions procedure
- Mode of admission
- Written assignments
- The interviews
- Notice of acceptance
- Information
- Personal attributes
- Undergraduate performance in relation to mode of admission

- Motivation
- Discussion with other students
- Is there an “unwritten agreement” between the faculty member conducting the interview and the selected student?

All students remember the admissions procedure and the different stages well, even though it was five years since they had participated in the process and as if it had taken place just yesterday. All students believe that the admissions procedure is well conducted and several point out the importance of alternative ways of being accepted to higher education. In the opinion of the students, this procedure gives those applicants with a genuine interest but with lower matriculation grades a second chance to be admitted, which is good, both for the student and the higher education institution. One student believes that admission to higher education should be compared with employment selection procedures where the personal impression made by the applicant is important and may be decisive.

All but one student recall who they were interviewed by and in which order. The tenth student remembers the interviews and the content well, but not who conducted them. All students except one report that the two interviews had different outlines and content. The students believe that the difference in outline of the interviews allows the students to reveal their own special qualities. Most of the students believe that it is good to be interviewed by one interviewer at a time and not interrogated by a panel of interviewers, as it is less intimidating.

Most of the students had actively sought information about the selection procedure from a number of different sources, such as information provided by the university, or through advertisements and catalogues. Eight students did not remember that new information was given or received during the process. Of the other two, one recalls that new information was given but does not recall about what and the other recalls that new information was added during the process.

The students have not in general thought about why they were admitted or what relevant personal attributes they might have. However when asked explicitly they use expressions such as purposeful, insightful, interpersonal skills, determined, open-minded, positive attitude, a good listener, and leadership qualities. Several of the students believe that the admissions procedure is reflected in their undergraduate performance. The reasons given are that: they have been specially chosen, they have reflected more over their future professional careers, they are more highly motivated compared to students selected by traditional modes because they were prepared to undergo the admissions procedure in order to be offered a place. At the beginning of the course, study results were positively influenced by the mode of admission. They also believe that their ambition to become dentists is greater than that of students applying through a traditional mode. Among the group of students who do not

believe that the admissions procedure is reflected in their study results, one student does believe that being selected heightens self-confidence. Yet another student thinks that the challenge of successfully undergoing an individualised admission process might be character building for some students, but not for her.

All students use the word motivation spontaneously during the interview. All but one offers a definition of the word motivation. Several claim that motivation and determination mean the same. Motivation/determination is an important driving force and especially in adversity. One student offers a more thorough definition using words such as: inspiration, determination to achieve good results, responsibility: as a motivated student performance is better.

Nine of the students have not subsequently had any specific contact with the lecturers who interviewed them even though nine of them recalled who had interviewed them. The tenth student commented that one of the interviewers has meant a lot during the entire course but did not elaborate on this.

Discussion

Methodological considerations

In order to fulfil the aims of the thesis, a combination of quantitative and qualitative methods was used. The overall results are based on data from several sources, comprising quantitative values such as examination results and withdrawals (Papers I-II), assessment of professional competence (Paper III) and qualitative data on human phenomena such as the perspectives of those taking part in the admissions procedure (Papers IV, V). The research design was selected in order to provide new dimensions to research in the field of admissions procedures.

The researcher

The researcher's background and position will affect *e.g.* what he/she chooses to investigate, the angle of investigation and the findings considered most appropriate (Malterud¹, 2001). Contemporary theory of knowledge acknowledges the influence of a researcher's position and perspectives and questions the concept of a neutral observer. This is true in qualitative studies and maybe also applies to quantitative investigations. These effects should be taken into account in discussing the limitations and the strengths of the studies (Malterud¹, 2001).

In interpretational studies, the researchers themselves can be regarded as research instruments: the interpretations are based on pre-understanding (Nordenram and Norberg, 1998; Malterud, 1998). Pre-understanding is a philosophical concept which implies practical familiarity and concepts from one's own field of expertise, which influence perception and interpretation of the data (Carrothers, 2000). Observations or interpretation without pre-understanding would negate the aim of contributing to understanding: the interpretation must be based on understanding of what is to be interpreted (Bronfenbrenner, 1976). Preconceptions are not the same as bias, unless the researcher fails to mention them (Malterud¹, 2001). According to Murphy (2001) qualitative research is highly labour-intensive and therefore demands the highest level of expertise to undertake the "hands-on" research.

In this context, it is important to outline the researcher's pre-understanding of the questions addressed in the current study. As mentioned initially, the interpreter in the present studies has extensive prior knowledge of dental education. As former Assistant Dean at the Dental School, Karolinska Institutet. I was involved in the Baltic dental program and was an initiator for implementing a new procedure for admission to both the Baltic program and to the dental undergraduate course. For several years I was also a member of the

admissions committee at the Dental School. My pre-understanding has therefore both breadth and depth and has also been a key motivating factor in undertaking the present research: to determine whether the assumptions made in introducing this form of selection had been fulfilled. Papers I and II were finalised while I was still a member on the committee; however I had left the Dental School before collecting the data for Papers III-V.

By clarifying my background and experience, with special reference to the aims in this thesis and my pre-understanding to the field, I hope to avoid what is referred to as “skewed subjectivity” (Kvale, 1996). As a single researcher, I devised strategies to handle the two interpretative studies, IV and V (Malterud¹, 2001). These procedures will be discussed later on. However, my close former relationship to the admissions procedure is both a strength and a weakness, and it is possible that another researcher, with a different frame of reference, would have chosen to highlight other parts of the material (Selghed, 2004).

Hertting (2003) has described the researcher in such a situation as mine as an insider with an outside perspective.

Subjects

In Papers II, III and V all students come from the same rounds of admission *i.e.* the first three rounds after the individualised student selection was introduced. In Paper II the number of students was 169 and in Paper III – three years after the initial studies – 128. This reflects the dynamics of a student cohort during a 5-year course: students defer undergraduate studies in order to undertake research, to travel, for maternity leave or because of ill-health. It was not within the scope of the study in Paper III to investigate the reasons for the reduction in number of students between second and fifth year.

In Paper IV all seven committee members in the year of 2003 were included. The subjects in Paper V were randomly selected. While there are no principled objections to probability sampling in qualitative research, the ratio of settings studied to the population to which one wishes to generalise is usually too low to permit statistical extrapolation. However, researchers can enhance the generalisability of their findings by making thoughtful sampling decisions (Fulop, 2001). In this case the random selection gave a broad spectrum of participants among the two groups of male and female students accepted through this mode: spread in age, spread in cultural background, students who had either participated in a similar procedure at another Swedish Dental School or had previously failed to be accepted at the Dental School in Stockholm. Miles and Huberman (1994) describe this procedure as checking for representativeness. While the experimental researcher uses randomisation conventions early, the qualitative researcher typically uses them later, as verification devices. Because of this broad representativity of candidates it was decided that further interviewees were unnecessary.

The interviewer was well known to the interviewees in Paper IV and V, as a former colleague, a former teacher and the former Assistant Dean. All the interviewees consented to participate in the study. The interviewees did not seem to be distracted by the tape recording, apart from brief initial embarrassment. The narratives were usually long and fairly detailed, indicating that the conditions under which the interviews were conducted induced confidence.

Assessment methodology

In Paper II, three different objectives were investigated in an initial evaluation of the individual student selection procedure, in order to determine whether the procedure was fulfilling its assumptions. As the students had only recently embarked on their dental studies, it was necessary to find methods that would disclose student motivation, their potential to become good dentists and their academic ability. It is argued that this is not a sample study as all the students – at the time – were included and therefore statistical hypothesis was not relevant; instead descriptive data was used. Although statistical testing on larger cohorts of students would have been possible later on, at the time of the study an initial evaluation of the admissions procedure was required, in order to confirm that the desired effects were being achieved.

The aim of Paper III was to assess two modes of admission in terms of professional competence of the students in their final year. In order to assess professional competence, a protocol was specially designed, comprising assessment of seven different criteria and one overall – global – rating. The criteria to be rated were knowledge, initiative, responsibility and judgement, patient contact, clinical skills, co-operative approach, and commitment and motivation. A five-point rating scale was used for these criteria, but for the overall rating, a seven-point scale was used. In accordance with the recommendation by Keck *et al* (1979) with respect to prediction of clinical performance, the criteria used in Paper III were a combination of cognitive and non-cognitive attributes.

Thirteen faculty members participated in the study. The inclusion criteria were that they knew the students well and had been supervisors in the adult comprehensive care clinic for a long period. For each round, a number of faculty members was added, using a core of 4 faculty members in all three rounds of accepted students. In a similar study where different criteria were assessed, no significant difference was found between *e.g.* experienced staff and new staff (Nowacek *et al*, 1996). By way of rater training, the faculty members received a presentation by the author covering the aim of the study, the manual, and the protocol.

With respect to the effect of training raters for clinical evaluation of students, some studies have shown that training improves reliability considerably

(Patridge and Mast, 1978), although a review of the literature discloses inconsistent results. Rater training or calibration in dental education has been described in the literature in terms of “easy” and “hard” graders (Biller and Kerber, 1980). A similar approach is used by Chambers (1987) who claims that the use of several examiners allows physical corrections for rater differences based on the assumption that exposure to several examiners will “average out”. Chambers (1987) also claims that calibration plays an important part in efforts to eliminate undesirable variation in ratings of students’ clinical work, but there are limits to the extent to which such faculty training is effective. Svensson² (1998) on the other hand states that systematic disagreement (bias) concerning scale categories used could be reduced by either clarifying the category descriptions, or by training the raters. In this case it was also emphasised that the scale is an ordinal scale *i.e.*, the distance from class to class is not known. All that is known is that higher numbers represent “more” of the attribute, therefore no arithmetic calculations should be used (Merbits *et al*, 1989).

Data from ordinal scales should therefore not be used for analysing statistical significance (Merbits *et al*, 1989). The Box-plot discloses the distribution and the cut-off points and in addition it reveals possible extreme values, so-called outliers (Körner and Wahlgren, 1996) making it possible to compare the groups studied *i.e.* IS- and TM-groups.

Patridge and Mast (1978) argue that the use of an overall or global scoring approaches the performance of a skill as a whole. In contrast, using different criteria or so called analytical scoring yields separate ratings for each of the small parts which make up the whole performance. According to their results both systems can yield reliable evaluation, but used as a pedagogical tool the analytical approach to scoring can provide more feedback to the student. However, the assumption that both systems actually yield reliable evaluation may be questioned, as the rating of the overall score is the result of the separate ratings for each small part. This form of arithmetic calculations or operation, adding different items or criteria to one overall score, is not appropriate for such data (Svensson¹, 1998). Thus in the present study, the overall rating was to be based on the seven different criteria, but not by way of arithmetic calculations. The reason for choosing a seven-point scale instead of a five-point scale was therefore to force the assessors to reflect over which of the seven criteria they considered most important for the overall rating.

The question of intra-rater reliability often arises in discussion of different assessment methods, and is highly relevant with respect to Paper III. When assessing individuals, and not a radiograph or a colour, it is not possible for the raters to embark on a follow-up assessment without being influenced by their preceding assessment of the same person. While the perception of nuances of colours might well be forgotten between two assessment occasions, this does not occur with assessment of people. If a reasonable time interval is allowed to

elapse between assessments, the assessors do not assess the individuals as they were, but rather how they have changed since the previous assessment.

The lowest inter-rater reliability coefficient was for the overall rating, 0.56. Thus although more acceptable inter-rater agreement was achieved for circumscribed, defined criteria, such as “co-operation” 0.70 and “responsibility and judgement” 0.66, there was much greater variation with respect to the overall rating. One reason may be lack of consensus among raters, not as to what they consider most important in an overall rating, but rather how to use the other circumscribed criteria in the global rating. The results here indicate that the seven-point scale used in Paper III also should have had a clarifying description of the categories (Svensson², 1998).

The advantages and disadvantages of different scoring systems, *i.e.* comparing multi-point scales with *e.g.* two-point scales, have also been discussed in the literature (Patridge and Mast, 1978; Svensson¹, 1998). The advantage of scales with a large number of categories is the protection against loss of information and increase in responsiveness, provided there are clearly defined categories (Svensson¹, 1998). Using a two-point scale may lead to greater reliability but there is some loss of responsiveness and this is not feasible as an educational tool (Patridge and Mast, 1978; Svensson¹, 1998). On the other hand, a multi-point scale, *e.g.* from 0 to 100, may give a false impression of continuous response variables of high precision. In both this study and the study conducted at the Medical School, Karolinska Institutet (Ritzén *et al.*, 1999), the primary interest was a thorough assessment of student performance using a multiple point scale from 1 to 5 and from 1 to 7, with clearly defined categories or with a clearly defined range.

Patridge and Mast (1978) state that in selecting a method for clinical evaluation, not only should questions of reliability and validity be addressed, but also practical aspects, such as the time necessary to develop, implement, and maintain an evaluation system. The raters in this study have not expressed problems in using the scales and the evaluation has not been time-consuming.

Interview design

Papers IV and V have a qualitative approach, using semi-structured interviews in order to disclose some perceived experience of members of an admissions committee and of some students accepted through the individualised selection in question.

Qualitative methods are useful for studies *e.g.* of thoughts, expectations, and attitudes, especially when related to interaction, relations or interpretations (Malterud¹, 2001). Data collection through interviews and interpretations is one of several methods used in qualitative research (Kvale, 1996), and semi-

structured interviews could be used as a method for collecting data for qualitative analysis (Malterud¹, 2001).

In the present studies, semi-structured interviews were selected in preference to non-structured or structured interviews, in order to create a friendly dialogue, but at the same time to focus on the topics and questions in the specially designed interview guides used. The use of semi-structured interviews and their advantages and disadvantages will be discussed further on and in relation to the interviews with applicants.

Analyses of interviews

The method used for analysis in Paper IV and V is based on Giorgi's (1985) modified phenomenological analysis, which was further developed by Malterud² (2001) into a pragmatic procedure for conducting qualitative data analysis.

In the literature on methodology, the detailed description and theoretical support, namely Giorgi's (1985) Phenomenological Analysis and the Grounded Theory of Glaser and Strauss (1967), distinguish two procedures, based on different theories. Grounded Theory can be applied to both developments of theory and descriptive analysis, whereas Giorgi's method is most appropriate for the development of new descriptions and notions related to human experience (Malterud², 2001). The process is thus modified according to Giorgi (1985) who, on the basis of the phenomenological concept, claims that the aim is to develop knowledge of the interviewee's life and experience within a defined field. The actual modified analytical process requires no in-depth knowledge of phenomenological philosophy according to Malterud (1998), enabling researchers from other disciplines to use the method.

The interviews were transcribed *verbatim* by the author of the thesis (Paper IV) and by professional secretaries (Paper V). The literature describes various approaches for handling the transcriptions. Kvale (1996) on the one hand argues that while it is of value for the interviewer to do the transcription, the time devoted to this can invariably be used on more urgent matters in the research. On the other hand, Malterud (1998) finds several good reasons for the researcher to do the transcriptions even if it is time consuming. One reason is that the interviewer recalls different moments of the interview and that may improve the understanding of the text and its context. Due to circumstances, both approaches were used in the present studies. In my experience the Malterud approach is preferable, as the content of the interviews are better recalled and this simplifies the analysis.

The concepts of validation and reliability in qualitative research

Within qualitative research, there are divergent attitudes towards the concept of validity, those who refuse to acknowledge it because it is so closely associated

with quantitative research (Guba and Lincoln, 1989), and others who consider that the concept must be allowed wider implications than within quantitative research (Kvale, 1996). According to Kvale (1996), validation in qualitative research, *i.e.* where method and analysis include control of the credibility (reliability) is a guarantee that there is an empirical basis and that the interpretation presented is reasonable. According to Svensson and Starrin (1996), validity takes precedence over reliability, *i.e.* if validity is high then so is reliability. The concept of reliability may be regarded as more closely interwoven with the concept of validity in qualitative studies and can therefore not usually be studied separately as in quantitative studies (Svensson and Starrin 1996). At the same time the strength with qualitative methods is validity while the strength of quantitative methods is reliability.

Although qualitative analysis does not emphasise number or breadth, there is a difference between knowledge drawn from most of a sample and knowledge drawn mainly from a few separate individuals (Malterud, 1998). Malterud (1998) also states that the validity of results can be tested by searching systematically for data, which contradict the conclusions. Multiple researchers might strengthen the design of a study – not for the purpose of consensus but rather to supplement each others' statements (Malterud², 2001). As only one researcher conducted the interpretations it was necessary to establish other strategies for broad and critical reading. Validation by consensus or repeatability is seldom adequate in qualitative research (Malterud², 2001). In the present studies, the use of a summary matrix containing a catchword for each code studied formed a basis for validation.

In Paper IV the analyses of the interviews were validated by feedback from the interviewees. The strategy chosen has been classified by Bronfenbrenner (1976) as "phenomenological validity", the aim of which is to determine whether the interviewees concur with the researcher's interpretations and conclusions. Miles and Huberman (1994) describe this feedback validation as an important tactic: to check with the informants who supplied the original data. The interviewees were presented with the complete matrix and were directed to identify themselves therein by feed-back validation (Svensson and Starrin, 1996). Six of the seven interviewees, *i.e.* 85%, successfully identified themselves.

In Paper V it was not possible to use the same procedure, as the students who had been interviewed had graduated and therefore were not available for feedback validation. Instead another researcher familiar with both qualitative research and admissions procedures validated the analyses of the interviews. The other researcher was presented with the ten transcribed interviews and the complete matrix with catchwords for each code group and was asked to identify and combine each interview with the abstracted answers. This strategy, devised by the author, could be described as a modified form of expert validation (Svensson and Starrin, 1996). All ten interviews, *i.e.* 100%, were successfully identified.

The results from Paper V show that the modified validation method devised by the author could also be used when a single researcher undertakes the interpretations.

The selection procedure of individually admitted students

The hypothesis underlying the student selection procedures described in this thesis is that motivation and commitment are important determinants of student achievement. The successful outcome of undergraduate studies should be perceived in a broader context than mere success in a series of examinations. It is further proposed that motivation and commitment can be disclosed more readily through tests and interviews than through traditional modes such as matriculation grades and aptitude tests. The results of the present studies support these contentions.

In the experience of all the committee members, as described in Paper IV, the admissions procedures are engaging and meaningful, but also difficult. All the students interviewed in Paper V remember the admissions procedure and the different stages well, even though it was several years since they had participated in the procedure. They also believe that the admissions procedure is well conducted, which is important as an ineffective process can result in poor admission choices, and for those who matriculate a poor start to the university course (Albanese *et al*², 2003).

It has also been stated that first impressions strongly influence future relations and applicant's impression of the selection procedure may have long-term implications (Kravitz *et al*, 1996). Examination of a large cohort of applicants to medical schools in UK disclosed a preference for schools which interviewed applicants. This preference is perhaps explained by applicants feeling more personal involvement with schools they have visited and which have selected them individually, rather than on basis of an impersonal application form (McManus *et al*, 1999; Marciani *et al*, 2003).

In the Swedish Commission, Three Paths to the Open University, *Tre vägar till den öppna högskolan* (SOU 2004:29) it is described that students have more confidence in interviews combined with specific knowledge required for the course than other available means of admission as matriculation grades or the results of aptitude tests. Cliffordson (2004) also argues that step-wise admissions procedures are highly valued by students and regarded as having strong face validity. Yet another study for evaluation of selection and promotion decisions found that the applicants awarded the most positive ratings to interviews and work samples and these tests also received the lowest invasiveness ratings (Kravitz *et al*, 1996). Similar findings are reported by Rynes and Connerley (1993) where 390 students applying for jobs were asked to rank 13 different

selection devices. The simulation-based interview was ranked highest but the attitude towards ability tests was low and ranked as number nine.

Perceived validity by the applicants does not necessarily correspond with the actual validity of various procedures. Smither and Reilly (1993) report that in a study conducted among 154 newly hired managers they *e.g.* perceived high validity of unstructured interviews, which generally has low validity in literature.

This raises the prospect that sometimes an employer or a university may be using a highly valid selection procedure that is perceived unfavourably by the applicants. One must also bear in mind that an applicant who seems attractive to one university will almost certainly be equally attractive to other institutions and may, as a result of the admissions procedure, enrol elsewhere (Bullimore, 1992). It is not only the institution that makes a choice but also the applicant. It is therefore of great importance to conduct the different steps with a high degree of professionalism.

Stages in the selection procedure

The Dental School admissions system described here is a three-stage model with almost independent stages, taking into account both academic performance and personal attributes. Between stages 2 and 3 the interviewers have access only to the students' self-description. It is important to state that it is not a self-assessment but a description of the applicant, allowing the interviewer access to some basic information about the applicant prior to the interview. There is a preference for multi-stage models, both in Sweden and in other countries *e.g.* for medical school admissions in Australia, Israel and UK (Vinson *et al.*, 1979; Antonovsky, 1987; Powis *et al.*, 1988; Glick, 1994; RUT-93, 1995; Hoad-Reddick and Macfarlane², 1999).

The interviewer does not have access to any other material such as matriculation grades or the results of aptitude tests or to the full name of the applicant. The underlying reason for this is that the interview, as previously discussed, is intended to assess applicants' non-cognitive abilities and not primarily cognitive abilities more readily disclosed by other means. It has also been shown that interviewers who have access to *e.g.* matriculation grades before the interview were influenced in their ratings of non-cognitive traits (Shaw *et al.*, 1995). In order to reduce potential subjective bias the interviewers should not be provided with earlier testing, or with any academic details (Powis and Rolfe, 1998). If the interview is to be regarded as a valued step in the selection process, with special reference to assessment of the candidates' humanistic skills or non-cognitive abilities, then the interviewers should not have access to the application file before the interview (Spafford, 2000).

The choice of dependent or independent steps is critical, and may influence the validity and reliability of the selection tool. Creating dependability between the steps may give a better overall impression of the applicants, *i.e.* may increase validity. The risk is that final assessment may be skewed by some of the material on which the assessment is made, *i.e.* reliability may be reduced. Factors that distort the reliability will probably detract from the validity of the measurement. In a multistage selection system, fairness to the individual can probably best be guaranteed if the instrument is constructed in independent stages (Vinson *et al.*, 1979; Antonovsky, 1987; Powis *et al.*, 1988; Glick, 1994; RUT-93, 1995; Hoad-Reddick and Macfarlane², 1999). This is supported by the results of the present studies, at least in relation to the factors examined: drop-out rates, academic achievement, and professional competence.

Written assignments

In the present context, written assignments contribute a further dimension of importance to the overall assessment of the applicant. The written material has proved of value in disclosing facility in linguistic expression, and the applicants' analytical ability. The results in Paper II, in relation to student performance in selected examinations, indicate that linguistic ability and personal attributes (assessed in both stage 2 and 3) in combination are important determinants of study performance.

One of the longest serving-members of the committee now considers the essays to be more important than the interview (Paper IV). According to this member, the interviews affirm the written evidence. Essays assess productive and organisational skills (Lindblom-Ylänne *et al.*, 1996) and these attributes can also be confirmed during the interview. Furthermore, in other contexts this particular type of measurement is considered self-evident: the teacher makes an overall assessment of the pupil's or student's ability to make use of the language in relation to the content of an assignment such as an essay (Wedman, 2000).

If, as stated by one of the committee members, written assignments are of such a great value, is it then possible to replace the interview with a written assignment and save time and effort both for the individual and the institution?

Gafni *et al.* (2003) conducted a study in order to examine the replacement of interviews with a questionnaire, intended to improve standardisation and objectivity and at the same time save time and manpower without losing the predictive validity. The final version of the questionnaire included twenty-three open-ended questions and was divided in two parts: motivation and personality. A training workshop was conducted during which six raters agreed on the final criteria for each question. Each question was scored independently by two raters and the score on each question was the mean of the two raters. The correlations indicate a high degree of agreement between the two raters. The results suggest that the interview and the questionnaire might be fairly equivalent indicators of

the factors they measure: motivation and personality. Gafni *et al* (2003) suggest that the questionnaire might be an adequate pre-screening tool and it might save interviewers a substantial amount of time and the recommendation is to conduct the admissions process in two steps.

The design of the selection procedure at the Dental School, Karolinska Institutet, where written assignments precede the interviews supports the results of the Gafni-group (2003). It is possible, however, that some people were deterred from applying for admission to the dental undergraduate course because the selection procedures included written assignments.

Interviews

The interview process is the main part of the selection process and the most important purpose is usually to gather information about an applicant that would be difficult or even impossible to obtain by any other means. The most widely used method to achieve this is the admission interview. The interview is believed to disclose information about an individual such as flexibility, motivation, responsibility, and values (Powis *et al*, 1988; Edwards *et al*, 1990; Bullimore, 1992; Glick, 1994; Tutton, 1994; Albanese *et al*¹, 2003). It should also be noted that much controversy exists regarding the reliability of the admission interview in relation to inter-rater, inter-team and/or intra-team reliability (Salvatori, 2001). Cliffordson and Askling report in a recent study (2004) that until ten years ago, the interview was generally considered by researchers to have poor validity, but nowadays there is an agreement that provided certain criteria are met, the interview has much greater validity than has previously been believed.

In Paper IV, all but one committee member consider the interview to be the most important phase of the selection process, as it is believed to be the best method of assessing the applicants' attributes. At the same time the "why" of interviewing raises a further question, that of responsibility. Does a university have a greater responsibility than that of training its undergraduates to the intellectual level required for their degree course? According to Bullimore (1992), Tutton (1994) and Powis and Rolfe (1998) and also according to the objectives set by the Dental School, Karolinska Institutet, the answer is yes: especially for a vocational university course the general opinion appears to be that a university has this responsibility. In order to reduce failure rates and produce suitable graduates, it is necessary to search beyond scholastic achievements. The committee members in Paper IV also elaborate on the need for pre-admission interviews, especially for health science courses, or in other fields in which there is contact with people in a dependent relationship.

The use of interviews in the admissions procedure is time-consuming and costly, and the interview must therefore be designed to produce maximum reliability and validity (Bullimore, 1992; Gaengler *et al*, 2002). The decision as to whether an interview is worth the time and expense must be based on whether the

interview yields something that cannot be obtained by other means (Bullimore, 1992; Hoad-Reddick and Macfarlane¹, 1999; Åberg, 2000; Albanese *et al*¹, 2003).

Powis and Rolfe (1998) also states that, although the admissions procedure at University of Newcastle is costly, the indirect benefits to the university and the community, by admitting more suitable students who will complete the course should not be overlooked. When costs for the institution and community and for the individual student are high after admission, with or without withdrawal, then why should it not be worth investing time and money before applicants enter the course?

Hughes (2002) has also pointed out that the cost of an individual admissions system is high and the results achieved at present do not reflect best practice. The studies on which the present thesis is based were conducted to assess a process used for more than 10 years, in order to take the discussion on best practice on individual student selection further. The results support the value of an individual admissions procedure.

Another interesting interpretation of the adoption of individual student selection by an institution is that it may be regarded as a very clear indication of the institutions' values. In a review of the use of interviews for admission to medical schools, Albanese *et al*² (2003) found that no one mentioned that the admissions process is not a mechanical analysis of paper credentials, but a judgement of applicant's qualities as a human being and a future colleague. The use of interviews indicates that an institution values the personal interaction between human beings and it gives a chance to place a human touch on what is a highly stressful, high-stakes decision process for all involved. Cliffordson (2004) argues that tests aimed at measuring personal characteristics have strong face validity, even if little is known about their properties as selection instruments, and therefore they give a powerful signal to prospective students that personal qualities are taken into account before being selected. Powis *et al* (2004) elaborate on the same theme: that using non-cognitive criteria for selection sends a strong message to students about the qualities the medical school values in its students.

The interview formats

In this case each applicant undergoes independent interviews by experienced faculty members, on two separate occasions. The choice of different interview formats – structured, semi-structured, and non-structured – has been an important consideration in the literature, as has using individual interviewers on different occasions, tandem interviewers or panels (Sade *et al*, 1985; Antonovsky, 1987; Powis *et al*, 1988; Carlsson, 1991; Glick, 1994; Powis, 1994; Tutton, 1994; Tutton, 1997; Schmidt and Hunter, 1998; Högskoleverkets rapportserie 2000:14 R).

The chosen format for the interviews at the Dental School, Karolinska Institutet, could be referred to as semi-structured: the questions are not predetermined and the interviewers may have access to each interviewee's self-description (Edwards *et al*, 1990; Carlsson, 1991). Over 95% of medical and dental schools in the U.S. interview candidates as part of their selection process for admission and nearly all conduct semi-structured interviews (Gafni *et al*, 2003).

Glick (1994) argues that a semi-structured interview by thoughtful, perceptive interviewers adds immeasurably to the quality of the admissions procedure. At the Faculty of Medicine at Monash University in Australia, the selection of medical students is based on personal qualities as appraised by semi-structured interviews alongside academic merits (Tutton, 1994). At Monash, the use of semi-structured interviews is believed to create a friendly and purposeful atmosphere, indicating that the faculty is interested in exploring what the candidates sincerely think and feel about a range of issues.

Powis (1994) states that if admission interviews are properly structured for objectivity, they will have the capacity and the power to predict failure or success in a course of medical studies, provided the interviewers are trained in advance of their task. The results of different types of interview within industry show that inter-rater reliability in a structured or semi-structured interview is high and predictive validity is reasonable. Reliability and validity increase with the degree of structuring (Bullimore, 1992). Semi-structured interviews are almost as valid and reliable as structured interviews (Edwards *et al*, 1990). Tutton (1994) also reports that inter-rater reliability seems adequate when using semi-structured interviews.

The results of the present studies indicate that the described semi-structured interviews are highly relevant to their purpose and the students experience them as friendly but still focused, and that the dialogue provides them with the opportunity to give a more detailed impression of their personal attributes.

The use of independent interviews offers an advantage to the interviewee, encouraging a positive, more relaxed atmosphere than confronting two or more interviewers at the same time. Edwards *et al* (1990) on the other hand considered that a panel of interviewers enhances the reliability of the resulting results but they conclude that the panel interview deserves more attention. In a study by Albanese *et al*¹ (2003) it has been reported that students are critical of schools using a panel approach, as it can seem threatening for the applicant to be interrogated by more than one faculty member.

At the time of the study, the one-to-one interview was reported by Edwards *et al* (1990) to be the most frequent interview format used in U.S medical schools, 74%. The students in Paper V also give credence to the process of meeting one

interviewer at a time: they perceived it as more relaxing and conducive to a more personal interview.

No data are available with respect to the agreement between the parallel interviews, *i.e.* reliability. However, the fact that major disagreements over scores for applicants have arisen only occasionally (Paper II) indicates a high level of inter-assessor reliability. With respect to the admissions procedure for medical students at Karolinska Institutet, inter-assessor reliability is estimated to be 0.85-0.90 (Högskoleverkets rapportserie 2000:14 R). Using a structured interview, with defined assessment variables and interview training, a reliability of around 0.90 can be achieved (Högskoleverkets rapportserie 2000:14 R). Powis (1994) states that the scores of the two independent interviewers used in Newcastle have been notably consistent. In the experience of all the committee members in Paper IV the most striking feature is the high degree of consensus.

The AC-members in the present study are provided with the applicant's self-description in order to avoid wasting important interview time obtaining information which is already available in written form. Without predetermined questions, each interview can vary in style and in content, providing the Admissions Committee with a broader picture of each applicant. The vast majority of the students in Paper V also report that the two independent interviews differed in outline and content. All but one recall who interviewed them and in which order. The students felt that this difference was an advantage, as it gave the applicants an opportunity to show different personal qualities adding to a more complex or full picture of them. The opinion of the students also underlines the value of both semi-structured interviews and independent interviewers. The results also indicate that the interviews make a lasting impression on the applicants and therefore should be handled cautiously.

Of course a more problematic weakness in this study is the exclusion of the opinions of applicants who participated but were not admitted. One of the interviewed students, however, had applied unsuccessfully on a previous occasion to the Dental School. The applicant still decided it was worth-while applying again, indicating that the applicant considered the process to be fair. While this issue cannot be addressed fully with current data it is something that needs to be considered further.

Who should interview?

Another question to be addressed is who should conduct the interviews. In this case seven experienced faculty members, representing different disciplines and ages, conduct the most of the interviews. The duration of membership of the committee ranged from 10 down to 2 years.

The committee has a psychologist as a consultant and she reads some of the written assignments and she also conducts a few interviews. The reason is that

her professional competence is used as a means of calibration and to create a frame of reference. All the committee members emphasise the important contribution of the psychologist to their assessment skills and their development. One of the longest-serving committee members states that it is important to be aware of the feelings aroused in the interviewer and that the psychologist has encouraged the members to acknowledge their responses with confidence. Other admissions committees include a psychologist in the admissions committee, Medical School at Karolinska Institutet (Hindbeck *et al*, 1994), or non-medical interviewers from the local community (Bullimore, 1992; Areskog *et al* 1992).

Regardless of the use of medical or non-medical interviewers, there can be no exception to the requirement for formal training. All institutions dealing with this kind of selection procedure need to invest resources in monitoring the performance of interviews and subsequent student outcome. This is both to provide feedback to the committees and to improve the efficiency of the overall selection procedure (Bullimore, 1992).

In a study conducted to evaluate reliability of assessments, *i.e.* how much the members of a committee agree with one another, it was concluded that the assessments made by the interviewers were very reliable (Richards *et al*, 1988). This applied not only with their own previous judgements but also to those of other interviewers now observing the same video taped interviews. Reliabilities were however higher for more experienced interviewers, which suggests that additional training might increase the reliability of less experienced interviewers.

In the present study, new members of the committee have been included on different occasions, leaving a core of experienced members on the committee. If the judgements of the more experienced members are more reliable, then it is important to retain such a core even when there is a need for replacements, provided of course that their judgements are valid.

The current study confirms the need for an admissions committee to have access to the support of an experienced psychologist during the process but the form for the participation may vary. The results further underpin the need of experienced interviewers on the admissions committee.

Training of interviewers

Bullimore (1992) states that the interviewers must be trained in interviewing and furthermore knowledgeable about the aims of the institution and the course. It is also important to assist interviewers in gathering efficiently the kind of information that can only be obtained through face-to-face interaction. Concern should also be directed toward improving the interpretation of information. Although quantitative methods often correlate with predictions of academic success, human judgements are required to predict long-range professional competence (Litton-Hawes *et al*, 1976).

According to Mårdberg (2000) in the report from the National Agency for Higher Education, a prerequisite for high validity is training in interview technique, in order to ensure a uniform frame of reference (Högskoleverkets rapportserie 2000:14 R). In order to increase interview reliability and validity, the purpose of the admission interview must be clearly articulated, so that the interview training can be designed to achieve its purpose (Turnwald *et al*, 2001). In the process described here the Admissions Committee initially underwent a full day of interview training by the consultant psychologist and subsequently annual follow-ups. According to at least one of the members the in-service training has given them a common norm for desirable attributes in the applicants, which underpins the results of Mårdberg (2000).

The present study confirms the need for an admissions committee to have access to the support of an experienced psychologist also in between the selection periods, in order to help to reflect on the process and to contribute to annual in-service training for both experienced and less experienced admissions committee members.

Individual student selection and student achievement

The results in Paper II show that students accepted *via* the individual system do not tend to interrupt or discontinue their studies. In three major integrated examinations, designed to disclose not only factual knowledge but also comprehension and maturity, these students performed as well as, or better, than students accepted through traditional modes.

Similar results were found in an assessment conducted among medical students admitted through different modes to the Medical School, Karolinska Institutet. Medical students accepted through the individual mode, so called PIL-admission and based primarily on the same principles as described here, showed the lowest rates of study interruption and the lowest rate of drop-outs. Their pass-rate in the pre-clinical final examination was higher than for students admitted through other modes (Lonka *et al*, 2004).

A recent study based on data extracted from a large scale longitudinal project compared students admitted to medical education on different admission grounds (Cliffordson and Askling, 2004). The results showed that students admitted through an individual mode had the lowest proportion of interruptions in studies and drop-outs. Similar findings are reported from a survey at the psychology course at Stockholm University (Ögren and Sundin, 2004). In another study conducted on students, who had already been admitted to a dental course, significant correlations were found between results of the interview and the number of course examinations students failed, but the dropout rate could not be predicted in the interviews (Heintze *et al*, 2004).

The results of the present thesis support these findings. Although levels of academic achievement on entry (matriculation grades) might not be as high as those of students traditionally admitted as dental undergraduates, once admitted, highly motivated students are less likely to withdraw from the course. Their academic achievements compare well with those students admitted through traditional modes.

In the final year assessment, Paper III, thirteen faculty members participated, all defined as knowing the students well. As described earlier, the lecturers had been clinical supervisors in the comprehensive care clinic for a long period and therefore had the opportunity to follow the clinical progress of the students. The overall results in Paper III show that the students selected through an individualised procedure are more homogeneous, generally at a higher level than the control group, and with fewer negative extremes. In all seven criteria, the median score values for the IS-group was equal to or higher than for the TM-group. The two groups compared differ in size, which partly could explain why the IS-group is more homogeneous. In clinical problem solving, comprehension and communication are of great importance (Murden *et al*, 1978). The results here indicate that students selected by an individualised selection mode are more professionally competent, according to the criteria assessed, than students selected on traditional modes.

In a similar study, the correlation between the interview and other measurements became stronger as the student progressed through dental school (Walker *et al*, 1985). The students were assessed just prior to graduation and the results of the assessment yielded the best support for the validation of the interview as a predictor of which applicants would make good dentists. The assessment was conducted by faculty members who had the longest and closest clinical association with the students. Ratings given by faculty members to students whom they believed would be the best dentists correlate with the interview scores. However, the ratings for students considered by the faculty members to be technically the most adept did not correlate significantly with the interview. A good dentist requires many other attributes besides technical skills (Walker *et al*, 1985).

Edwards *et al* (1990) report that there is evidence, albeit somewhat imprecise, that the interview actually predicts clinical performance in medical school. Edwards *et al* (1990) state that if interview outcomes could be correlated with the outcomes of comprehensive clinical competence that deal with interpersonal skills and ethics, then perhaps a more precise correlation between interviews and clinical competence could be obtained. In the assessment of final year students the specially designed protocol used included both cognitive and non-cognitive predictor variables and the assessment was made at the comprehensive care clinic.

Meredith *et al* (1982) report a similar result on the positive use of the interview. In the interview five variables were chosen as potential predictors of clinical performance: maturity, individual achievement, motivation/interest in medicine, judged ability and interpersonal skills had very strong relationships with the subjective evaluations of clinical performance. In the clinical evaluation eight different variables were used: knowledge, clinical skills, presentations, maturity, rapport with patient, rapport with health care team, clinical judgement and attitude. Murden *et al* (1978) showed that personal attributes disclosed in the interview have a high correlation to clinical success.

An Australian study compared the performance in initial medical practice of graduates from a number of medical schools that selected students solely on the basis of prior academic achievement and one that selected on personal qualities, with a lower academic threshold (Barnsley *et al*, 1994). The latter group of interns was rated as good, or better, than the former in all 15 aspects of professional activity evaluated. Beyond medical school and the short-term outcomes, there are several reports that suggest that academic achievement *per se* is not a good predictor of performance in the longer term (Reede, 1999; Powis *et al*, 2004).

The results of the above studies are in good accordance with the results from Paper III using criteria similar to those of Meredith *et al* (1982) and Reede (1999).

In a study conducted on two groups of students attending the five-year Master's Program in Professional Psychology at Stockholm University and admitted solely on matriculation grades or a combination of matriculation grades and admission interview, the aim was to examine the different admissions procedures (Ögren and Sundin, 2004). Both students themselves and supervisors performed the ratings. Students admitted on the interview procedure rated their development of psychotherapeutic skill significantly higher than the other group of students. The corresponding difference between supervisor ratings was not significant. Students admitted on matriculation grades rated their skills lower than the supervisors did, while the results from the other group of students did not differ from the supervisors. Ögren and Sundin (2004) conclude that interview as a complement to traditional admission modes seem to strengthen a professional-specific aspect of the student's self-confidence and have a favourable effect on the student's development during the course.

In the present studies, both the majority of the students interviewed and the committee members believe that the admissions procedure had a positive influence on students' academic performance. The students report that they feel specially selected or chosen for their suitability, that they have reflected over their future professional careers and are therefore more highly motivated than other students. The committee members give credence to the same opinion: they believe the students feel specially selected and this awareness leads them to

aspire to good academic performance because it in itself increases motivation. The students want to live up to those expectations by aspiring to high achievement because someone has shown faith in them. According to the students this has been of greatest importance during the early stages of the course and when they have had to deal with setbacks. According to the students, their study results were positively influenced by the mode of admission especially at the beginning of the dental course. It is apparent that both students and faculty members on the admissions committee share the same opinion about the positive relationship between student selection procedures and academic achievements.

It has been argued in Paper II but also by other researchers such as Askling (in Högskoleverkets rapportserie 2000:14 R) and McManus (1999) that students selected through an individual process create a mutual contract or an unwritten agreement with the lecturers who interviewed them and therefore aspire for higher achievements. In Paper V, the interviews with the students disclosed no evidence that an alternative form of selection influenced the relationship between the students and the lecturers on the Admissions Committee. Nor did the interviewed admissions committee members give credence to this hypothesis.

The results above indicate that the individually selected students perform better, in relation to criteria assessed, both during the initial phase of the course and during the final phase. The individually selected students have been selected by a system using both cognitive and non-cognitive attributes. Powis (1994) states that “it is in the non-cognitive area that predictors of success or failure in a medical course should be sought”. Schijven *et al* (2004) also claims that a “good” surgeon is not merely a product of a person’s knowledge and psychomotor skills. To become a good surgeon, personal traits such as interest, endurance, empathy, stress-resistance, and decision-making abilities are important and equally necessary. There are also various reports of correlation between non-cognitive criteria, such as responsibility, interpersonal skills, attitude, and success in medical studies and thereafter (Keck *et al* 1979; Edwards *et al*, 1990; Ritzén *et al*, 1999). There is a complex relationship between admissions criteria *e.g.* cognitive and non-cognitive attributes, medical school performance and post-graduate medical competence. More detailed longitudinal studies on these complex relations are needed (Willoughby *et al*, 1979; Ferguson *et al*, 2002).

It is important that the students selected can benefit from the course they have chosen and will succeed in their chosen careers. Failure is a disaster, not only for the individual concerned. It can have financial and long-term manpower implications for the profession (Drummond *et al*, 1997; Hoad-Reddick *et al*, 1999). The study in Paper III and the interviews in Paper IV and V are intended to explore this issue further, as the comprehensive care clinic setting resembles

real clinical dental practice and the students interviewed are close to their graduation.

According to Tutton (1997) excellent scholastic achievements should remain a prerequisite for entry to medical school. However there is a need to consider carefully to what extent this scholastic assessment should be modulated by appraisal of other attributes such as assessment of communication skills or empathy. Bullimore (1992) has a similar approach and concludes:

“The message is clear. Academic criteria alone cannot identify the required non-cognitive attributes but they do provide the appropriate intellectual safety net. (...) Structure the interview and train the interviewers. We will then produce from our universities doctors with the range of skills and knowledge that our society needs, expects and deserves.”

The results of this thesis indicate that attributes not readily revealed by academic merits can be disclosed by an individual student selection procedure based essentially on written assignments and interviews.

Personal attributes

In interviewing the applicants, the committee members state in Paper IV, and without access of the interview protocol, that they look for such attributes as realism about the future career, motivation, maturity, attitudes, endurance, drive, engagement, empathy, *i.e.* non-cognitive attributes. This corresponds well with the attributes assessed in the interview protocol earlier described. When asked who they admit, most of the lecturers observe that the students selected individually fulfil their expectations and are committed, empathetic, motivated and have a realistic concept of themselves, the undergraduate course and their future in the profession.

On the other hand, the students interviewed in Paper V had in general not reflected on why they were admitted or what relevant personal attributes they might have. However when explicitly asked, the students use expressions such as: purposeful, insight, people skills, determined, open, positive attitude, a good listener, and leadership qualities.

According to Glick (1994) the interview is considered to be the best method of assessing applicants' attributes as it discloses information about an individual such as attitude, motivation, responsibilities and values. The interviewed committee members in Paper IV also consider that in their opinion the individually selected students in fact have many of the above attributes. As one of the longest-serving committee members expressed it, they have "emotional intelligence". The predictive capacity of previous scholastic achievement fades with progression through the course and therefore Tutton and Price (2002) suggest that greater emphasis could be placed on some of the multidimensions of

intelligence during the selection procedure – for example, emotional intelligence. Carrothers *et al* (2000) have used five dimensions to identify emotional intelligence: maturity, compassion, morality, sociability, and calm disposition. Although these dimensions could also be suitable here, it is beyond the scope of this study to explore the concept of emotional intelligence further.

To what extent are these personal qualities influenced by nature, nurture, or maturation? And are these personal qualities truly stable (Albanese *et al*¹, 2003)? If individuals mature in their personal qualities as they progress through a university course such as dentistry or medicine, the challenge for the admissions committee is to identify those who are most likely to mature in desirable ways. If personal qualities are stable, then the challenge for the admissions committee is to develop reliable and valid measures of these qualities (Albanese *et al*¹, 2003).

If the education itself moulds and reinforces those attitudes and abilities considered desirable then it is less important that the applicant has these abilities upon entry. On the other hand, if the education does not deliver or strengthen these abilities but rather has a dehumanising effect in the students, then the selection of candidates is of great importance (Holm, 1985). Despite some contradictions in the results of the investigations cited by Holm (1985), there is still much evidence indicating that medical training, with its heavy emphasis on cognitive knowledge and medical technology, has a negative effect on medical students' capacity for empathy and their motivation to maintain a holistic view of their patients.

According to Albanese *et al*¹ (2003) the problem is that it is not an either/or proposition. Some personal qualities may be relatively easily influenced while others are relatively stable, but this also differs between individuals. Although of great interest and warranting further exploration, assessment of students' development of personal abilities over time is beyond the scope of the present thesis. The objective of the thesis was *i.a.* to assess two modes of admission in terms of professional competence. In Paper III the IS-group presented median values of 4.5 for the criteria "responsibility and judgement" and "commitment and motivation" compared to 4.0 for the TM-group. For the criterion "patient contact", both student groups had the same median value, but the range was narrower, as well as for the criterion "responsibility and judgement". One motive for introducing individual selection was to identify students who had the ability to become "good dentists" and the results presented here indicate that the procedure selects students who have some of these abilities.

In Paper III the faculty members were also asked to verify which – one or more – of the 7 criteria used they found most important for the overall rating. Nearly all 13 faculty members considered "responsibility and judgement" to be the most important, followed by "knowledge". It is further argued in the paper that if a student or a dentist has sound judgement and is highly responsible, these attributes outweigh poorer assessments in other qualities. Although it is beyond

the scope of this thesis to analyse these results, it could be speculated that these two criteria, “responsibility and judgement” and “knowledge”, are of special importance in assessing professional competence.

Motivation

In Paper II it is argued that students accepted through an individualised selection procedure seemed to be more highly motivated than students admitted by traditional modes using drop-out rates as an indicator. It is further argued that motivation could be a predictor of good clinical performance – using motivation in its broadest contexts.

Powis *et al* (1988) carried out a comparative study at the University of Newcastle in Australia. All members of the entering class were interviewed, but one half of the class was selected on purely academic criteria, ignoring the recommendation of the interview. The other half of the class was selected from the top 10% of applicants on the basis of an interview. The interview proved to be an excellent predictor of achievement in medical school, with respect to both student performance and withdrawal rates (Powis *et al*, 1988). Glick (1994) states that emotional stability, motivation and other qualities sought by the interviewers have a significant influence on academic achievement.

All the committee members and all the students in Papers IV and V spontaneously use the word motivated during the interview when they describe this method of selection. They all define motivation in a similar way: “having the drive to achieve the goals one has expressed”, that this is the individual’s own choice and therefore there is a determination to carry out the task, even though it will require hard work and even if there are occasional setbacks. One student offers a more thorough definition of the word motivation: inspiration, determination to achieve good results, responsibility: and as a motivated student, performance is better.

All the committee members are of the opinion that it is possible to assess an applicant’s motivation, by assessing *e.g.* tenacity, realistic goals, sense of purpose, motivation behind the choice of course and how one has previously coped with setbacks. One of the longest-serving committee members thinks that if there is any doubt about the possibility of assessing the level of motivation then this form of individual admissions system should not be used.

Like the committee members, all the students spontaneously associate high motivation with this method of selection. The overwhelming majority of the students believe that those admitted through this mode are more highly motivated than other students: they voluntarily underwent this selection procedure to gain an undergraduate place and had therefore reflected more over their profession of preference. A study by Tutton (1994) showed that students in a questionnaire given shortly after the interviews revealed that 36% felt that

being interviewed had improved their motivation to succeed in the course. A later study conducted by Tutton and Price (2002) showed that some qualities – capacity for empathy and motivation to be a doctor – are particularly important for predicting success in the medical course at the University of Newcastle.

Motivation – using the term in its broadest context – has been proposed as a good predictor of clinical success (Rhoads *et al*, 1974; Murden *et al*, 1978; Sade *et al* 1985; Powis *et al*, 1988; Glick, 1994; Powis and Rolfe, 1998). The results from both the quantitative and the qualitative studies in this thesis further support those of earlier studies.

Conclusions

The main objective of the individualised admissions system at the Dental School, Karolinska Institutet, is to seek out, from a pool of applicants with good academic standards, highly motivated students with the potential to become good dentists. In this thesis, an initial evaluation of the first three rounds of admission using the system has disclosed the following outcomes: there have been few drop-outs among individually selected students, the academic achievements of individually selected students compare well with students admitted through traditional modes. In terms of the criteria applied to assess professional competence in the final year, the individually selected students achieved higher ratings than students accepted through traditional modes. With respect to the influence of student selection procedures on subsequent undergraduate achievement, the consensus opinion of both interviewed students, admitted through the individualised system, and the admissions committee is that the individualised admissions procedure has a positive influence on students' academic performance.

It is therefore concluded that motivation and commitment are important determinants of student achievement and that these criteria are more readily disclosed through tests and interviews than through traditional modes such as matriculation and aptitude tests.

Brief historical review of Swedish admissions systems to higher education

During the immediate post-war period, almost all students who met the entrance requirements were eligible for admission to higher education. No selection system was necessary, as students were not generally excluded on the grounds that the number of applicants exceeded the number of available places. Places were limited mainly in courses that involved laboratory work, e.g. medicine, dentistry and civil engineering. However, the expansion of secondary and higher education systems, including the introduction of compulsory comprehensive secondary schooling, led to an increased demand for more undergraduate places in different fields of study, and a selection system had to be introduced (Högskoleverkets skriftserie 1997:13 S).

For decades, admission to all tertiary full-time courses of study in Sweden was centralised, and administered by special national units. Until 1993, students wishing to enter a university programme had to apply directly to the national unit for admission, ranking courses in order of preference.

During the 1960s and 1970s, there were several important commissions on higher education. In 1965 the so-called Competence Inquiry (CI), *Kompetensutredningen*, was commissioned. Various reforms to the school system had resulted in an increase in the number of matriculants wanting to continue on to higher education, and new higher education courses had been introduced or were being planned. These developments led in turn to the need for a change in the method of selecting students (Högskoleverkets skriftserie 1997:13 S). In brief, CI (SOU 1970:21, SOU 1970:55) recommended a group quota system to satisfy the various categories of applicants. The Commission's recommendations were thorough and far-reaching, and covered such topics as general requirements for the respective quota, specific requirements, selection methods including the use of aptitude tests, how to organise admissions, and how to reach broader groups of applicants through improved information.

In the bill, *Some guidelines for reforming the rules on qualifications, selection etc. for higher education*, *Vissa riktlinjer för reformering av reglerna om behörighet, urval m.m. för den högre utbildningen* (prop. 1972:84) the Government was embodying the main recommendations by the Commission. With respect to aptitude tests, it was stated that these should be applied with some caution at individual level. The new admissions system should offer adults previously ineligible for higher education an opportunity to qualify, and also

give people with inadequate high school matriculation grades a second chance at qualifying. The bill was passed by Parliament.

The reform of 1977, presented in a bill entitled Education and Research in Universities, *Utbildning och forskning inom högskolan m.m.*, (prop.1976/77:59), introduced a broader concept of higher education. All forms of education for which the preadmission requirement was completion of secondary school to matriculation standard were to come under the auspices of universities and university colleges. The reforms of 1977 limited the number of allocated places for most courses, and selection procedures were therefore necessary. With respect to selection discriminants recommended in the bill, the following were based on the recommendations of the Competence Inquiry and the Competence Commission, *Kompetenskommittén*, (SOU 1974:71): grades from secondary school, work experience, and the results from the national university aptitude test. One sequel to the Competence Inquiry was the introduction of the university standard aptitude test (USAT), applied initially only to the so-called 25:4 quota (Högskoleverkets skriftserie 1997:13 S).

In 1983 a new commission was appointed: the Inquiry on University Admission, presenting their proposals in 1985 Admission to University, *Tillträde till högskolan* (SOU 1985:57). Government proposals based on the Inquiry were presented to Parliament in a bill On selection etc. to higher education, *Om urval m.m. till högskoleutbildning* (prop. 1987/88:109). The selection rules were ratified by Parliament and came into effect in 1991. Among major changes, there was less recognition of work experience, and the application of USAT as a selection instrument was allowed for at least one-third and no more than two-thirds of the available places in all tertiary courses and programmes (Högskoleverkets skriftserie 1997:13 S). While the content of USAT has been modified over the years, the principles have remained constant.

In a memorandum Independent universities and colleges, *Fria universitet och högskolor* (Ds 1992:1) it was proposed that in future state regulation of student selection should be strictly limited. The basis for selection should be the applicant's knowledge, experience and particular aptitude for the course in which he/she sought a place. It should be the responsibility of the university to determine which of the selection criteria in the higher education institution regulations should be applied (SOU 2004:29).

The Government's proposal was presented in a bill Universities and university colleges – quality through independence, *Universitet och högskolor – frihet för kvalitet* (prop. 1992/93:1) and in relation to selection the proposals followed the suggestions in the memorandum. Following the introduction of the Higher Education Reform Bill which came into effect 1 July 1993, decisions about admission were decentralised to institutional level, i.e. student admission became the prerogative of the individual university or university college.

The current overall admissions system used in Sweden is essentially based upon the rules introduced in 1997. These rules are based upon the proposal from the commission RUT-93, Qualification and selection, *Behörighet och urval* (SOU 1995:71), and subsequently presented in the bill Admission to higher education etc., *Tillträde till högre utbildning m.m.* (prop. 1995/96:184). The purpose of the government's proposal was to introduce a system of admission to higher education which would be unambiguous and foreseeable and protect the legal rights of individual applicants and at the same time facilitate the task of admission to higher education. The regulations meant that the requirements for both general and specific qualifications for entry became more stringent than previously. The rules of admission were introduced as a consequence of a parliamentary decision to reform secondary school. Since then a few alterations in the admissions rules were presented in the bill Open university, *Den öppna högskolan* (prop. 2001/01:15) and later adopted by Parliament in relation to e.g. methods for assessing proficiency in real terms.

In March 2003, the Government appointed a new admissions commission in order to review the existing regulatory system and submit proposals for new rules governing admission to undergraduate education. The results of the Commission Three paths to the open university, *Tre vägar till den öppna högskolan* (SOU 2004:29) were presented in February 2004. The report has been widely circulated for consideration and is now the subject of preparation at the Ministry of Education, Research and Culture for a coming bill on higher education policy.

The introduction of specific selection methods to higher education

The higher education reform of 1977 meant *i.a.* that for around 90 % of the freshman places, the same selection rules applied. The rules were very detailed and did not take into account the fact that the aims and content of courses differed and that different selection method could also be appropriate. This was pointed out in the 1983 commission of inquiry into admission in its report Admission to higher education, *Tillträde till högskolan* (SOU 1985:57). The commission considered that a new selection system should allow a greater variation and recommended that up to one-third of the freshman places should be offered without a special decision by the state, by applying selection criteria different from those generally applicable. The commission stated that with respect to many courses it would be advantageous to allow selection to be based on criteria appropriate to the undergraduate course in question and that for new courses under development, appropriate methods of student selection should be included in the overall planning.

In a bill On selection etc. to higher education, *Om urval m.m till högskoleutbildning* (prop. 1987/88:109) the government approach was more cautious than that of the commission of inquiry, but it was proposed that current projects with respect to selection of students to architecture and medical

undergraduate courses should continue. In the long term, the experience thus gained would provide an important basis for addressing the question of broader application of special selection instruments.

However, a more positive approach to specific selection methods was recommended by The Parliamentary Standing Committee on Education, *Utbildningsutskottet*: the Committee considered that it was important to give applicants with special merits for a certain type of course the opportunity for selection. To achieve this, trial of methods other than the centralised admissions procedures should be allowed. The legislation was subsequently changed in 1988 to allow specific selection methods.

Starting in 1991, the universities were able to seek permission from the Ministry of Education and Science to apply an individualised system of admission to no more than one-third of the total number of places in a course. Between 1993 and 1996, permission from the Ministry of Education and Science was not required: during this period the universities were allowed to adopt their own admissions systems and procedures, provided they met the following requirements, determined by the Parliament:

- ”- Relevant and clear discriminants
- Risk of subjective assessment of applicants minimised
- Moderate cost”

In a bill Admission to higher education etc., *Tillträde till högre utbildning m.m.* (prop. 1995/96:184) the government claimed that it should be possible to be admitted even to very popular courses, on the basis of matriculation grades and USAT-performance. Therefore in contrast to the RUT-93 inquiry (SOU 1995:71), the government considered that use of the special admissions tests should be restricted. The National Agency for Higher Education, Högskoleverket, was directed to decide which undergraduate courses could continue to use the special tests and under what conditions. Insofar as special admissions were to be applied at all, they should be restricted to undergraduate studies leading to work which requires certain personal attributes or specific competence. In the bill Open university, *Den öppna högskolan* (prop. 2001/02:15), the government considered that this regulation should be retained unaltered.

In accordance with the above, since 1997 any university wishing to adopt individual selection systems has been required, according to the rules above, to apply for consent from the National Agency for Higher Education. The Agency initially established the Admissions Test Council, *Provrådet*, an advisory body dealing with issues relating to the USAT-test and other special admissions tests. The council was replaced in 2000 with the Admissions Council, *Tillträdesrådet*, with similar duties. According to the 2001 report Follow-up of special selection for admission, *Uppföljning av särskilt urval vid antagning* (Högskoleverkets rapportserie 2001:1 R) the Agency has granted indefinite permissions to use

special selection methods to 48 different programs at 17 different institutions and 6 time-limited permissions. In practice, permission is given to use special methods to allot only two-thirds of the available places to one specific program.

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Swedish abbreviations in the reference list and in the text:

Ds.	Departementsskrift	Ministerial Communication
Prop.	Proposition	Bill
SOU	Statens offentliga utredningar	Official Reports of the Swedish Government

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