University of Rhode Island
DigitalCommons@URI

Senior Honors Projects | Honors Program at the University of Rhode Island

5-2011

Esophoria and Exophoria in Relation to Personality

Nicole F. Horn
University of Rhode Island, nicole.horn9@gmail.com

Follow this and additional works at: http://digitalcommons.uri.edu/srhonorsprog

Part of the Cognition and Perception Commons

Recommended Citation
Horn, Nicole F., "Esophoria and Exophoria in Relation to Personality" (2011). *Senior Honors Projects.* Paper 213.
http://digitalcommons.uri.edu/srhonorsprog/213

This Article is brought to you for free and open access by the Honors Program at the University of Rhode Island at DigitalCommons@URI. It has been accepted for inclusion in Senior Honors Projects by an authorized administrator of DigitalCommons@URI. For more information, please contact digitalcommons@etal.uri.edu.

RUNNING HEAD: VISUAL ESOPHORIA AND EXOPHORIA

Visual Esophoria and Exophoria in Relation to Personality

Nicole Horn

University of Rhode Island

Abstract

Vision is much more than simply being able to see 20/20. There are a number of different visual problems which can impact how we see and interact with the world around us. One visual skill, which is looked at in this research, is convergence. Convergence is the ability to turn the eyes so that they both focus in on the same object, at the same time, and at the same distance in space. If the eyes either underconverge or overconverge, this can lead to an altered perception of the world. Overconvergence is also known as esophoria, which is defined as a tendency for the eyes to deviate inwards. Underconvergence, or exophoria, is the tendency for the eyes to deviate outwards. Both of these tendencies can affect how people learn, interact with others, and understand their surroundings.

This study includes 50 undergraduate students who were tested to see if they have a tendency towards esophoria or exophoria. A survey was also distributed to them with questions about demographics and a section where participants indicated whether they agreed or disagreed with statements regarding the introvert/extrovert scale and the conscientiousness scale, and a section about vision in general; such as, whether the participant wears glasses and can clearly see the classroom board from across the room.

Of the 50 participants in this study, 27 exhibited a tendency towards esophoria at far and 29 a tendency towards esophoria at near. One participant had a tendency towards exophoria at far and four had a tendency toward exophoria at near. My research data showed that there is a correlation between conversion ability and feelings of confidence and paying attention to details. Correlations were also found between being able to see clearly at distance and the ability to pay attention to detail, stick to plans, and the preference for order. The results of the surveys were also assessed to determine how many of the participants cannot clearly see the board across the room and how many regularly go to the eye doctor.

This study provides insight into the different aspects of personality that visual convergence can affect, as well as aspects of personality that are affected by clear vision. The impact of having undiagnosed vision problems is also explored.

Visual Esophoria and Exophoria in Relation to Personality

Our visual system plays a huge role in how we perceive our environment and how we understand the world around us. People may perceive "vision" as being only the ability to see their surroundings clearly. Oftentimes, the eyes are only tested for distance vision; if the patient can see clearly at distance, then the patient is told that they have good vision. There is much more to vision, however, than whether our visual acuity is 20/20; 20/20 vision does not necessarily indicate perfect vision. Issues with convergence, binocularity, and near-point vision are often neglected because they are not tested for. Individuals who exhibit problems with these visual functions, however, can have many adverse effects, which can be both physical and emotional. Insufficient vision can lead to headaches and strain in the eyes; it can also affect the ability to learn, as well as personality. "Current research indicates that approximately one in four children has vision disorders that can interfere with their ability to learn" (American Optometric Association). Even if learning is not affected, there are small differences in how our individual visual systems work, which affect how we see the world and in turn influence how we interact with the world. One of the ways in which our overall visual system can affect an individual is in its relation to personality.

Personality is extremely complex and is influenced by all of the aspects of an individual's life. The way in which someone perceives the world can be viewed as one way to understand this complexity. As Warshowsky says, "One's relationship of himself to space and objects within that space is an indirect barometer to his personality" (2008). Spatial awareness is the ability to see peripherally. Peripheral vision is not sharp and clear but allows one to be aware of the space around oneself. If we cannot properly visualize the world around us, then we may need to adjust

for this in our personalities. Peripheral vision is especially important in sports, bike riding, and driving. It is also important when reading in order to be aware of what word and line to read next. “A lack of ability to control and manipulate vergence can compromise a patient’s visual perception and can diminish her awareness of space” (Warshowsky, 2008). There are a number of different visual problems that can impact how we see the world around us. One visual skill that can be looked at is convergence, which is the ability to turn the eyes so that they both focus in on the same object, at the same time, and at the same distance in space.

If the eyes either underconverge or overconverge, this can lead to an altered perception of the world. Overconvergence is also known as esophoria, which is defined as a tendency for the eyes to deviate inwards. Underconvergence, or exophoria, is the tendency for the eyes to deviate outwards. According to MacDonald, this occurs due to nerve, muscle, congenital or mechanical anomalies (1931). These phorias, which are measurements of control of the convergence system, are not permanent muscle changes but are tendencies. They can, however, create uncomfortable effects on the body because they stress the visual system and cause the person to have to use excessive energy to make the eyes work properly together. A problem that can arise due to esophoria is the patient’s seeing things as being smaller than they actually are. This results in having to use extra effort to get the object to appear the right size, or it can lead to bringing an object, such as a book, inappropriately close to the face to read. On the other hand, if exophoria exists, one problem that may arise while reading is that each time fixation on a word is broken, the eyes will tend to deviate outwards and they must be brought back in to regain fixation. These difficulties while reading and doing near work can be problematic for learning and can cause a variety of discomforts, such as a feeling of tension and a headache that gradually increases with the use of the eyes during the day; fullness in the lids; dull pain in the back of the eyes and brow;

and spasms of the muscles around the eye. (MacDonald, 1931). In addition to various physical symptoms that patients with esophoria and exophoria may experience, there may also be behavioral and personality differences in these individuals.

It has been found that these esophoria/exophoria tendencies can lead to altered behaviors and thinking patterns, which can be attributed to altered spatial awareness. "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. Individuals who were more central (over convergence) would see space in detail while those with more peripheral (under convergence) ways of processing visual information see space in a broad, holistic perspective" (Warshowsky, 2008). These different ways of approaching "space" and the processing of information may affect individuals' personalities and their ability to comfortably handle various visual tasks. According to Dr. Theodore Thamel, O.D., of Worcester, MA, some children who exhibit more severe esophoria will avoid more spatial activities such as sports and will enjoy near point activities such as reading, puzzles, and projects. Nevertheless, they may still have trouble with reading due to their lack of peripheral awareness of the page. Children with a higher severity of exophoria have been found to have a tendency to be more fidgety, avoid near work, have difficulty copying notes from a board to a page, and they may have trouble remembering things they have read. These difficulties can all result in decreased performance in school and may also affect their personality.

Our vision can determine which tasks individuals are comfortable performing and the means by which they execute these tasks; consequently, vision can be related to personality. The

preference of individuals with exophoria to perform work that does not require reading combined with the speculation that exophoric individuals understand the world with a broader view can lead to the comprehension of how these individuals will behave and give insight into their learning styles. Esophoric individuals, on the other hand, understand the world on a more central level. Naegel (1990) explains that esophoria has also been related to myopia (nearsightedness) in that myopic individuals have a tendency towards esophoria, especially at near. Furthermore, he indicates that patients with myopia tend to be introverted. Naegel also states that there are similarities in the activities that individuals with myopia and esophoria enjoy, specifically activities that are done at near point, such as reading. These choices of activities can be attributed both to their being able to see things more clearly and focus more easily at near and to their being introverted. In order to substantiate this relationship between vision and personality, we need to have a clear definition and understanding of what is meant by the terms "extrovert" and "introvert."

"Extrovert" and "introvert" are two terms that we can use to categorize people based on their personality traits. The terms extroversion and introversion refer to the extent that a person is considered outgoing or shy, which includes traits such as being talkative or silent, sociable or reclusive, adventurous or cautious, eager to be in the limelight or inclined to stay in the shadows (Wade, 2003). According to Sternberg, "The extroversion trait characterizes people who are sociable, expansive, lively, oriented toward having fun, and have interest in interacting with other people. Introverts, in contrast, are quiet, reserved, and generally unsociable" (2001). Extroverts and introverts tend to enjoy different activities from each other because their interests are different. Extroverts tend to enjoy being around people and participating in activities with

other people, such as sports and parties. Introverts, on the other hand, have been found to prefer activities like reading and spending time alone.

The studies that have been done that have shown that exophoric individuals look at things with a broader view and do not enjoy near-work may point to these individuals being more extroverted in their personalities. In addition, studies have found that esophoric individuals enjoy reading and close activities more than exophoric individuals. This in conjunction with the relationship between esophoria and myopia, and the fact that myopic patients tend to be more introverted, may point to esophoric individuals having more introverted personalities. The purpose of my research project is to determine whether or not individuals who are exophoric also tend to be more extroverted, and whether or not individuals who are esophoric also tend to be more introverted by studying undergraduate students at the University of Rhode Island. I will also be including a brief survey of how many of these students may have vision problems.

Method

Participants

Participants were undergraduate students at the University of Rhode Island (12 males, 38 females; *N*=50) between the ages of 19 and 44. The racial composition of the participants was Caucasian (88%), African American (8%), Hispanic (2%), and Asian (2%).

Materials/Apparatus

Participants' eyes were tested for esophoria/exophoria using a stereoscope. The stereoscope is an instrument with two lenses that are separated by a divider through which a patient looks at a card placed on a holder. The particular card used in this study is a card with

numbers and a paint brush on it. The stereoscope can test to see if both eyes are being used together because only one eye sees the paintbrush and the other sees the numbers. The paintbrush and numbers will both be seen when looking through the lens only if both eyes are functioning together. This instrument can also test for esophoria/exophoria depending on the number at which the paintbrush is pointing. Esophoric individuals will see the paintbrush pointing to numbers fewer than 6, and exophoric individuals will see it pointing to numbers over 8. The more extreme numbers on the scale indicate higher intensities of esophoria/exophoria.

An informed consent procedure, approved by the URI IRB, was used prior to each person's participation. A survey was used to obtain data which consisted of demographic information and 20 statements regarding the introverted/extroverted personality scale and conscientiousness scale. These scales were obtained from the MMPI personality test.

Procedure

Flyers were posted around the URI Kingston campus and read in class announcements. A $100 Visa gift card drawing was offered as an incentive. The study was also an extra credit option for students enrolled in Dr. Collyer's PSY 301 class.

Participants were first informed of their right to skip any questions and to leave the study at anytime. An "informed consent" form was read by the participant. The participant was then asked to hold the stereoscope to their forehead and was asked questions regarding what they could see. The stereoscope is a tool that allows the researcher to analyze whether the participant may have esophoric or exophoric tendencies depending on which number they see the pointer pointing to when they look into the instrument.

Next, the participants were asked to fill out a survey. The survey included demographic information (age, sex, major, race, etc) as well as 20 statements regarding the introvert/extrovert scales and conscientiousness scales. The participants answered by writing “agree” or “disagree” in regards to each statement about their personalities.

Finally, the participants were informed that they could place their name in a box for the $100 drawing if they chose to do so.

Results

Of the 50 participants in this study, 27 exhibited a tendency towards esophoria at far and 29 exhibited a tendency towards esophoria at near. One participant had a tendency towards exophoria at far and four had a tendency toward exophoria at near. There was no significant correlation found between esophoria/exophoria and introvert/extrovert (r (50) = .109, <.445) or conscientiousness (r (50) = -.173, <.229). My research data showed that there is a moderate correlation between higher degree of esophoria at distance and lack of confidence (r (50) = .281, p <.048) and between higher degree of esophoria and paying attention to details (r (50) =.304, p <.032). A high correlation was found between being able to see clearly at distance and the ability to pay attention to detail (r (50) = .523, p <.000); and moderate correlations were found between ability to see clearly at distance and ability to stick to plans (r (50) = .331, p <.019); and the preference for order (r (50) =.292, p <.040).

Other important findings on visual ability were also observed. Fifty percent of the participants wear glasses or contacts. Twenty percent of all participants could not clearly see the classroom board. It was found that there is a moderate correlation between wearing glasses and

lower report of ability to see the classroom board clearly (r (50) = -.300, p <.039). Of all 50 participants, 18 percent had not been to the eye doctor in over 4 years; of this 18 percent, 67 percent of them could not see the board clearly.

Discussion

The original hypothesis for this research project, that individuals exhibiting esophoria would tend to be more introverted and individuals exhibiting exophoria would tend to be more extroverted, was not found to hold true in this sample of participants. One reason for this may be that individuals adapt in order to succeed. Some individuals, therefore, may have learned how to compensate for their introverted or extroverted personalities; therefore, they no longer exhibit signs of these personality traits. There were, however, some interesting correlations that were observed that do suggest a relationship between convergence and personality. Participants who tended towards esophoria rather than exophoria reported lower feelings of confidence, which is one dimension of an introverted personality. It was also interesting to find that participants who were more esophoric reported paying attention to detail more often than exophoric individuals. It has been found in previous research that people with esophoria pay more attention to specific detail, while people with exophoria tend to pay more attention to the whole idea rather than the details. “Individuals who were more central (over convergence) would see space in detail while those with more peripheral (under convergence) ways of processing visual information see space in a broad, holistic perspective” (Warshowsky, 2008). This finding was reproduced in my research.

The correlations between being able to see clearly at distance and the personality factors of paying attention to detail, the ability to stick to plans, and the preference for order can also be

looked at to further understand how our visual system impacts our personality. A person who lacks the ability to see clearly would be less likely to pay attention to the details of their surroundings. It is interesting to discover that someone who cannot see clearly would have trouble making plans and sticking to them. This could be due to a feeling of disorder in how they visualize the world which would impact how one responds to the world. This feeling of disorder would then transfer to an individual's not having as much preference for order in everyday life.

The findings in this research project regarding the percentage of students who are not able to clearly see the classroom board are useful in understanding why some students may fail to succeed in school. Twenty percent of participants are unable to clearly see the classroom board and 30 percent of these participants have not gone to see an eye doctor in over four years; this clearly is an issue that needs to be addressed. If these students were encouraged to get help with their vision, this could greatly improve their educational achievement and the ease with which they can complete their school work. Inability to clearly see the classroom board can lead to a lack of note-taking, a diminished interest in learning, and a decrease in grades. Also, it was found that students who wear glasses or contacts reported higher levels of inability to see the classroom board than people who do not wear glasses or contacts. This correlation shows another area that can be further investigated at the University of Rhode Island in order to improve the ability of these students to clearly see the classroom board; a vital step towards increasing the overall educational level of the student body.

Overall, the results from this research project show that there is a relationship between how we visualize the world, whether it be in how the eyes converge or in degree of visual acuity, and certain personality characteristics. These findings contribute to an understanding of the

means by which our personality can be shaped by how we visualize the world around us and consequently how this can affect many areas of our lives. In addition, the results revealed that there is a significant population of students who are lacking good visual acuity, which could be examined as a possible source of lower education levels or greater difficulty in completing schoolwork amongst undergraduate students at the University of Rhode Island.

Limitations

There are a couple of limitations that must be discussed. One limitation of this project is that students volunteered to participate in this research. Students who were truly introverted may have been less likely to respond to this invitation; therefore, this may have led to inaccurate results. Additionally, if a larger number of students were screened, there may have been a more even distribution between participants who exhibited esophoria and those who exhibited exophoria, which may have led to more accurate results. There was also a greater proportion of psychology students who participated in this research due to the extra credit that was offered in Dr. Collyer's PSY 301 course. This may have led to larger proportion of participants with a certain type of personality and understanding of the personality factors that were being measured.

Appendix A

Visual Esophoria and Exophoria in Relation to Personality

Consent Form- Anonymous Research

KEEP THIS FORM FOR YOURSELF

Dear Participant,

My name is Nicole Horn and I am a student at the University of Rhode Island. You have been invited to take part in my research project described below. If you have any questions, please feel free to call myself or Charles Collyer.

The purpose of this study is to see if behavior is affected by vision, as well as to survey vision problems on our campus. Responses to these items will be kept in a locked file and no names will be associated with your responses. **There will be a random drawing for a $100 Visa Gift card. Drawing for the gift card will be done by picking names from a jar. Your name that you put in the jar will in no way be associated with the information obtained in this screening. Your name and phone number or email address should be provided on the paper you place in the jar so that I can contact you if you win. This contact information will be kept in a locked drawer and destroyed after the drawing**.

During this study I will be using an instrument called a stereoscope to assess your eyes. The stereoscope, as a vision testing instrument, allows each eye to see a specific image at a particular point. This instrument does not touch your eyes and will be sanitized between each session due to handling. Using the stereoscope, it is possible measure esophoric and exophoric tendencies. **Exophoria is a condition in which people's eyes tend to turn outward; therefore, people with this condition are more comfortable viewing things that are farther away. Esophoria is a condition in which people's eyes tend to turn inward; therefore, people with esophoria are usually more comfortable viewing things that are closer to them.**

YOU MUST BE AT LEAST 18 YEARS OLD to be in this research project.

If you decide to take part in this study, your participation will involve filling out a survey pertaining to your agreement or disagreement with certain personality statements and a brief section on your vision.

The possible risks or discomforts of the study are minimal, although you may feel some embarrassment answering questions about private matters.

Your part in this study is anonymous. That means that your answers to all questions are private. No one else can know if you participated in this study and no one else can find out what your answers were. Scientific reports will be based on group data and will not identify you or any individual as being in this project.

The decision to participate in this research project is up to you. You do not have to participate and you can refuse to answer any question.

Participation in this study is not expected to be harmful or injurious to you. However, if this study causes you any injury, you should write or call Nicole Horn or Charles Collyer at the University of Rhode Island at (401) 874-4227.

Participants will not necessarily receive any direct benefits by participating in this research.

If you have other concerns about this study or if you have questions about your rights as a research participant, you may contact the University of Rhode Island's Vice President for Research, 70 Lower College Road, Suite 2, URI, Kingston, RI, (401) 874-4328.

You are at least 18 years old. You have read the consent form and your questions have been answered to your satisfaction. Your filling out the survey implies your consent to participate in this study.

Vision and Behavior Survey

This is a study on how vision may affect our behavior. Please answer the following questions to the best of your ability.

Please indicate your major_____

Please circle one:

Male Female

How old are you?_____

Please indicate your academic standing. (circle one)

Freshman Sophomore Junior Senior

What do you consider your nationality?

Please indicate whether you agree or disagree with the following statements.

Agree/Disagree

I prefer to just pass by school friends, or people I know but have not seen for a long time, unless they speak to me first. _____

Criticism or scolding hurts me terribly. _____

I am likely to not speak to people until they speak to me. _____

I am certainly lacking in self confidence. _____

I am easily embarrassed. _____

I seem to make friends as quickly as others do. _____

While in trains, busses, etc. I often talk to strangers. _____

In a group of people I would not be embarrassed to be called upon to start a discussion or give an opinion about something I know well. _____

I like parties and socials. _____

My feelings are not hurt easily. _____

I am always prepared _____

_____

I pay attention to details. _____

I get chores done right away. _____

_____

_____

I make plans and stick to them. _____

I love order and regularity. _____

_____

_____

I leave my belongings lying around.

I waste my time.

I do things in a half-way manner.

I leave a mess in my room.

I find it difficult to get down to work.

Please Circle One:

Do you wear glasses/ contacts? Yes No

Do you get headaches often? Yes No

Can you clearly see the board when you are sitting in class? Yes No

When was your last eye exam?

Under 1 year 1-2 years 2-4 years Over 4 years

Distance Card

See both numbers and arrows _____

What number is the arrow pointing to? ____

Just numbers_____

Just arrows_____

Are both the numbers and arrows clear? Yes No

Which is blurry? _____

Near Card

See both numbers and arrows _____

What number is the arrow pointing to? ____

Just numbers_____

Just arrows_____

Are both the numbers and arrows clear? Yes No

Which is blurry? _____

Works Cited

American Optometric Association. http://www.aoa.org/

MacDonald, Alexander. (1931). *Esophoria and Exophoria.* The Canadian Medical Journal Association, Toronto. pp 306-308.

Naegel, Guy. (1990). *Myopia, A Behavioral Problem.* European Society of Optometry Communication 134. pp 17-22

Sternberg, Robert J. Psychology: In Search of the Human Mind. 3rd ed. (2001). Thomson Learning. pp 495-496.

Wade, Carole. Psychology. 7th ed. (2003). Prentice-Hall. p. 468.

Warshowsky, Joel H, O.D. (2008). *Vergence as a Self Perception Relationship Function.* Journal of Behavioral Optometry. 19, #6. pp 151-153