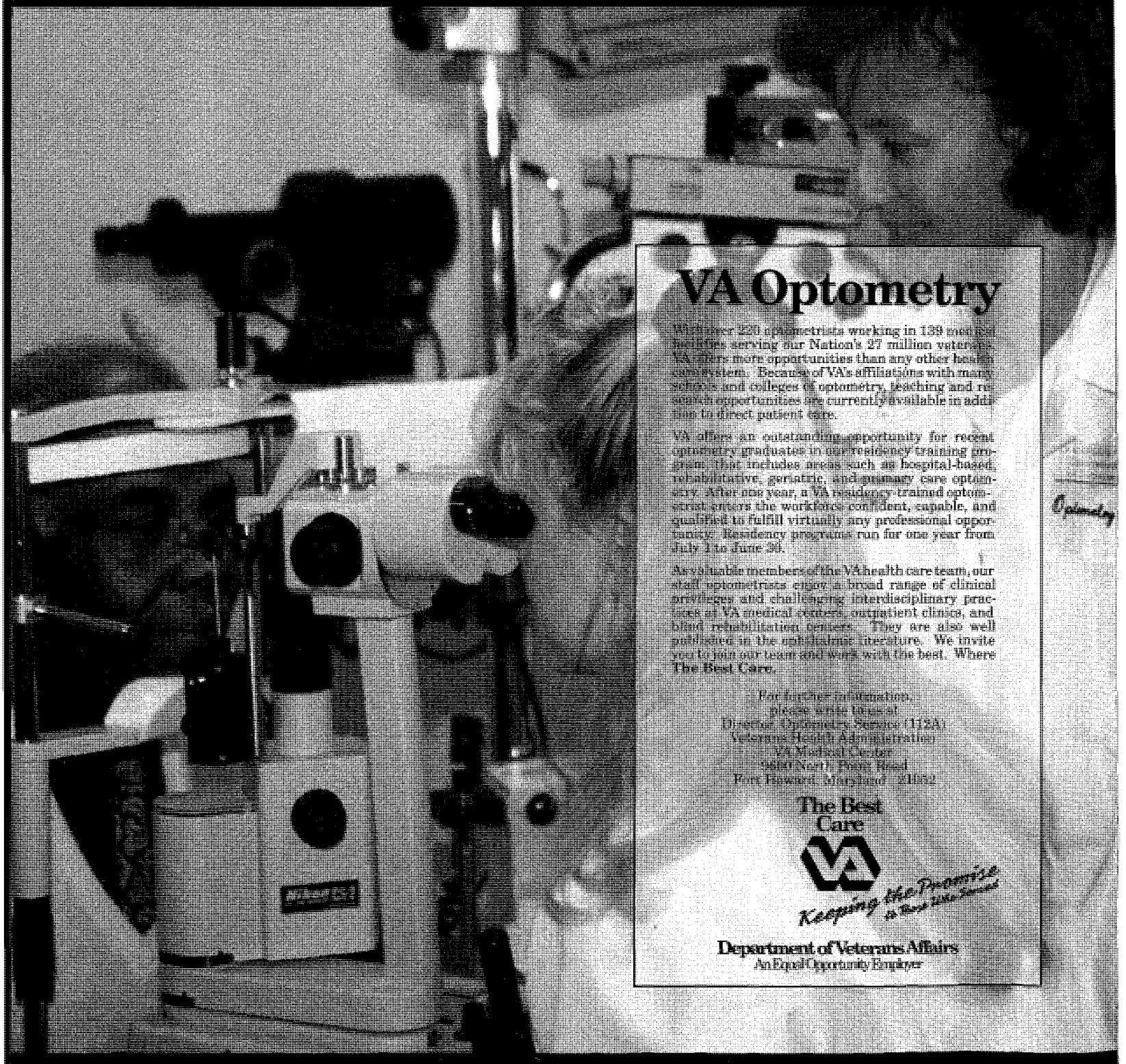
The Journal of the Association of Schools and Colleges of Optometry

OPTOMETRIC EDUCATION

Volume 19, Number 1 Fall 1993

The Professional School Admission Interview

Looking Toward the Future...



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Cover photo courtesy of Southern California College of Optometry. Special thanks to Debra S. Marks.

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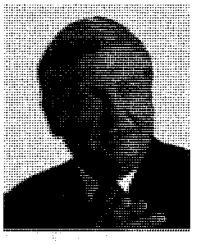
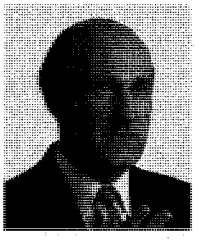
Why Daily Wear Two-Week Replacement?



• Better Compliance

"My daily wear two-week patients simply comply better than my conventional lens patients. Better compliance gives me greater control of my contact lens patients."

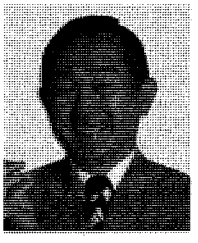
— Kirk Smick, O.D., F.A.A.O. Atlanta, GA



• Practitioner Satisfaction

"I believe 90% of contact lens complications I see involve dirty lenses. Replace lenses every two weeks, and I believe you eliminate 90% of the problems."

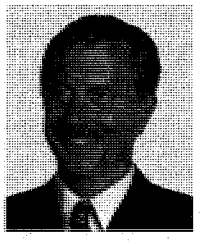
— John Herman, O.D., F.A.A.O. Pittsfield, MA



• Patient Satisfaction

"My patients get the comfort and convenience they want with daily wear two-week replacement. In my opinion, it's the best way to prescribe daily wear today."

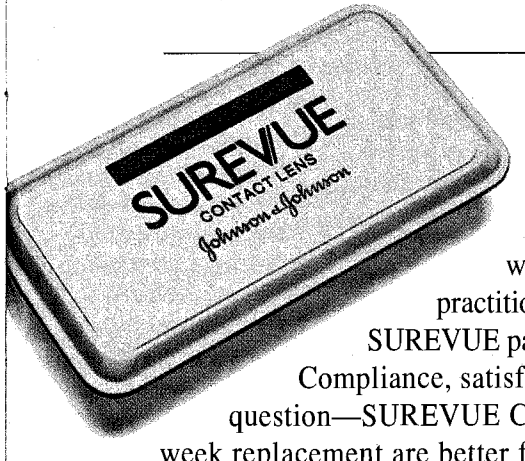
— Rodger Kame, O.D., F.A.A.O. Los Angeles, CA



• Practice Growth

"My daily wear two-week patients are so happy, they tell their friends. Furthermore, my practice enjoys a 94% renewal with these patients, ensuring continued practice growth."

— Lee Rigel, O.D., F.A.A.O. East Lansing, MI



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GUEST

EDITORIAL

Ethics Education In Optometry

Allan N. Freid, O.D., M.Opt.

A recent study of American high school and college students conducted by the Michael Josephson Institute for the Advancement of Ethics revealed that a large percentage of the students admitted to lying, cheating and even stealing at school, work and home. Sixteen percent of the college students admitted to shoplifting within a year of the survey, eleven percent admitted to stealing from parents or relatives, one in eight college students admitted to fraud in lying on insurance or financial aid forms, about one-third of the college students stated they are willing to lie to get a job and 32% of the college students admitted to cheating on examinations. In addition, unbelievably, 30% of the college students even admitted to not being completely honest in answering all of the questions on the survey. This latter finding caused the authors of the report to suggest that the results of the survey probably underestimate the frequency of dishonest behavior. The percentages for admitted dishonest behavior among the high school students surveyed were even greater than those found for the college students.

In recent years medical schools have become increasingly concerned about students' ethics, the impetus being "the increasing recognition that students' professional development and personal ethics are likely predictors of their behavior as practicing professionals." There is no reason to believe that optometry students would be any different from medical students. Students, today, have an abundance of negative role models when almost on a daily basis the news media carry reports of unlimited greed and unethical behavior.

Drs. Norman Haffner and Richard Hopping, individually, and others have published articles detailing the issues and concerns relating to optometric ethics. Optometric practice, like all health care practice, has become increasingly complex over the past three decades. New technology, third party payers, managed care, practitioner advertising, direct public advertising by manufacturers and suppliers, corporate intrusion into the vision care arena, Medicaid and Medicare regulations and other changes have all added ethical dilemmas to the issues a practitioner must address in providing appropriate patient care. Perhaps the one most important factor causing the geometrically increasing ethical issues has been the government's move over the last twenty years to change health care from a "calling" to a "commodity." This particular change has, to a large extent, caused the "commercialization" of health care, placing it in the "business" arena. Stanley Reiser, M.D., M.P.A., PhD., a medical ethicist, has stated that business and health care professions have different ethical requirements. A businessman, unlike a health care professional, has no responsibility to protect a buyer from himself.

Dr. Reiser has discussed the Hippocratic Oath in detail and points out that a significant amount of that oath is devoted to the requirements placed on the physician as a person. The person taking that oath during Hippocrates' time was expected to become a different person. He was expected to put his past life behind him. He was taking on a "calling," much like the ministry. The physician was entering a field that required absolute patient trust, and the Oath delineates what the physician must do to maintain that trust both for himself and the profession. Optometric providers are no different. It is recognized, in modern times, that good business management is required to maintain a practice. After all, if a practitioner cannot maintain a viable practice, both the public and the practitioner lose. However, "good business management" should not and cannot be allowed to compromise ethical decisions, or for that matter, any issue relating to patient care.

It is our belief that most optometry students, as well as practicing optometrists, would agree with our statements regarding "business" versus "ethics." And it is our belief that the vast majority of optometry students and optometric practitioners hold high values. However, many do not always recognize an ethical dilemma when it arises, nor do they know how to address the issue in a logical manner that will afford the best solution for the patient. If the optometric profession and its individual practitioners are to maintain the public's trust, which has

(continued on page 9)

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(continued from page 6)
been developed over the history of the profession, it is imperative that optometric students be exposed to "ethical reasoning" as part of their studies in optometry school.

Michael Josephson of the Josephson Institute has written that it is not likely that an educational approach which deals directly with the development of character and basic moral values will be effective in dealing with young adults and mature professionals. However, he does say that an approach that addresses the development of qualities beyond character can be effective in enhancing ethical behavior in these age groups. He lists these qualities as: 1) ethical commitment, 2) ethical consciousness and 3) ethical competency. These are the components that lead to "ethical reasoning."

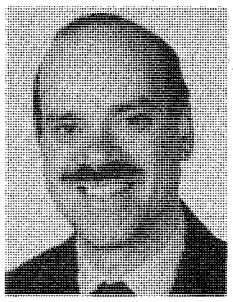
Dr. Leonard Werner has surveyed the optometry schools in the United States in regard to their status in addressing ethics education. The results of the survey indicate the need for significant enhancement. Curriculum committees at the schools and colleges of optometry must begin to view ethics education as an integral part of the student's optometric education. Adequate time must be afforded in the curriculum to teach ethics in a manner that has the potential to actually affect behavior. According to the experts, didactic lectures, alone, will not do that. In addition, it is important that the ethics course stand alone, not as part of another course, in order to emphasize its importance to those taking the course.

In March 1993, ethics educators from seven of the schools and colleges of optometry met to exchange information on their teaching methods and to address issues relating to how the schools and colleges could increase the importance of ethics in education and practice. It was reported that there was a great deal of interest also expressed by all schools who could not attend due to restrictions beyond their control. Thus, it would appear that the schools and colleges of optometry in the United States are aware of the increasing practice problems that are developing in today's health care arena, and they do wish to explore the potential for addressing these problems through ethics education. The March meeting was a major first step. More meetings are planned where it is expected that more of the schools will be able to attend.

As "man does not live by bread alone," optometry does not live by technology alone. In today's world, with optometric practice as complex as it is and continuing to become more complex, the schools and colleges of optometry have an obligation to the public, the profession and their students to address all issues which may have a major impact on patient care. Ethics is one of those issues.

Ethics is the sustenance of a health care profession. Lacking ethics, the profession will cease being a profession. □

Dr. Freid is a professor and director of continuing education at the Southern California College of Optometry.



ASCO Executive Director Earns Certified Association Executive (CAE) Designation

Martin A. Wall, M.P.A., ASCO's executive director, was one of 58 individuals nationwide who earned the Certified Association Executive (CAE) designation from the American Society of Association Executives (ASAE) in August.

Prior to certification, applicants are rated on their experience and accomplishments in association management and must successfully complete a comprehensive one-day examination which tests general knowledge of the association management profession. Among association professionals, "CAE" is an indication of demonstrated skill in leadership, activity in community affairs and expertise in association management.

The American Society of Association Executives, Washington, D.C., is an individual membership society made up of more than 20,000 association executives and suppliers. Its members manage leading trade associations and professional societies across the country and also represent suppliers of products and services to the association community.

The 1993 Class brings the total number of association executives who have earned the CAE designation to over 2,000.

CALENDAR

ASCO Committee Meetings — November 17, 1993. Washington, D.C. Contact: Rebecca M. Defibaugh (301) 231-5944.

ASCO Executive Committee Meeting — November 17, 1993. Washington, D.C. Contact: Martin Wall (301) 231-5944.

ASCO Board Meeting — November 18, 1993. Washington, D.C. Contact: Martin Wall (301) 231-5944.

AOA/ASCO Conference on Financing — November 18-20, 1993. Contact: Joyce Urbeck (314) 991-4100.

ASCO Committee Meetings — March 1994. State College of Optometry, State University of New York. Contact: Rebecca M. Defibaugh (301) 231-5944.

ASCO Executive Committee Meeting — March 1994. State College of Optometry, State University of New York. Contact: Martin Wall (301) 231-5944.

ASCO Board Meeting — March 1994. State College of Optometry, State University of New York. Contact: Martin Wall (301) 231-5944.

INDUSTRY NEWS

Companies appearing on these pages are members of ASCO's Sustaining Member Program. Sustaining Members are listed on the inside front cover of each issue. Membership is open to manufacturers and distributors of opthalmic equipment and supplies and pharmaceutical companies.

Ciba Announces New-In-Practice Program for Recent Graduates

Ciba Vision Corporation announced The Professional's Choice "New-In-Practice" Program for recent graduates planning to start their own eye care practices. The "New-In-Practice" Program provides graduates with a complimentary contact lens resource package which includes Ciba Vision lens care products and contact lenses. The package is valued at more than $2,500. Eye care professionals are eligible to receive the "New-In-Practice" resource package for up to four years following graduation.

In addition, whether planning to start an eye care practice or not, all graduates enrolling in the program are eligible to receive two practice management booklets: **49 Best Ways to Boost Your Practice** and **100 Best Ways to Meet Twelve Important Trends**, both by Robert A. Koetting, O.D.

"Ciba Vision recognizes the challenges that eye care professionals encounter upon graduation," said **Sally Dillehay, O.D., M.S., manager, professional services**, CIBA Vision. "The 'New-In-Practice' Program is designed to offer support and encouragement to graduates as they begin their professional careers. In addition, The Professional's Choice New-In-Practice program offers additional practice management support to professionals enrolling in the program."

"New-In-Practice" enrollment forms were mailed to 1993 graduates. In addition, interested professionals can contact CIBA Vision's professional services department at 1-800-227-1524, to receive further details about the program.

Ciba Vision Corporation offers a wide range of vision care products and services, including soft contacts lenses, lens care products, and ophthalmic pharmaceuticals. Ciba Vision products are marketed in 70 countries.

Vistakon Launches 1-Day Acuvue®

Vistakon announced the launch of 1-DAY ACUVUE®, the world's first contact lens designed specifically to be worn for a single day, then discarded and replaced with a new pair the next day. The product will be available initially in two test markets, Omaha and Las Vegas.

The culmination of more than three years of worldwide research and close to $100 million invested in advancing the company's patented manufacturing technology, 1-DAY ACUVUE offers contact lens wearers the convenience of never having to clean their lenses, along with the excellent eye health, comfort and vision benefits of fresh, sterile lenses every day. For doctors, the lens offers increased patient satisfaction, reduced chair time and practice building opportunities.

The enormous success of ACUVUE®, the world's first disposable contact lens, has made today's launch of 1-DAY ACUVUE possible," said **Bernard W. Walsh, president** of Vistakon, a division of Johnson & Johnson Vision Products, Inc.

"ACUVUE introduced the concept of weekly disposable wear to the country five years ago, and since then, both doctors and patients have enthusiastically embraced disposability and the 'shorter is better' philosophy we pioneered. After the launch of ACUVUE, doctors began telling us that the ultimate disposable lens would be one that was worn for a single day, then thrown away," said Walsh.

Corning Announces Low Vision Awards Program

Optometric students interested in low vision are now eligible for the annual Corning Low Vision Award. Corning Medical Optics will present the award to a graduating student from each optometric school in the U.S. and Canada who demonstrates interest and exceptional clinical proficiency in the area of low vision.

"A career as a low vision specialist is something to be encouraged," said **Rhoda Derbigny, national sales manager**, Corning Medical Optics. "Recognizing these students creates a positive incentive to hold their interest. We also wanted this award to have some practical application. The winners will be given a Corning Glare Control™ Lens Clip-on Trial Kit for use in their own practices."

Corning Medical Optics manufactures Corning Glare Control Lenses, designed to offer relief of glare symptoms for people with light sensitive conditions such as developing cataracts, glaucoma, macular degeneration and other problems caused by the normal process of aging.

Bausch & Lomb Position Upheld Against Mail Order Litigation

Legal action instituted by California-based Dial-A-Contact Lens has been dismissed. As part of the dismissal, Bausch & Lomb retained its right to refuse to sell contact lenses to the mail order firm.

Dial-A-Contact acknowledged that Bausch & Lomb was not and is not obligated to do business

with it or to supply it with contact lenses.

"We are very pleased to have our long-standing position acknowledged," said **Harold O. Johnson, senior vice president** of Bausch & Lomb and president of its Contact Lens Division. "We have steadfastly maintained that contact lenses, as medical devices, should only be available through a patient's licensed eye care practitioner and that to distribute them without that supervision raises important vision health issues. We will continue to abide by and enforce our sales policy."

California-based Dial-A-Contact sued Bausch & Lomb and several other manufacturers in 1990, claiming that the companies' refusal to sell it contact lenses would drive it out of business. Bausch & Lomb was the last remaining manufacturer/defendant in the case after all others settled out of court. "We simply refused to alter our time-honored position on this issue, and we have been vindicated," Johnson said. "Our position benefits the eye health and welfare of consumers."

Varilux Announces Student Grant Award Recipients

Recipients of the Varilux Student Grant Award Program for Optometry Schools have been announced. This year's national winner **William Cox, Ph.D.**, a student at the **University of Alabama at Birmingham**, was chosen for his paper "A Clinical Study of Satisfaction for Bifocal Wearers Fitted with Varilux Infinity Lenses." Dr. Cox received a $500.00 grant, and a trip for two to the 96th Annual American Optometric Association Congress Meeting June 1993 in Anaheim, California. Also, his faculty advisor, Michael Cho, O.D., received a trip for two to the Congress meeting.

Each school's clinical staff chooses a recipient from its third or fourth year optometry students, based on written case reports using Varilux Progressive Addition Lenses. A $500.00 grant is given to each school's winner.

"Varilux Corporation has a strong history of optometric school support, and we are very pleased to see the high quality of research papers submitted to us for the National Award," said **Rod Tahran, O.D., professional services**, Varilux Corporation.

Vistakon's Lenses Attain Largest Market Share to Date

Vistakon, a division of Johnson & Johnson Vision Products, Inc., announced that it attained the largest quarter-to-quarter increase in soft lens new fits of any company, +20.3%, in the first quarter of this year. Its ACUVUE® disposable and SUREVUE® daily wear, two-week replacement contact lenses have climbed to 18.8% of total soft lens new fits, their largest combined share ever.

"Our growth helped fuel growth in the entire soft lens market," said **Craig H. Scott, Vistakon's vice president of marketing**. "For the third consecutive quarter, total soft lens new fits increased versus a year ago."

ACUVUE continued to be the number one lens for all new fits of soft lenses, with its share growing to more than 15% — the brand's highest share ever of the market.

Market research figures are reported by Health Products Research, Inc., of North Branch, New Jersey.

Students Receive Complimentary Subscriptions from Ciba Vision

Fourth year optometry students at the 17 schools and colleges of optometry across the United States and Puerto Rico are now receiving a complimentary one-year subscription to *Contact Lens Update*, a newsletter published by Anadem, Inc., courtesy of CIBA Vision Corporation. *Contact Lens Update* provides abstracts of contact lens related articles from almost 40 journals.

The subscriptions which are valued at more than $100,000 began in January 1993. They were sponsored by CIBA Vision to help encourage students to stay current with literature related to the profession and to stimulate interest in research. "This is just one example of CIBA Vision's continuing commitment to education and fostering a better understanding of contact lens knowledge," said Sally Dillehay, O.D., M.S., manager of professional services at CIBA Vision.

Wesley-Jessen Announces Research Award

The "Wesley-Jessen Excellence Award" has been granted to **Darren Lee, O.D.**, and **Lena Chang, O.D.**, who graduated in spring 1993 from the Southern California College of Optometry, Fullerton, CA.

Gary I. Bekritsky, O.D., F.A.A.O., W-J's manager of clinical research and optometric services, will present the fourth annual award at the annual meeting of the American Optometric Association's Contact Lens Section, in Las Vegas, NV, Sept 9-12.

At the meeting, Drs. Lee and Chang will present a synopsis of their winning research paper, "Changes in Myopia Induced by Hydrophilic Contact Lenses." In addition to receiving a $3000 scholarship award, W-J also will host their trip to the meeting.

Designed to further clinical understanding of contact lens and cornea-related topics, the prestigious research competition was begun by W-J in 1989.

Sunsoft Provides Grants to Colleges of Optometry

In keeping with the company's goal to support the schools of Optometry, Sunsoft recently provided grants to the Contact Lens Departments at both the Southern California College of Optometry and the University of Alabama's School of Optometry. "The money from these grants will be used to assist the schools' contact lens clinical education programs," said Dr. Rod Porter, Sunsoft's Director of Professional Services. Throughout 1993, Sunsoft has also provided support to Colleges of Optometry at The New England College of Optometry, University of Houston, Pennsylvania College of Optometry, University of California at Berkeley.

The Professional School Admission Interview
A Review of the Literature

Marlee M. Spafford, O.D., M.Sc.

Abstract

The use and format of interviews in the admission decisions of health care professional programs is discussed. A review of the literature demonstrates the widespread use of admission interviews, their inherent limitations and the need for controlled research in this area.

Key Words: *admission interviews, use, format, validity, reliability, interviewer qualifications*

Introduction

The admission committee of a professional school is frequently viewed as a gatekeeper to the profession. The admission decisions determine who may and may not become the future members of that profession. This gatekeeper role is usually the responsibility of the professional academics. The use of an interview in selection decisions is widespread among various health care professional programs. The interview continues to be used despite the known significant costs of its administration and analysis.

The practice of interviewing likely differs among optometry programs throughout North America, although no systematic study of this has taken place. Historical, political and philosophical factors may account, in part, for different uses of the selection interview. In addition, optometry admission procedures may be affected by the different number of programs and applicants in each country.

Despite increasing concerns about basing decisions on reliable measures of candidates, many professional programs have not formally evaluated the use and format of their admission interview. The first step in evaluating the use of admission interviews is to become familiar with how other health care professional programs view and use interviews. Secondly, a knowledge of what research has been done in the area of admission interviews is needed. This paper is a review of current literature that addresses these two issues. The general finding is that most health care professional programs interview their applicants; however few programs have evaluated their interview and little controlled research has been done on admission interviews.

The intent of interviews seems to be consistent among different health care professional programs. Therefore it is unnecessary to limit discussion to one health care profession. Interestingly, a review of the literature in the past fifteen years failed to reveal any publications about admission interviews by optometry programs. This is an area which needs review and study. It is beyond the scope of this paper to consider the extensive psychological literature on interviewing techniques, although some discussion is included about the problems that have been identified with current admission interview formats.

The Prevalence of Admission Interviews

Surveys have been published about the use of admission interviews by health care programs.[1-3] Of three studies found, only one[2] appeared to incorporate multiple inputs into the questionnaire design. This is an important point since the design of a survey greatly affects the data collected. Johnson and Edwards[2] performed an extensive search of the medical education literature to determine pertinent questions and format for their survey. Two staff members from the Association of the American Medical Colleges (AAMC) as well as the AAMC's Student Affairs National Committee on Admissions provided input to the draft questionnaire. Finally, although limited, a pilot test of the questionnaire was conducted on three admission officials.

It is difficult to identify real changes in the use of medical admission interviews between a 1981 survey[1] and a 1991 survey[2] since many of the questions targeted different issues. Neither study showed a sample of its questionnaire; therefore possible biases created by phrasing could not be identified by the reader.

These surveys were effective in pointing out the widespread use of interviews in selecting students for health care professional programs.[1-4] In the early 1980s, 99% of U.S. medical schools reported using interviews in the selection of students.[4] Puryear and Lewis[1] received responses from 87% of

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the 123 U.S. medical schools they surveyed. Ninety-nine percent of the respondents used an interview in the selection process. In 1989, Johnson and Edwards[2] surveyed all 127 LCME-accredited U.S. medical schools. Responses were received from 72% of the schools. Ninety-eight percent of the respondents used interviews in admissions decisions. Myslinski and Jeffrey[3] received responses to a survey from 70% of the 59 American dental schools. Ninety-three percent of the respondents used interviews in the admission process. Regardless of whether schools who did not respond to these medical and dental surveys used interviews, the prevalence of the admission interview is undoubtedly high.

Typically, health care professional schools using interviews do not provide one to every candidate. Johnson and Edwards[2] found medical schools interviewed an average of 42% of candidates who completed an application. Many schools targeted their interviews towards academically strong candidates (80%), minorities (59%), relatives of alumni (40%) and/or "older" applicants (24%).[2] Affirmative Action in the U.S. enables schools to identify visible minorities hoping that this will prevent discrimination. In Canada, the same concern about discrimination prevents admission committees from using this type of candidate data in admission decisions. Since not everyone is interviewed, it is apparent that candidates must successfully overcome certain admission hurdles to qualify for an interview. This implies that the interview has a value since it is awarded only to a select group.

The Purpose And Use of Admission Interviews

Edwards et al[5] stated that interviews serve four purposes: 1) information gathering, 2) decision making, 3) verification of application data, and 4) recruitment. These authors argued that useful information gathered in an interview was often not obtainable by other means.

Johnson and Edwards' survey[2] reported that medical schools wanted to assess the candidates' noncognitive skills. Eighty percent of the schools also viewed the interview as a public relations tool. This latter reason has become more important as application numbers to professional programs have decreased.[6] Other purposes for interviewing have been cited: to predict success as medical students (53%), to provide a realistic preview of medical school (47%), and to assess cognitive ability (26%).[2] The prevalence of the last reason is surprisingly high in view of the availability of other cognitive measures such as university transcripts and MCAT scores. Occasionally, schools interviewed to clarify written application information or to identify psychiatrically at-risk students. Willer et al's survey[7] of 142 medical schools in the U.S. and Canada reported that respondents believed admission interviews provided the best opportunity to identify psychiatrically at-risk students. Yet, most felt that current interview structure and interviewer training would have to be improved for such individuals to be identified. In 1981, the U.S. Court of Appeals ruled that an admission committee's decision could be affected by the knowledge of a candidate's mental health, yet paradoxically, legislation prevents a committee from making inquiries about a candidate's mental health.[8]

Puryear and Lewis[1] found only 8% of the interviewing schools assigned a fixed weight to the interview for admission decisions. The average weight was 31%. A similar question in Johnson and Edwards' survey[2] found that 22% of the respondents weighted the interview. The average weight was 35%. Medical schools ranked the importance of pre-admission variables such as GPAs, MCAT scores, interviews and references when making admission decisions. Interviews ranked first[1] or second[2].

The reasons for interviewing candidates varies. In general, the motivation seems to center around the intent of improving the selection process, either by obtaining more appropriate students or by making the process more fair.

Format of Admission Interviews

The majority of medical and dental schools interviewed their candidates twice (46%[1]; "almost 60%[2]; "two-thirds"[3]). In decreasing frequency, schools employed one, three or, rarely, four interviews per candidate. An interview lasted on average about 44 minutes.[2]

The interviewer to candidate ratio was most often "one to one" (85%[1]; 87%[2]; almost 80%[3]). The alternative format to the individual interview was a panel approach involving two or more interviewers. On the average, medical school panels had 3.7 interviewers.[2] The relatively infrequent use of panel interviews is a concern since there is evidence in the psychology literature that increased interrater reliability of interviews occurs with this format.[9]

Interviews can be structured, semi-structured or unstructured.[5,9] One view[9] of the structured interview is that it meets four criteria: 1) the interview questions are derived from a job analysis, 2) every candidate is asked the same questions, 3) sample answers to questions are given to the interviewers to increase rating consistency, and 4) interviews are conducted by a panel. Semi-structured interviews meet some but not all of the criteria. Unstructured interviews have none of these qualities. A review of the literature failed to uncover any health care professional schools using the structured interview format as described by Campion et al[9].

Three studies of health care professional programs[10-12] described their interviews as structured, although their attributes would meet Campion et al's[9] criteria for semi-structured. All three studies derived their interview questions from a job analysis. This is perhaps one of the most crucial aspects of the structured interview. Edwards et al[5] used the term, Success Analysis of Medical Students (SAMS), to refer to a job analysis for medical students. There are different techniques for conducting a job analysis, and the most frequently used is the critical incident technique (CIT).[5] The CIT for medicine would be determined by relevant experts (e.g. physicians and medical school faculty members) who would develop a list of 50 to 200 critical incidents. The incidents reflect real life recollections of successful and unsuccessful medical student behaviors, attitudes and performances. For example, an incident might involve a medical student's handling of patient confidentiality in a particular situation. Two independent expert panels would group the incidents into major categories. Those items consistently categorized by the two groups would be kept. Finally, the value of each incident would be rated on a scale from effective to ineffective. Tarico et al[11] was the only report found in the health care professional literature which used the CIT to design the interview.

The types of questions asked in interviews varied considerably among schools. They included questions about general background, related experience and accomplishments, opinion and attitude, hypothetical situations, as well as the ability to meet requirements.[2]

Myslinski and Jeffrey[3] found an interesting inconsistency between what interviewers indicated they wanted to evaluate and what they actually evaluated. Ninety-seven percent of the responding dental schools said they wanted to evaluate the candidate's character. However, only 69% of the schools asked questions that would directly impinge on humanistic qualities. Conversely, only 69% of the schools indicated they wanted to evaluate the candidate's knowledge or intelligence. Yet, 83% of the questions addressed these issues. Interviewers found it easier to evaluate knowledge and intelligence rather than humanistic qualities, the latter being the cited goal of most interviewers.

The literature suggests that the most common admission interview format is two, individual, semi-structured interviews which intend to evaluate the candidate's humanistic qualities but more likely evaluate the candidate's knowledge or intelligence.

Admission Interviewers

Although most admission committee members interviewed candidates, student and administrator members were most likely to be excluded from interviewing.[3] Often the demand for interviewers exceeded the number of committee members; therefore membership was not always a requirement to interview. Johnson and Edwards[2] found on average that 68% of interviewers were members of the admission committee. The representation of faculty, students, alumni, administrators and residents in the interviewing and admission decision processes varied greatly among schools.[2,3] By far, faculty comprised the majority of the roles.

Although interviewing is a skill, few schools ensured that their interviewers were trained for the task.[2,3] Sixty-nine percent of medical schools indicated that some level of interviewer training was provided.[2] Much of the training was limited to providing interviewers with written instructions or guidelines. Sometimes workshop courses and rarely videotaped interviews or role-play exercises were employed. Less than half the schools indicated that their interviewers received specific technique training in questioning, recruiting, rapport or listening skills. Very few schools offered training about rater bias or interview structure. The psychology literature suggests that interview reliability and validity are decreased by unstructured interviews given by untrained single individuals.[5,9] Interestingly, a review of the literature on admission interviews for health care professional schools reveals these problems are commonplace.

The remainder of the paper reviews published reports that have attempted to evaluate the use and impact of various features of the admission interview.

Research on Admission Interviews

Studies that have examined admission interviews can be separated into three broad areas of investigation: interview format, interviewer reliability and interview validity.

Interview Format

Only one study[11] was found that compared different interview structures. Candidates for a radiology residency received both a structured and unstructured interview. The structured interviews were derived by faculty using the CIT method. The structured interviewer was extensively trained and had no access to the applicants' data. The unstructured interviewers were untrained and did have access to the candidates' files. The interview goals were the same for both methods; however only the unstructured interviewers' scores correlated with the candidates' pre-admission grades. Tarico et al[11] suggested that interviewers rely on academic qualifications when that information is made available. This influence is greater when an untrained interviewer provides an unstructured interview. The CIT structured interview was also conducted on individuals already enroled in the radiology residency. Their interview performances were compared with their monthly faculty clinical evaluations. High correlations were found between the interviews and clinical evaluations for both cognitive and non-cognitive attributes.

Despite the evidence in the psychology literature[9] that structured interviews increase reliability, numerous studies[13-18] were found that failed to describe the level of structure employed. Without these data, the impact of their findings is lowered.

No reports were found which compared the individual with the panel type interview. Only one study[12] used a panel interview, while most used the less reliable[9] individual interview. Several studies[10,16-20] failed to describe whether an individual or panel interview was employed.

Most programs use a panel or individual interview format. However, it should be noted that some programs employ a group interview in which more than one candidate attends the interview. Levine et al[21] compared a physical therapy program's 1982 change from individual to group interviews. Group interviews most often involved three interviewers and five candidates, although scheduling problems often changed the ratio. The method of evaluation in the group situation was not explained. The attributes assessed in the semi-structured interviews also changed in 1982 making direct comparisons difficult. Neither type of interview correlated well with academic or clinical performance in the program. The numerous inconsistencies in interview format make it difficult to isolate any difference the individual versus group interview format may have had.

Research on admission interview format has mostly involved individual interviews, a technique which has been shown to be less reliable and valid than panel interviews. Structured interview performance has been found to correlate well with clinical evaluations of a professional student both in terms of cognitive and non-cognitive attributes.

Interviewer Reliability

Interviewer bias has been examined. Tarico et al[11] found that interviewers were influenced by the candidate's written file. The knowledge of a candidate's academic background was seen to affect interview scores in at least two other studies[13,14].

Elam and Andrykowski[14] studied interview ratings, as well as candidate and interviewer characteristics over a four-year period at a U.S. medical school. Candidates received two individual interviews with untrained faculty. The applicant's age, gender and rural legal residence were not found to be correlated with interview ratings. However, lower interrater agreement was found when the interviewers differed in gender, professional background, and admission committee membership. For instance, admission committee members consistently ranked candidates lower on the interview than non-committee members. The investigators concluded that their current admission interview did not provide unique useful data. Needed changes included interviewer training, increased interview structure and greater non-committee membership knowledge about the admission

process.

Markert and Shores[15] determined difficulty and consistency ratings for untrained interviewers during one admission year to a medical program. Difficulty was defined as the tendency of an interviewer to grade a candidate lower or higher than other interviewers. Therefore, an interviewer's difficulty rating was the average of all the interview scores assigned by that interviewer. Consistency was defined as the degree of agreement among interviewers rating the same applicant. It was in essence a measure of the reliability of an interview. Interviewer consistency could be determined because three individual interviews were provided to each candidate. The structure of the interview was not specified. Markert and Shores pointed out that adjusting an interviewer's mean rating to the group mean was inappropriate because it assumed that interviewers would on average encounter equally competitive candidates. This was not necessarily the case since the main determinant of interviewer-candidate combinations was usually the availability of the participants at the interview time. Markert and Shores categorized the interviewers by a difficulty-consistency index where a higher index represented a lenient, hard and/or inconsistent interviewer. They suggested that interview teams should be purposely arranged so that the total difficulty-consistency index did not exceed a certain pre-determined level. Using their acceptable index cut-off, one-third of the applicants in their study encountered a combination of interviewers with unacceptable index totals. Their method offered a strategy for increasing fairness in interviewer assignments.

Only one study[14] was found that evaluated the data-gathering skills of admission interviewers. Five interviewers and fifteen applicants agreed to have their interviews videotaped and analyzed. Interviewers were untrained. The investigators analyzed the data after admission decisions were made so that their study would have no direct effect on the admission process. However, the behavior of the participants was likely affected by the knowledge that they were being videotaped. The interview scores of the subjects might have been different had they not been taped, thereby altering the admission decisions in some cases. Two types of skill deficiencies were found among interviewers. First, interviewers frequently made inefficient use of time. They often began the interview by asking relatively closed-ended, focused questions. This seemed to hinder candidates later in the interview when they were presented with more open-ended, broader questions. The second problem was that interviewers tended to rely on the applicant's written file, particularly toward the beginning of the interview. Reliance on the written file tended to reduce eye-contact. This discouraged communication and prevented the interviewer from noting the candidate's non-verbal cues. Also, the written data tended to bias the interviewer's rating of the candidate. Litton-Hawes et al[14] provided feedback to the participating interviewers and the admission committee so that changes in the interview format might occur. No follow-up study was found.

Studies of the impact of the interviewer reveal several concerns. The candidate's interview score may in some cases be more a reflection of the interviewer than the candidate. Interviewer attributes that have been found to influence inter-rater reliability include gender, professional background and membership on the admis-

sion committee. The combination of certain interviewers has also been identified as a potential problem. Finally, interviewers who are allowed to access the candidate's file have been shown to be unduly influenced by the written information. In fact, their interview scores become more a reflection of the written application than the interview.

Interview Validity

Numerous studies have compared interviews with various pre- and post-admission measures in an attempt to comment on the validity of the interview. There are some potential problems with these studies. First of all, the interviews are usually compared with academic grades. It has been suggested that interviews do not measure the same traits as academic grades.[5,12,13,22,23] In fact, much of the justification for interviewing lies in this difference. Another problem is that academic grades alone are not valid predictors of who will become a competent practitioner. Academic-criteria predictors may lose their correlation with successful practice as the student progresses through training.[10,11,22,24,25]

Since academic competition to enter medicine is high, Powis et al[12] argued that all medical students would successfully complete the program if academic grades were the only valid predictors of success. Since there is attrition due to failure, they proposed that other factors must affect success. Powis et al reviewed the admission interview performances of two types of medical students over a nine-year period: those who graduated from their program with honors and those who failed to complete the program. Attrition occurred as a result of academic failure or voluntary withdrawal. Since the interview content had been derived from a job analysis, both an overall score and individual attribute scores of the interview could be compared. The overall interview score and several individual attribute scores were significantly lower for the students who did not complete the medical program. The interview performances of honor graduates were better on average but not statistically different for all but one interview attribute. Oddly enough, although the investigators argued in favour of interviews and pointed out the good correlation with clinical performance, they chose to compare the interviews strictly with academic standing which they stated did not reflect clinical ability in practice. This is the only study that found a significant correlation between interview performance and academic standing. Other studies found no such correlation.[10,16,18,20,23]

For six years, Walker et al[10] compared structured-type pre-admission interviews with both academic and behavioral measures throughout a dental program. During the pre-clinical portion of the program, they found no significant correlation between the job-analysis derived interview and the GPA derived academic performance. However, the interview was significantly correlated with the clinical phase later in the program. The correlation between the interview and clinical evaluation was not that surprising since several common attributes were being assessed by both methods.

Pre-admission interviews, GPAs and MCAT scores were compared with academic and clinical evaluations of a 1981 medical graduating class.[23] Three individual semi-structured interviews were averaged for each candidate. Meredith et al[23] found that the pre-admission interview was correlated with the clinical performance measures while the academic pre-admission standing was correlated with the NBME results. Meredith et al pointed out that admission committees need to identify their priorities. If they want to predict clinical performance, then the interview should have weight. If they want to predict objective knowledge, then traditional measures like the GPA and MCAT scores are sufficient.

Other studies found no correlation between pre-admission interview scores and academic or clinical performance.[16,17,20] Vargo et al[20] found that the interviews given over a four-year period in an occupational therapy program were not predictive of either academic or clinical performance. Unfortunately, the only details given about the interview were that it was semi-structured and ranked on a four point scale.

In 1982, the Brown University program in medicine eliminated the interview from its admission process. The reasons cited were the high cost and inconvenience of interviewing, coupled with the lack of compelling published evidence supporting the validity of interviews. Two reports have been published on the students admitted before and after the interviews were eliminated.[16,17] There was no statistically significant difference in the GPAs after first year between the students admitted with and without an interview.[16] In a later study, the residency program director reports of overall performance were compared for the interviewed and non-interviewed students. There was a significantly greater number of deficient grades received during the residency by the interviewed group.[17] Since the format and weighting of interviews versus other admission variables were never stated, it is difficult to interpret this finding.

The influence of a job-analysis structured interview on admission decisions was reviewed in a dental school.[19] The actual class was selected using the interview score, cumulative GPA, DAT scores and number of years of pre-professional education. The actual class was compared with a hypothetical class selected from the same applicant pool. The hypothetical class selections were based on all the same information but excluded the interview scores. Doering et al[19] found that the membership of the hypothetical class was 20% different than that of the actual class. This would suggest that when the interview data was available, the admission committee did use these data and at times put less weight on academic measures. Unfortunately, the impact of this study is limited because of numerous methodological problems. First of all, the validity of the interview design was tested on senior dental students. It could be argued that the motivation, maturity and knowledge of admission candidates is significantly different than that of senior dental students. Consequently, the interview performance of senior students may not have been comparable with admission candidates. Secondly, the methodological details for selecting the hypothetical class were not reported. For instance, did the same people select the real class and the hypothetical class? If so, could memory of the interview data have affected selections of the hypothetical class? Also, was there a fixed weight to the pre-admission variables? Although the interview data seemed to affect the admission decisions, the study could not address whether "better" selections were made by the interview or non-interview methods.

Gramet and Terracina[26] concluded from an eight-year retrospective study that physical therapy admission committees should base their decisions on a combination of four variables: high school average, pre-professional cumulative GPA, age at entry and personal interview. The validity of the interview data is questionable because changing admission policies over the course of

the study altered the number of times a candidate was interviewed. Also, the interviews were individual with minimal structure.

Perhaps the most controversial approach to studying the utility of interviews was taken by a Canadian occupational therapy program.[18] It was the only prospective study found. From 1977 to 1980, students who met minimum academic qualifications were offered places in the program by one of three different selection methods. Some students were admitted on a random basis. Other students were admitted based on their strong academic background. Finally, some students were admitted based on their strong interview performance. Bridle[18] pointed out two similarities. The strong interview group did not perform significantly better in the program than the other groups as judged by academic and clinical measures. Also, the randomly selected group did not perform significantly worse than the other two groups. It should be pointed out that significant group differences may not have been apparent because of student similarities among groups. For instance, 70% of the students in the random group had excellent interview scores and therefore were like the interview group in that respect. The investigator suggested that interviews were not worth the time spent to administer them. There is concern however, that the methods employed may have prevented this point being proved.

The study of interview validity is perhaps the most difficult issue with which to grapple. If one can identify the actual attributes measured in the interview, then showing validity will be dependent upon finding common measures in the professional program with which to make comparisons. For instance, if the interview evaluates humanistic qualities, then it is not likely to correlate well with didactic GPAs. Therefore, attempting to compare these items to answer the issue of interview validity seems ill-conceived. There appear to be few studies which have taken this into consideration.

Conclusions

A review of the literature in the past fifteen years reveals the widespread use of interviews in the admission decisions of health care professional programs. Also apparent is the tremendous controversy about the use and validity of interviews. At the root of this controversy are two questions. Does the interview measure something useful about a candidate that can not be gleaned from other application data? Also, is it the responsibility of the admission committee to select candidates who will become successful clinicians or does the responsibility stop at selecting candidates who will complete the professional academic program? The strongest argument for the interview is that it may provide important non-cognitive measures of a candidate that are not evident from university transcripts and standardized admission tests. The greatest concern with the interview process, which is acknowledged to be expensive, is that flawed design often invalidates the intent of the interview.

Almost all the published studies on admission interviews have been retrospective. It is difficult to comment on the validity of the admission interview based on the current literature since there seem to be many methodological problems with the studies. Also, many reports have failed to describe the interview format, thereby making conclusions about their validity more tenuous. It would appear that there is a need for prospective studies that more rigorously evaluate the admission interview.

A review of the literature on health care professions depicts a selection process fraught with limitations and biases. However, the review also allows a profession the opportunity to identify those problems and seek viable solutions. With the continued intense competition for entry into the optometric profession, it would seem ethical and therefore essential to seriously evaluate its current gate-keeping role.

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Predictors of Performance in Optometry School A Study at the University of Missouri-St. Louis

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Abstract

Many qualities of an applicant's record are reviewed before offering the applicant a position in the UM-St. Louis optometry school's entering class. We analyzed the records of all students entering our program between 1980 and 1988 to determine which aspects of an applicant's entering profile were the most significant predictors of performance in the first professional year, in the first and second professional year, in the four-year program, and in the clinical portion of our program.

Key Words: *admission, performance, grade point average (GPA), Optometry Admission Test (OAT)*

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Introduction

Predicting which applicants will make good optometry students is a problem that faces all optometric admission committees. The committee aspires to select candidates who will complete successfully the professional program, achieve licensure, and become competent professionals.

In making a choice of which candidate to admit to a program, many factors are considered: undergraduate grade point average in science and non-science courses, cumulative GPA, the Optometry Admission Test (OAT) scores, the personal interview, other academic crendentials, the "competitiveness" of the undergraduate institution, letters of recommendation, residency preferences, and whether this person has previously applied to the professional program.

The need to select for admission those individuals who are most qualified is not unique to optometry schools. All health professions schools carefully screen applicants for admission to their programs. Much has been written about the relative success different schools have had in selecting students for the professional program and the success of those students in the program. Some institutions have found the undergraduate GPA to be a good predictor of performance[1-7], others have found the admission test to be a good indicator of success[7-11], while still others point to the value of the personal interview of the candidate in predicting the applicant's ability to do well in professional school.[12-15]

Through much of the 1980's the applicant pool was declining in size,[16,17] forcing professional schools to choose some candidates they may not have previously accepted. One consequence of a declining applicant pool is increased competition among the schools for individuals who have applied to more than one institution. While schools want to offer admission to candidates who intend to matriculate,[18] they also want to select students who will complete the program successfully. In recent years the applicant pool has been rebounding, but we have a long way to go before the size of the applicant pool approximates what admissions officers would consider the ideal ratio between applicants and available seats in optometry programs nationwide.

Recent optometric literature does not contain much information on the best predictors for success of candidates admitted to optometry school programs. Many of the articles on this subject were published before the Optometry Admission Test (OAT) replaced the OCAT as the entrance test for optometry school applicants.[19-23] While school admission committees compile a wealth of information on each applicant, we wanted to analyze how well our selection criteria predicted performance of students admitted to our program. Were we making selection decisions that correlated well with performance in optometry school, or were these decisions based on data with relatively low predictive value? In an effort to determine what attributes of applicants led to adequate performance of students at the University of Missouri-St. Louis, School of Optometry, we undertook the following study.

Methods

The University of Missouri-St. Louis, School of Optometry accepted its first class in the fall of 1980. Since then, there have been nine graduating classes (1984-1992). We analyzed the records of

all those admitted to the program since it began to determine what effect various entering qualifications had on optometry school performance. The optometry school performance indicators that were considered were first year GPA, GPA at the end of two years, clinical performance, and cumulative four year GPA. The clinical performance was based on grades received for all the patient care rotations in the third and fourth professional years.

The entering qualifications that were analyzed were undergraduate science GPA, undergraduate non-science GPA, undergraduate cumulative GPA, OAT subtest scores, OCAT subtest scores, age of applicant, number of credit hours of "D" or "F" in undergraduate course work and the number of "D's" or "F's" that existed in undergraduate work after courses were re-taken, the number of undergraduate schools attended, the competitiveness of the undergraduate institution, whether the person had a bachelor degree and post baccalaureate credentials, the number of semester hours of undergraduate credit, and the personal interview. The personal interview at UM-St. Louis consists of a panel interview with individual evaluations on a scale of zero (low) to eight (high) in seven categories. The interview is used to rate an applicant's level of career planning, knowledge of optometry, communication skills and leadership potential.

Table 1
Overall Applicant Pool

	Mean±1 S.D.	Range
Age	24.61±4.22	20-40
Undergraduate science GPA	3.025±0.47	1.945-4.00
Undergraduate non-science GPA	3.296±0.428	1.895-4.00
Undergraduate cumulative GPA	3.131±0.421	2.058-3.994
OAT: Academic Average	315±19	250-360
Quantitative Reasoning	320±34	230-390
Reading Comprehensive	320±29	230-380
Physics	315±35	220-400
Biology	314±31	260-370
General Chemistry	313±31	220-380
Organic Chemistry	308±34	230-370
Total Science	314±27	220-390
OCAT: Biology	52±26	1-99
Chemistry	50±27	1-99
Physics	47±28	3-99
Vocabulary	51±28	1-99
Quantitative Analysis	49±28	3-99
Study Reading	54±28	1-99
Average	51±19	8-96
Interview	5.29±1.10	1.41-7.94
Number of Undergraduate institutions	2.0±1	1-6
Number of Undergraduate Credit Hours	139±37	90-342
Number of Credit Hours: "D"	2.975±6.129	0-49
Number of Credit Hours: "F"	0.883±2.9	0-29
Number of Credit Hours "D" after retake	2.295±5.3	0-49
Number of Credit Hours "F" after retake	0.69±2.4	0-21

Results

Data were gathered from student records and subjected to statistical analysis. The mean and standard deviation for the students in the nine classes that have graduated from the University of Missouri-St. Louis are shown in Table 1. To determine what admission profile factors might be used to predict optometry school performance, a stepwise regression was done using all items listed in Table 1. The best predictor of performance in the first year of our program was the undergraduate cumulative GPA, in combination with the score on the OCAT study reading test, and the rating on the applicant's personal interview, $F_{(3,216)} = 47.6$ ($p<0.001$). These factors accounted for 40% of the variance in first year optometry school GPA.

The most significant predictor of second year GPA was found to be the personal interview, with the score on the OCAT biology subtest, and the undergraduate science GPA, $F_{(5,211)} = 35.5$ ($p<0.001$). Forty-six percent of the second year optometry school GPA variance was accounted for by these factors.

Four year cumulative optometry school GPA had as its best predictive combination the personal interview, the undergraduate science GPA, and the undergraduate non-science GPA, $F_{(3,215)} = 59.2$ ($p<0.001$). These factors accounted for 45% of the variance in the final optometry school GPA.

Of the admission factors considered, the most significant predictors for clinical grades were the personal interview, and the undergraduate science GPA, $F_{(2,216)} = 14.5$ ($p<0.001$), which accounted for 12% of the variance in the clinical GPA.

Often in making a decision on which candidates to admit to the program, there is a sizable group of candidates that members of the admissions committee agree is highly qualified and should be admitted, and another group that the admissions committee feels is not qualified and should not be offered admission. These two groups are relatively easy to identify. There is another group of candidates however, which is considered by the committee to be admittable to the program, but is not as qualified as the first group. This group of moderately qualified candidates has an above average undergraduate GPA, (often between 2.00 and 3.00), but are not as outstanding scholastically as the highly qualified group. In an effort to determine which of these moderately qualified candidates would do better in our program, we did an analysis of candidates with an undergraduate cumulative GPA between 2.00 and 3.00 and again ran a stepwise regression using the same factors.

Limiting the analysis to students with undergraduate cumulative GPA's between 2.00 and 3.00, we find undergraduate cumulative GPA to be the best predictor of the first year GPA, $F_{(1,108)} = 15.8$ ($p<0.001$) accounting for 13% of the variance, and the best predictor of second year GPA $F_{(1,97)} = 21.1$ ($p< 0.001$) accounting for 18% of the variance. For the four year optometry GPA, undergraduate cummulative GPA and the personal interview, $F_{(2,94)} = 13.9$, account for 23% of the variance in the final GPA.

For the clinic grades, the personal interview, $F_{(1,95)} = 8.78$ ($p<0.001$), is the most significant predictor, accounting for 9% of the variance.

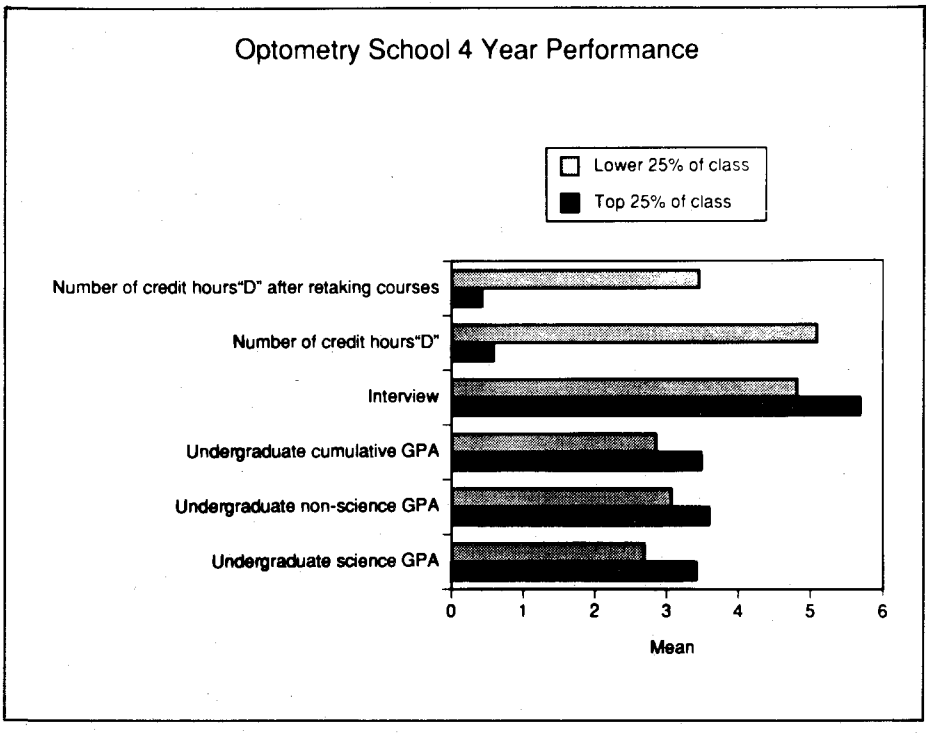
We also divided the entire group into quartiles and compared the students who finished in the top 25% at the end of four years with those who finished in the lowest 25% at the end of four

years. An unpaired two-tailed t-test was performed for all the factors considered. We found a significant difference between the groups in undergraduate science GPA ($p<0.0001$), undergraduate non-science GPA ($p<0.0001$), undergraduate cumulative GPA ($p<0.0001$), the applicant interview ($p<0.0001$), the number of undergraduate credit hours with a grade of D ($p<0.0001$), and the number of undergraduate credit hours of D after retaking the courses ($p<0.0001$). This is summarized in Table 2 and represented in Figure I.

Students with clinic grades in the top 25% of graduates and students with clinic grades in the lowest 25% of graduates also were compared. A significant difference ($p<0.0001$) was found in the admission qualifications of the two groups in undergraduate science GPA, undergraduate non-science GPA, undergraduate cumulative GPA, and the number of undergraduate credit hours with a grade of "D". Significant differences ($p<0.0005$) also were found in the personal interview and the number of undergraduate credit hours with a grade of "D" after retaking the courses. This is summarized in Table 3 and Figure 2.

Table 2

	4 Year GPA in Top 25%	4 Year GPA in Lower 25%	t value
Mean undergraduate science gpa	3.42	2.69	-12.441 $p<0.0001$
Mean undergraduate non-science gpa	3.599	3.07	-9.076 $p<0.0001$
Mean undergraduate cumulative gpa	3.49	2.854	-11.841 $p<0.0001$
Mean interview score	5.69	4.82	-4.712 $p<0.0001$
Mean number of credit hours "D"	0.59	5.10	6.38 $p<0.0001$
Mean number of credit hours "D" after retaking courses	0.43	3.46	5.792 $p<0.0001$



Discussion

Using the undergraduate grade point averages to predict professional school performance has been found to be a successful selection criteria for several other schools.[1-7] The use of the personal interview in predicting performance in professional school also has been established.[12-15] These were the two most significant predictors of success in our program at the University of Missouri-St. Louis

It is important to note that in identifying students with an undergraduate grade point average that is only moderately above average (between 2.00 and 3.00), undergraduate GPA is still a useful predictor of success.

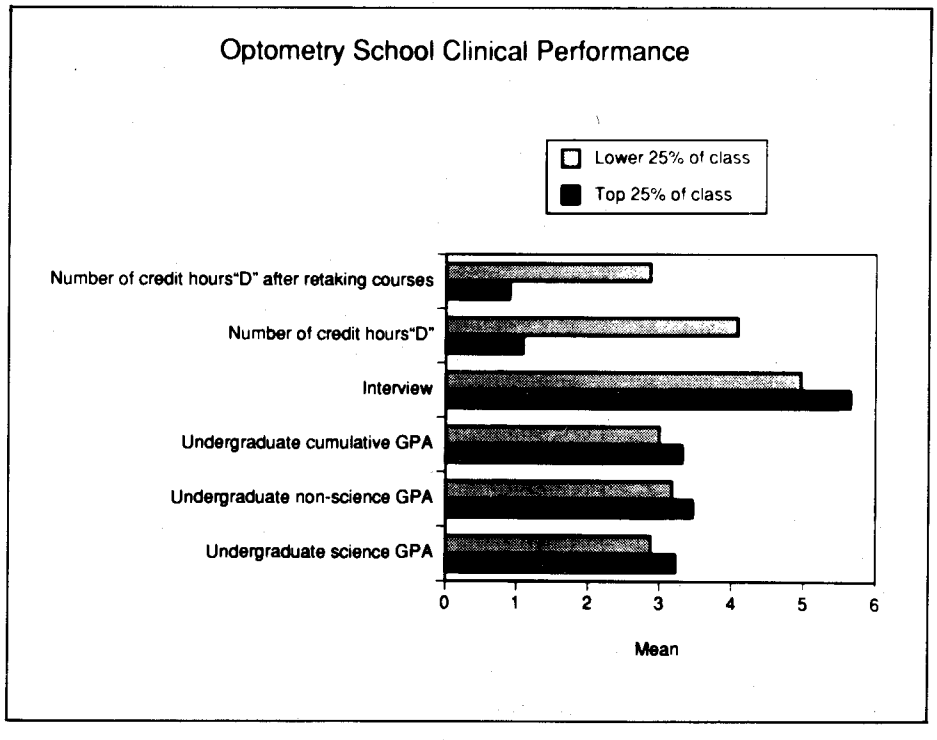
While some of the OCAT subtests also were shown to be significant, the OCAT is no longer in existence. Therefore, it is no longer possible to use the results on the OCAT to predict optometry school performance. While no parts of the OAT subtest in this case were shown to significantly predict performance in our professional program, there have been only two graduating classes that were admitted after the use of the OAT was begun. As more students who have taken the OAT complete our program, we will be able to determine its usefulness in predicting success in our professional program.

In looking at the difference in applicant factors between students who finished in the top 25% of the graduates academically and students who finished in the lower 25% of the graduates, it is interesting to note that, in addition to the significant difference in undergraduate cumulative GPA, undergraduate science GPA, undergraduate non-science GPA, and the performance on the personal interview, there is also a significant difference in the number of undergraduate credit hours in which a grade of "D" was received. The larger number of credit hours of "D" grades could be expected in a weaker applicant and could contribute to an overall lower undergraduate GPA. However, in that case a significant difference in the number of credit hours of "F" grades could be expected as well, which we did not find. This difference may be due to the low number of "F's" overall for the whole group.

In addition, the undergraduate GPAs in science and non-science courses and

Table 3

	Clinical GPA in Top 25%	Clinical GPA in Lower 25%	t value
Mean undergraduate science gpa	3.226	2.88	-4.625 $p<0.0001$
Mean undergraduate non-science gpa	3.465	3.179	-4.273 $p<0.0001$
Mean undergraduate cumulative gpa	3.323	3.001	-4.909 $p<0.0001$
Mean interview score	5.65	4.97	-3.597 $p<0.0005$
Mean number of credit hours "D"	1.09	4.09	4.1 $p<0.0001$
Mean number of credit hours "D" after retaking courses	0.90	2.87	3.575 $p<0.0005$



the undergradute cummulative GPA are interrelated. Consequently we would expect that, if one were to have a predictive value, the others would too.

As students choose which school to attend, there will be some limits to the implications other schools and colleges of optometry may infer from this study for their own applicants. This study has, however, helped to clarify which candidate qualifications are important for success in our program. Other optometry programs can, through similar analysis of their records, determine which attributes of prospective students are most important to them.

Acknowledgements

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The Relationship Between Hemispheric Preference and Learning Style

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Abstract

The Alert Scale of Cognitive Style (ASCS) and the Kolb Learning Styles Inventory (LSI) were used to explore relationships between learning style and hemispheric preference (cognitive preference) in a third year class of optometry students at the Southern College of Optometry. Significant differences were observed among the subjects in the Kolb LSI and between learning style and hemispheric preference. Implications and limitations of the study are discussed.

KEY WORDS: *hemispheric preference, cognitive style, learning style, Kolb Learning Styles Inventory, Alert Scale of Cognitive Style*

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Introduction

The increasing scope of practice of optometry, the cost of education, and the time required earning a Doctor of Optometry degree have mandated changes within optometric education. More than ever, educators and administrators are aware of and receptive to methods of instruction which provide a cost effective and efficient learning environment.

As any discipline, optometric education is a bilateral interaction involving the teacher and the student. The instructor must be knowledgeable in the area of content and must present the material in an organized manner. Similarly, the student must be willing to receive and process the information, and then apply the information if learning is to occur.

Gaps in the learning process may develop when the instructor's teaching methodologies are mismatched with the student's cognitive learning style.

Theoretical Framework

Educational research abounds with learning style and cognitive style testing inventories such as Gregorc's Style Delineator,[1] Schmeck's Inventory of Learning Processes,[1] and Dunn's Learning Style Inventory.[3] These inventories, with their underlying philosophies into the psychology of education, recognize that differences in the learning capability of students relate to their cognitive style or hemispheric preference and their preferred learning style.

J. W. Keefe[4] defines an individual's learning style as "characteristic cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment." Cognitive style may be described as the interaction between an individual's personality traits, specific dimensions of the individual's thinking and learning patterns, and the preferred cerebral hemisphere for processing information.

Hemispheric preference or cerebral dominance classifies brain function into three realms: left, right, or bilateral preference.[5] The two hemispheres are believed to process information and sensory stimulation differently. The left hemisphere generally processes input which is sequential, analytical, and more logical in nature, while the right hemisphere processes stimuli which can best be addressed via a random or holistic and more global approach in processing.

The explorations of Geschwind and Galaburda[6] have led to a general understanding of cerebral lateralization. Synonymous with left hemisphere processing is "auditory-linguistic" processing, characteristically gathering information one "sound" at a time. Synonymous with right hemispheric processing is "visual-spatial" processing, characteristically gathering information in the entire visual field at once.

The classification of cerebral preference has not previously been documented in a population of optometry students. Therefore the purpose of this study is 1) to determine the cognitive style and learning style of a population of third year optometry students, and 2) to determine if a relationship exists between cognitive style and learning style in this population.

A previous study[7] examining the learning style and academic achievement of a similar population of students found 46 percent of high achievers and 44 percent of low achievers were classified into distinct learning style

categories. Studies[8] relating cognitive profile and academic achievement have shown those subjects performing within one half of their grade level or higher displayed the dimensions: analytical, focuser, narrow, complex, reflective, sharpener, tolerant. Those performing lower than one half of their grade level displayed the dimensions: global, non-focuser, broad, simple, impulsive, leveler, and intolerant.

Methods and Materials

The Alert Scale of Cognitive Style[9] (ASCS) is a series of twenty items, each consisting of two statements from which the student must select the statement which is most accurate. Each statement is assigned a value from which the total score is obtained. This score will then give the student a ranking concerning hemispheric preference with 0-4 = strong left hemisphere; 5-8 = moderate left hemisphere; 9-11 = bilateral balance; 12-15 = moderate right hemisphere; 16-20 = strong right hemisphere.

The Kolb Learning Styles Inventory[10] (LSI) is a series of twelve statements with four choices which the student must rank from one to four in order of accuracy. These numerical rankings are then tallied with the result placing the student into one of four learning style classifications (Appendix A).

Eighty-six subjects (sixty-eight males and eighteen females) ranging in age from 23 to 45 comprised the population. All of the subjects were full-time students enrolled in the optometry curriculum at Southern College of Optometry. The population represented 100 percent of the third year class. Instructions for each test instrument were read aloud to each subject to minimize bias.

Results

Table 1 lists the hemispheric preferences for the population. Thirty-eight percent of the male subjects and 44 percent of the female subjects demonstrated a moderate left brain preference.

Table 2 lists the learning style classifications for the population. Forty-six percent of the male subjects and 41 percent of the female subjects were classified as assimilators. The skew toward assimilator was not significant at $P<.001$.

Interaction between cognitive and learning style for the population is listed in Table 3. The interaction was significant at $P<.001$ only for male subjects.

TABLE 1

Cognitive Preferences in the Population

Classification:	Male:	Female:
Strong Left Brain	13.2%	0%
Moderate Left Brain	38.2%	44.4%
Bilateral	29.4%	22.3%
Moderate Right Brain	14.7%	33.3%
Strong Right Brain	4.5%	0%

TABLE 2

Learning Style Classification in the Population

Classification:	Male:	Female:
Diverger	10.7%	23.5%
Converger	36.9%	35.3%
Assimilator	46.2%	41.2%
Accommodator	6.2%	0%

Discussion

Validity studies of the second generation Cognitive Bias test from which the ASCS was the precursor indicate a moderate positive correlation with the EEG measurements of hemispheric activity.[11,12] Studies of the Kolb LSI indicate test-retest validity between .30 and .71.[13]

The percentages for learning style classification were consistent with prior applications of the LSI in optometry and other health care disciplines.[7,14,15] The interaction of the learning style and cognitive preference in this population of optometry students was previously undocumented. The exact cause of this interaction is speculative at this point but may relate to previous educational experiences which have reinforced modifications in current learning strategies. As a degree of success is achieved in a learning endeavor, the strategies that allow cerebral dominance to be in harmony with preferred learning style become more evident and ingrained. Because this relationship may be profoundly influenced by experience, it is not unlikely that the interaction observed in the subjects could be transitional and variable over a given period of time.

Practical evidence of this relationship may be observed by differences in the level of performance among students in didactic and clinical settings. The subjects demonstrating a moderate left hemispheric preference and classified in Kolb's categories of assimilator and converger might be expected to excel more readily in the classroom setting. The opposite would be expected from those classified with a right hemispheric preference and a more active, people-oriented learning style. This second group would typically demonstrate improved performance characteristics in an active, participatory environment such as the clinical doctor-patient encounter. Generalizations and specific applications of the findings of this study are limited, however, without further research. Foremost is whether the results were influenced by the selection of testing instruments. Other considerations include bias through sample size, the limited number of female subjects, and the influence of previous academic experience.

If preliminary generalizations are

TABLE 3

Learning Style Versus Cognitive Style

	Accom:	Div:	Con:	Assim:	
	0%	1.5%	6.2%	4.6%	Strong left brain
	1.5%	3.1%	15.4%	18.5%	Moderate left brain
(M)	1.5%	3.1%	9.2%	15.4%	Bilateral
	0%	1.5%	6.2%	7.7%	Moderate right brain
	3.1%	1.5%	0%	0%	Strong right brain
	0%	0%	0%	0%	Strong left brain
	0%	5.9%	17.6%	23.5%	Moderate left brain
(F)	0%	0%	11.8%	11.8%	Bilateral
	0%	17.6%	5.9%	5.9%	Moderate right brain
	0%	0%	0%	0%	Strong right brain

made to the larger population of optometry students, an important consideration becomes evident. It is vitally important for optometric educators to be aware of students' cognitive and learning styles and their subsequent interactions in order to provide the most efficient learning environment for the students. The development of alternative teaching strategies, however, does not rest entirely with the optometric faculty member. Effective modifications will most likely require the input, recommendations, and review of a team of allied educational specialists.

A variety of additional questions also are prompted by the results of this study. Should these or similar testing instruments be used in the admissions process? Do teaching sessions need to be supplemented more by auditory-linguistic or visual-spatial teaching aids? Answers to these questions will require further research involving larger sample populations and more structured experimental designs. Applications will necessitate a multidisciplinary team extending beyond the confines of optometry. The results of this current study provide a reference point for these future explorations of the interrelationship between learning style and cognitive preference in optometric education.

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APPENDIX A

Kolb Learning Styles Categories[10]

Convergers:	These individuals are best at finding practical applications for ideas and theories. Generally, they are more comfortable dealing with technical tasks or problems than with social and interpersonal relationships.
Divergers:	These individuals assess situations from multiple viewpoints. They are usually imaginative but tend to observe rather than act.
Assimilators:	These individuals organize information into concise, logical form. They usually find theoretical logic more significant than practical application.
Accommodators:	These individuals depend heavily upon practical, hands-on experience. They tend to act on what feels appropriate rather than on what is logical. In contrast to convergers, they are usually very comfortable dealing with social or interpersonal relationships.

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Teaching Ethics in the Schools and Colleges of Optometry

D. Leonard Werner, O.D.

Abstract

A survey form was mailed to 17 schools and colleges of optometry in the United States and Puerto Rico to learn more about the teaching of ethics in optometry. Completed surveys were returned by 16 schools. Twelve of the schools indicated that they were teaching a course or a portion of a course specifically identified as dedicated to the teaching of ethics. All of these 12 teach it as a required course. The number of curriculum hours dedicated to the teaching of ethics as defined in our survey varied from 0 to 40, with the median number of hours at 7. The topics covered varied considerably with the two most frequently reported being professionalism and the American Optometric Association Code of Ethics. Much of the coursework takes place during the first and third professional years. The faculty are most typically optometrists although 6 of the schools also utilize non-optometric faculty specifically trained in ethics. These and other results from the survey indicate the need for a coordinated effort among the schools to develop a curriculum model for optometry relating to the teaching of ethics.

KEY WORDS: ethics, teaching ethics, ethics education, bioethics

Introduction

During the past 20 years, medicine, especially academic medicine, has devoted a great amount of effort and energy to the teaching of ethical issues and a national standard exists for medical ethics programs in their schools.[1] The entire December 1989 issue of *Academic Medicine* was devoted to this topic featuring a description of a number of bioethics programs.[2] Virtually all of the accredited medical schools in the United States and Canada are teaching courses in ethics.[3,4] Ophthalmology has also been very active publishing a specific guide for practitioners.[5]

There are several reasons for the impetus to teach ethics in medical schools. The General Professional Education of the Physician (GPEP) Report, "Physicians for the Twenty-First Century," recommended that "medical faculties should emphasize the acquisition and development of skills, **values,** and **attitudes** by the students at least to the same extent that they do their acquisition of knowledge."[6] (bold added by author)

While the theoretical direction for medical education was fashioned in that document, the major catalyst forcing the establishment of bioethics courses in contemporary medical education came from technology. Some have specifically identified the development of the kidney dialysis procedure.[7] This was a technological advancement capable of enhancing the quality of life as well as increasing longevity for some patients, but it was not universally available for all of the needs of the population. The concept of the rationing of care became a reality in the daily decision making process. As a result of this and other techniques and devices, many institutions had to establish ethics committees to wrestle with methods to establish medical priorities. These committees, often referred to as "God Committees" frequently consulted with disciplines other than medicine, as it was recognized that other inputs were needed. Technology, reinforced by the patient's and consumer's rights movement, and coupled with cost containment concerns, helped to stimulate this major thrust of medical bioethical education. Behavioral guidelines for the medical establishment in life and death issues, abortion, genetic engineering, organ transplants and surrogate parenting as well as problems in everyday practice were required. As medical advances increase longevity, quality of life issues also need to be addressed. Unfortunately the concern with issues of major magnitude has submerged the level of discussion of some of the ethical issues that are an integral part of daily health care practice, those which may be less dramatic but which have serious ethical implications. One issue identified as "provider abuse" by the insurance companies needs to be addressed by all health care practitioners and with the insurance carriers.

The author hypothesized that the profession of optometry and its educational institutions was falling behind other health care professions in the teaching of ethics. A possible reason for this is that the optometric professional has not typically been involved with the profound life and death decisions.

Dr. Werner is distinguished teaching professor at the State College of Optometry, State University of New York. Dr. Werner has held a number of positions at the college ranging from department chair to acting vice-president for academic affairs. He recently completed the Intensive Bioethics Course at the Kennedy Institute of Ethics at Georgetown University.

In addition, we have been more recently focused on the changes in the scope of practice with its educational needs. In any event, optometry has been slow to respond to bioethics concerns. There have been relatively few articles published in the optometric literature and little emphasis dedicated to this topic at professional meetings. [8,9,10] In 1991 the American Optometric Association created its first Committee on Ethics and Values. The author is unaware of any previous attempts to learn what is being taught in optometry schools concerning ethics.

Methods

In the fall of 1991 a survey document on the teaching of ethics was sent to the academic deans of 17 member schools of the Association of Schools and Colleges of Optometry(ASCO). They were asked to forward the surveys to the faculty member who was most appropriate. The purpose of the survey was to learn what was being taught, by whom, and how many contact hours were devoted to the topic of ethics.

Results

Sixteen schools responded to the survey, 12 of which answered "Yes" to the question: "Is there a specific course or an identified portion of a course at your school dedicated to the teaching of ethics?" All of the schools responding "yes" indicated that the course was required rather than elective.

The faculty teaching ethics come from many disciplines and include 21 optometrists, 3 counseling psychologists, 3 attorneys (one of whom received specific training as a legal ethicist), 2 persons with degrees in public health, and 1 medical ethicist. Some of the faculty are identified as invited lecturers, but in all schools the courses are the responsibility of educators with optometric degrees.

Although placement of the course, or portions of the course varied, most schools scheduled some of their courses during the first and third professional years. (see Table 1)

All but one of the schools teaching ethics have required reading assignments, and students are typically assessed with written examinations (11 schools), classroom participation (4 schools), and/or assigned papers (2 schools). One school uses a pass/fail grading system while the others give a letter grade.

The topics taught vary from school to school and do not suggest a core of subjects common to all of the schools.

Table 1

Year(s) Ethics is Taught	Number of schools
1st year only	1
2nd year only	0
3rd year only	0
4th year only	0
1st and 2nd years	0
1st and 3rd years	5
1st and 4th years	3
2nd and 3rd year	0
1st, 2nd, and 3rd years	2
1st, 3rd, and 4th years	1

The most frequently mentioned topics are: Professionalism, the American Optometric Association Code of Ethics, Social Obligations and Concerns, Interprofessional Concerns, The Optometric Oath, Standards of Care, Informed Consent, Patient Rights, Confidentiality, Truth Telling, Rationing of Health Care, Clinical Research, Paternalism, Ethical Values, Medical Ethics, and Fraud.

Three quarters of the responders indicated difficulty in identifying and quantifying the ethics education taking place in the clinics. Three of the schools conduct clinical seminars and case reports with specific ethical implications.

The total number of classroom hours dedicated to the teaching of ethics ranged from 1 to 60 total hours with a median range of 7 to 8. One-half of those teaching ethics responded that their ethics program was "too little"; the other half felt it was "about right." None of the schools felt that "too much" time was devoted to this topic. It is interesting to note that two of the schools reported 8 total hours, but one felt it was "too little," the other "just right."

In-house faculty ethics education as defined by a full day program was not reported at any of the schools. It is quite likely that shorter programs do exist, but the survey did not ask for this information.

In responding to how the teaching of ethics can be improved in their school, most responded that there needs to be more formalized clinical integration. Others felt the need for more faculty conferences, more classroom time, smaller student groups, and more outside experts.

Discussion

The initial impression reviewing the responses, particularly the comments accompanying these responses, is that ethical education in optometry requires direction and a higher profile. One problem identified by the survey is the difficulty in quantifying ethics education contact hours since the teaching of ethics must transcend a number of didactic courses as well as the clinics. The exact extent of ethics education will always remain somewhat elusive in both quality and quantity.

It is particularly interesting that a topic frequently identified in the ethics courses is "Professionalism." While ethical issues can be taught under this title heading, it is also conceivable that some discussion may focus on the mode of practice considerations. If so, this may be more within the scope of practice management than ethics. The confusion of ethics and professional practice has a long history in optometry.

While most educators suggest that a theoretical framework for ethics needs to be established during the pre-clinical years, the true relevancy of ethics education is that which takes place with patient care.[11,12] Jonsen feels that in medical education most of the emphasis must be during the 4th year when students have the clinical expertise to understand and appreciate applied ethical teaching.[13] A difficulty with scheduling ethics during the last year of optometric education is the large number of students attending externships. This may explain the preponderance of ethics taught in optometry during the third year when students have been in the clinics.

Every patient in the clinic may be a laboratory for ethics education (or a missed opportunity) and many lessons in the classroom in courses other than those labelled as "ethics" may also fall under this lost opportunity umbrella. The clinical faculty member who shares his/her reasoning with the students—including such ethical principles as beneficence, nonmaleficence, justice

and patient autonomy in the care of the patient—is teaching applied ethics.

The assessment of the ethics lessons learned is also problematic, and their ultimate influence on future practice behaviors even more difficult to quantify. Licensure boards have traditionally asked few questions on this topic, and those asked relate to optometric law and written codes of behavior, since it is easier to write questions concerning these topics. However, with some creativity, questions can be formulated to include such topics as truth telling, informed consent, patient rights, confidentiality, and inappropriate testing. One study on the use of objective clinical examination suggests that this can be accomplished.[15] The absence of licensure testing in ethics is a negative motivator to improve the educational product. It creates a closed loop that must be broken.

Conclusions and Recommendations

It is clear from this survey that optometric education has a need for direction. Certainly the public has the right to expect that primary care health providers are receiving appropriate ethics education. Unethical behaviors impede the quality of care rendered and increase its cost. The interprofessional team care approach necessitates a consistent code of behaviors throughout the health professions.

Jonsen describes the clinician's basic ethical dilemma as the conflict between altruism and self-interest.[16] Optometric educators must help future clinicians recognize and estimate the relative portions of altruism and self-interest in clinical decision making.[17]

This survey clearly indicates that the profession of optometry must join the other learned health care professions with a better defined direction in teaching bioethics. The educational underpinning of this teaching needs to be addressed by the schools and colleges. Today's economic climate necessitates that we pool our resources and develop curriculum guidelines in ethics. The initial step is to take the results of this survey and begin a dialogue among the schools. One of the recommendations of "The Report of a Working Party on the Teaching of Medical Ethics in Great Britain" (1987) was "Courses introducing students to ethics should not be undertaken without careful planning, drawing on the experience of other schools and bodies . . . already involved in medical ethics teaching."[18] This recommendation also applies to optometry.

RESOLUTION OF THE ASSOCIATION OF SCHOOLS AND COLLEGES OF OPTOMETRY

CODE OF ETHICS

WHEREAS, the current Code of Ethics of the American Optometric Association was adopted by the House of Delegates in 1944; and

WHEREAS, its principles have guided the social values of generations of doctors of optometry for nearly five decades in terms of their professional behavior; and

WHEREAS, some affiliated associations have adopted codes of ethics to guide the conduct of their members; now, therefore, be it

RESOLVED, that the Association of Schools and Colleges of Optometry urges the American Optometric Association and its affiliated associations to review carefully existing codes of ethics in order to update, where appropriate, their content, focus and understanding; and, be it further

RESOLVED, that affiliated associations without such codes are urged to create and adopt codes of ethics and values consistent with local history and tradition and commensurate with the high degree of purposefulness as expressed in the AOA Code of Ethics and Standards of Conduct.

Approved by the Board of Directors, June 19, 1993

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IN REVIEW

Genetics for Primary Eye Care Practitioners, 2nd Edition, Helene V. Fatt, John R. Griffin, William M. Lyle, Butterworth-Heinemann, 229 pp, 1992, $34.95.

The second edition of *Genetics for Primary Eye Care Practitioners* is an expanded and updated version of the original text. The preface to the First Edition defines its intent to be a reference manual for practitioners and a basic text for students. Its goals are to increase the doctor's ability to recognize hereditary disorders and their transmission, and to make appropriate recommendations to patients for further care.

The book consists of ten chapters and two appendices which cover a variety of topics from basic background information on the physical and biochemical basis of heredity and genetics, to modes of transmission and charting a pedigree, as well as guidelines and resources for counseling, referrals and ethics.

The organization of the book is good and the content is presented in an orderly logical sequence. Clinically the most useful chapters cover the genetic conditions with either primary or significant secondary eye effects.

The major shortcoming of the text is that it is too comprehensive in some areas to be a convenient clinic reference, yet not comprehensive enough in other areas to be a primary office reference.

Its appeal will differ for students and doctors. Students should find greater use for the initial section of the book which covers details of chromosomes, molecular genetics and transmission modes. Practitioners, on the other hand, should find the second half of the book more practical with its information on common genetic ocular problems, other genetic ocular anomalies and referral resources.

This book will replace neither a good handbook on clinical genetics nor a textbook of ocular syndromes, but rather occupies a niche somewhere between the two. It can be recommended to practitioners who regularly or occasionally deal with special populations and to students with an interest in this area.

Guest Reviewer:
Dr. Jay M. Cohen
SUNY State College
of Optometry

Neuro-Ophthalmology, Nancy M. Newman, Appleton-Lange Publishers, East Norwalk, Connecticut, 1992, $95.00.

In the Preface the author states, "this book attempts to explore neuro-ophthalmology in a reasonably complete manner." I feel that she accomplished her objective. The book is well organized and easy to follow. The Table of Contents is very complete and arranged in an excellent manner for finding general subtopics easily. Most of the diagrams and illustrations are quite good and easy to correlate with the text. The technology described for evaluation of the various diseases and disorders is current, nicely described and easy to understand. The topics covered are very appropriate and inclusive of the common and rarer forms of neuro-ophthalmologic (I prefer the term neuro-optometric) diseases and disorders. At the end of each chapter there is an excellent bibliography. A very strong point is the Index as it is very complete and comprehensive.

The only significant weakness I observed in reading the book is that some of the actual patient pictures illustrating clinical findings are too dark to interpret easily. This is particularly true for the pupillary abnormalities. However, the text itself is good enough to overcome this weakness in virtually every case.

Overall I feel this is a nice addition to the eye care practitioner's armamentarium. It is particularly useful as a ready reference text when presented with a neurological problem as the information in the book is current and easy to find in a hurry.

Guest Reviewer:
Dr. Lesley L. Walls
Dean, Pacific University
College of Optometry

Marketing, Managing and Contact Lenses, Robert Koetting, Butterworth Heinenann, 205pp, 1992, soft cover, $34.95.

Marketing, Managing and Contact Lenses is clearly written. The author combined the thoughts and leading management and motivational authorities outside of optometry with his philosophy of optometric practice. Seasoned practitioners will smile and agree with the author's wisdom of over 30 years in practice. The younger optometrists will benefit from the author's how to and can do approach to success.

The only criticism might be in the title. It should be retitled "Marketing and Managing An Optometric Practice." Although the author is an eminent contact lens practitioner, his ideas are equally valid for the primary care general optometrist. I have made this book required reading for all of our third and fourth year optometry students. It is a valuable addition to our Optometric Economics armamentarium. This book belongs on every practitioner's library shelf.

Guest Reviewer:
Dr. Paul Farkas
Southeastern University of the Health Sciences, College of Optometry

Publication Guidelines for the Journal of Optometric Education

I. Introduction

The *Journal of Optometric Education* invites educators, administrators, students, practitioners and others with an interest in optometric education to submit manuscripts for publication consideration.

The *Journal of Optometric Education* is the national quarterly publication of the Association of Schools and Colleges of Optometry. Its circulation includes all of the accredited optometric educational institutions in the United States, as well as students, practitioners, government leaders, and others in the health sciences and education. Established in 1975, the *Journal of Optometric Education* is the forum for communication and exchange of information pertinent to optometric education. It is the only publication devoted entirely to optometric education.

The *Journal of Optometric Education* publishes scholarly papers of archival quality, descriptive and timely reports, information and observations in the field of health sciences education, as well as current news from the member institutions of the Association of Schools and Colleges of Optometry. Manuscripts submitted for consideration for publication are evaluated by any or all of the following: 1) journal editor, 2) members of a peer review board, and 3) two or more independent referees who are specially selected as nationally recognized experts in the subject area of the manuscript. Manuscripts are considered for publication with the understanding that they are to be published exclusively in the *Journal of Optometric Education*, unless prior arrangements have been made.

International Style Guide for Uniform Submissions

In May 1987, a number of optometric editors and writers met in St. Louis, Missouri, to develop a standard set of publication guidelines for optometric journals. The *Journal of Optometric Education* subscribes to these guidelines. The following instructions to authors reflect those guidelines (first published in 1989 by the *Journal of the American Optometric Association and the American Journal of Optometry and Physiological Optics*), but have been modified slightly to reflect the educational orientation of the *Journal of Optometric Education*.

The *Journal of Optometric Education* generally publishes four basic types of manuscripts:

1. Articles
2. Literature reviews
3. Communications
4. Editorials

II. The educational research article

A. Title

The title should be concise, meaningful and clear. It generally should not be in the form of a complete sentence. Subtitles may be used whenever needed for specific purposes relating to the title or text. Titles should indicate the content of the manuscript, serve as a guide to reference librarians, and facilitate communication.

B. Author

The name of the author, or names of the authors, should be typewritten and centered, one double space below the title. Proper names should be in capital and lower case letters, and the appropriate academic degree(s) should be indicated. In a multi-authored manuscript, the person should be listed first who has made the most significant intellectual contribution to the work regardless of academic rank or professional status. This list should include only those who have made a substantial contribution to the design and execution of the work and the writing of the manuscript. Authors should identify the name and address of the author to whom correspondence should be sent.

C. Abstract

Authors are required to submit abstracts with their papers. The abstract should be typed on a separate sheet of paper in one paragraph, and it should not exceed 100 words. Abstracts should be as informative as possible and should contain statements regarding the nature of the problem studied, methods, results, and conclusions.

D. Key Words

Authors should select key words (about 5) that reflect the primary subject matter of the paper. The purpose of key words is to assist reference librarians and others in retrieval and cross-indexing. The *Journal of Optometric Education* is listed in the computer databases Ocular Resources Review and Educational Resources Information Center (ERIC).

E. Text

The goal of scientific writing is effective communication. More specifically, its goal is to communicate abstract propositions, logical arguments, empirical observations, and experimental results, including their interrelationships and interactions.

Authors should use the active voice ("this study shows" rather than "it is shown by this study") and the first person ("I did" rather than "the author did"). The past tense is appropriate for describing what was done in an experiment; the present tense is suitable for referring to data in tables and figures.

Lens formulas and associated acuities should be expressed as in the following example: OD:+2.25 - 1.00 × 95, 20/20 (6/6).

Generic drug names should be used, followed by the proprietary name in parentheses at the first mention. Acronyms and abbreviations should always be spelled out at first mention.

Symbols and diacritical marks, when used, must be clearly drawn and identified in pencil in the margin, for example, "prism diopter sign."

Manuscripts should be organized within the framework of a formal outline. The standard outline for reporting of studies, experiments, or other research projects is as follows:

1. Introduction
   The introduction has several functions. It acquaints the reader with other relevant work performed in the subject area. Only contributions that bear on the interpretation of the results should be referenced. The introduction also presents the general nature of the problem to be addressed, the specific aspect of the problem that was studied, and the hypothesis and the manner in which it was tested.

2. Methods
   The methods should be described in enough detail so that others could replicate them. However, if portions of the methods have been described elsewhere, a summary with appropriate citations is sufficient. It is essential to describe how case and control subjects were selected for study. It is important to describe any commercially available apparatus used in the study by identifying the manufacturer's name and address. Brief descriptions of methods that have been published but may not be universally understood should be presented. In addition, limitations of the methods employed should be presented, and new or modified methods should be described in detail. It is important to identify precisely all contact lenses, chemicals, drugs, or ophthalmic lenses, including generic names, dosages, and administration where appropriate. It is inappropriate to publish names of subjects or patients, their initials or other personal identification. Also, it is inappropriate to use ethnic terms when they serve only to perpetuate unnecessary, unscientific or derogatory connotations.

3. Results
   The results should be presented in a logical order, emphasizing only the important findings of the study without elaboration. Limitations of the results and any implications should be stated. The statistical analysis, if any, should be clear and relevant.

4. Discussion
   The discussion should elaborate on the data, noting the interrelationships among the results and relating them to the original question asked in the study. Acceptance or rejection of the hypothesis should be stated. In addition, the discussion should emphasize any unique or new aspects of the study, and discuss the relevancy of the results.

   It is important to draw those conclusions that can be supported by the results. Implications for basic and applied issues should be stated wherever possible.

F. Acknowledgements

Only those who have made a substantial contribution to the study should be acknowledged. Authors are responsible for obtaining written permission from those acknowledged by name, because readers may infer that acknowledged persons have endorsed the methods and conclusions of the manuscript. Many contributions justify acknowledgement, but not authorship. Such contributions might include acknowledgement of technical help, financial support, sources of materials, and persons who have contributed intellectually to the development of the manuscript. Also, any financial relationship that may be interpreted as a conflict of interest must be acknowledged.

G. References

A list of references is placed at the end of a manuscript following the corresponding author's address. References should be listed in sequential order as they are cited in the text by superscript numbers. Accuracy of citations is of major importance because it makes each specific reference retrievable by the reader. Authors should make every attempt to cite references that are relevant, original and current, and only references actually consulted. Manuscripts that have been accepted for publication but not yet printed, should be cited in the footnote section. Manuscripts that have been submitted for consideration for publication, but have not been accepted, should not be referenced. The list of references should be checked for accuracy against the original publications.

Most optometric journals have adopted the style of references used by the U.S. National Library of Medicine in the *Index Medicus*. The titles of publications should be abbreviated according to the style used in *Index Medicus*. A list of abbreviated names of frequently cited publications is printed annually in the January issue of *Index Medicus* as the "List of the Journals Indexed."

Examples of the correct form of referencing are listed below:

Journal articles

1. Standard journal article
   (List all authors when six or less; when seven or more, list only the first three and add *et al.*)
   Alpar AJ. Botulinum toxin and its uses in the treatment of ocular disorders. Am J Optom Physiol Opt 1987 Feb;64(2):79-82.
2. No author given
   Anonymous. The OD-MD conflict: economic

welfare. Optom Manag 1982 Jul;18(7);23-7.

3. Journal paginated by issue
   Kloos S. How do TPAs impact practice? Optom Manag 1987 Apr; 23(4): 14-21.

Books and other monographs

4. Personal author(s)
   Taylor S, Austen DP. Law and management in optometric practice. London: Butterworths, 1986.
5. Editor(s), Compiler(s), Chairman(en) as Author(s)
   Bartlett JD, Jaanus SD, eds. Clinical ocular pharmacology. Boston: Butterworth, 1984.
6. Chapter in book
   Mondino BJ. Bullous diseases of the skin and mucous membranes. In: Duane T, ed. Clinical ophthalmology, vol. 4. Hagerstown, MD: Harper & Row, 1980:1-16.
7. Published proceedings paper
   Norden CN, Leach NA. Calibration of the ERG stimulus. In: Lawville T, ed. Proceedings of the XIV annual symposium of the International Society for Clinical Electroretinography. Doc Ophthalmol Proc, series 12, XIV ISERG Symposium, May 10-14, 1977. Louisville: XIV Annual Symposium of the International Society for Clinical Electroretinography, (ISERG), 1977:393-403.
8. Monograph in a series
   Wurster U, Hoffman I. Influence of age and species on retinal lactate dehydrogenase isoenzymes. In: Hockwin O, ed. Gerontological aspects of eye research. New York: S Karger, 1978:26-39. (von Hahn HP, ed. interdisciplinary topics in gerontology; vol 13).
9. Agency Publication
   United States Department of Health and Human Services. Fifth report to the President and Congress on the status of health personnel in the United States: Optometry, March 1986. Springfield, Va: United States Department of Commerce. National Technical Information Service, 1986; DHHS publication no. HRS-P-OD-86-1.

Footnotes

Optometric journals discourage excessive or improper use of footnotes, but realize that on specific occasions the footnote may be acceptable. Footnotes can be used to designate a non-retrievable citation, a personal communication, or institutional affiliation of the author. A footnote can also be used to identify sources of equipment or instruments. Footnotes should be identified with small superscript lower case letters in alphabetical order in the text, and referred to at the end of the text of the manuscript under a listing "Footnotes."

III. Literature Review

The purpose of the review is to analyze, consolidate and synthesize the literature on a subject of interest. Topics should be relevant to the journal's readership. A review can make an important contribution to the literature by arriving at a supportable conclusion. Headings for the literature review do not usually follow the standard format (research manuscripts), but the author should use headings and subheadings that promote understanding of the topic.

IV. Communications

This type of manuscript generally describes a program, teaching method or technique useful to the health professions educator. Manuscripts submitted in this category frequently discuss programs or methods, which might otherwise be a research article but for which an assessment of effectiveness has not been done. Communications can also review a body of literature on a specific subject for the purpose of providing the practitioner with guidelines or recommendations regarding the subject matter. Headings for a communications paper do not usually follow the standard format for a research paper, but the author should use headings and subheadings that promote understanding of the topic.

V. Editorials

An editorial is generally a concise article consisting of a critical argument, a personal opinion, or emphasizing an important issue. An editorial does not necessarily depend upon literature support. Letters to the editor, as an editorial submission, are encouraged by the *Journal of Optometric Education.*

VI. Tables, figures and appendices

A. Tables

Each table should be typed double-spaced on a separate page. Tables are usually not submitted as photographs. Tables should appear in consecutive order in the text designated by Arabic numerals (example: Table 1). Location of tables within the body of the text should be specified in the manuscript. An appropriate table title should be on the same page as the table to which it applies.

B. Figures

All figures, whether line drawings, black-and-white photographs, color photographs or 35 mm slides, should add to the presentation of a manuscript.

All figures should be of professional quality, whether they are drawings or photographs. Most computer-generated "drawings" are unacceptable. Figures should be submitted as 5x7 inch (13x18cm) black-and-white or color, glossy prints.

All figures, whether line drawings, black-and-white photographs or color photographs, should be designated as "Figures" (eg., Figure 3). They should be numbered consecutively in Arabic numerals throughout the text of the manuscript. Locations of figures within the body of the text should be specified in the manuscript.

1. Legends
   The numbers and captions should be typewritten, double-spaced, in paragraph form, and on a separate sheet of paper. Legends for several figures should be typed on a single sheet of paper. Legends should be kept as short as possible, and should not contain explanatory notes that duplicate the explanations in the text. All internal labels in the figure should be identified in the figure legend.

2. Labels
   Authors should label figures adequately. On the back of each print, the author should place a label that indicates the name of the author, the title of the article, the figure number, and the direction of the top of the figure. When labeling slides, clearly label with author's name, figure number and a red mark to indicate the upper right hand corner for viewing the slide, not projecting of the slide. To facilitate the review process, the authors should submit an original and three copies of each line drawing, photograph or slide.

C. Appendices

Occasionally it is necessary for the author to supply subordinate information that is relevant to the study but that might distract the reader because of excessive detail; eg., computer programs, mathematical formulas, address lists, surveys or other data that might be cumbersome to present in the text. Appendices should be labeled Appendix A, Appendix B, Appendix C, etc. Each should have a short, descriptive title.

VII. Submitting the manuscript

A. General guidelines

The manuscript should be typed double-spaced on a heavy grade of white bond 8½x11 inch with margins of at least 1 inch. Print quality should be highly legible. For reviewing purposes, the original plus three photocopies of the manuscript should be submitted along with the original plus three high quality duplicates of each figure and table. All pages should be numbered consecutively, beginning with the title page, and the author's (authors') name(s) should appear only on the title page.

A cover letter should accompany all manuscripts and the letter should identify the corresponding author. The cover letter should also contain a statement that the manuscript has been approved by all of the authors of a multi-authored paper. In addition, the letter should indicate the type of article and whether or not the work has been submitted to other publications. Copies of letters of permission and other pertinent information should be included.

Authors should arrange manuscript pages as follows:

1. First page: Title, name of author(s), degrees and the institutional affiliation, if any
2. Second page: Abstract and key words
3. Text (start on a new page)
4. Acknowledgements (start on a new page)
5. Footnotes (start on a new page)
6. References (start on a new page)
7. Appendices (start on a new page)
8. Tables (each on its own page)
9. Figure legends (all on one page, if possible)
10. Figures (each separately)

B. Mailing instructions

Protection of manuscripts from rough handling while in transit is necessary. The mailing envelopes should be strong and provided with stiff cardboard or corrugated fillers slightly smaller than the envelope. Fillers are essential if drawings or photographs are to be enclosed. Authors should always retain copies of their manuscript as a precaution against the potential loss of originals.

C. Accepted manuscripts

If a manuscript is accepted for publication, the author will be asked to make or respond to any changes recommended by the reviewers and to resubmit the revised paper within a specified time period. Authors are asked to submit revised papers on computer discs as well as in printed form. Information on which software can be converted for computerized typesetting may be obtained in advance from the managing editor. Otherwise that information will be included when manuscripts are returned to the author for revisions.

References

1. The International Style Guide Committee for Uniform Submissions to Optometric Journals. Uniform requirements for manuscripts submitted to optometric journals. J Am Optom Assoc 1989 Jan;60:1.
2. The International Style Guide Committee for Uniform Submissions to Optometric Journals. Uniform requirements for manuscripts submitted to optometric journals. Optom Vis Sci 1990 Jun;66:1.
3. Potter JW, O'Rourke PC, Carlson PT. Publication guidelines for the Journal of Optometric Education. J Optom Ed 1986;12:1.

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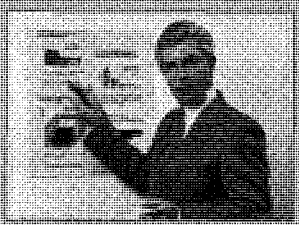

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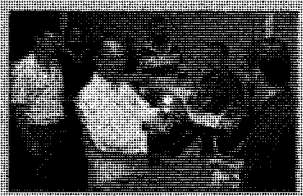

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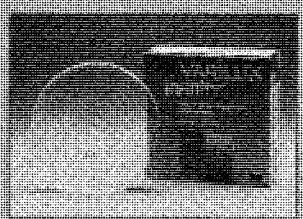

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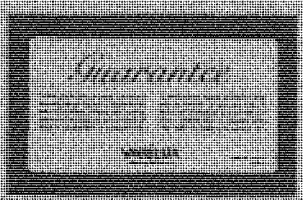

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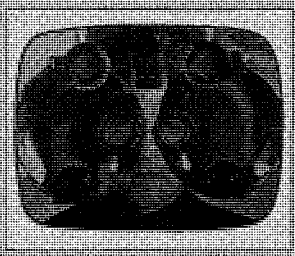

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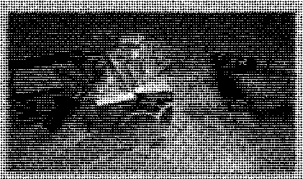

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