The Experience of Reading:

Exploring new ways of creating atmosphere and extreme emotions while reading

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Abstract

I have recently found myself thinking a lot about the ways in which new technologies seem to be changing the experience of reading. Television, the Internet, and other such media, have caused many people to spend less time reading. The wonderful experience of reading is receiving less and less attention, or so it seems (mainly amongst youngsters), as the era of digital communication is moving forward. People still value good books, they still collect them and take pride in their personal libraries; however, the powerful experience seems to be fading away. This paper examines the question: Is it possible to change the way we experience reading, in order to return its lost familiarity to our lives? In order to explore this issue, experiments were done to explore diverse ways of practicing reading in a different manner, without diminishing the power involved in the original experience. Several behavioral psychology hypotheses were necessary in order to

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perform this experiment and design the appropriate framework. The research builds a theoretical model that proposes a new way of experiencing reading, by invoking extreme reactions of excitement to the text. Optional product designs are then presented for the model, offering a range of paths to implement the idea into a real product. The end result questions our need for an external stimulus to get excited, and indicates new channels of product design for future research.

1.   Introduction

Books are most significant on a personal level. We experience thought and feeling through the act of serious reading. In its original form, reading is one of our few remaining forms of personal meditation. This theory stems from my belief that reading offers much more than a mere escape into fantasy.

However, despite what has been dubbed the "Harry Potter Effect", which credits J.K. Rowling's book series with turning Game Boy addicts into lifelong readers -- reading is in serious decline among teens worldwide, according to Michael Graves, professor and head of the Literacy Education Program at the University of Minnesota. Researchers are examining ways to encourage reading, including using public figures as role models to make books cool.

Could it be that the powerful experience of reading has vanished from the world? Could it be that so many people today are willing to give up such an incredible experience? Indeed, people still collect books and take pride in their personal collections. Certain conclusions can be drawn about a person according to the books in his possession, such as his interests, level of education, intelligence, and so on.

Interviews with people have demonstrated that the assumption that one no longer values the intensity and strength of the reading experience is mistaken. The vast majority of respondents did not underestimate or doubt the immense

satisfaction involved in the experience of reading. The results led to a different conclusion as to the origins of the problem of lack of reading: the fast pace of today's modern lifestyle does not leave room for the slowness of reading. It is disconcerting to learn that reading in the average Western society home has been losing ground in its race with other leisure activities. Most people today would rather fill up a free hour in front of the TV or the computer. These stimulate the eyes and supply fast, immediate gratification to the user. When reading a book on the other hand, there is no visual image to respond to, and if the reader himself does not complete the missing images in his mind, he will misunderstand the story. The process of reading forces the reader to be active. Not only does he need to decode the meanings of the words and sentences, but also to comprehend what hasn't been written by the author. The course of reading is very complex. In fact, reading is one of the most complex skills a human being can perform. It requires a visual perceptual ability, a linguistic ability, general knowledge, the ability to retrieve cognitive meanings and apply them when necessary, a thinking ability that enables the completion of missing details, the ability to conclude, and more. Nevertheless, the delight of reading stems precisely from this point. A good reader is a curious person who uses his reading skills to learn more and explore the world that surrounds him.

Undoubtedly, the book as a product has a future of a few more good years. The electronic book did not succeed to the extent predicted by its developers. If so, people hold the opinion that the value of books did not decline. They are aware of the strong experience a book can provide; and yet, they still prefer to watch TV. This paper will examine the possibility of a new dimension, and perhaps impart a slightly different meaning to the experience of reading as we know it today.

2. The problems of such a change: multimedia as a strong competitor of the written word

What do digital leisure activities (television, computer, game-boy, play-station and so on) provide, that is so lacking in books? When competing against

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alternative leisure activities, reading is usually found at the bottom of the list. As previously mentioned, television offers more instant gratification. It does not require a lot of thinking. The story begins and ends in a maximum of three hours. Many television shows do not require the person to watch the entire show in order to understand the scenario. It is easily possible to begin watching the show from episode 358, and still understand exactly who hates who, who is trying to take revenge on who, and so forth.

Surely, the book does not provide the characteristics mentioned above. It does however, deliver something else, perhaps even stronger. When reading a book, the reader is totally involved in the production. Amos Oz, a famous Israeli novelist, writer and journalist, compares the relationship between a book and its reader to the relationship between a man and a woman: if it's the right book, it carries you away into your deepest and most inner self. The black squiggles on the white page can seem as still as the grave, as colorless as the moonlit desert; but, they give the skilled reader a pleasure as acute as the touch of a loved body, as stimulating, colorful and transfiguring as anything out there in the real world. The more stirring the book, the quieter the reader. However, reading, just like the romantic relationship in Amos Oz's comparison is a difficult experience to describe; and the ones requiring explanations will probably never understand…

3.   Attempts to encourage reading

Numerous researchers, teachers, librarians and writers are concerned about the disappearance of books. William S. Gray and Ruth Munroe from the University of Chicago study reading habits. In their book, *The Reading Interests and Habits of Adults,* the writers analyze and summarize papers by many researchers who studied reading habits in different parts of the world and among people of all ages, occupations and interests[1]. This study reveals that one in two Americans do not read books at all, and those who do devote less than half an hour a day to reading them. Although this study is now many years old, current reading habits

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[1] *Journal of Educational Sociology*, Vol. 5, No. 8, Adult Education (Apr., 1932), pp. 513-522

are much the same. Competing with newspapers and magazines, films, radio, golf, bridge and other hobbies, books are apparently hardly contenders.

In response to this concern, there are various products and devices that attempt to encourage reading. One of them is audio books, in which a voice reads the story out loud, and the individual simply has to sit back and listen. However, this example does not really "encourage reading" after all.

In 1990, book publishers in the UK fought the government against charging tax on books. But does the government really have such influence on the public's book purchasing and reading habits? The English book store chain *Books etc.* initiated a campaign in which a reader can return a book that was not to his liking within 28 days, for a full refund. After interviewing salespeople working in the English chain, they admitted that less people than expected came to return books and that indeed more people bought books. According to the salespeople, it was very noticeable if someone took advantage of the sale to acquire a book just to read and return it. However, when a purchase of any kind is not "final", and a product can be returned and refunded simply because one didn't like it, people buy more.

Another attempt to encourage reading was developed by researcher Mark Billinghurst and his colleagues at the University of Washington, Seattle, with a

project called *The Magic Book²*. Using a book as a starting point, the Magic Book project allows readers to interact with the text by viewing combinations of virtual reality and the real world. The intent is to enhance reading and learning in storybooks, textbooks and technical publications. Readers become part of the action through a high-tech mixture of traditional storytelling and virtual reality. A Magic Book looks like a traditional book - it has text and colorful pictures. But when looking at it through a lightweight viewer, three-dimensional images emerge from the page. People can read the book together, interacting as they read the story and simultaneously viewing the virtual images from different angles.
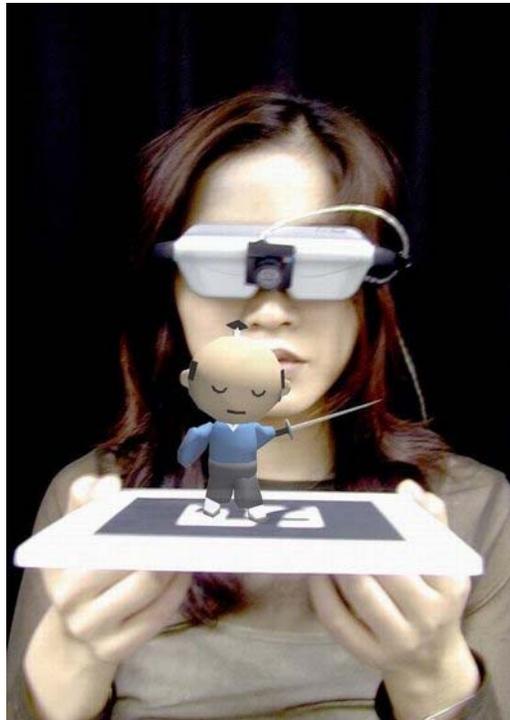
Reading a magic book using virtual reality special glasses

The Purpose of this Research

The aim of this project is to create a special reading experience, different from the one we are familiar with today. However, there are some reading

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² Kato H., *Magic Book: Exploring Transitions in Collaborative AR Interfaces*, Human Interface Technology Laboratory, University of Washington, Seattle, 2000.

characteristics that are important to preserve, even when changing the experience, such as maintaining the personal experience of reading and keeping the individual's imagination active. From this perspective, I seek to investigate directions other than what the Magic Book offers. Indeed, the Magic Book helps the reader step into the story; however, the scenes he sees were already pre-defined by the creators of this virtual reality, so in fact the act of imagination is lost.

4.   How will I achieve this objective?

My goal is to cause one's natural emotions to peak while reading a book. This concept is easier understood by picturing a scenario taken from a book. Picture yourself in a deep and frightening forest, walking towards something unknown, knowing there is a princess that needs saving at the other end of the forest. The level of fear one might sense while reading a paragraph as such could be measured by a certain number X. The goal of this study is to explore a way to increase the value of this variable, and reach a number X+Y. In other words, I am seeking a way to increase the intensity of a feeling. Just as the volume in a radio can be increased when a favorite song is played by simply turning a knob, and causing our body to respond while hearing those familiar tones in full volume; I seek to turn up the volume while reading a book, and thus attain a physical reaction. The experience I am seeking to achieve can be compared to using drugs and feeling tremendous ecstasy. In all these cases, regular natural feelings are actually being amplified.

In the course of this research, I investigated diverse ways to achieve this goal; amongst them: using virtual reality, using chemical factors that would influence physical reactions, using a computer to manipulate our thoughts, and so on.

In order to keep this paper concise and clear, allowing the reader to follow the theoretical model, I will not elaborate on each stage that was tested and

investigated in the course of achieving the final result. Elaborations are presented in the detailed thesis I wrote as part of this final project[3].

5.   The methods I used to research this case study

In order to investigate this matter, and to determine what will best affect the reader's emotions and how, I met and interviewed numerous professors from the various Israeli universities in addition to reading many published academic papers and books. Since there are quite a few schools of thought amongst the different academic researchers concerning the concept of feeling, I had to find the most appropriate person, one who specialized in every issue I wanted to explore. For this purpose, interviewing professors from only one university would not be sufficient. During the interviews with the professors, one researcher referred me to another, and the latter referred me to a third, and so on and so forth; until I had an extensive enough network to develop a new theoretical idea. I interviewed researchers from the fields of musicology, psychology (of reading and understanding written text), physiology, brain science, and cognitive science. I hybridized information from all disciplines, and finally reached the conclusion I will now present. Once the conclusion was formulated and the theoretical model had been developed, I returned to the same professors and presented it to them to receive their confirmation that the model I developed did indeed appear logical and practical.

6.   The research question

The discovery I made and became most engrossed in, did not necessarily have to be directly connected to reading books; and can easily be applied to other subject matters as well. However, after explaining the concept, I will elucidate my desire to apply this innovation to book reading.

I examined whether it was possible to create a new and direct relationship between feelings and atmosphere comprised of music and colorful light; and in

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[3] The elaborated thesis is written in Hebrew, but can be translated per request.

this manner – intensify the emerging sensation. I asked cognitive science professors (amongst them, Prof. Gilad Hirshberg, Bar Ilan University), if it is at all possible to reach a measure of sensation; and if so, which physiological measurements in the body indicate the intensity of feeling? After that, I turned to musicology professors (Prof. Roni Granot and Prof. Edwin Sarusi, Hebrew University, Jerusalem) to inquire whether music and sounds can influence our sensations, and if so, which particular sounds create which feelings and which feelings can peak followed by which sounds? Subsequently I studied the psychological influences of color. Can color affect us, and if so, which hues influence us in what way? This research question can be best phrased in this way:

7.   Research summary: Understanding feelings through cognitive science

All researchers agree that a person's awareness can be determined using physiological measures. The state of consciousness is determined by basic physiological measures - blood pressure, resting heart rate, breathing rate and skin conductivity response. Physiological measurements indicate one's relative level of awareness.

However, as for the purpose of this research, knowing the level of awareness is not enough. In order to cause one's feelings to peak while reading, I need to first determine whether a feeling is indeed a measurable factor. I was delighted to discover one researcher in Israel, Dr. Gilad Hirshberger from Bar Ilan University, whose field of expertise is physiology and the study of feelings and emotions[4]. After visiting two physiology labs, one at the Hebrew University in Jerusalem and

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[4] Dr. Hirshberger was a post doctorate student of Prof. Robert Levenson, a leading researcher in the field of human psychophysiology, University of California, Berkley, USA.

the other at Bar Ilan University, and interviewing the lab supervisors, I reached the following conclusions:

According to empiric experiments conducted in these labs, it is possible to measure a feeling using two methods: the first is by analyzing facial expressions. Facial expressions allow us to gain information about one's emotional state. The measurements obtained from analyzing one's facial expressions provide a very precise figure concerning feeling; including sensations the subject himself was not aware he was feeling at that moment, such as repression.

The second method of measuring feeling is the physiological way. In the human body, the autonomic nervous system (ANS) is the part of the peripheral nervous system that acts as a control system, maintaining homeostasis in the body. As mentioned, a disagreement amongst different researchers exists regarding the amount of information this system can provide about measuring feelings. (Some of the researches I interviewed told me my idea lies in the realms of science fiction; while others claimed it was very plausible and provided a precise explanation). One approach claims that the ANS can only indicate a measure of awareness within a subject. The opposing approach however, claims and demonstrates that there is a specific physiological reaction to specific types of emotions. I will further elaborate the second approach. According to this method, the measurement of awareness for each emotion will be different. If so, the measurement of awareness when a subject senses anger will differ from the measurement while sensing anxiety, joy, etc. In the physiological labs I visited, I saw exactly how these differences are concretized by viewing the different wavelengths on computers used for ANS measurements.

The leading researcher today attributed to the second approach is Prof. Robert W. Levenson from the Department of Psychology at the University of California, Berkeley. According to his research, each and every emotion has a unique signature. He bases this claim on an interesting theoretical assumption: Some one hundred years ago, when research concerning the relationship between experience and physiological awareness just began, an intuitive connection was firstly discovered: fear elicits a corresponding physiological response; in other

words, the body's reaction (=the physiological measurement) appears according to the type and intensity of feeling that evolved. Prof. William James, from Columbia University, New York, shows in his research how there is a certain awareness that causes fear, followed by a feeling. In other word: we are afraid BECAUSE we run away.

8.   In what way does the emotional system differ from the cognitive system?

The evolutionary theoreticians (following the research established by Charles Darwin) claim that the human's emotional system was created because the cognitive system alone cannot be relied upon to respond quickly enough. In other words: the cognitive system includes logic and thinking; the physiological system embraces feelings. If we were to rely solely on the cognitive system, if we encountered a lion, we would start thinking logically about whether the situation was good or bad, and what would be the right action to take. Reaching a conclusion to run away could take too long, and be too late. Therefore, an initial physiological reaction is created (for example – keeping still). However, this is an active stillness – the blood flows faster, we feel pain, etc. The physiological reaction reinforces the survival system, since we act quickly enough, thanks to emotions.

According to Prof. James's theory, the physiological system evolved in order to bypass the cognitive system. If awareness is expressed by anger, the body will read closed fists and other reactions as anger, and subsequently, the cognitive system, the intellect – will react, and the person will be angry; if awareness is expressed by fear, the body will read blood pressure as fear, and as a result the person will feel fear, and so on. That is to say, physiological awareness changes from sensation to sensation, and it is possible to distinguish between feelings and measure a particular reaction that a person is sensing at a given moment, via physiological measurements.

9. First Conclusion:

The conclusion reached by combining the two theories mentioned above, James's theory with Levenson's theory, is that it is possible to use a system that reads physiological measurements in order to read an indication of emotion, and later to enhance it. It might even be possible to introduce a camera that reads facial expressions to this system, and obtain a more precise measure of the feeling to enhance.

10. Evidence showing it is possible to control the physiological system: Bio-Feedback

Biofeedback is a form of alternative medicine that involves measuring a subject's bodily processes such as blood pressure, heart rate, skin temperature, galvanic skin response (sweating), and muscle tension and conveying such information to the individual in real-time in order to raise the subject's awareness and conscious control of the related physiological activities. By providing access to physiological information which the user is generally unaware of, biofeedback allows users to gain control over physical processes previously considered automatic. Through trial and error, people learn to identify and control mental activities that bring about desired physical changes. This system is actually evidence to the fact that there is a way for people to control physiological measurements.

Of course I did not want to use bio-feedback in this project, since it in fact works in the opposite way to what I am trying to achieve. The intention behind bio-feedback is to calm the subject, making him feel more relaxed; in contrary to that, in this research I am seeking a way to enhance feelings, even if these feelings are negative, such as anger or fear. The idea behind this project is to provoke the reader's serenity.

11. How can music contribute to feeling amplification?

After reaching the conclusion that it is possible to identify a measurement of a feeling; the next step is to examine whether this measure can increase as a result of atmosphere comprised of light and music.

As explained before, physiological measurements indicate awareness, and the type of awareness indicates a feeling that is created at a certain moment. Music evokes enhanced awareness. 'Awareness' should be understood as individual consciousness, perception and knowing; it describes the subject's strongest ability to sense. This strong sensation reduces itself to a minimum while sleeping and climaxes when one senses powerful emotions such as deep remorse, great anger or sexual excitement.

The physiological connection of sound and its influences on the body can be realized in the sense that awareness is expressed in many types of physical changes, a large portion of them which can be measured. While awareness is active, the skin's electrical resistance is reduced, pupils dilate, breathing accelerates, slows or becomes irregular, blood pressure and heart beat tend to increase and muscle tension rises. There is scientific evidence that the correlation between hearing and the awakening of feelings is stronger than the correlation between sight and the awakening of feelings. The sight of a suffering animal or person will most likely evoke some kind of emotional reaction by the viewer. However, as soon as a cry or a scream will be added to that sight, the viewer will become much more excited. On an emotional level, there is something extremely strong and deep in hearing, that is lacking in sight itself. Therefore, when hearing a stranger, a stronger connection is made between them than when seeing a stranger.

Music is very likely to evoke strong and deep feelings, from supreme happiness to shedding tears. Music organizes time. By means of the order music imposes, an evoked emotion is guaranteed to peak when a matching musical sound is

heard. The fact that the same event could evoke different feelings in different people is insignificant.

12.   The importance of using wordless melodies in this project

Music and speech are presented separately, each on opposite sides of the brain. In spite of the congruence between them, as in many brain functions, linguistic input is processed mainly in the left brain, while music is processed in the right brain. This distribution is mainly known for dividing between senses and logic; and less between music and words. When certain words are directly associated with feelings, as in composed or non-composed songs, the right side of the brain is activated. This is despite the fact that the focus of the left brain is processing verbal stimuli. The difference between the left and right sides of the brain can be demonstrated in a few ways.

It is possible to anesthetize one side of the brain, and leave the other in a normal state of awareness. By injecting anesthesia into the left vein in the head, the left brain is put to sleep and the person cannot speak, but is able to sing. However, by injecting anesthesia into the right brain, the subject will not be able to sing, but is able to speak normally.

In this project I am interested in manipulating a subject's feelings, not logic; and therefore words are unnecessary.

One scientific study conducted several tests on a subject while hearing music that included measuring blood pressure, breathing, heart rate and other nervous system functions. It turned out that while the subject was fully concentrating on the music, the test results showed arousing of certain emotional shapes; however, when the subject adopted an analytical critical approach, these changes were not observed[5].

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[5] G. Harrer and H. Harrer, 'Music, Emotion and Autonomic Function', in Music and the Brain, edited by Macdonald Critchley and R.A. Henson, London, Heinemann Medical Books, 1977, pp. 202-203.

13. Clynes's theory: electronic music can be created according to feeling identification

Several research studies deal with the correlation between music and emotion. It has been confirmed that a subject's temper can change as a result of hearing music. Professor Manfred Clynes (Ohio State University, School of Music), a neuroscience researcher devoted his research to the study of genetically programmed dynamic forms of emotional expression. Prof. Clynes discovered that people's brains produce remarkably similar patterns when presented with the same color and sound stimuli. His study investigates the possibility of measuring affective responses to hearing music. He invented the sentograph, an instrument which measures dynamic motor behavior, which is known to be influenced by affective state. The subjects responded on the sentograph to brief musical selections. The subjects also completed a questionnaire regarding the emotional content of each piece, their familiarity with it and their evaluation of it.

The study showed that (1) the responses on the sentograph were fairly similar between subjects, (2) the responses were not affected by a subject's familiarity with or evaluation of a piece and (3) the sentograph indeed measures the affective response to the music. These findings are related to general emotion theory to construct a tentative model that accounts for certain aspects of the affective response to music.

The sentograph enabled Prof. Clynes to discover characteristic emotional shapes. He found that all of humanity shares the same emotional shapes. They appear to be programmed into the way our physiological system is designed. People in different communities had the exact same form for emotions like anger and love. He discovered that when people listened to great classical music, certain emotional shapes consistently arose. Clearly, certain interpretations of the tunes caused his subjects to experience deeper emotional responses. He

was able to turn these insights and observations into mathematical parameters for the "inner pulses" of various composers.
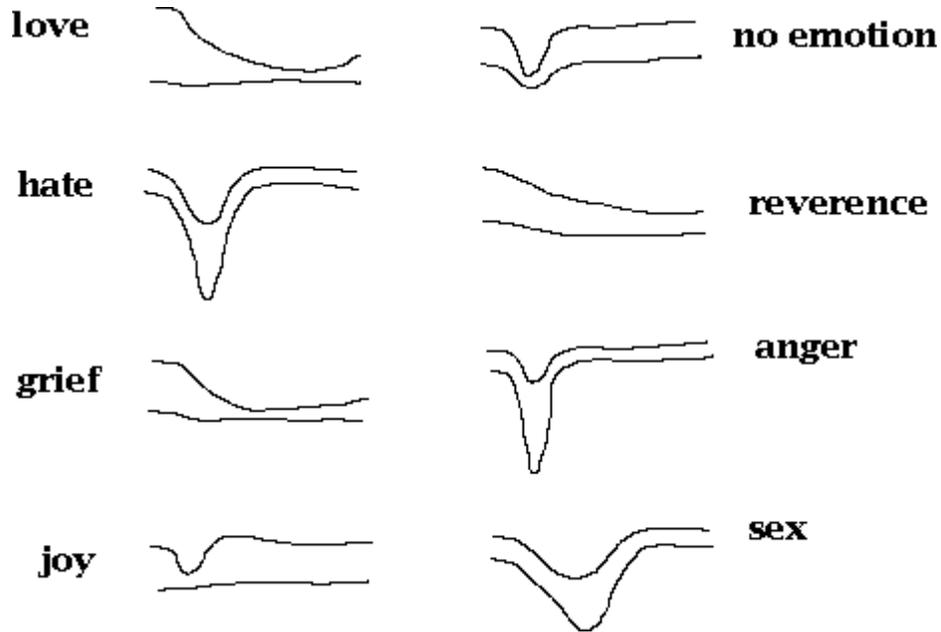
Prof. Clynes found a way to describe musical communication by making connections between neurophysics, gesture and emotion. He mapped certain tones and referenced them with certain emotions such as anger, love, sex, joy, sorrow and more. These connections can also be associated with the human voice and its similarity to music in expressing emotional tones. For example, when we are angry we raise our voice, which tends to vibrate in a high frequency. Sadness, on the other hand, causes the voice to be much slower and softer. Clynes used single tones and converted the acoustic sound with emotional senses. We hear both music and speech. They are both transmitted via sound waves. Contact is not something we hear. Clynes, through his research, actually turned contact into acoustics, making it clear that it is possible to use a system that can indicate a measure of emotion, and later enhance it.

14. Second Conclusion

Since my intention is to design sound and tone in a way that will enhance a feeling, I intend to use Prof. Clynes's composing theory. The computer will

compose a musical segment according to the emotion that was identified, resulting in a reinforced emotion.

It is important to mention that the invention of media recording in Western society, and the use Hollywood's film industry makes of certain sounds for certain scenes, has undoubtedly created a universal dictionary of emotions. In other words, certain combinations of tones will automatically awaken certain feelings. This cultural idea has created a musical language. For example, the major scale evokes feelings such as joy, hope, and other positive emotions. The minor scale, on the other hand, evokes sadness and gloom. Therefore, a composition in minor is considered sad; while a major composition is cheerful. Major and minor scales are actually physical frequencies. Of course, the association between scale and what a tone symbolizes is based on cultural aspects.

Because of the power music produces, and mostly because we are already overly trained and educated through the world of Hollywood film, the connection between musical stimuli and emotion is very precise. We are so used to hearing sound while watching a movie that if there is a moment of silence we are extremely surprised. Of course movie makers use this knowledge to create frightening scenes. This is basic knowledge Western society has taught us. Today, due to globalization, these basic codes have slowly become universal.

15.   The influence of color on feelings

Color is a function of the human visual system, and is not an intrinsic property. Objects don't "have" color; they give off light that is perceived as color. Spectral energy distributions exist in the physical world, but color exists only in the mind of the beholder. Each color can be correlated with a measurable wavelength and frequency. The wavelength and frequency of light we see influences the color we see; therefore each color has a different influence upon the subject's body and soul.

Color is not only an aesthetic preference but is a direct reflection of one's mood, style and innate personality. Colors can manipulate thinking, transform actions, and cause reactions.

Many studies have been conducted concerning the influence of color on a subject. These studies aim to identify a subject's mood at a given moment (not to make general conclusions about his personality). Of course, there are also cultural consequences relating to specific colors; and different preferences among children (who mostly prefer reds) and adults (who are mostly inclined towards the blues). Also, when examining studies that deal with the influences of color, other parameters need to be considered, such as the light source, the object being lit and the observer.

It is a well known fact that color influences mood and feeling in common experience, however, the field of color psychology is still not well understood. Research on the psychological aspects of color is difficult to conduct for the mere reason that human emotions are not very stable and there is great variation between people regarding psychic make-up. Nevertheless, there are a number of general and universal reactions to color which seem to be observed in most persons. According to fundamental psychology, Freudians relate hues back to bodily function - blood, feces, and so on, - while Jungians tend towards a more liberal interpretation of hues, believing that the individual's response to color is too complex to allow a simple (sexual, for example) interpretation[6].

16.   General reactions towards color

Colors have the power to change living things: physically, emotionally, and psychologically. Each color can do something different to our bodies. Faber Birren (1900-1988) was a leading authority on the effects of color on humans. The purposes of his research were to (1) discover the relation between color and personality, (2) review the general and more extensive knowledge of color

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[6] Babbitt Edwin D., *The Principles of Light and Color,* published by the author, East Orange, N. J., 1896.

psychology, (3) examine the problems with color psychology and potential solutions, and (4) predict the prospects of color psychology. As a matter of fact, many contradictions and ambiguities arose during his studies, especially in researching the psychological effects of color, as some studies tend to be subjective rather than more scientific. This is because emotional reactions are not easy to measure. However, there are some commonalties that can be found from the resources. Generally, hues in the red area of the color wheel are called 'warm', while those in the blue and green range are referred to as 'cool'. These terms are relative rather than absolute. Faber Birren defines this commonality regarding the colors of the spectrum by associating each with two moods. The warm colors are active and exciting, such as a red and its neighboring hues. The cool colors that are passive and calming are blue, violet and green. Likewise, light colors are active, while deep colors are likely to be passive.

Modern researchers in Japan put their finger on this point precisely. For example, Choku Akashi (1986) demonstrates a number of his research results that imply that red is often felt to be active and may be connected under some circumstances with aggressiveness. In contrast to the warm colors, the cool colors are inactive or passive. As Faber Birren stated, "the rather strong observation is to be made that division of the spectrum into warm and cool colors holds very evident and simple meaning with reference to human personality." Indeed, though the conclusion may be largely empirical, warmth and coolness in color are dynamic qualities, warmth signifying contact with the environment, coolness signifying withdrawal into oneself.

To conclude, red is emotionally exciting while blue is subduing. Physically and physiologically, the same sort of complementation exists. Red colors tend to increase bodily tension, stimulate the autonomic nervous system, whereas green and blue colors release tension and have a calming physiological effect. However, direct connections between the brain and the body exist and reactions take place independently of thought or deliberation. (Birren '55)

17.   Third Conclusion

Changing the atmosphere in a room using color and light will influence one's mood and subsequently influence one's physiological status and nervous system. Some colors are capable of increasing one's blood pressure, breathing and heart rate. The rise is relative to the intensity of the colors. If so, energies produced from color are influential in ways that are beyond the sense of sight alone. Therefore, my conclusion is that arranging a colorful spotlight is likely to intensify an evoked emotion.

18.   Why is it relevant to relate these three conclusions to book reading?

The first conclusion confirmed the fact that it is possible to attain a measure of feeling. The next two conclusions demonstrated that it is possible to enhance or change that feeling using music and color/light.

The question that needs to be answered now is: Why apply these conclusions specifically to book reading?

As mentioned in the introduction, the objective of this study is to achieve a slightly different reading experience than the experience as we know it today. This is mainly to discourage the feeling that the slowness of reading no longer suits fast-paced modern lifestyle.

A few reasons lead me to apply the new method of creating atmosphere to book reading:

1) As previously described, a very strong relationship exists between hearing and the arousal of feelings. By connecting silent reading to sound and color, the segment being read will be felt more intensely. This can be demonstrated using the same example used above: if, while reading about an injured person, the appropriate sound of pain will be heard, the reader will experience an intensified feeling while reading this section.

2) Demonstrating the different feelings we experience in different situations: Amos Oz said that one never reads the same book twice, because each time he himself is a different person: he is in a different location, he is experiencing something different, etc. The sound and light that accompany the course of reading can illustrate this, and strengthen the different reading experience created every time. Regarding the same book, a different melody will be produced each time I read it, and my memory regarding this book will change.

3) Music imposes order in the imaginative space, which can be taken advantage of during reading. Music has the power to cause emotions to well up within us. These feelings color our moods, affect our perceptions and generate a behavioral pattern. Music can produce various emotional responses in different individuals and even different responses in the same person at different times. Music may produce expressions of various emotions - peaceful, relaxing, exciting, festive, boring, unsettling, stimulating, invigorating, and so on. Music has the power to create an inner world. Authors that 'hear' the sentences they write as if someone was reading them out loud often write better than authors that only 'see' their sentences.

4) The psychology of reading and understanding text: Another assessment in the process of reading relates to the two partners involved in the process – the reader and the text. The quality of both the reader and the text is extremely important regarding the efficiency of reading. Reading, therefore, unites the reader and the text. The special characteristics of both the reader and the text determine the outcomes of this encounter. This means that a different atmosphere will be produced among different readers.

5) Music causes its listeners to activate the creative and organizing part of our soul. Psychoanalysts relate to this activation as Projective Identification[7]. Concerning the book, a person is likely to feel much more involved in the story as a consequence of the atmosphere, and by projecting identification on to the book.

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[7] A psychological term first introduced by Melanie Klein of the object relations school of psychoanalytic thought in 1946. It refers to a psychological process in which one person projects a thought, belief or emotion to a second person or object.

19.   The uncompleted experiment

After developing a complete theory and coming to the conclusion presented above, I returned to the professors whom I initially interviewed, in order to ask them whether this equation seems theoretically plausible.

The researchers I interviewed all agreed that this proposal is theoretically applicable. And yet, in order to make a solid and final conclusion, an experiment needed to be conducted. This experiment is comprised of two parts: First, there is a need to examine whether the place in the book that is supposed to evoke a certain emotion does in fact produce the predicted response (of course this emotion could change slightly among different people). The second part of the experiment would be to examine whether the manipulation conducted on the reader via music and light will indeed intensify the aroused feeling. Theoretically, this model is workable. However, every new idea needs to be proven empirically. This project is indeed based on an in-depth investigation, seeking to discover and design a new form of experiencing reading; nevertheless, the research remained on a theoretical level up to this point. The next step in this project should have come to fruition by conducting an experiment on subjects in a physiological lab.

20.   The Product - General

The product I am presenting as a developing process creates atmosphere. The purpose of creating the atmosphere is to change and renew the experience of

reading. The reason is the fast pace in which we live our lives today cannot tolerate the slowness involved in the process of reading. The designed product will contain two elements that are essentially different from each other: One element determines what the atmosphere will be; the other element creates that atmosphere. The colored light and music are manipulations intended to influence the reading process. The same emotion that was initially created will be reinforced. The technological system will decide which emotion was created and change the atmosphere – the music and the colors – according to the identified emotion, so that in fact the emotion that was created – will intensify.

21.   How does it work?

The computer translates the biometric indications and transforms them into an audio visual display. The information is transformed from the reader's body by means of wireless methods to the computer. The receiver inside the product obtains the measurements and produces an audio visual display using amplifiers and Led lights. A battery inside the product radiates energy to the amplifiers and light.

22.   Advantages of the product

The objective of this product is to enhance feelings during reading. In this way, the reader's emotional involvement peaks, causing him to feel more involved in the story. This product is actually comprised of two objects, whose joint function constitutes a complete product that operates on a subject during reading. One object reads physiological measurements generated in the body, thus recognizing a particular feeling. The second object perceives the measure identified and relays a relevant audio visual response.

Initially, I would like to present the hand device. This device's function is to perceive the physiological measurements that the body transmits, and to determine what the atmosphere will be (a different device will produce the atmosphere). This is actually a 'mediator product' – between the subject and the atmosphere that will be formed. This device is capable of 'measuring the

subject' and accordingly determines what atmosphere will be created. The device is designed as a kind of jewelry, which is flexible and pleasant when worn on the hand. The device touches the hand in the four points in which physiological measures are calculated to evaluate a feeling:
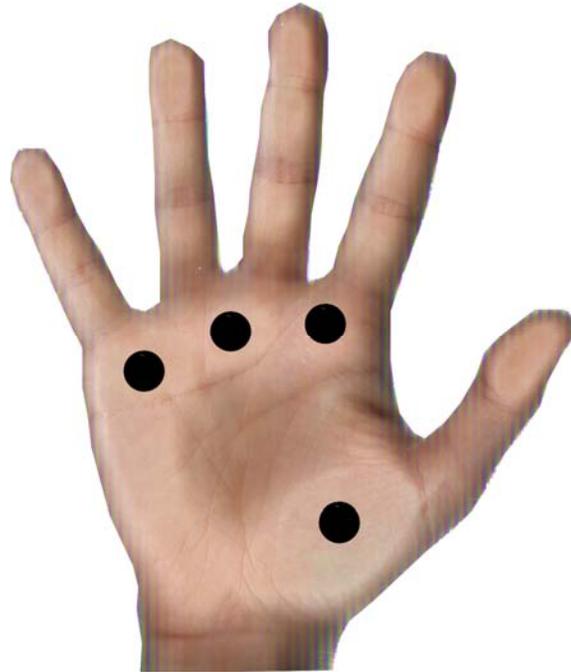
One product (the hand device) is responsible for deciding on the appropriate atmosphere. The other product creates that atmosphere by emitting suitable sounds and colors. The product that produces the atmosphere could actually be formed in any shape. I want to present the option of a possible axis, representing potential products. I will present both poles of the axis, and offer a possible

design for each of the poles. In this way, the mid points should also be understood.

The two other products represented here present two poles of an axis that could potentially contain almost an endless range of products. At the one pole there is the small, minimal, hi-tech mobile device, which can be carried anywhere. This is the 'disappearing object' – like many other electronic mobile devices, it is dressed on the body and virtually invisible. This device has a direct functional objective. In this example, the product on this end of the axis is designed as a rounded earphone, which has a Led bulb at the end of it intended to light the page of the book being read. The product has a direct function: to accompany the reader with sound and color, and no more. The earphones include loudspeakers that produce the sounds; and light that changes its colors according to the feeling that was identified. It is possible to direct the light source; and the music is stereophonic, meaning it can be heard from both ears.

Far away on the other side of this axis, resides the 'primitive', massive product. It is portable, but only within a limited space. In this example, the product on this end of the axis is designed as a large pillow, which is fun to lie on or cuddle with while reading. It is possible to put the pillow on a bed or rug. Here too, it is possible to direct the light to the book. Since the pillow is supposed to manipulate the reader, I wanted to give it a dominant look, even monumental in some way.

The two products – the pillow and the earphone present the 'third product' in the chain, which looks like this: (1) the subject's body transfers a dispatch of feelings. (2) The hand device perceives the measure of feeling and determines what kind of atmosphere should be produced. (3) The pillow, or earphone – produces the atmosphere.
This process repeats itself over and over again.
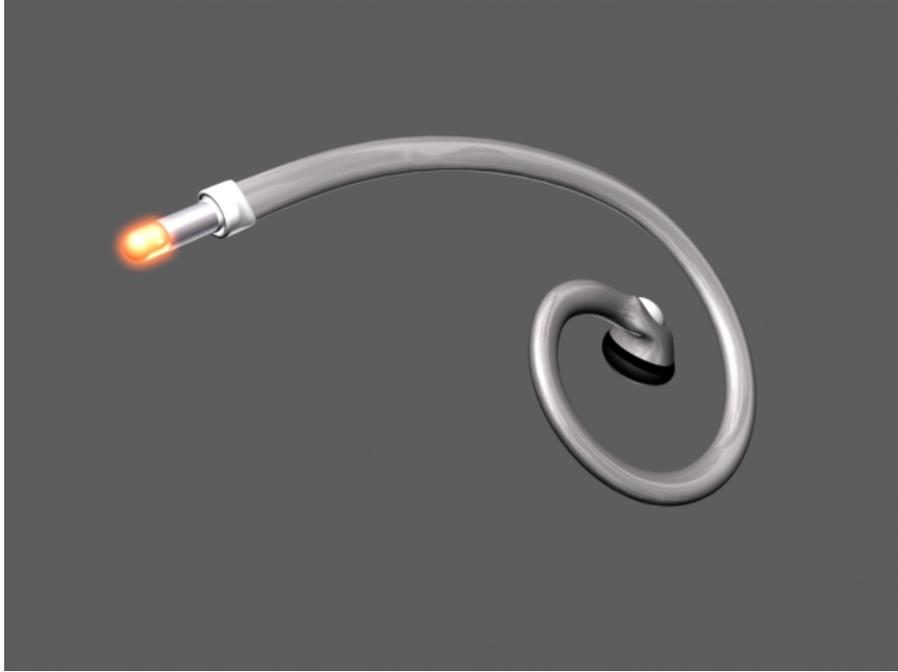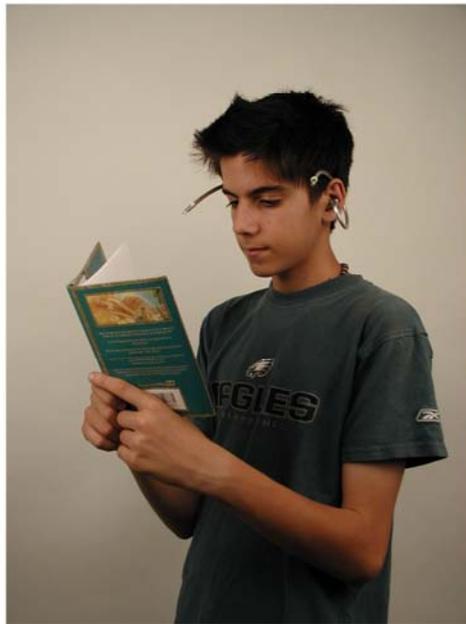
As demonstrated, I do not intend on offering a final or single solution for a product that can express the concept described in this paper. My intention is to show that there is no final solution, and that this idea can take many three-dimensional forms, that span the product axis, as previously described – from a

minimal hi-tech stylish product, to a massive, perhaps 'primitive' product, and of course all the products in-between.

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