

# The Aesthetic Experience, Emotion and an Artistic Virtual Environment

Dena Eber, Brian Betz, Gregory Little

## Abstract

In the last few decades, a number of artists have used virtual environments (VE) technology to create computer-based virtual environment art installations or what we call Artistic Virtual Environments (AVE). We created AVEs that we have used to explore the aesthetic experience for participants and how it is tied to their emotional response and thus, the emotional content of the AVE. This may shed light on how artists can use emotional content to facilitate the aesthetic experience for viewers.

Our research indicates a correlation between presence, the aesthetic experience, and emotional response. This paper will focus on the findings from a series of studies, two quantitative and two qualitative, that relate to the emotional content of the AVE, the emotional response of the participants, and how both are tied to aesthetic experience.

## Introduction

In the last few decades, a number of artists have used virtual environments (VE) technology to create computer based virtual environment art installations or what we call Artistic Virtual Environments (AVE). We created AVEs that we have used to explore the aesthetic experience for participants, which is tied, in many cases, to the emotional content of the AVE and the emotional response of the participant. In other words, we are noting if emotion, presence, and the aesthetic experience are related for participants of an AVE.

AVEs are a relatively new medium with new aesthetic, creative, and intellectual problems to solve and questions to ask. In particular, the description of emotion and how it relates to the aesthetic experience will shed light on some of the unique factors of the VE art form. It will also show ways in which emotional content might facilitate the aesthetic experience and emotional response might be indicative of the aesthetic experience for participants of AVEs.

Our research indicates a correlation between presence and the aesthetic experience. It is this correlation that has lead us to question if the VE technology portion of the artwork is indeed what facilitates a more thorough and rich experience for the viewer. Inherent in this exploration is the content of the art. We have used and will continue to use what we feel is art infused with

meaning and emotion. The emotional content of a work of art may play a factor in facilitating the aesthetic experience. It is this factor that we will give special note to in our current and future research.

At the time of publication, we are in the process of this new phase and have some final quantitative results; however our overall results are not final. Thus, the paper will focus on the findings from a series of studies, two quantitative and two qualitative, that relate to the emotional content of the AVE, the emotional response of the participants, and how both are tied to aesthetic experience.

## Methods

We used qualitative and quantitative methods to explore the aesthetic experience for participants. The qualitative portion followed a phenomenological model (Bogdan & Biklen, 1992), in which the researcher attempts to understand the meaning of an event, person, or process to people in a given situation. The specific instance of the phenomenon is a case. For this study, the case was the aesthetic experience and the emotional response of viewers in an AVE. We studied many instances of this phenomenon, thus rendering it a multi-case study. The data includes interviews, the art installation, surveys, and field notes from researcher observations.

**AVEs are a relatively new medium with new aesthetic, creative, and intellectual problems to solve and questions to ask. In particular, the description of emotion and how it relates to the aesthetic experience will shed light on some of the unique factors of the**

For the quantitative portion we used a 5-point Likert scale questionnaire that measures the extent to which the participants had an aesthetic experience. The questionnaire also includes the Independent Television Commission - Sense of Presence Inventory (ITC-SOPI), developed by Lessiter et al. [1], and Telegen's Absorption Scale. [2]

## Definition of Terms

Because we analyzed both emotional response and emotional content in an AVE, we used the following working definition of emotion. It is characterized by physiological arousal, changes in facial expressions, gestures, posture, and subjective feelings. For the most part, we focused on emotional feelings, which is defined as a person's private subjective feelings. The eight primary emotions are disgust, anger, anticipation, joy, trust, fear, surprise, and sadness. [3] Much like mixing colors, more complicated emotions are combinations of the eight primary emotions. For example, fear and surprise will yield awe. It is this entire gamut of emotion that we probed in our participant responses.

Because emotional content in any art form is not an easily defined entity, we relied on the emotional response of the participant to determine emotional content. In other words, if the participant responded in an emotional way, then she must have encountered emotional content in the AVE.

Virtual environments (VE) have gained recognition as computer simulated worlds that can be used for diverse applications such as training pilots for national defense, gaming, training workers in hazardous operations, visualizing complex information and scientific data, treating patients suffering from post-traumatic stress, and simulating military war games. Since the early developments of VE technology, artists have used it to create computer based virtual environment art installations or what we call artistic virtual environments (AVEs).

By the aesthetic experience we mean an instant in which a person may feel "A combination of interest and pleasure and curiosity...The moment is one of heightened attention to perception, which is what makes it both meaningful and memorable." [4] For some this means getting lost in the visual elements, and for others it is highly emotional. It is this emotional response from the participant that will key our analysis into the emotional content and thus the aesthetic experience for the viewer.

Another way to observe the aesthetic experience in relation to the emotional content is through the flow experience. [5] Although complex and multifaceted, the aesthetic experience for a viewer may be characterized by a finely tuned state of consciousness, or an experience in which the person is in awe, intensely focused, and in pure enjoyment. [6] Csikszentmihalyi also refers to this state as the flow experience. As our research shows, this kind of response is tied to the emotional content.

Csikszentmihalyi defines the flow as an optimal experience, "when the information that keeps coming into

awareness is congruent with goals, psychic energy flows effortlessly." [7] When a person is in the flow state, she displays a number of characteristics such as intense curiosity, intrinsic interest, a sense of control, a distorted sense of time, and focused attention. [8] Although the flow state is usually something experienced by those involved in an activity they find stimulating, such as challenging sports, making art, and challenging work, the same attributes may be applied to somebody who is highly engaged and involved with enjoying music, sculptures, or other forms of art.

By presence we mean the extent to which the viewer feels encompassed in the space provided by the AVE, or "the level of personal presence within the synthetic or remote environment." [9] Viewers who experience a sense of presence as they encounter an artwork, or those who are having an aesthetic experience, also seem to work on a different scale of time. People who are so wrapped up in the work of art that they lose a sense of time display one aspect of flow, and thus the aesthetic experience. They feel free from the past and the future and experience emotional detachment from daily routines based on time. [10] This is one way in which presence and the aesthetic experience are related and perhaps indicative of each other.

## Quantitative Analysis

Below we will describe two quantitative studies in which the relationship between the aesthetic experience and psychological presence was examined. In both studies the aesthetic experience was described to subjects as being one that is very emotional for the participant and that is characterized by "feeling deeply about all that happens." Thus, our quantitative research has focused on emotional feelings, defined above as an individual's subjective feelings. For Study 1, 100 subjects explored a desktop version of Little's The Dance of the Body w/o Organs. After experiencing the AVE, a questionnaire was administered which asked subjects to rate on a 5-point Likert scale the extent to which they had an aesthetic experience. In addition, the questionnaire included the Independent Television Commission - Sense of Presence Inventory (ITC-SOPI), developed by Lessiter et al., and Telegen's Absorption Scale.

The ITC-SOPI employs four factors to measure presence:

- Physical space; for example, "I felt I could have reached out and touched things (in the displayed environment.)"
- Engagement; for example, "I felt myself being drawn in."
- Ecological validity; for example, "The content seemed believable to me."
- Negative effects; for example, "I felt nauseous."

The absorption scale contains 31 items that require a true or false response. High absorption scores point toward a capacity for imaginative involvement, openness to experience, and imperviousness to distracting events. Absorption is viewed as a personality trait that, contingent upon environmental cues, may predispose individuals to experiencing altered states of reality. [11]

## Results

Pearson's Product Moment correlations were used to test for significant associations between ratings on the aesthetic experience measure and the ITC-SOPI presence scales. As predicted, significant positive correlations between ratings on the aesthetic experience measure and spatial presence ( $r = .49, p < .01$ ), engagement ( $r = .47, p < .01$ ), and ecological validity ( $r = .31, p < .01$ ) were found to be significant. A significant correlation was not found between aesthetic experience and negative effects. Thus, with the exception of negative effects, all aspects of presence measured by the ITC-SOPI were found to be associated with ratings on the aesthetic experience scale. Because negative effects measure such experiences as feeling dizzy or nauseous, it was not expected that negative effects would be related to the aesthetic experience

**By presence we mean the extent to which the viewer feels encompassed in the space provided by the AVE, or "the level of personal presence within the synthetic or remote environment." Viewers who experience a sense of presence as they encounter an artwork, or those who are having an aesthetic experience, also seem to work on a different scale of**

Pearson's Product Moment correlations were also used to test for significant associations between ratings on the absorption scale and the ITC-SOPI presence scales. As predicted, significant positive correlations between the absorption scale and spatial presence ( $r = .19, p < .05$ ), engagement ( $r = .19, p < .05$ ), and ecological validity ( $r = .17, p < .05$ ) were also observed. A significant correlation was not found between the absorption scale and ratings on the aesthetic experience measure. Thus, subjects scoring higher on the absorption scale experienced a higher degree of presence in the AVE, but high absorption was not related to aesthetic experience.

Our second study was a 2 (interactive vs. non-interactive) by 2 (descriptive vs. symbolic cognitive set) design in which there was a total of 80 subjects. To compare an AVE with traditional art, interactivity was manipulated. AVEs are interactive by nature, but traditional art typically does not involve interactivity. Thus, subjects either interacted with an AVE or viewed a video file of the AVE. We were also interested in exploring if the cognitive set of subjects would influence subjects emotional response to the AVE (i.e., the aesthetic experience). Cognitive set can be defined as specific mental predisposition one uses in approaching a situation. In the descriptive cognitive set conditions subjects were asked to focus on describing what they see and not to be concerned with interpreting the meaning of the displayed environment. In the symbolic cognitive set conditions subjects were as to focus on the possible meaning and symbolism of the displayed environment. It was predicted that a significant interaction would be found between interactivity and cognitive set such that ratings on the aesthetic experience would be highest in the interactive/symbolic cognitive condition. The AVE used in Study 2 was a desktop version of Betz and Little's Invisible Guests.

After either interacting with the AVE or viewing the video file subjects completed the same questionnaire that was used in Study 1. Thus subjects rated on a 5-point Likert scale the extent to which they had an aesthetic experience and they completed the ITC-SOPI as well as the Absorption Scale.

An Analysis of Variance did not reveal a significant interaction between cognitive set and interaction on the aesthetic experience ratings. Thus, our hypothesis was not supported. Nevertheless, a significant main effect for cognitive set was found; subjects in the symbolic cognitive set conditions had higher ratings on aesthetic experience than subjects in the descriptive cognitive set conditions.

As with Study 1, Pearson's Product Moment correlations were used to test for significant associations between ratings on the aesthetic experience measure and the ITC-SOPI presence scales. Positive correlations between ratings on the aesthetic experience measure and spatial presence ( $r = .57, p < .01$ ), engagement ( $r = .65, p < .01$ ), and ecological validity ( $r = .27, p < .05$ ) were found to be significant. In addition, positive correlations between the absorption scale and spatial presence ( $r = .40, p < .01$ ), engagement ( $r = .48, p < .01$ ), and ecological validity ( $r = .27, p < .05$ ) were also observed. Contrary to the findings of Study 1 a significant correlation was found between the absorption scale and ratings on the aesthetic experience measure. Additional research is needed to further investigate this discrepancy in our findings, and, for the most part, the findings from Study 1 were replicated.

## Qualitative Analysis

As specified in the definition of terms, we used the emotional response of the participants to determine if they perceived emotional content in the AVE. Because emotional content in any art form is somewhat ambiguous, we felt that for the qualitative portion that a case-by-case perception of emotional response by the participant was the best indicator of emotional content. We explored the reactions from the participants for indications of the eight primary emotions, disgust, anger, anticipation, joy, trust, fear, surprise, and sadness, along with higher order complexities of these eight. Interestingly, most participants, when asked directly, responded that they did not find the experience with the AVE emotional. However, the ensuing discussions with the participants indicated some level of emotional response in each case.

For the qualitative portion we analyzed ten cases. For each case, the participant experienced the AVE with a head mounted display after encountering the set-up in a multi-purpose building at Kent State University. We felt that this kind of set-up would be one version of how such an artwork would actually be installed.

During the experience, the researcher observed each participant and was able to simultaneously observe what he was viewing in the HMD. The researcher noted body gesture and comments by the participant, however, did not speak to her during the experience. After the encounter, however, the researcher discussed the experience with each participant. In general, each participant responded emotionally to some degree and that degree was, in each case, correlated to her aesthetic experience and sense of presence, which was the most significant finding. The gamut of emotional response was great and included all of the primary emotions. Examples of some of those responses and the level of each accompanying aesthetic experience follow.

One participant (P2) who was particularly involved with the AVE showed a strong sense of negative presence coupled with a number of negative emotional responses. Her aesthetic experience was clear through her stated intense curiosity, a measure of flow and her sense of feeling part of the art, a distinct characteristic of the aesthetic experience. Her presence, however, was mostly apparent through her admitted dizziness and sensation of vertigo, which is an ITC-SOPI measure of negative effects. Her tense body gesture and sudden movements suggested fear, a primary emotion. When I probed the participant about her gestures she said that they were in reference to a lack of control and fear that built to a crescendo when, at the end, her basic concern was to get out of the AVE. About this turning point she said desperately that, "my reaction was to get out of there [the AVE]." During our dis-

ussion she revealed that the vertigo frightened her yet she was curious to discover the source of her disorientation.

This participant had an aesthetic experience coupled with a powerful negative emotional response. Art reflects the entire range of emotions and a sense of fear and curiosity is certainly a valuable and engaging experience. One of the more interesting things about this participant is that her aesthetic experience, sense of presence, and her emotional response seemed not only equally strong, but were equally negative in a full and appealing way.

In contrast, another participant (P3) had the same sort of passionate response, but also included the humorous and joyful end of the scale. P3 had a very high attention focus, a characteristic of flow, as indicated by his lack of awareness of things outside of the AVE. About halfway through his time with the art, a person with a very loud and disturbing utility cart passed inches from P3. As we observed the participant, we feared that his experience was interrupted, however, we saw no indication of it. When we asked him if he recalled a time while he was in the AVE if he heard a loud noise from the outside he responded with, "what noise?" In addition to this and other aspects of flow, P3 gave indications that he was highly present as he felt that the space was believable (ITC-SOPI, naturalness) and that he was physically in the environment (ITC-SOPI, physical space).

P3 clearly had a strong aesthetic experience, but also displayed a high level of emotion. Much like the last participant (P2) and most of the others, he stated that he did not find the environment emotional. However, during his experience he often grinned and chuckled, followed by a few "wows," all indicating a sense of surprise, enjoyment, and humor. When we asked him about our observation, the participant described the scene we observed and he recalled that he found it funny and very curious, prompting him to analyze the scene.

P3: It was kind of funny to see the bulls running around in circles in a head. What are they doing there (chuckle)?

I: Oh the bulls!

P3: Curious, what does that have to do with the human body? Could it be a dream or maybe a subconscious something?

P3 indicated other parts of the AVE that he felt were humorous and he explained these instances with a high level of excitement in his voice as our discussion progressed. The participant used elegant and descriptive language to illustrate what he encountered in the AVE. He noted intense colors and severe angles, which are both used as emotional devices in art. In fact, part of his description included, along with the humor, a bit of fear.

P3: It was interesting. I think it made it, with all the bright colors and different angles, also scary. After you realize this, everything kind of makes more sense.

This impression of fear tied with the humor described earlier mirrors the feeling of a movie, *What Dreams May Come*, which P3 associated with the AVE. With both a semi-dark and comical slant, it is a story that explores life after death. With Robin Williams playing a lead roll, the movie is often amusing, but at the same time scary and sad as it addresses first the death of a child, then the father (Robin Williams), followed by the mother's (Annabella Sciorra) suicide. The afterlife is depicted in a visually stunning way and the viewer gets lost in this metaphysical aesthetic beauty while grappling with a wide emotional spectrum. The film is highly poignant and touches on a full range of feelings. A comparison by P3 of this nature is a clear indication of how he perceived powerful emotional content, which seems to be tied with his deep level of immersion as his responses to ITC-SOPI indicators (physical space and naturalness) identified. P3 felt fear, joy, excitement, and humor as he found the world enjoyable, funny, and a bit scary.

As mentioned earlier, all ten participants in the qualitative portion had some level of aesthetic experience, even if only slight. Thus far we have described two participants with a high to very high level of immersion and emotional response. Participant number eight (P8) was one partaker who displayed a lesser, yet highly significant aesthetic experience.

During our discussion, it was evident that P8 was highly involved with the exploration of the space rendering a moderate level of presence in engagement. She also felt in the world, which is a description of the physical space. Both engagement and physical space are ITC-SOPI dimensions. She also described a sense of curiosity and control, which are both measures of flow. Although she indicated these senses, the potency was not as high. P8 mostly described the mechanisms of the space, such as movement, and did not get into much about the art and her experience with it or interpretation of it. Hence she had a sense of involvement, albeit a mild one.

This coincides with what we observed on an emotional level. This participant indicated a sense of surprise by a few gasps and body jerks during her time in the AVE. However, when we probed her about these reactions, she did not seem overly enthusiastic and felt that the movements were nothing out of the ordinary. That said, she indicated excitement over what she described as the psychedelic aspects of the AVE. In fact, this is where she displayed the most interest and enthusiasm, both in her voice and in the level of detail, relative to this participant. When asked to describe her experience, she quickly and resolutely responded that it was psychedelic, then further expanded this idea.

**Intelligent Agent 5.1.1**

**As mentioned earlier, all ten participants in the qualitative portion had some level of aesthetic experience, even if only slight. Thus far we have described two participants with a high to very high level of immersion and emotional response. Participant number eight (P8) was one partaker who displayed a lesser, yet highly sig-**

I: Could you describe the experience for me?

P8: Psychedelic.

I: Psychedelic in what way?

P8: Hearing all the different voices and the birds and how everything was changing [seemed quite intriguing.] I wanted to understand the voices yet I thought that they might be connected with the birds. [From notes] This dynamic kept changing and it all happened in a body.

P8: Well, I think that it wasn't just a body. That's why I said psychedelic because it was more than the body; it was the words on the side and the voices [From notes] and birds and how it all came together.

P8 experienced what she saw as psychedelic content. Psychedelic is defined as 'mind revealing' or 'mind manifesting' and the word is used to describe enhanced perception and imagination induced by ecstasy with or without the use of drugs. [12] We do not mean to suggest that P8 was feeling ecstatic, but the sense of heightened observation she displayed and referred to indicate a level of excitement, perhaps confusion and a bit of intrigue. If P8 found the world psychedelic as she explained, then she responded on some emotional level, even if only minimal. This is significant because it parallels her level of presence and her aesthetic experience. P8 stated that she was a novice about art and almost never sought viewing it in any form. She further seemed less than enthusiastic about what art could do for her. Perhaps the technology involved with the AVE played a role in building a bridge for P8 to have some memorable instant with the art. Of course we cannot say much about this speculation with these data, however, we are probing this question in our current research. It could suggest that meaningful AVEs filled with emotional or otherwise evocative content might act as a bridge to encourage engagement, not only in art but other overlooked areas. In other words, could the technology garner enough interest from a viewer so he spends time with the art and eventually finds that he are in fact interested in the content as well? Conversely, could less than meaningful VEs have the opposite effect? The participant might be attracted to the technology but her inter-

**ve.eber\_bet\_z\_little.05**

est could quickly fall away due to lack of intriguing content. These are all provocative conjectures for further inquiry.

## Discussion and Conclusion

The aesthetic experience is a multifaceted and complex response to a work of art that is characteristic of a heightened sense of awareness and a feeling of awe over the art. Part of that experience includes an emotional reaction from the viewer that is indicative of emotional content. Is it this emotional content that is part of what helps a person have a fuller experience with the art? Perhaps. However, anticipation, surprise, and fear are among the eight primary emotions (disgust, anger, anticipation, joy, trust, fear, surprise, and sadness) and are arguably experiences video game participants feel when they are engaged with mindless and often shallow video games. Maybe if the game is shallow then the anticipation, surprise, and fear dissipate and the experience becomes superficial over time. On the other hand, this level of immersion and aesthetic experience might be valuable to some, even if not to others.

What is certain is that emotional response from a viewer implies emotional content in art, thus holding the participants' interest. In the qualitative portion of the study, each participant displayed some level of

presence and some kind of aesthetic experience, even if negative. Correlated with these factors was an equal emotional response both in the type and intensity of it. The examples illustrated in this paper show how the response could be negative (P2), how it could be mixed with seeming contradictory emotions such as joy, fear, sadness, and excitement (P3), and a very mild experience coupled with a low level of emotional response (P8). This last case implies a possible way in which the characteristics of an AVE might reach out to people who are otherwise not interested in art, and more far reaching into other scenarios such as learning. As explained in the qualitative analysis, these data do not answer this speculation, however, they serve to encourage further exploration into the capabilities of the medium to help deliver a meaningful message.

A general summary of our quantitative research would be that emotional involvement (i.e., the aesthetic experience) is clearly related to a sense of presence in AVEs. It should be recalled that the aesthetic experience was described to subjects as being characterized by strong emotions. Thus, our results indicate that emotional feelings are related to a sense that an AVE is a physical space (i.e., special presence), that a participant is drawn into the space (i.e., engagement), and that the content of that space seems believable (i.e., ecological validity).



The cognitive set adopted by participants is also of importance; a focus on meaning and symbolisms appear to heighten the emotional involvement of participants. Perhaps a focus on meaning rather than mere description is more likely to cue memories that are of personal significance and hence more likely to produce subjective feelings. More research is needed to determine how cognitive set may be instrumental in altering viewers' emotional reaction to art and the specific mechanisms involved in producing certain reactions. This has obvious applied value in that statements made by artists about their work may play a role in determining a participant's emotional reaction to the work.

In terms of traditional versus non-traditional art we are currently designing a study to explore this issue in greater depth. In Study 2, video clips were used as example of traditional art and in our current study we wish to use still images. It is possible that still images may be just as emotionally involving as time-based media. It is also possible that individual differences may exist in viewing still images and the aesthetic experience. For example, experience and education in viewing art may be a factor in determining subjective emotional reactions.

An AVE is particularly primed to act as a mediator for intense encounters with artworks. The technology provides interaction and immersion that help focus the viewer and encourage participation. Though this immersion and response, the user is more likely to become engrossed and "get lost" in the work of art to reach an aesthetic experience. If the content is meaningful, the participants tend to spend more time with the work and have a fuller experience. Part of what makes content meaningful is the emotional dimension, which is ultimately determined by the emotional response of the viewer. Our research shows that there is a correlation with the aesthetic experience, presence, and emotional response. What we need to further investigate is if the technology of the AVE helps bring the viewer closer to that rich, meaningful, and emotional content. To do this, we are in the process of comparing responses from the AVE to responses from traditional art.

The aesthetic experience is a state that most artists hope people will reach when viewing their work and one that museum curators and educators attempt to facilitate for visitors to museums. The part of the experience that is the emotional response may be an important factor in facilitating a rich encounter with the art. Studio art instructors also try to make students aware of the experience if not for themselves, at least for the audience who view their work. This is significant beyond the art realm as such an emotional response might also aid in an aesthetic experience with other forms of VEs that vary in applications.

Dr. Dena Eber, Bowling Green State University,  
Bowling Green, OH  
Dr. Brian Betz, Kent State University/Stark Campus,  
Canton, OH  
Gregory Little, Bowling Green State University, Bowling  
Green, OH

## References

- [1] J. Lessiter, J. Freeman, E. Keogh, and J. Davidoff, "Development of a new cross-media presence questionnaire: The sense of presence inventory." Presentation at *Presence 2000 - the 3rd International Workshop on Presence*, Technical University of Delft, Delft, Netherlands, 2000.
- [2] A. Tellegen, Brief manual for the differential personality questionnaire, unpublished manual (Department of Psychology, University of Minnesota: Minneapolis, MN, 1982)
- [3] D. Coon, *Essentials of Psychology* (Thompson / Wadsworth: Delmont, CA, 2003)
- [4] K. Walsh-Piper, "Museum Education and the Aesthetic Experience" in *Journal of Aesthetic Education* 28 (1994), p. 105-115
- [5] M. Csikszentmihalyi, *Flow: The psychology of optimal experience* (Harper & Row: New York, 1990)
- [6] John Dewey, *Art as experience* (Minton, Balch & CO: New York, 1934). M. Csikszentmihalyi and R. Robinson, *The Art of Seeing* (Paul Getty Museum: Malibu, CA, 1990)
- [7] M. Csikszentmihalyi, *Flow: The psychology of optimal experience* (Harper & Row: New York, 1990)
- [8] Ibid. [7]
- [9] R.S. Kalawsky, *The science of virtual reality and virtual environments* (Addison-Wesley Publishing Company: Wokingham, England, 1993), p. 3
- [10] M. Csikszentmihalyi and R. Robinson, *The Art of Seeing* (Paul Getty Museum: Malibu, CA, 1990)
- [11] E. Hirschman, "On the acquisition of aesthetic, escapist, and agentic experiences" in *Empirical Studies of the Arts*, Vol 1(2) (1983), p. 157-172
- [12] H. Osmond, "A review of the clinical effects of psychotomestic agents" in D. Solomon (Ed.), *LSD-The Consciousness Expanding Drug* (Putnam & Co Ltd.: New York, 1964)