

ESSAY

VERGENCE AS A SELF PERCEPTION RELATIONSHIP FUNCTION

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Abstract

Vergence, perhaps more than other variables affects how one sees and provides the practitioner with insight into a patient's visual experience. People develop as individuals through their own perceptions. Visual function is an integral part of that perceptual function. It is my belief that vergence, as a function of the individual's visual perception, gives insight into their personality. One's relationship of himself to space and objects within that space is an indirect barometer to his personality. A lack of ability to control and manipulate vergence can compromise a patient's visual perception and can diminish her awareness of space.

My thesis is that, without efficient visual function to view the world properly both one's thinking and one's personality can be warped. This relationship between a patient's perception and her subsequent identity provides a valuable window for clinicians to view how patients react to space. How aware and connected one is to her visual space world can be witnessed through a patient's sense of self. I propose the ease with which patients convey this sense of self to others is also a measure of personality. The confidence projected can be, in part, attributed to the assurance that people have in knowing what is accurate and real within their space worlds. This paper will address and clarify this thesis.

Key Words

adapt, convergence, identity, illusion, perception, reality, relationship, self actualization

INTRODUCTION

A persistent clinical observation in my practice is how vergence behavior of the patient provides rich, deep insight into the patient's visual experience. Vergence function appears to reflect personality and may be used to potentially help patients understand their visual condition. I do not mean to negate posture, balance, visual-motor integration, accommodative and ocular motor skills. All visual skills can play significant roles in broadening the understanding of the patient's visual function. The purpose of this paper however, is to propose that vergence, as a sensory motor function, provides more than just useful information into understanding the patient. Vergence allows patients to understand the difference between their personal perception of space and the objective reality of space.

Vergence, of course, can be viewed merely as a simple physiological function. Such a view minimizes the potential that vergence can contribute more in-depth meaning to the clinician and patient. Vergence function may help clinicians answer some basic questions concerning our patients by understanding where the patient is in relationship to space. The complex interaction of the patient to the objects one encounters throughout that space can be observed through the vergence function.

Spatial Awareness

Kraskin¹ postulated three levels of commitment for one to feel secure interacting within a particular space. These levels are related to Skeffington's circles. The first level is a need to be aware of where we are (anti-gravity) followed by a second level indicating where it is (centering) and finally what it is (identification). My premise is that personality and behavior are complex interactions of the brain and body. The behavior of the visual system, particularly the vergence system, can give insight into the personality of the individual. I am also proposing a four layer model of understanding space that ultimately gives a person his sense of security, safety and personal understanding of self. This model is postulated to develop from both internal, innate psychological factors and external factors, the environment. The model focuses on the interaction of the "where" of the person in space.

The initial level of this model is that information is derived from basic monocular cues. These monocular cues are overlap and parallax, among others. The monocular cues provide valuable information about the "where in space," from a two dimensional (2-D) perspective.^{2,3} A second level, vergence is a binocular function. This brings a three dimensional (3-D) view that heightens our understanding of the "where in space" awareness.⁴ It offers more robust cues as to how the person is positioned relative to other objects within that space, i.e. the egocentric process. A third level (action) is added when one begins to interact with people and objects within space.⁵ The movement

gives understanding and meaning to the distances between one's self and the environment. The process allows recognition of how people and objects in space fit relative to the individual. The fourth and last level (emotional/psychological) is overlaid on the previous three.⁶ These four factors taken together allow us to better understand the patient.

The Impact of Vergence

With an understanding of these factors, we can begin to discuss how vergence information from the two eyes might impact and be impacted by the patient's behavior and personality. When the eyes are properly coordinated, vergence function gives specific information about our bodies and our relationship to space. The visual metrics of vergence function may be relatively simple to measure and understand, but simple does not necessarily mean unimportant.

Consider the world as a room. Our lives play out within the room's defined spatial boundaries. Even outdoors our ability to perceive, to move, to act in and have an influence is always bounded by some spatial limit; a distant horizon, a stand of trees, a rock ledge. There is always a boundary. If an object is outside the boundary, we do not physically perceive it. Now imagine that I have presented you with a photograph of a large room. It is a 2-D picture representing a 3-D room, the photographer's technique often replicates the effort of a monocular viewer attempting to see the 3-D world. The photograph on flat paper is a 2-D analog for our 3-D world. The flat representation of dimensional space in the photograph can serve as a helpful tool to understand our relationship to everything within the room. Mentally, look at everything in the photograph of this room - as if you just walked into it. Your brain processes a myriad of information about this place. Where am I in it? What are the boundaries? How far away are they? How close are the objects? How large are they, relative to me and my location? Am I safe here? Am I in danger? Do I have room to move?

The optometrist's insight into how a patient answers these questions provides the clinician with cues as to the perceptions of the patient. Data, both sensory and motor, is furnished by vergence that allows the patient to be connected to his world. Visual spatial awareness is maximum in a stable and precise 3-D, binocular, world. Vergence that is less than adequate can

impact judgements of size and distance. Are objects as large as they appear or are they just close? Are they small or just far? Which is illusion? Which is reality? What we think of as big may really be small. What we think is far may actually be close. The unstable vergence system makes for unstable judgements of space and size. Monocular vision does not allow optimum perception. Depth information via overlap or parallax movement is certainly available when objects move about. But, the rate that people or objects move, however, relative to each other also provides cues of depth versus size. More distant objects or people appear to move slower than those close to us. People may be moving more slowly but not be further away. In everyday life, confusion such as this can be important for success or even for survival if you are driving a car.

If one has difficulty perceiving where one is relative to what one is looking at, or if his view is limited in some way, then his perception of space, the sense of boundary will be erroneous. That's not to say that monocular individuals don't have answers to these questions. Rather, they have to go through different and alternative levels of awareness to acquire the knowledge they need. As an example, someone with intermittent strabismus or a strabismus that has a variable angle over time has the potential for more confusion about space and location in space than someone with a stable, constant strabismus. I propose that the misperception from inaccurate convergence would be more disturbing to one's awareness of space than an adjusted perception that comes from a stable monocular view.

Efficient and accurate vergence function provides the beholder greater dimension in answering these questions of time and distance. When one knows how to efficiently function in her space world, a sense of connectedness follows. The person feels "I am part of the matrix." Vergence and the sense of where one is in space become internalized. A stable vergence system allows for stable perception of space. A stable space world will assist in developing stable behavior in that world and ultimately will be perceived as having a stable personality. One's personal knowledge of where one is in relationship to other objects can then have a dramatic impact on behavior.

An object closer than one perceives it to be might lead to a stubbed toe. However, if one gets closer to another person,

and enters that person's perceived spatial boundary, it would be considered an invasion of privacy. This violation of one's territory would be perceived by the person being violated as abnormal behavior and subsequently, the personality of that individual would be questioned. The dynamics and complexity of emotions that come from the person's perceived relationship of himself and the world around him also impacts how he or she reacts to that world. Consider an individual with convergence insufficiency (CI). It is not difficult to project that a person with CI might adjust and consequently adapt in a dynamic environment. People with CI have a lack of awareness of where they are; this can have an impact on their self-image. It is my assertion that they lack a sense of centeredness and a consequent lack of connection to their space world. This lack of connection impacts their observed behavior.

I have observed this in patients whose diagnosis is a vergence function, particularly convergence. My observations indicate that convergence deficits appear to correlate with high levels of anxiety and ultimately this results in exaggerated agoraphobic behavior. Resolution of the convergent issue results in significantly reduced anxiety, panic attacks and the agoraphobic response. Where one sees one's self then, relative to objects and people in the environment, can have physical and emotional affects far beyond the relatively simple physiological convergent task. If the person perceives a threat, an invasion of his personal space, or if the person's space is unstable, then spatial behavior may reflect those stresses.⁷

Convergence as a Premise

Forrest⁶ suggested that key elements of visual behavior can create different starting points that often lead to greatly different conclusions even when based on similar evidence. Convergence, I believe, is one of these key elements. Over-convergence can lead to very different outcomes than underconvergence. On a simple level over/under convergence can affect one's tendency to swing a bat, to hit a baseball too early or too late. On a deeper level, an overconvergent individual may approach perceptual tasks from a more central perspective than peripheral. They may subsequently choose to process sequentially, in a step-by-step manner rather than spatially, from a gestalt perspective. McDonald⁸ presented styles of information processing based

on the central-peripheral organization of one's visual space world. Individuals who were more central (over convergence) would see space in detail, i.e. figure, while those with more peripheral (under convergence) ways of processing visual information see space in a broad, holistic perspective i.e. ground. Therefore, two patients presented with the same visual environment will construct different views of the world, based on their unique internalized vergence starting point.

Forrest⁹ took this concept even further. He suggested that eso and exo postures are the physiological result of these visual information processing styles. The innate psychological bent is reflected in the extra ocular muscle posture. He suggested that when one converges to an object of regard, to a more or less degree, this reflects how one reacts to life situations in an even deeper, more internal level of awareness. Forrest⁹ considered it reasonable to assume that how the individual reacts to people, things and events, reflects his attitude toward those people, things and events and also about himself.

This predilection to over or under converge has a connection to one's own basic beliefs and may help to solidify/clarify one's own premise of what one believes to be true. Similarly, Birnbaum¹⁰ stated that visual perceptual style, be it central relating to figure or peripheral relating to ground, may relate to more "organismically-pervasive styles." That is, awareness of space emerges not only from an outward perceptual level, but also from an inward sense, an all encompassing style that each individual possesses.

Vergence as an Emergent Function

Assuming the hypothesis is correct, are the internal features of a patient with convergence inefficiency caused by the convergence inefficiency; or does internal behavioral and/or the emotional features of a patient lead them to physiological expression of their vergence function?

Without accurate and efficient perception that accurate convergence provides, our patients may be somewhat disconnected from, or disconnect themselves from, their surround. It is important, I believe, to see this not as dysfunction, but rather as a highly evolved functional expression of an internal need or desire guiding one to perceive in a particular way.

A patient with intermittent exotropia associated with a reading disability was

examined by me. She was depressed, yet was an extremely bright woman, who had many insights into her own behavior. As she evolved through her therapy she became more aware that her visual function related to her long standing depression. She learned through her therapy that when her eyes were aligned, her depression diminished. The exotropic posture correlated with her depression. The depression became more apparent when the exotropia was present. The depression presented itself as the exotropia became evident. Through our therapeutic relationship we were able to trace back in history and discover her exotropia coincided with the initiation of her mother's debilitating illness. My sense is that perception simply cannot be divorced from self-perception. This patient's connectedness to herself, how she was able to feel about herself emotionally, was reflected in her ability to adjust. She would converge or not converge her eyes to subsequently see her world.

Both Groffman¹¹ and Dhonden¹² contend that disturbances of vision¹¹ and bodily disorders¹² have their origins in the individual's previous mental environment. If we consider a patient's ability to converge, not just from an external physiological perspective, but also from one that is internal, we may better understand how our patients develop visual function and process. In other words, why they are doing what they do. If made aware of any predisposition, it is possible that they will be able to understand their predilection and be able to circumvent the perception. If unaware, they become an observer of the perception and captive to it. Once our patients begin to understand their internal contribution, they can then become more aware of their potential ability to contribute to other alternatives and ultimately be more productive/efficient. A goal of their therapy is to help the patient to understand their visual process and how they perceive their world.

A True Sense of Knowing

One's space world may be seen through a sense of self. The ease that one conveys this sense of self may be attributed to the assurance one has in knowing the difference between spatial illusion and reality. The knowing of differences between illusion and reality, to some degree, comes from the confidence one has in knowing "where I am" and subsequently "who I am." Vergence function may provide us with some of the raw material needed to

know the difference. A closer scrutiny of the vergence system of our patients may lead to better understanding of the behaviors of that patient, beyond the presently accepted ocular motor function. We owe it to our patients to help them know their own visual function so that they have the understanding to know what is really true for them.

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