RE-VISIONING OPTOMETRY: AN INTRODUCTION TO Systems Theory & Implications For Behavioral Optometric Pratice

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Abstract

The professional role of optometrists is changing. Part I of this article introduces systems theory as a useful tool for dialogue concerning the present and future state of the profession. A systems model representing a generic example of optometric practice is developed. Part II discusses the changes in systems of optometric practice oriented towards the goal of best visual acuity. These systems are becoming more mechanistic with more narrowly defined roles for staff, technicians, and optometrists. Optometrists are increasingly identifying themselves professionally within the ocular health evaluation component of these systems. Behavioral optometry, primarily concerned with best visual performance, is dependent upon a therapeutic relationship between the professional and patient. It is becoming difficult to integrate the therapeutic relationship within the increasingly mechanistic systems of optometric practice. Alternative systems of behavioral optometric care are needed to complement the changes taking place in optometry and help preserve the full scope of the profession.

Keywords

systems theory, primary care optometry, behavioral optometry, practice management, professionalism, visual acuity, visual performance, therapeutic relationship

The profession of optometry is changing. Optometrists are now licensed in virtually every state to prescribe ocular pharmaceuticals. Refractive surgery is becoming more commonplace. Managed care plans are requiring optometrists to see a greater number of patients for reduced fees. These are just some of the ways the profession has changed over the past decade. Of course, social and economic change is always taking place; change in itself is neither good nor bad, but the direction change takes has always come under question. From a narrow perspective one can provide cogent arguments for or against change in almost any direction, but these arguments soon break down as the complexity of the situation is uncovered. Any critical appraisal of a situation such as the changes taking place in optometry will be confronted with a complex web of interrelationships between social, economic, political, and environmental factors. Optometry should be diligent in its dialogue concerning the important issues that shape its future. Optometry should investigate contexts for such dialogue that respect the complexity of the issues in question and provide insights that can help shape the profession's future. One such context is that provided by systems theory.

Systems theory developed following World War II as a general intellectual movement closely related to cybernetics, information theory, and operations research. A biologist, Ludwig von Bertalanffy, is usually given credit for the establishment of the movement through the publication of his book *General Systems Theory*[1] in 1968. Since then the principles of systems theory have been further elaborated and applied within diverse fields such as physics,[2] biology,[3] business,[4] education,[5] ecology,[6] and anthropology.[7] In short, systems theory concerns itself with the principles of organization within complex networks of interacting components. A set of elements are connected by such principles of organization to form a whole which manifests properties that cannot be found by examining a component part in isolation. Systems theory developed partly as a reaction against the reductionistic methodologies of scientists who attempted to explain a phenomena in terms of elementary components.

This paper will introduce the approach and terminology of systems theory by application of the concepts to a generic example of the modern optometric practice. The reader is encouraged to extend the approach, terminology, and concepts in an application more specific to his/her situation. For further reference concerning the systems approach applied to social organizations, the reader is encouraged to consult *Designing Social Systems in a Changing World*[8] by Bela Banathy, 1996, and *Introduction to Systemics*[9] by Gian-Franco Minati and Arne Collen, 1997. There are also many systems related world wide web sites on the internet.[10]

The important point of this example of systems thinking is not the individual components that are used to describe an

optometric practice, but rather the dynamic relationships between these components. This introduction will closely follow, in format and sequence, a work by Bela Banathy on systems theory applied to education.[5] First, a systems-environment model of an optometric practice will be presented. This discussion serves to differentiate the system in question from its environment. Next, a still-picture model describes the components of the system and their structural relationships one to another. Finally, a motion-picture model provides a description of the dynamic relationships of the various components to each other as well as the environment; it is a model of the system in action. Once a systems model of the optometric practice is developed, some implications of the model will be discussed in relation to the future of behavioral optometry. To aid the reader in recognizing terminology commonly used in systems theory, the first occurrence of a word common to systems theory will be italicized.

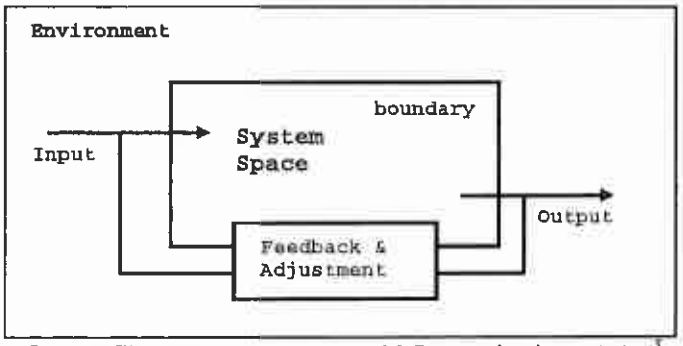

Figure 1. The systems-environment model. Reprinted with permission.[5]

A SYSTEMS-ENVIRONMENT DESCRIPTION

The first step in building a systems view of an optometric practice is to differentiate between *system* and *environment* (see Figure 1). The environment is everything except the system in question. It includes everything that affects the system or is affected by the system. The system is a whole that emerges through the interaction of a multitude of components. A *systems-environment description* specifies the *boundary* that separates that of the system from that outside the system. To begin a systems-environment description of an optometric practice, the realm of the environment will be addressed first.

Many forces act upon the modern optometric practice but they are not usually systematically acknowledged or characterized by those people active within the system. The environment is *broad* and *open*; it represents a vast number of interrelated forces that potentially influence the system. It is not a well demarcated *suprasystem* since it is difficult to specify the boundaries of the environment itself. The list of possible environmental forces acting upon the optometric practice can become overwhelmingly complex; therefore, I am proposing they be classified into four major suprasystems. These would be the suprasystems of: 1) the patient, 2) the doctor, 3) socioeconomics, and 4) science & technology.

The Patient

Without the patient there would be no optometric system. The patient brings to the optometric practice the most relevant *expectations, demands, requirements,* and *resources* which collectively represent the most important environmental input to the optometric practice. Some of these inputs are as follows:

1. The patients' chief complaint is the main reason for seeking the system of optometry. They expect, demand, and require the optometric system to address this *need*. Some common complaints are listed in Table 1.
2. In addition to patients' chief complaint, they usually have some secondary complaints from Table 1. They would like these problems solved, but the problems are not sufficient in themselves to motivate them to enter the optometric system. Patients expect these issues to be addressed but may be satisfied if only the chief complaint is dealt with.
3. Patients come to the optometric system with prior experience in similar situations. These experiences set up expectations as to the style, sequence, and procedures they will encounter.
4. Patients come with economic expectations, requirements, and resources. They may have only a limited amount of money to spend on a new pair of glasses. They may, or may not, have an insurance or vision service plan.
5. Patients come with demands for services and products they have learned about through friends, relatives, and/or the media.

Table 1
Common Chief Complaints

- Blurry vision / "weak glasses"
- Needing new glasses / glasses too old or broken
- Wanting contact lenses / replaced or new
- Routine or required / no other complaints
- Red eye
- Painful eye
- Something in the eye
- Bump in or around eye
- Light flashes or floaters
- Double vision
- Eyes appear to cross or turn out
- Itching eye
- Watering or dry eyes
- Headaches
- Tired eyes with school or work
- Poor school performance
- Referred by another professional / not sure why

The Doctor

The doctor is both part of the system and part of the environment. As part of the environment, the doctor brings to the optometric practice expectations, demands, requirements, and resources. Much of what the doctor represents has developed outside of the optometric practice. The doctor's personality and professional training were all acquired before he/she became a part of the optometric practice. The doctor, therefore, brings input to the system that will shape how the system operates. The doctor will have his/her own set of expectations, demands, and requirements, such as:

1. A personality which will place expectations upon how the system should function. For example, some doctors may prefer a jovial, laid-back, practice atmosphere while others prefer a business atmosphere.
2. A professional internalized code of ethics which will specify proper doctor/patient relationships and expectations for how patients are to be greeted, communicated with, and serviced.
3. Knowledge and experience of the profession which will create a set of requirements, according to the doctor, for the professional servicing of his/her pa-

tients. This would include which tests and sequence the doctor feels most appropriate, along with particular treatment protocols. It also includes what the doctor perceives as professional tasks to be done by him/herself, and what is technical and can be delegated.

4. Economic demands for an acceptable level of income from the system.
5. Time demands for an acceptable balance between professional and personal time.

Socioeconomics

Social, political, and economic factors also play an important role in shaping what form the optometric system will take. Socioeconomic expectations, demands, and requirements include:

1. **The public perception of eye care.**
   The public will have expectations for the proper time and place for eye care. These expectations are developed primarily through media and word of mouth.
2. **Social forces close to the doctor.**
   These forces are the doctor's professional peers who also have opinions and expectations as to the proper place and time for eye care.
3. **Political input from professional associations, state boards of optometry, and government regulations.**
   These factors will specify what can and cannot happen within an optometric practice. Some states, for example, allow optometrists to prescribe oral medications, others only allow topically applied medications. Regulations and requirements set the standard of care and demand the doctor perform certain tests in certain situations.
4. **National, state, or local economic health.**
   Economics shape the make up of the optometric practice. Some pieces of equipment are very expensive, such as a visual field tester; not all practices can afford such instruments. On the other hand, social and political forces say visual field testing is standard of care for certain situations. The economic resources of the population served will also shape the level of service and products a practice can provide.
5. **Health maintenance organizations and managed care groups.**
   These organizations place both political and economic demands upon the optometric practice.

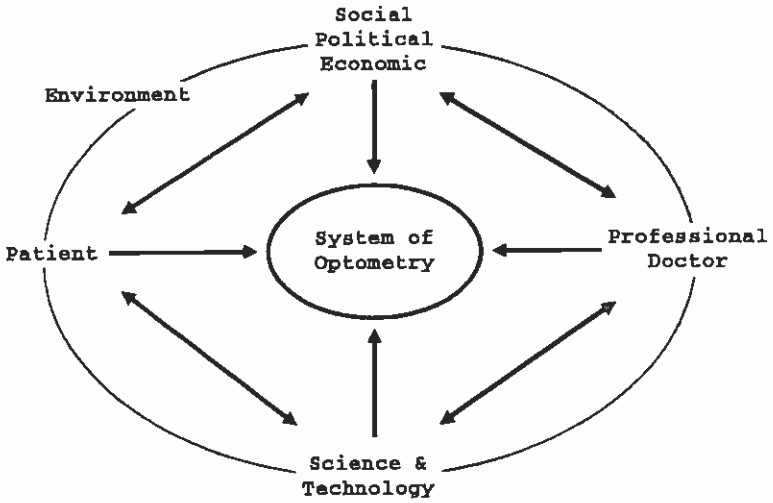

Figure 2. The environment of the optometric system.

Science and Technology

The sciences, such as visual science, clinical science, or computer science, are always making advances. Discoveries and inventions place new expectations, demands, requirements, and resources on the optometric practice:

1. Visual science research brings a better understanding of normal and abnormal functioning of the visual system. When this knowledge is transferred to the doctor and optometric practice it may demand changes in the procedures, diagnosis, and treatment of certain conditions.
2. Clinical science research brings new diagnostic and treatment methods that might prove more effective than the previous methods. This information can lead to new demands and requirements for new techniques.
3. Most modern optometric equipment is computerized in some way. Advances in computer technology allow for testing that was not feasible in the past. It also reduces some tasks that were once considered professional so they can be delegated to a technician. Advances in these areas place new expectations and requirements on the optometric practice.
   a. Office management technology such as fax machines, copiers, and computers are constantly being updated.
   b. Billing practices and banking services are moving towards an electronic media. More and more financial transactions with patients and insurance plans will be paperless.

A SYSTEMS-ENVIRONMENT MODEL

A good way to conceptualize these suprasystems would be to view them as four major directions of input into the system of the optometric practice. Figure 2 is only two dimensional, so it does not represent the true interaction among the suprasystems. Picture it as three dimensional, with all four suprasystems equidistant from each other and equally interactive. This would be like a methane molecule, with a carbon atom and four hydrogen atoms surrounding it. In fact, the methane molecule is a good metaphor because, in reality, the hydrogen atoms are spinning around the carbon atom. In the environment of the optometric practice the four suprasystems are very interactive and spinning around the practice. The borders separating these four environmental suprasystems are broad and open, and any particular system input from the environment might easily be classified in more than one of the environmental classifications.

BOUNDARIES

So far, I have presented an overview of the environment of which the optometric practice is a part. In Figure 2 the optometric practice was symbolically represented as an oval with all the environmental influences impinging upon the system. Now we will consider the *boundaries* that separate the optometric system from its environment.

A simplified conceptualization of the optometric practice boundaries would be to consider them constituted by the physical dimensions of the optometric practice itself. When a person is within the walls of

Table 2
System-environment boundaries, and stimuli for the recognition of the optometric system

- The physical practice, such as seen from the road
- All listings of the practice in official registrations, associations, or mailing lists
- The telephone book, such as a yellow page advertisement
- A newspaper or newsletter article or advertisement
- A radio/television interview or advertisement
- A presentation given by the doctor or staff at some function like the Lions Club
- "Word of mouth" (good and bad) from former patients or gossip
- Referral sources such as other professionals

the practice, they are within the system; when they are outside, they are within the environment. However, in order for the optometric practice to have any existence as a system within the environment, it must be recognized, from the perspective of the environment, as a means to an end. Otherwise, no one enters the system and no interaction between the environment and system occurs; the system will dissolve. Therefore, the boundaries of the practice go beyond the physical. The boundaries encompass all forms of stimulation that the optometric practice provides to the environment. If the practice runs a newspaper advertisement and any person looks at that ad, then that person is entering, in a manner, the system of the practice. If the practice doctor travels across the country to a conference, then he/she becomes a representative of the practice, and environmental information can affect the practice through the doctor. Table 2 lists some of the obvious boundaries of the optometric practice within its environment.

When a potential patient develops one of the chief complaints listed in Table 1, he/she will initiate some sort of search for an eye care practice. The stimuli at the system-environment borderline will be the "lures" that will attract (or repel) the potential patient entering a particular optometric practice system. When a potential patient interacts with one of these stimuli and is motivated to act upon it, by calling or entering the practice, she has crossed the borderline and entered the system.

OUTPUT

The practice's outputs are the results of the processes that take place within its boundaries. Since the patient entered the system with an expectation and need that was formulated within the environment, it is hoped that the system fulfills the need. However, output involves more than just the satisfaction of the patient's expectations and needs. It may involve the satisfaction of the doctor's needs, socioeconomic needs, or science and technology needs. For example, when patients enter a practice to obtain a new pair of glasses, they also leave with dilated pupils. The doctor is responding to political and science inputs by using pharmaceutical agents to dilate the pupil in order to more thoroughly evaluate ocular health. Many patients accept this but would be as satisfied if the new glasses were provided without the additional testing. Thus, when the patient is happy, the social and political forces may not be, and this can have repercussions for the continued existence of the practice. The patient's satisfaction is just one part of the output of the practice.

Another significant output is the financial reward of the system to the doctor and employees of the practice. Satisfaction of the patient's needs is not the only goal of the practice but is the means for the continuation or growth of economic rewards. The doctor could be practicing state-of-the-art, performing high quality eye examinations, but not charge enough to pay the overhead. While patients may love such a practice, since they receive so much more than they expected, the economic requirements are not being met and the practice won't endure. Conversely, a doctor could be performing poorly, such as not evaluating eye health, but still have many satisfied patients because they obtain their glasses quickly and cheaply. Economically, such a doctor might be doing very well, but could, because of missed pathology, encounter a massive malpractice suit. Therefore, maximizing economic reward or producing patient satisfaction are never in themselves the sole output of the system. Output involves multiple factors in the same directions as the input; the patient, the doctor, socioeconomic, and science & technology.

FEEDBACK

All of the inputs from the patient, doctor, socioeconomic, and science & technology will stimulate *positive* and *negative feedback loops* that will establish the balance and vitality of the system. When any single factor is emphasized over and above other factors, such as economic reward, there may be a short term increase in the performance of that factor. However, this is at the expense of other factors and can eventually lead to the termination of the system.

When the system's output is different from environmental expectations, either the system has to change its output or the environment has to change its expectations. In the first case, feedback will result in an *adjustment* of system operations to more closely meet the environmental expectations. If, for example, an optometric practice has many patients returning their glasses because of inaccurate optics, the practice may *adjust* by switching to a different optical lab that has better quality service. On the other hand, if the poor accuracy is a result of the doctor's poor refraction skills (and the doctor thinks he/she is doing an excellent job) it might be much more difficult to make the adjustment. In this case, if the system does not adjust, the environment will *accommodate* the system to some extent. This will happen when the patient base dwindles or tends to become "easy to please." This type of optometric practice is more likely to survive in a bigger city since the environment is more *accommodating* to differences compared to a small town.

To summarize, the systems-environment discussion has described some of the characteristics of the external environment of the optometric practice, the borders that separate the system from its environment, and the input and output relationships across these borders. The importance of feedback between the system and its environment has been stressed as one of the factors that define the system in relationship to its environment.

Now I will discuss the system itself in more detail. Two approaches to modeling the system will be presented. The still picture description will highlight the components of the system and their structural relationships, and the motion picture description will highlight the activities and operations—the dynamic relationships—of the system in action. However,

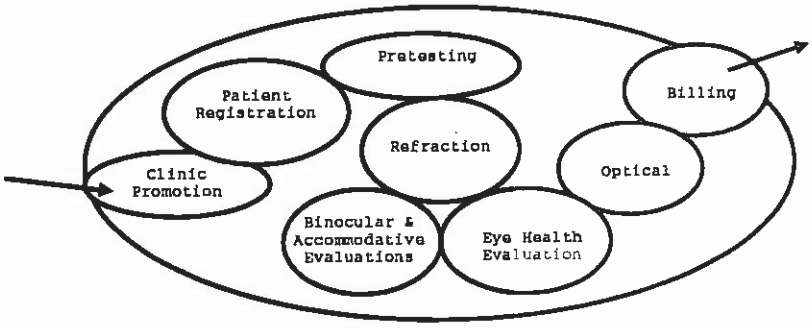

Figure 3. Components of the optometric system.

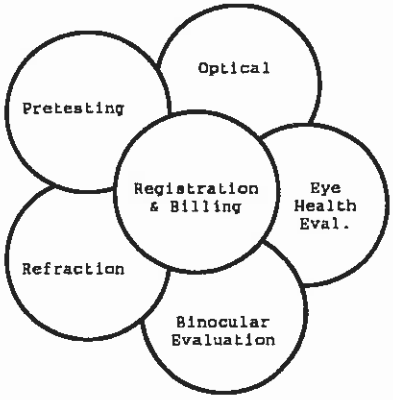

Figure 4. Viewing the relationships between components.

no single system model is descriptive of all optometric practices. The model described here is a generic example of a practice engaged in what is commonly called primary care optometry. In Part II. this model will be critically evaluated, in terms of behavioral optometric care, and alternative systems will be proposed.

A STILL PICTURE DESCRIPTION

In building a still picture description of an optometric practice the system is divided into a set of *interrelated components*. The components are primarily determined by the *goals* and *functions* of the system. Goals are the system's response to *needs* within the environment. Probably the most common need encountered in the environment of the optometric practice is blurry vision. Since there is a way to satisfy this need, there also exists the *requirement* that a system be established, such as the optometric practice, that will function to meet the needs of patients for clear sight. The need of the environment, therefore, becomes the goal of the system, which specifies the functional components that are necessary to the system. Since the goals of an optometric practice emphasizing treatment of ocular pathology may be different than the goals of a practice emphasizing developmental needs, the structural components of these two practice systems may be very different.

In this generic example of optometric practice patients enter the practice system through a process of registration and exit the system through a process of billing. This registration/billing component may not be directly related to the satisfaction of the patient's chief complaint, but is necessary for the continued economic and legal vitality of the practice. Patients often proceed from the component of registration to a component of pretesting. This usually involves the patient being brought to an examination room by an assistant to record case history and visual acuities. The doctor enters the room and the component changes. The doctor performs the refraction, binocular, accommodative evaluations, and eye health evaluation, writes a prescription, and escorts the patient to the optician. The optician, the next component, helps the patient choose a frame and lens, then sends the patient back to the billing component where fees are collected (see Figure 3).

Another component of the system is the outreach of the practice into the environment, such as advertisements, media coverage, word of mouth, etc. Patients who leave the office with their needs satisfied may still be part of the system as they inform friends and relatives about the practice. This works against the practice when a dissatisfied patient leaves and spreads the word.

Equally important as the human resources are the material resources such as equipment and space. Different needs such as poor vision, ocular disease, or functional problems, require specific equipment that not all offices contain. Some offices do not meet the needs of patients who come for treatment of ocular disease since they lack the proper equipment for diagnosis and treatment. More often, offices lack the space, human resources, and equipment to properly handle vision therapy and other functional and developmental needs of patients.

A STILL PICTURE MODEL

The previous conception of the optometric components does not emphasize the fused-state of many of the components and subsystems that are involved within the system of the optometric practice. Both registration and billing are often performed by the same staff. While they can be thought of as two separate subsystems, it is also possible to imagine them as an integrated subsystem through which patients enter and exit the main system. The other components of pretesting, refraction, binocular and accommodative evaluations, eye health check, and optical can also be merged closer together since often there is considerable exchange between these subsystems. The optometric practice system can be visualized graphically as a set of spheres representing each of the components mentioned above. Five of the spheres—pretesting, refraction, binocular and accommodation, eye health, and optical—form the foundation on which sits the fifth sphere—registration and billing. The two dimensional nature of Figure 4 captures the model to some extent but it must be visualized as three dimensional. Imagine it as a pyramid, or an iceberg; the high point of this system model is the beacon that attracts patients to the system. They enter the system and descend into the main operation center where they may go back and forth between components until finally they ascend again through the tip and become part of the beacon as they leave the system (making it shine with a green light, "come on in," or a red light, "stay away").

A MOTION PICTURE MODEL

This model considers the dynamic aspects of the optometric system.

Input Operations

Before patients enter the system they must recognize that it has the potential to meet their specific needs. If the system is not sending signals out into the environment, there is no way for the environment to recognize the system and send back patients. Some examples of the signals that an optometric practice sends out to the

environment were listed in Table 2.

When potential patients first hear or view something concerning the practice, they are entering the *interaction operations* of the system. Based upon the information in the signal, certain potential patients might be attracted to further enter the system while others may decide the system is not appropriate for their needs. For example, imagine the optometric section of the yellow pages. There are two large ads, one that says; "Eyeglasses and Contacts," the other says; "Eyeglasses, Contacts, and Eye Disease Treatment." The potential patient has a red eye. Both doctors actually treat red eyes, but the patient picks the second doctor because the ad mentions eye disease whereas the first doctor's does not. In the second doctor's ad, the signal was stronger, or tuned more closely to the needs of the patient. The first doctor didn't get the patient because he/she didn't send the proper signal. If, on the other hand, the first doctor does not diagnose and treat eye diseases, then his/her ad is working very well at limiting the input to his/her system to more appropriate patients.

There are many more inputs to the system of optometry than patients alone. On a larger scale the system has to be open to other kinds of input. Input from the doctor, socioeconomic, and science and technology all provide pressure to the system for change. The system needs to *receive, decode*, and *verify* these signals. In the interaction operations, nothing will happen to these signals other than the awareness or unawareness of their presence. Feedback involves the clarification or amplification of weak or noisy signals to the point of awareness and acknowledgment.

Once the patient decides to contact the optometric practice as a result of the interaction operations, the patient then enters the *identification operations*. Most often, this involves a phone call to make an appointment. The receptionist should evaluate the needs of the patient and identify the appropriateness of the system to the patent's needs. If this is not done, it is possible that a patient could arrive at the optometric office with an earache. He/She may have seen or heard the word "doctor" in an ad and assumed that all doctors treat an earache. It is possible that the expressed need of the patient does not fall within the professional scope of the doctor; such as "I want to know if my kid has dyslexia." If the receptionist says, "Well, the doctor only tests eyes; we don't test for dyslexia here," then the patient may say "Oh, OK, thank you," and hang up. In this case no feedback has taken place. The receptionist completed the identification process from one sentence spoken by the potential patient. If, on the other hand, the receptionist *probed* more deeply into the patient's needs, the question the potential patient is asking could be rephrased as, "My kid is having trouble reading. I want to make sure a vision problem is not contributing to his reading difficulties." This is within the professional scope of the optometrist, and the patient can be scheduled for an appointment.

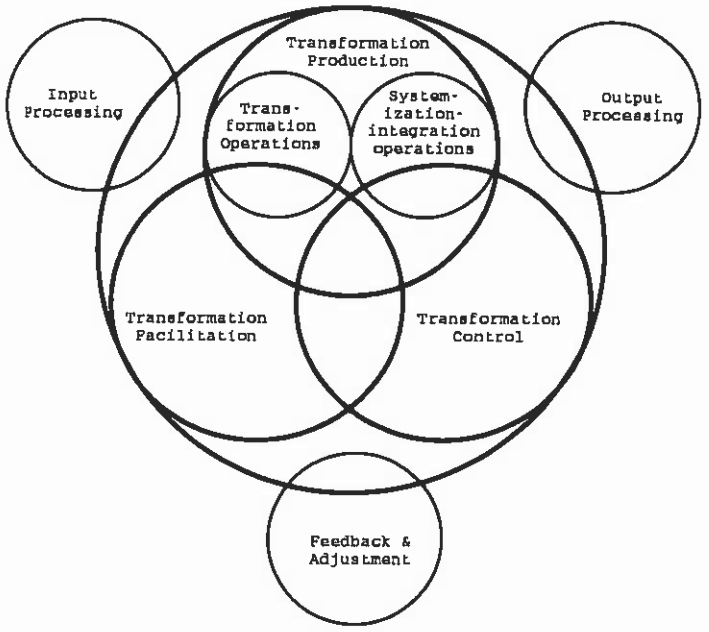

Figure 5. The Transformation Model. Reprinted with permission.[5]

For the other inputs from the doctor, social, and science directions, the interaction operations bring concerns or environmental feedback to the surface. Identification operations process these signals and evaluate them. The signals are either going to change the system in some way or create a negative feedback event for the purpose of maintaining stability. For example, imagine that patients perceive the doctor's optometric equipment to be very old and outdated (even though to the doctor it is still very functional). The feedback to the practice is very subtle, and it is up to the interaction operations to acknowledge its presence; the doctor and staff might be oblivious to the subtle hints. Once it is acknowledged, the issue can be identified and evaluated. The doctor can either *adjust* the system by updating the equipment, or try to *accommodate* the environment by saying things like, "They just don't make things like they used to." In this case the attempt is to balance the negative perceptions of the old equipment with positive suggestions.

The final part of input operations is *activation*. This process could be symbolized by the act of making an appointment. When the patient has made the effort to contact the practice, and the receptionist has identified the patient as appropriate to the system, the patient is given a time to actually move into the transformation process. Feedback at this point is the process of give-and-take in trying to find an appropriate time: "How about tomorrow at 1:00?" "No, I have another appointment then; how about 4:30?" "Yes, that will work; tomorrow at 4:30; see you then."

Transformation

The transformation of input to output takes place through the interaction of three important domains. *Transformation production* refers to the actual process of the transformation of input to output. T*ransformation facilitation* refers to the maintenance and energization of the system so that it can carry out the transformation process. *Transformation control* refers to how the system is monitored and adjusted to maximize the transformation process.

The motion picture model is meant to represent the dynamic nature of the system. It is difficult, therefore, to represent this model as a static figure. Nonetheless, Figure 5 may help in the organization of the transformation concepts presented here.

In terms of the modern optometric office, the process of transformation is usually set up in a sequential nature as was described in the still picture model (Figure 3). Most patients flow from registration to pretesting, refraction, binocular, accom-

modation, and eye health check evaluations, to optical, and finally billing. Transformation production, therefore, refers to this patient flow from beginning to end, with the end product being the satisfaction of input needs. There are other concepts relevant to transformation production. *Transformation operations* refer to the operations that relate directly to the satisfaction of needs; these are equivalent to the action of the doctor when refracting for a pair of glasses. But not all of the actions performed in the process of transformation are directed towards the patient's needs, such as the movement of the patient from one room to another. These actions, which are necessary for the overall transformation, are called *systemization-integration operations;* they assure a smooth flow from beginning to end. While patient registration is not directly related to the goal of providing the patient with a pair of glasses, it is directly related to other goals such as the economic and legal vitality of the practice. Systemization-integration operations assure that the various goals are processed in an efficient and smoothly integrated fashion.

Transformation facilitation refers to the support subsystems that keep the system going. Most of the system's functions depend upon human action. This action is connected to an economic incentive, so that the energy comes to the system in terms of the trade of human services. Patients come to the system for human services that they cannot provide themselves. They provide economic compensation in exchange for the services the system provides. These economic resources are then distributed among the employees of the system, and will allow them to go out into the environment and trade for other services. If there were no economic compensation for staff services, the system would not last long. The bookkeeping activities, therefore, serve as an important *transformation facilitation* process. Other facilitation operations include maintenance of the proper equipment and inventory, cleaning and janitorial activities, scheduling and time management activities.

The process of transformation doesn't always flow in a predictable manner. There are many things that can happen that will disrupt the smooth flow through the optometric practice. For example, if the doctor gets into an extended conversation with a patient, suddenly there is a "backup" of patients. *Transformation control and adjustment* processes will have to be initiated in order to try to reestablish the proper transformation production. This might involve the doctor being "beeped" by the front desk in an attempt to communicate that other patients are waiting. Sometimes emergency patients come to the office and have to be squeezed into a very busy schedule. Transformation control and adjustment will attempt to make this happen with the least disruption to the standard flow. Transformation control also represents the processes of monitoring the transformation operations to assure that needs are being met. For example, if a patient seems unhappy about some part of the process, the staff should address the issue and try to resolve it before pushing the patient forward to other components.

Output Operations

Most optometric practices have an implicit idea or model of the satisfied patient leaving with a new pair of glasses or contacts. But, few practices have an output system that compares actual patient impressions with the model. After the patient receives the new glasses or contacts, and has paid his/her bill, he/she usually leaves the office. For some practices this is equivalent to the patient leaving the system. However, as previously discussed, the true boundaries of the optometric practice include the stimulation through "word of mouth." Patients leaving the office are going to talk to friends and relatives about their experience; therefore, they are still part of the system, even though they have left it physically.

An important part of the optometric system should be *output operations* ("output processing" in Figure 5) and *feedback and adjustment*. Evidence should be gathered in some manner to provide a way to compare the actual impressions of patients after they have left the office with the ideal model of the satisfied patient. This might involve a telephone call to the patient a week or two after receiving new glasses. If the patient is satisfied with his/her new glasses, this information will assure that the practice has done a good job. If the patient isn't satisfied with his/her new glasses then the problem can be addressed and adjustments made before the patient begins informing others about the poor job the practice did.

Another important area of output operations is to gather evidence from the community of its awareness and perceptions concerning the practice. Since opinions about doctors' offices travel well through communities, the results of the output of the practice could be evaluated by analysis of the common perceptions of the practice. If nobody has heard of the office then possibly more advertisement is necessary. If a large percentage of people have positive things to say about the practice, it may reinforce the maintenance of certain procedures that might have been otherwise dropped out of ignorance of their benefits. If there are specific negative points coming out of such a survey, then an adjustment of the system can be designed to eliminate the production of such a perception. Often, practice management consultants or other professional service providers are able to perform the community surveys and research.

This completes the description of the optometric practice from a systems approach. It is a generic description; not all practices function in the same manner presented. The important point is to begin to focus on relationships between components of the system and its environment, rather than the components themselves. Next, I will use these systems concepts in a discussion concerning the future of behavioral optometry.

PART II
OPTOMETRY'S IDENTITY CRISIS

A recent contact lens ad,[11] in the form of a poster, reminded optometrists that most patients come to their offices with a specific need; the ad said, in large letters: "YOUR PATIENTS JUST WANT BETTER VISION PERIOD." The ad went on, "My doctor recommended torics to correct my astigmatism. The fitting was QUICK and EASY and my vision is so much better. Now I can concentrate on more important things.... DON'T COMPLICATE MY LIFE!" What does this say about the public perception of eye care?

This ad suggests the patient was distracted by poor visual acuity and sought optometry to remedy the problem. This ad sums up a common public view of optometry. For the most part, the need for optometry is aroused in people when they experience poor visual acuity; and the success of eye care is often considered a quick and easy return to the ideal of 20/20. Glasses and contacts are simply a neces-

sary means to achieving this goal.

Most optometrists have had the experience of patients who, immediately after refraction, start to leave the chair. And the optometrist has to say, "Hold on now, I need to evaluate your eye health." The patient acquiesces; but, in his/her mind, the exam is already done; the eye health examination is just to please the doctor. If the exam had ended after the refraction, many patients would feel their needs had been met. Most patients do not relate the eye health evaluation to their primary need of solving blurry vision problems.

A recent article in *Optometric Management*, on the topic of remote controlled refraction, reports on the experiences of Dr. Glenn Seifert.[12]

> *He had reached the point where he was unable to see more patients than the 20 to 30 per day he was seeing. Even at that pace, though, Dr. Seifert, a 20-year practitioner from Hamptom Bays, N.Y., still wasn't keeping up with the volume demands managed care had placed on him.*

If the primary patient need is sharp sight, and refraction to best visual acuity is the way to provide it, then Dr. Seifert's problem can be solved by giving patients the needed refraction in less time. Remote controlled refraction, performed by a computer and a technician is one way to provide more refractions in less time. When the doctor arrives, not only has the technician completed the case history, acuities, and current Rx determination, but the refraction is complete too. Dr. Seifert, however, is not comfortable having a technician refract. He says: "I'm still not comfortable having a technician refract...but I am comfortable in speeding up the refraction."[12] Why does Dr. Seifert cling to his role as refractionist when it can be easily delegated? With these new instruments, and the goal of reaching best corrected visual acuity, it is easy to refract; it could be conveniently delegated to a technician. The phoropter, however, has symbolized our profession for many years. Most pictures of optometrists have a strategically placed phoropter next to one shoulder. It is a magical machine that solves the problem for which the public seeks eye care. What would patients think if a technician performed the refraction? Would the patient perceive the optometrist as obsolete?

Within our profession, many optometrists are practicing with a "20/20 is enough" paradigm, because that's what the public wants. Ophthalmology has technicians refract, why not optometry? Is it because optometrists don't want refraction to lose its professional image? If technicians refract, it becomes a technical skill, and is no longer a professional skill. If optometry has defined itself professionally by refraction, it is easy to understand the reluctance of optometrists to reduce it to a technology.

What makes a profession? A profession requires perception and wisdom gained through experience. There's not much professionalism left in today's version of 20/20 refraction; if refraction is so easy, then it really isn't professional; it is only technical. So, in response to the dwindling professional image of refraction, optometry has sought to be challenged by "something" else that causes a decrease in sight, "something" that requires a great deal of perception and wisdom gained through experience to diagnose and treat. That "something" is ocular disease and pathology. Optometry has begun to define itself as a profession that diagnoses and treats sight-threatening pathology. Pictures of optometrists are beginning to appear with the slit lamp or binocular indirect ophthalmoscope to the side.

Other components of the system of optometry have been changing too. Who spends time with the patient to determine the style, materials, and type of eyeglasses that are best for the patient? Not the optometrist anymore. This has been delegated to opticians and assistants. Who takes the case history and entrance skills? Not the optometrist anymore. Does a doctor need to develop a rapport with his/her patients, or are a few yes/no questions to confirm a specific pathological diagnosis all that is needed? More and more aspects of the examination are performed by computers and technicians. And what about the eye health evaluation that is defining the profession these days? Is it the reason, or the need, the patient comes to the office with? Well, "I just want better sight, Doc, period. Don't complicate my life." This is the impetus stimulating opticians to seek refracting licenses. They know what people want and seek to provide it. And what is optometry's argument against optician refraction? Eye health and pathology.[13] The eye health evaluation may warm the professional heart of today's optometrist, but for most patients it's not why they're sitting in the chair.

Table 3
Reasons for optometric care

1. Poor vision
2. Ocular disease
3. Functional problems
4. Cosmetic desires
5. Impaired visual development

A CHANGING SYSTEM OF OPTOMETRY

The result is the public environment imposing needs for clear sight upon the system of optometry which is struggling internally to define its professional self in ways which are incongruent with the imposing environmental needs. These needs are broadly categorized in Table 3. They impose upon the optometric system expectations, demands, resources, and restrictions. One of the primary expectations from the patient is "better vision...period," but the system must also respond to the expectations, demands, resources, and restrictions from science and technology, the doctor, and socioeconomic factors. The optometric examination goes beyond a simple satisfaction of the patient's needs through components, such as the eye health evaluation, that satisfy needs from other directions.

Changing environmental needs have demanded changes in the system of optometric practice. Refraction is becoming more of a technical skill than a professional skill. Socioeconomic factors have demanded that optometric practices examine more patients for lower fees. Technology has developed instruments such as autolensometers, autorefractors, and remote controlled refractors that further simplify refraction for best visual acuity. This trend results in a reduction of emphasis within the component of refraction to equal the other technical components, such as registration, pretesting, optical, or billing (see Figure 6).

Since optometry's professional image cannot be maintained through an increasingly technical skill such as refraction, optometrists have begun identifying themselves professionally through the ocular health evaluation component. Ocular health evaluations are truly professional, since it takes a great deal of wisdom and experience in the diagnosis

and treatment of ocular pathology. In Figure 6, this is represented as an increased emphasis of the ocular health evaluation (highlighted).

The component of binocular and accommodative evaluations also remains a thoroughly professional part of optometry. It takes the wisdom and perception of experience to diagnose and treat binocular and accommodative problems. But, optometry has not identified itself professionally through this component in the same way it has through the ocular health component. Moreover, binocular and accommodative issues have increasingly been neglected, as the optometric system responds to the socioeconomic demands to see more patients for less pay. Figure 6 represents this increasing de-emphasis through the faded representation of the binocular and accommodative evaluation component.

With the de-emphasis of this component, and the technical demotion of refraction, the ocular health evaluation has become the one component in the modern optometric system that has remained truly professional. All of the other components have been delegated to technicians or neglected. Again, the eye health evaluation is where optometry is presently defining itself, but the eye health evaluation is not directly related to the common need that causes patients to enter the system—to attain clear sight through glasses or contacts. So, without disrupting the satisfaction of most patients, the ocular health examination and binocular and accommodative evaluation could be squeezed out of the system, thus eliminating optometry altogether (see Figure 7). If it were legally possible, a health care system such as an HMO might welcome such a technician-based system of providing for the public's optical needs. Ocular pathology and health prevention could be integrated into an alternative system such as outpatient health care, staffed by physician assistants working under a group of specialist physicians who deal only with the complicated cases (optometry included?).

While this scenario is unlikely because of optometry's present legal and political environments, it does raise an important question for the profession: what can optometry do to prevent movement towards this possibility? Movement towards more mechanistic systems based upon principles of mass production may be inevitable,

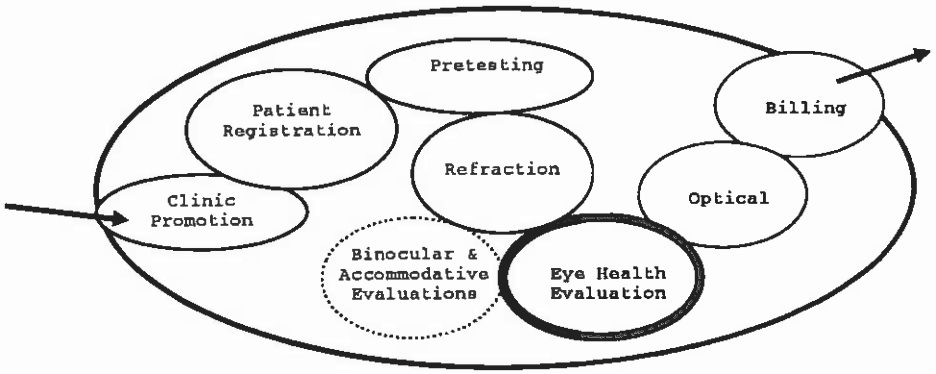

Figure 6. A changing system of eye care.

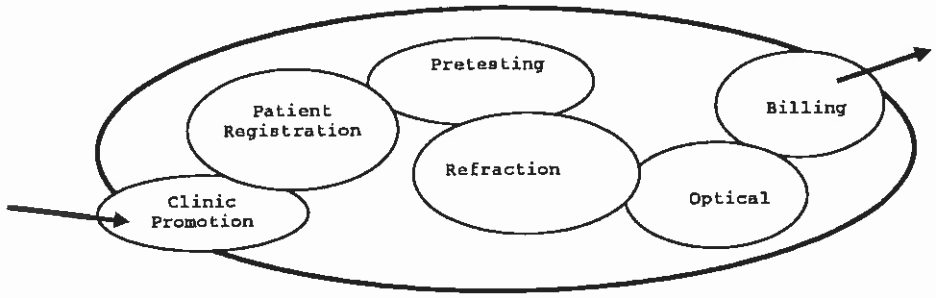

Figure 7. Technician-based eye care.

given the present socioeconomic demands from the larger health care suprasystems. This movement itself should not be feared; it is simply the development of one type of viable system to meet public needs. What should be feared is the narrowing of the professional scope of practice so that the only viable systems are mechanistic with limited and redundant roles for the optometrist. A new optometrist should be able to choose a career within one of many viable systems of optometric care, rather than be limited to a narrow role within a mechanistic system. Optometry needs to open its eyes to human needs. Humans need more from their vision than acuity and it should be optometry's obsession to explore those human needs and design viable systems to meet them.

THE BEHAVIORAL OPTOMETRIC SYSTEM

A different system of optometry that responds to a different set of environmental needs could preserve much more closely the full scope of professional optometric activities. The key here is that this system would be responsive to a *different set of environmental needs*, not the same set of public needs that primary care optometry serves. This different system, therefore, would not be in competition with the primary eye care system. This different system is not new, it has been with optometry for years; it is behavioral optometric care. Behavioral optometric care addresses a different set of needs which are summarized in the College of Optometrists in Vision Development (COVD) vision statement.

> *In a world of ever-increasing technology and visual demands, where productivity, life-long learning and quality of life are dependent upon full visual function, the College of Optometrists in Vision Development exists to ensure that everyone in our society receive quality vision care, including that required to develop binocular vision and visual information processing critical for maximizing human potential.*[14]

The need that the behavioral optometric system responds to is not "I want better sight, period," but, "I want to maximize my human potential." In the standard view of best visual acuity, no human action is necessary to reach an end point; the patient does not even need to respond. The eyes are considered strictly from a physical and biological perspective with mathematical formulas and laws that are able to neutralize refractive error by computer. Correction of refractive problems, then, becomes simply the technology of applying the

physical formula. Refraction is easy because there is a clearly defined end point. In the system of reaching the best visual performance, on the other hand, the human element can't be ignored. Visual performance will depend upon a multitude of factors, not only physical and biological factors but also nutritional, binocular, accommodative, perceptual, cognitive, linguistic, and sociocultural factors to name just a few. Best visual performance does not have a clearly reached endpoint in the way best visual acuity does. The endpoint is an issue of quality rather than quantity. In this sense, best human performance can't be reduced to a technology but requires professional attention at all stages.

In order to reach the end point of best visual performance the behavioral optometrist must evaluate the patient's needs and environment through a comprehensive case history. If the patient's chief complaint is only weak glasses, then possibly the best visual acuity model of eye care is all that is needed. However, if the optometrist probes, he/she might find that underneath the need for sharper sight are other unmet needs for better visual performance in school or work. In systems language, it is part of the identification operations of the behavioral optometrist to make these needs explicit. If the chief complaint is performance related, or if probing rephrased the chief complaint into performance related needs, then the behavioral optometrist should develop a rapport with the patient to understand the patient's environment and visual demands. This human relationship between the patient and the doctor will be vital for the success of the system in meeting the patient's needs. If a doctor-patient rapport is not initially established, then success of the system further along is severely diminished. The case history, therefore, is a critical component that cannot be delegated or made into a technology. (It is also a time-consuming component that conflicts with the efficiency and productivity emphasis in many primary eye care systems).

Next comes observations of the patient in action. This may include, but is not exclusively, refraction. The important part is to observe how the patient performs in his/her current state under various conditions. Again, this is a professional component that requires a great deal of wisdom and experience in the choice of which tests and conditions are appropriate for a particular patient. It also involves, not simply a quantitative recording of "data points" but, more importantly, a qualitative or phenomenological recording of the patient's experience. Many tests that a behavioral optometrist will perform do not involve any instrumentation, but are simply observing the patient in action. Technology is useful in dealing with quantitative data; a psychometrist could be employed to gather a standardized set of data, and a computer program could analyze the data and make a diagnosis, but technology cannot substitute for the qualitative understanding of the patient that comes from the doctor-patient relationship.

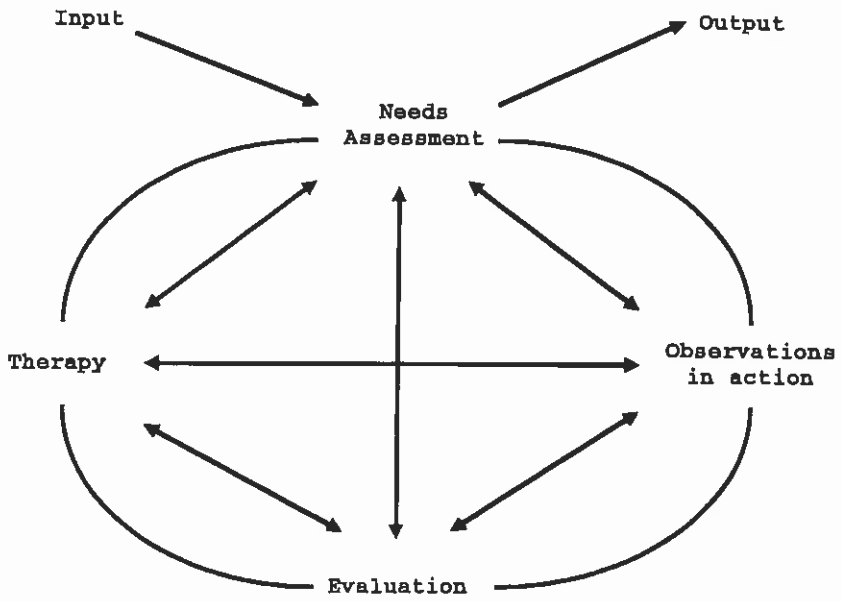

Figure 8. Behavioral optometric system of patient care: the therapeutic relationship.

From the qualitative and quantitative information, the doctor is then able to initiate an evaluative process. Evaluation is the term I prefer to use here since it stresses the qualitative nature of the process taking place. Another word, "analysis," which is often used to describe a similar process, stresses a quantitative approach or formula for success. Evaluation suggests that the doctor places a human value on specific observations and experiences with the patient. Through a process of discrimination or perception, the doctor is then able to organize the multitude of possible factors that are impacting the patient's performance. From here, the doctor can propose a therapeutic approach that will address the factors which have been uncovered. This approach may involve ophthalmic lenses and/or vision therapy.

The process, however, has only just begun. Once the therapy is initiated, the whole process provides feedback to the beginning. Now the patient is in a different situation which can be reevaluated. The history and rapport developed at the start continues to evolve; the doctor is constantly observing the patient in action. This feedback, from changes in therapeutic approach to changes in performance is then evaluated again, with modifications made to the therapeutic program as needed. Only after time do the doctor and patient reach the point of understanding where and how best visual performance is attained. And, if the patient/doctor rapport has developed the way that it should have, then both the doctor and patient will know when that time has come. This is a thoroughly professional process from beginning to end. Figure 8 graphically represents this system of professional rapport with the patient—the therapeutic relationship.

Compare Figure 8 with Figure 6. What is the difference? In Figure 6, the generic example of a common optometric practice, the optometrist's role is becoming more narrowly defined in the area of ocular health. This is happening because of environmental forces from patients, doctors, socioeconomics, and technology that demand the optometric system to see more patients for less pay. The primary care optometric system has responded to these forces by adapting its system into a sequential process of specialized subsystems allowing it to process best visual acuity needs in an efficient manner. The patient enters the system, travels through the various subsystems, each with their

respective technician or professional, and finally emerges with his/her best visual acuity or ocular pathology need satisfied. Throughout history, this assembly line approach to system design has proved very effective at mass production. The behavioral optometric system, as represented by Figure 8, is very different. It is a human system that emphasizes the relationship between the professional (doctor, therapist, or both) and the patient. The system is thoroughly professional; its effectiveness in managing best visual performance needs diminishes as soon as it is broken apart into subsystems. And, a system based upon a therapeutic relationship between the professional and patient does not necessarily need an elaborate office, fancy technological equipment, or a multitude of support staff. None of these guarantee a system of behavioral optometry. Without the therapeutic relationship, any fancy system of care for behavioral needs is unlikely to remain viable. A single professional can serve the various behavioral optometric system operations. One of the most effective means of interaction operations is public speaking by the professional provider. It is the professional who performs the identification operations to best identify appropriate patients. It is the professional who activates the patient. It is the professional who facilitates the process of transformation within the patient. It is the quality of the therapeutic relationship between the professional and his/her patient that satisfies the patient's needs.

This raises an important question. Can a system, primarily designed to serve the best visual acuity and ocular disease needs of people, simultaneously serve their best visual performance needs? This has certainly been the attempt on the part of the optometric profession. Most often, best visual performance and vision therapy needs have been addressed within the context of a practice system primarily designed for the satisfaction of best visual acuity needs. There are relatively few behavioral optometric practices that stand alone in addressing primarily vision therapy and best visual performance needs. With the socioeconomic, political, and science demands today, there is a growing divergence between the professional roles within systems geared towards the needs of best visual acuity and systems geared towards best visual performance. Since this divergence is likely to continue with

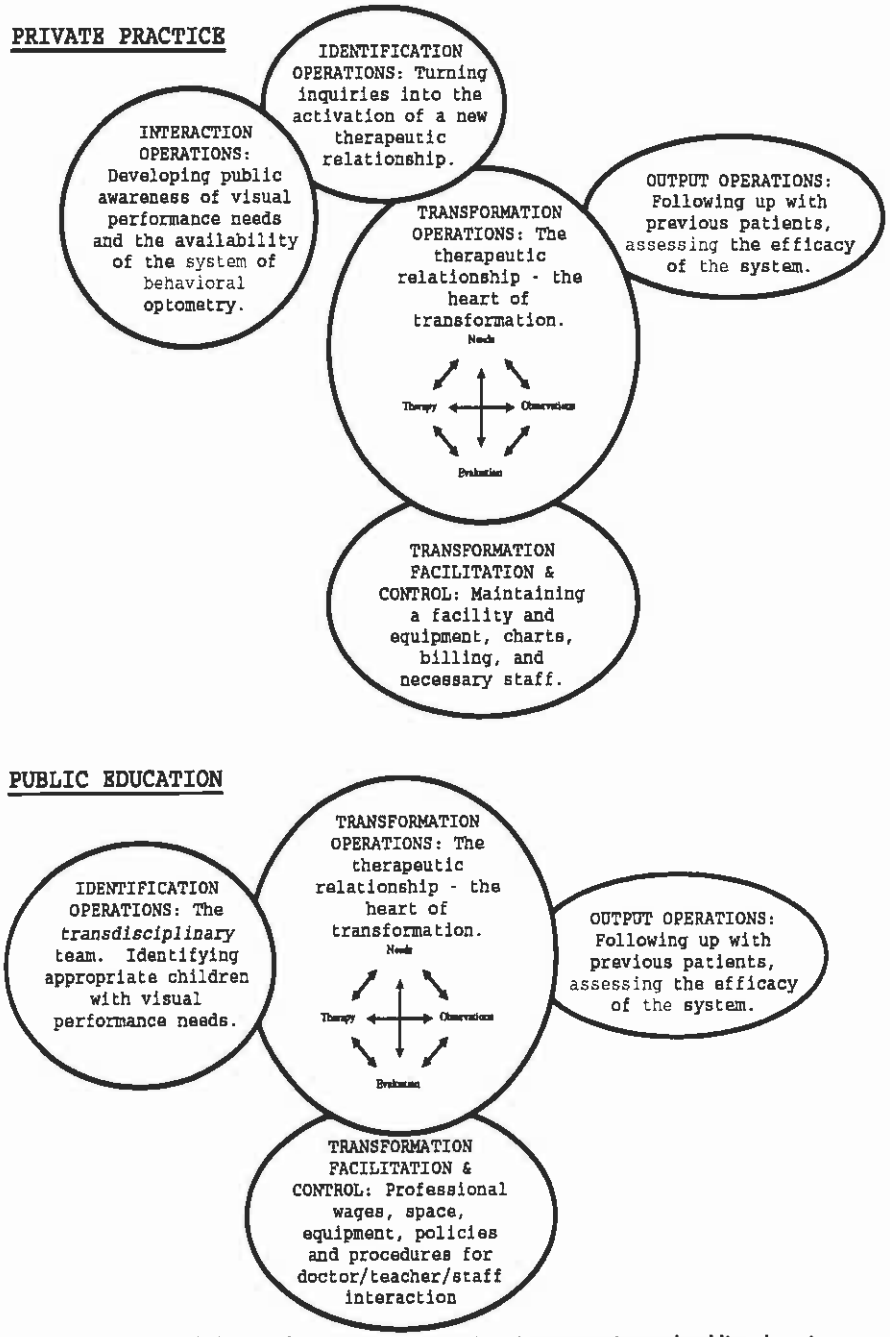

Figure 9. Possible behavioral optometric systems in private practice and public education.

the increasing development of the primary eye care concept, optometrists will have less time available, in such systems, for the establishment of the therapeutic relationship crucial to behavioral optometric care. Behavioral optometry will increasingly need to design and operate systems of care that stand alone in providing for the human potential and performance needs of people. The basic building block—the therapeutic relationship between professional and patient—could be applied in the design of viable systems within private practice, public service, education, or industry. A healthy variety of career options should be available for behaviorally oriented graduates of optometry schools.

In Figure 9, two systems, built upon the therapeutic relationship, are presented. These are only sketches; most of the details are left out of these system models. The first system is private practice. Unlike the generic system of optometry presented earlier, the various system components are performed by a sole professional or a professional with one or two assistants. The goal of the system is to provide high quality therapeutic relationships with a small

to moderate case load. Therapy typically involves one-two weekly visits over a period of months, in contrast to the high volume, short term, single visits of primary care optometry. This system model more closely resembles the system of practice of many professional psychologists.

The second example is public education. There are over 15,000 public school districts in the United States. As an example, visualize each of these districts employing optometrists in a similar way they employ speech language pathologists, occupational therapists, or psychologists. This would be an application of the system of behavioral optometry within the larger suprasystem of public education. Consider the potential impact for children's learning and development, and consider the impact on the profession of optometry that would need to grow by more than 50% to meet this need.

Conclusion

Behavioral optometry has a system which meets the human performance needs of people in a professional manner. It offers a means of reestablishing the professional scope of optometry that is currently being lost through delegation and disinterest. **But the system of behavioral optometry only functions if the public has a need for the services behavioral optometry can provide.** If people are not seeking to improve their visual performance, then there is no input to sustain a behavioral optometric system. Most behavioral optometrists have educated themselves and are aware of the tremendous need for improved visual performance in our communities, schools, and work. But with the public still saying, "Just give me better vision...period," and "Don't complicate my life," it demonstrates a basic lack of understanding of the potential for behavioral optometric care to simplify and improve lives. Without this public understanding there won't be much of a demand for a profession of behavioral optometry. Public education should be a number one priority within the behavioral optometry community today. The profession depends upon it.

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Date accepted for publication:
May 20, 1997