

# ENVIRONMENTAL Sensitivity

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## ABSTRACT

A model of situational environmental emphasis is used to demonstrate the concept of environmental sensitivity. The role of optometry in the diagnosis, rehabilitation and prevention of dysfunctions of environmental sensitivity through the visual and multisensory modes is described. Patient eligibility and the potential benefits of therapy are discussed briefly.

## KEY WORDS

environmental sensitivity, information processing, perception, visual therapy

**A**ny human organism can be considered as an internal environment within an external environment with the outer body surface representing a membrane between the two. Sensitivity to (or awareness of) these environments is present and operates through various sensorimotor and other systems, including vision, audition, gustation, olfaction, tactual processing and cardiorespiratory processing. Through environmental sensitivity the organism can make adaptations, usually with the goal of improved performance. Dysfunctions of sensitivity result in inadequate adaptation to internal and external environments.

A model of situational environmental emphasis is shown in Figure 1. The circle represents the human organism itself. The external environment exists outside the circle and is the universe within which the organism exists. Time is involved, as indicated by the arrow, since the organism operates in a spatiotemporal world within specific situations. Neither the external environment (dotted line block) or internal environment (dashed line circle) boundaries are fixed. The external environment is illustrated by means of a dotted-line block to indicate that such a boundary is

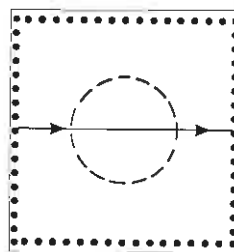


Figure 1. Model of situational environmental emphasis.

imaginary and merely serves to represent the external environment. Physicists suggest that the universe is gradually expanding and thus this imaginary boundary to the external environment also expands over time. The internal environment boundary is shown with a dashed line to represent its permeable nature, that is, to oxygen, glandular secretions, etcetera.

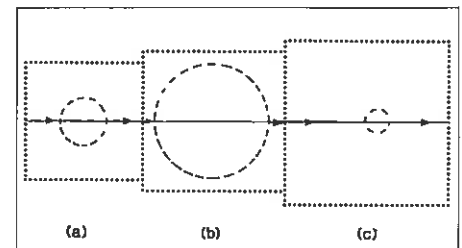


Figure 2. Model of sequential situational environmental emphasis.

A model of sequential situational environmental emphasis is shown in Figure 2. Each of these situations (a, b, c) represents particular units of time following one another. In Figure 2(b) an increase in emphasis on the internal environment has occurred, whereas in 2(c) a decrease has occurred. Sensitivity within any situation to the internal or external environments is variable and changes according to the demands of the situation.

In Figure 3 some of the inputs and outputs that an organism uses in processing information<sup>1</sup> are shown. For the purpose of discussion, the internal and external environments can be divided up into sub-environments such as a visual sub-environment, which itself consists of

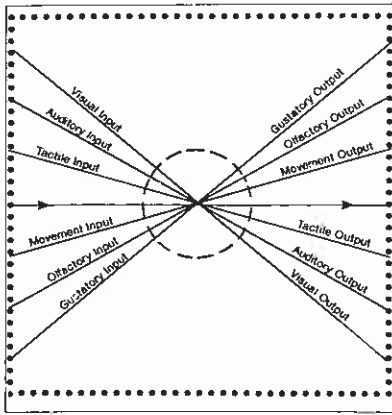


Figure 3. Model of environmental information processing.

an internal and external visual sub-environment. The internal visual sub-environment consists of the visual sensorimotor and neurochemical apparatus and the processes of this apparatus. The external visual sub-environment is interpreted via this apparatus. It is conceivable that some individuals might show a habitual environmental emphasis bias in many different spatiotemporal situations; for example, hypochondriacs could be individuals with an overemphasis on internal environments for many different spatiotemporal situations. Likewise, introverts might also exhibit a greater emphasis on internal rather than external environments and vice versa for extroverts. Myopes, who are often introverts,<sup>2</sup> might also have a greater emphasis on internal rather than external environments.

The habitual environmental emphasis of two hypothetical individuals is shown in Figure 4. Figure 4(a) represents an individual who places too little emphasis on internal environments with an overemphasis on external environments for most situations and this person may require

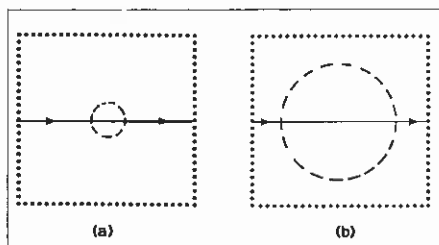


Figure 4. Habitual environmental emphasis of two hypothetical individuals.

therapy to increase sensitivity to internal environments. Figure 4(b) represents an individual who places too little emphasis on external environments with an overemphasis on internal environments and may require therapy to increase sensitivity to external environments.

## Diagnosis

Procedures used for the diagnosis of visuosensory and visuomotor environmental dysfunction are pathophysiological tests of the integrity of the internal visual environment, such as ophthalmoscopy and biomicroscopy, and psychophysiological tests of the integrity of the external visual environment, such as visual acuity, visual fields, oculomotor and accommodative functions, visual complexity and movement, colour, size, depth and form perception.

Procedures used in the diagnosis of visually deficient multisensory environmental dysfunction are those which evaluate visual-auditory perception, visual-kinesthetic perception (visuomotor perception), visual-tactile perception, visual-olfactory perception, visual-gustatory perception and combinations of the above and other visual-neurochemical perceptions.

Procedures used for the diagnosis of visualisational environmental dysfunction are those which evaluate visualisational processing such as memory (short, medium and long term), attention/concentration (transient and sustained), personality and self-image, concept, Gestalt and abstraction formation, learning, adaptational flexibility and intelligence, creativity and goal direction.

## Rehabilitation

In general, environmental sensitivity requires identification, discrimination and integration of sensorimotor and other inputs. The learning reflex<sup>3</sup> consists of recalling (past experiments), relating (current experiences) and directing (future experiences). The hypothesis of environmental sensitivity therapy is that various sensorimotor, biological and cognitive processes involving vision, audition, etcetera are developed and amenable to improvement. The optometrist and ophthalmologist are involved in the diagnosis, rehabilitation and prevention of dysfunc-

tions of the visual sub-environment. Other professionals involved with environmental sensitivity include: speech and hearing therapists, occupational therapists, psychologists, audiologists, music and art therapists and various medical practitioners.

Optometric treatment in environmental sensitivity includes procedures which may involve relaxational training, optolinguistics (the study of the uses and relevance of linguistics in optometry—in this case, optolinguistic training refers to visuoverbal integration, attitudinal and motivational training), visuosensory and visuomotor training, multisensory integration training and visualisational training.

Therapy is best performed with a relaxed and motivated patient and it thus becomes necessary in any therapeutic programme to include relaxational, attitudinal and motivational training in order to obtain maximal therapeutic effect. Optometrists use the following to affect environmental sensitivity (awareness) and encourage patient adaptation to new visual environments: lenses which appear to focus and defocus objects, increase or decrease object size, move objects closer or further; prisms and mirrors which appear to change object position, move objects closer or further, distort objects, produce diplopia, defocus and focus, invert or reverse the environment; filters which appear to change colours in environments, defocus vision, change the state of binocularity, for example, with Polaroids and anaglyphs; miscellaneous, that is, balance boards, walking rails, tactual objects, metronomes, music, and blackboards.

Patient eligibility for visual and multisensory environmental sensitivity therapy includes individuals with visual environmental sensitivity dysfunction (see Diagnosis). This includes not only individuals with binocular vision dysfunction and those with various pathological conditions (for example, associated with low vision) but also those suffering from gross and fine motor and balance disorders where vision is an integral aspect; for example, in cerebral palsy,<sup>4</sup> mental retardation, post-cerebrovascular accident<sup>5</sup> and other brain injury. Included also are individuals with self-image, self-awareness directionality and laterality disorders; for example, in learning disabilities<sup>6</sup>

and psychiatric conditions.<sup>7</sup> Others who would benefit from such training are, for example, athletes, businessmen, sculptors, writers, poets, artists, professional speakers, musicians and children. This avenue could be used in the prevention of potential future dysfunction of environmental sensitivity therapy and for the enhancement of various skills and abilities in the normal population.

## Conclusion

The potential benefits of therapy include improved visuosensory and visuomotor function, information processing, that is, visual and multisensory perception, spatiotemporal awareness, self-awareness, learning and memory, intelligence, thinking skills and creativity, adaptability and flexibility,

stress-handling abilities, autonomic nervous system influence, health and energy utilization, decision making, communication and social relations.

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