

VIDEO GAME PLAY AND CONSCIOUSNESS DEVELOPMENT: A TRANSPERSONAL PERSPECTIVE

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ABSTRACT: The development of consciousness to higher states is thought to be a natural process by some contemporary psychologists with a transpersonal orientation. Such “higher” states of consciousness can be enhanced with the right cultural amplifier. The most often examined amplifiers are the effects of prayer and meditation. But tools, from early attempts at record keeping with knots in ropes through today’s computer mediated communications, also affect cognition and thus ultimately consciousness. In this article the hallmark of electronically mediated interactive environments is examined in terms of its implications for the development of consciousness. That tool is video game play.

The connection between various forms of electronically mediated communication, especially video games, and higher states of consciousness (HSC) will be explored in this paper. In this article HSC is viewed globally as the experience, perception, and appreciation of a reality beyond what is commonly attained but which emerges as a result of developmental processes. It is proposed that lengthy exposure to video games, as the most commonly accessed electronically mediated communication endeavoring to create a virtual reality (VR)¹, may be a cultural amplifier for experiences of HSC. Before this is taken up, we must ask: How do we go from the simple definitions of consciousness available in introductory psychology texts such as “awareness of external and internal stimuli” (Matlin, 1995, p. 134), and their focus on the role of attention, to the notion of higher stages of consciousness, which may or may not be mystical? That is, the development of HSC may be marked by the emergence of experiences that transcend the ordinary in what appears to be an almost magical or “mystical” sense but they may also develop in subtle ways, but ways that enrich one’s life and are clearly healthy and functional (Alexander, Boyer, & Alexander, 1987).²

One attempt to understand consciousness as more than attention is to integrate a variety of disciplinary perspectives (e.g., Hunt, 1995). In fact, interdisciplinary approaches to the study of consciousness are increasingly becoming recognized as necessary in order to truly comprehend the nature of consciousness and its possible development. Although early psychology focused on the problem of consciousness it went out of favor as an area of inquiry until revived by cognitive and transpersonal psychologists. These two areas of focus in psychology, unfortunately, share few thinkers, journals, departments, or other more formal areas where researchers might discuss their

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mutual fascination with the problem of consciousness. A few notable exceptions exist, such as the Consciousness Studies Department at the University of Arizona, its biennial conferences entitled “Toward a Science of Consciousness” (<http://www.consciousness.arizona.edu>), and the *Journal of Consciousness Studies*, a multi-disciplinary publication dedicated to examining controversies in the sciences and humanities on the topic of consciousness.

Empirical research over the past 35 years has been examining experiences of higher states of consciousness, especially as achieved through the practice of meditation (reviewed in Murphy & Donovan, 1988, and in second edition Murphy, Donovan, & Taylor, 1997). Alexander et al. (1990), among others (Walsh & Shapiro, 2006), used eastern esoteric perspectives to inform western psychological developmental models with Alexander et al. arguing that the growth of higher states of consciousness is a natural phenomenon available to all. Further, his group argues that central to meditation is the experience of the transcendent or what is more commonly called the mystical experience.

Regarding these marker experiences of higher states of consciousness, Alexander et al. (1990) point out that to describe these states as “mystical” is a misnomer, for they transcend ordinary thinking in no more mystical a way than abstract thinking transcends sensory-motor behavior in infancy. This is the perspective taken in the current paper. That is, mystical or transcendent experiences are not supernatural or anything other than part of the normal developmental process. Historically most researchers on mystical experiences consider them isolated or infrequent experiences. The Alexander group (Alexander et al., 1990) was one of the first (see also Wilber, 1986 among others) to describe them in the context of a general model of development with their permanent establishment in an individual as a sign of the first higher state of consciousness. In terms of incidence Alexander and colleagues quote Maslow, who felt that in the population at large fewer than one in 1,000 have such experiences frequently so that the “full stabilization of a higher stage of consciousness appears to be an event of all but historic significance” (Alexander et al., 1990, p. 310).

An important methodological point regarding this body of work is that virtually all researchers in the group of Transcendental Meditation researchers are very careful to distinguish the practice of meditation from the experience of transcendence to HSC (e.g. mystical experiences), explaining that the former merely facilitates the latter (Gackenbach & Karpen, 2007). These meditation researchers go to great pains to show that their multiple correlations of health and well-being are more strongly connected to the transcendent experience than to the entire practice of meditation (for psychophysiological review, see Wallace, 1987; for individual difference review, see Alexander, Boyer, & Alexander, 1987; for theoretical review, see Alexander et al., 1990; for educational reviews, see Dillbeck & Dillbeck, 1987; Nidich & Nidich, 1987, 1990; for a recent compendium of developmental applications, see the special issue of *Journal of Social Behavior & Personality*, 2005, 17(1). This point is pertinent to the thesis of this article because there are other practices, or cultural amplifiers, which can have similar, if perhaps less powerful, outcomes.

In this case electronically mediated communication experiences, as most exemplified in video game play, are suggested as one such cultural amplifier.

The idea that technology mediates consciousness and creates at least altered states is not new. Probably beginning with the hemisync technology of the Monroe Institute (<http://www.hemi-sync.com/store/home.php>), a whole generation of mind machines has emerged. For instance, Persinger (2003) has developed a technique of inducing altered states of consciousness³ of a wide variety of types, including those that have been identified as mystical, using a helmet which produces alternating magnetic fields. “The Journey to the Wild Devine” is a biofeedback controlled video game that specifically trains users to meditate (<http://www.wilddivine.com/>). More recently, Young (2005) reports that after exposure to a cell phone prior to sleep, participants went into REM sleep faster than those not so exposed. Finally, Preston (2007) talks about the work of virtual reality (VR) artist Char Davies as being designed to elicit altered states of consciousness by wearing a VR helmet and “moving” through the spaces she has created. The point here is not to pass judgment on the validity or lack thereof of such work, but to note that scientific mapping of states of consciousness alterations is underway due to the manipulation of consciousness using technologically mediated devices.

TECHNOLOGY AND COGNITION

Mediated communication, whether via modern electronic technologies or simple lines on a cave wall, have an effect on how we think. Sternberg and Preiss (2005) examine these implications. They broadly conceptualize technology as “the building of artifacts or procedures — tools to help people accomplish their goals” (p. xvii) and thus note its long influence on human development. Cole and Derry (2005) point out that tool use is “both amplifier of human action and transformative of human mind” (p. 221).

The growth curve of technologies and their absorption in society is nicely characterized by Preiss and Sternberg (2005):

Cultural tools are invented historically and transmitted from one generation to the next and acquired ontogenetically. Some tools that are commonplace to one generation were created only through a great intellectual struggle by the previous generation. As these tools become commonplace and shared by a larger group of people, cognition becomes increasingly technological. As Pea notes, “the inventions of Leibniz’s calculus and Descartes’s coordinate graphs were startling achievements; today they are routine content for high school mathematics” (p. 203).

Modern technology affects our most basic cognitive achievements like writing and mathematics: “[The] writing process as planning and reviewing with word processors involves more cognitive effort than does working in longhand” (Sternberg & Preiss, 2005, p. xiii). In mathematics, calculators and computers allow more time for complex problem solving rather than endless computation.

A main issue in evaluating the effects of technology on the mind is the increasing ability to couple our mental representational systems with technological systems that augment input data. There are many examples: absorption in a movie or TV show, chatting on a cell phone, or playing a video game. Not only are we immersed in and enjoying these augmented realities but it is becoming increasingly obvious that technology is altering our range of mental functions (Sternberg & Preiss, 2005).

The most immersive and absorbing experience of technological mediation on mental functioning that is widely available is video game play. It has been shown that, at the least, mental functions are affected. For instance, higher levels of nonverbal problem solving in the specialized cognitive ability of visuo-spatial information processing are emerging in people who play video games (Greenfield, 1996; Subrahmanyam, Greenfield, Kraut, & Gross, 2001). It is being suggested herein that the development of consciousness may also be affected by such play. As noted by Greenfield (1996), “video games make it possible for the first time to actively navigate through representational space” (p. 91) or to be “in” virtual worlds. To date, media exposure has been largely a passive, observer experience: TV, videos, and radio come at the viewer. Although channels can be changed, the actual content of the experience is fixed even in today’s vote-for-the-winner type of reality television, so any one individual’s input is minimal. This is not the case with video game play where the player is an active participant in the emerging experience. Additionally, unlike passive audio/visual electronic media such as TV and most movies, video gaming now uses three dimensional visuals thus enhancing the sense of felt presence in Virtual Reality (VR). Thus video game play represents the best place to examine the effects of electronically mediated communications on experiences of self in the “world” and thus on consciousness development.

VIDEO GAMES AND CONSCIOUSNESS ELEMENTS

As noted earlier, consciousness is viewed in cognitive and neurosciences from a range of perspectives. Although the point of this paper is to suggest that consciousness develops or grows as a function of exposure to electronically mediated environments—especially, but not exclusively, video gaming—before that can be taken on directly, other measures of consciousness and the effect of video games upon them need to be considered. Various elemental aspects of consciousness have been examined as a function of video game play, and will be taken up next. These include attention, presence, absorption, and flow.

These four aspects are interdependent. What is immediately on our mind is what is in our attention. Our attention is most often thought of as an aspect of waking face-to-face reality but it need not be. So when we are asleep in a dream, the dream events have our full attention, but we are “living” in an alternative reality which is created anew each night by the biological “machine” called our brain. Another alternative reality which can command our attention is VR. Although not fully immersive many, if not all, video games create a technologically built alternative reality that players feel present

in, as it draws their attention to the enemy approaching. Thus, presence is when our attention is fully on a virtual reality. When this happens over some period of time, the player is described as absorbed in the game. At its most absorbing and challenging, game play can induce experiences of flow, or a sense of oneness with events as they unfold. This flow experience has qualities of HSC which can be distinct from addiction. This discussion will illuminate the linkages between video game play and attention, presence, absorption, and flow.

Attention

Attention might be thought of as what is immediately on our mind; however, the capacity of attention can be altered. In a methodologically tight experiment, Green and Baveller (2003) found that habitual electronic game players experience improved visual attention capacity versus those who do not play. Additionally when non-players were taught to play a video game, they showed attentional improvements from pre-training to post.

Players need to divide their visual attention in order to play video games. Subrahmanyam, Greenfield, Kraut, and Gross (2001) reported that skilled video game players had developed such skills better than less skilled players. In order to navigate through the VR of a video game landscape, one has to divide or perhaps broaden one's attention across the landscape in order to anticipate rapid changes in the situation.

Maynard, Subrahmanyam, and Greenfield (2005) reviewed the attention and video game play literature. They found that experimental manipulations with attention as the dependent variable resulted in improved attention among those assigned to the video game playing condition. They also found, however, that the type of game can affect the outcome. For instance, they reported that in one study a battle game was better at improving attention than a puzzle game. Attention is only one small element of consciousness which has also been examined in the meditation literature (Rani & Rao, 2000) showing similar improvements in attention following meditation. There are other aspects of consciousness that video games influence.

Absorption

Psychological absorption is another, broader, conceptualization of attention. Capacity for absorption can be thought of as a capacity for total attentional involvement over time. Funk, Buchman, and Jenks (2003) pointed out that although absorption in computer game play is often reported, it is seldom directly studied. Wood, Griffiths, Chappell, and Davies (2004) found that rapid absorption into games was rated as highly important by gamers. Psychological absorption in gaming has been examined by Glicksohn and Avnon (1997) whose subjects showed significant increases in absorption

associated with video game play, relative to subjects who did not report consciousness alterations during video game play.

Preston (1998) reviewed the research on absorption and VR immersion, which is most commonly experienced in video game play, concluding that those who score high on psychological absorption:

evaluate information in a distinct way that links it to self. This strongly implies that, regarding vision, audition, touch and balance, information to more modalities increases absorption. Multimodal stimulation creates a greater sense of presence in immersive VR. Immersive VR has the potential to offer low absorbers access to altered states of consciousness like those which high absorbers experience and also has the potential to offer to us all access to a higher level of consciousness (p. 285).

This relationship suggested by Preston (1998; 2007) is empirically shown in the work of Glicksohn and colleagues, who have found a positive relationship between absorption and alternative experiences of consciousness such as hallucinatory experiences (Glicksohn & Barrett, 2003) and anomaly in subjective experiences (Glicksohn, 1993–94). Thus, when full attention is commanded in video games, players can become so absorbed that alterations in consciousness result. Glicksohn and Avnon (1997–98) found that some of their subjects reported experiences during video game play indicative of altered states of consciousness (e.g., drifting, flying, or changes in visual or auditory perception).

To illustrate, in interviews with hard core gamers, Gackenbach, Matty, Kuruvilla, Samaha, Zederayko, & Olishefski (in press) point out that when the questioning turned to attention or how absorbed they were in the game the interviewees often smiled and joked about how zoned out they could become:

The transcribers commented that she rolled on the floor laughing after reading this from one of the first interviewees “I tune out everything like there’s very little distractions if I’m really set into a game like my fiancée has tried to do...sounds silly but tried sexual advances on me and I’ll just be oblivious to her you know, she pretty much has to get in front of me or shut off the game before I realize that she wants something.”

Now to turn to the next concept, psychological absorption has been conceptualized as the waking reality equivalent of presence in VR (Preston, 1998, 2007).

Presence

The cognitive sciences use the notion of a mental model as a conceptual way to understand our sense of self in the world. Along these lines Blackmore (2004) has pointed out that our perception of reality is a mental construction, a best guess. VR, and especially immersive VR, potentially offers practice in

maneuvering around in, as well as being in, “artificial” or perhaps “alternative” technologically constructed realities. The degree to which one feels like they are in the game is discussed in the VR literature as presence.

Sanchez-Vives (2006) noted that immersive VR systems typically include at least some sort of head tracking device as well as other devices to support other sensory modalities. This basic apparatus has been applied in a wide variety of settings, including psychotherapy, medicine, entertainment, and the arts. It is interesting to note that these VR environments are not especially accurate in their representation of the details of reality, yet they are quite capable of elicitation of self-report, behavioral, and physiological responses consistent with what would be expected in reality. Witmer and Singer (1998) found that high presence in VR occurred with increases in involvement, control, selective attention, perceptual fidelity and mimicking real world experiences. All are aspects of video game play. Interestingly, VR researchers express puzzlement at the call for realism so often expressed in application areas (Sanchez-Vives, 2006; Slater & Sanchez-Vives, 2006) but to gamers and developers of games increased realism is a desirable feature.

A comprehensive model of the relationship between the potential variables that affect a person’s sense of immersion or presence in video games is offered by Ermi and Mayra (2005). They delineate three types of immersion in video games: sensory, challenge-based, and imaginative. These investigators suggest that these forms of immersion are affected by and affect various elements of the games played and real worlds. They explain that

sensory immersion [is] related to the audiovisual execution of games...
challenge-based immersion...is the feeling of immersion that is at its most powerful when one is able to achieve a satisfying balance of challenges and abilities ...
imaginative immersion... is the area in which the game offers the player a chance to use her imagination, empathise with the characters, or just enjoy the fantasy of the game (p. 8) (emphasis[i.e. bolding] in original).

Challenge based immersion in this model is essentially “flow,” which is taken up next. Thus video games can capture the player’s attention if they have features that increase the sense of presence in the game. When presence is accomplished, which of course is the goal of video game designers, researchers and players talk about being not only absorbed in the game but also being in the flow of the experience.

Flow

Conceptualized as related to psychological absorption (Csikszentmihalyi, 1988a, 1990; Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005), flow is another way of experiencing consciousness that has been reported as a result of video game play, and is central to the present thesis. Csikszentmihalyi, Abuhamdeh, and Nakamura (2005) have summarized research identifying what flow is, how you get to it, and what the outcomes are. Flow consists of three major components: the merging of action and awareness, a sense of

control, and an altered sense of time. To have experiences of flow several conditions are needed:

1. a clear set of goals,
2. a balance between perceived challenges and perceived skills, and
3. the presence of clear and immediate feedback.

As far as outcomes from the experience of flow, Csikszentmihalyi, et al. (2005) note that the literature has reported “a strong positive relationship between flow and performance” (p. 604). This includes “artistic and scientific creativity ... effective teaching ... learning ... and peak performance in sports” (p. 604). In building a bridge between video game play and HSC, two areas of research into flow will be briefly examined: media use and peak experiences.

Flow and Media Use. Csikszentmihalyi, Abuhamdeh, and Nakamura (2005) argue that cultural selections of artifacts are a function of the degree to which their use elicits flow. This theme is picked up in the communication studies literature which has examined the relationship between flow and media enjoyment for some time. In a review examining how flow might account for media enjoyment, Sherry (2004) points out that the most often cited theory in the communication studies literature is the “uses and gratifications theory.” It argues that we use media because they are fun and gratify some need but that the nature of that gratification is unclear. Sherry suggests that flow offers a construct that clarifies why we enjoy media:

It is clear from the gratifications research that media use provides an enjoyable experience. Second, the gratifications of using media to escape and to forget are indicative of the intense focus and loss of self-consciousness in media use. ... Third, many have experienced temporal distortion Finally, the entire uses and gratifications research tradition is predicated on the empirical observation that media use is at least in part, intrinsically motivating (p. 333).

He qualifies his summary of the parallels between flow and media enjoyment by saying that two factors are critical: message difficulty and usage skills. Obviously not all media experiences are enjoyable or bring on flow.

Computer use is one form of media that has also prompted research relative to flow. Flow in this literature has been associated with online web experience (Mathwick & Rigdon, 2004; Skadberg & Kimmel, 2004), hackers’ motivation (Voiskounsky & Smyslova, 2003), and use of a broad range of information technologies (Pike, 2004). Additionally several researchers, including Sherry (2004), have offered theoretical models of computer use embracing flow (Sharafi, Hedman, & Montgomery, 2006; Finneran & Zhang, 2003). Interestingly, Sherry (2004) points out in his discussion that, “some might comment that Csikszentmihalyi seemed to have video games in mind when he developed the concept of flow” (p. 339).

Several video game researchers have found such a relationship. Voiskounsky, Mitina, and Avetisova (2004), Choi and Kim (2004), and Chou and Ting

(2003) note a positive relationship between video game play and the experience of flow. Voiskounsky, et al. (2004) found flow evidenced by players in a Multi-User Domain role playing game. Choi and Kim report flow as a quality associated with continued online play by Korean gamers. Chou and Ting examined self-reports of flow on a scale they developed among the “membership of virtual communities devoted to Internet games” (p. 666). Using the same scale developed by Chou and Ting, Gackenbach and Reiter (2007) found that frequent game players reported more flow experiences while playing video games along several dimensions than did infrequent players.

Sherry (2004) noted that “video games possess ideal characteristics to create and maintain flow experiences Games that facilitate flow are likely to be adopted whereas games that don’t create flow are likely to be discarded” (p. 340). The last echoes Csikszentmihalyi, Abuhamedh, and Nakamura’s (2005) point regarding how flow mediates the selection of cultural artifacts. It is not surprising then that game developers strive to design games that will produce flow. This quote from a gamer illustrates their potential to elicit flow: “You almost zone out, ... Your mind just goes on autopilot and you just become one with the system ... Sometimes, you can’t believe the moves you’re making” (McLean, 2005).

Flow and Addiction. An important point regarding flow is the concern that, in the case of video game play at least, it can lead to addiction. Chou and Ting (2003) examined this question by developing a “cyber-game” (i.e. video game) flow scale with items specifically designed to measure addiction as well as items measuring other elements of cyber-game flow. They took an economist’s perspective testing the rational-addiction model which argues that product preferences and loyalty is a type of rational-addiction based upon repetition of a behavior and does not have the negative overtones of the use of the term in psychology and psychiatry. However, they point out that this form of addiction can become negative at its high end. Chou and Ting conclude that the experience of flow can be the link between rational-addiction, chosen repetitive behaviors by consumers, and irrational, maladaptive addiction in cyber-game play.

Using the same scale Gackenbach (2007a) found that high end college student gamers reported more flow of a variety of sorts than low end gamers. She also found less flow which is associated with addiction in high end gamers when controlling for sex and motion sickness. Thus, heavy gaming may put the player at risk for addiction due to the elicitation of flow as has also been pointed out in runners (Chapman & DeCastro, 1990). However, any potential addiction effect in gamers may be moderated by gender (men play significantly more than women), and motion sickness (less motion sickness during play is associated with higher presence, sense of being there, in VR). Additionally, Gackenbach’s research participants were college students; thus one might assume that by being in college they are managing to integrate the appeal of video games into the rest of their lives.

While addiction to video game play is an important and oft cited concern, it is equally important to keep in mind that for most players it is passion, not

addiction that is at work. In a recent study Grusser, Thalemann, and Griffiths (2007) reported in a sample of over 7000 gamers that about 12% fulfilled the criteria for addiction. Gackenbach et al. (in press) noted that a common comment from their hard core gamer interviewees was that with college they learned to control not only their anger while playing, but also their single mindedness or potential addiction to video game play.

Flow and Peak Experiences. Related to the thesis of this paper, Csikszentmihalyi (1988b; Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005) speculates that flow has implications for the evolution of consciousness. “Unless we learn to enjoy using the mind freely, yet in an orderly fashion, the evolution of consciousness is going to be hampered” (p. 605). In fact, the concept of flow appears on the surface to be similar to that of the peak experience described by Maslow (Privette, 1983).

In a detailed analysis of the common characteristics of peak experience, peak performance, and flow, Privette argues that there are both common characteristics as well as differences among these states. Common to all three is absorption, attention, or clear focus. She adds that shared by all three is joy, valuing, and the “spontaneous, effortless, letting-be of the process and the graceful, integrated, Taoistic nature of the person in the event” (p. 1366). In a later paper, with empirical data, Privette and Bundrick (1991) found overlaps among these concepts.

There are also differences between the experience of flow and peak experience, however, so that it is a mistake to view them as the same thing. Privette (1983) detailed these differences and later developed an inventory to examine peak performance, peak experiences, and flow (Privette & Sherry, 1986; Privette & Bundrick, 1991).

Several dissertations on the relationship between flow and peak experiences emerged some years after Privette’s work. Of these four dissertations, two of the authors used qualitative and two of the authors used quantitative methods. The two qualitative studies examined flow and peak/mystical experiences in practitioners of Tai Chi (Kiehne, 2003) and Aikido (Heery, 2003). The two quantitative works examined college athletes’ experiences of flow and spirituality (Sainz, 2004) and, the experience of self-selected individuals from the San Francisco Bay Area who had a knowledge of flow and were willing to examine their experiences in depth (Galloway, 2005).

From these studies it seems that there is no clear linear relationship between flow and peak/transpersonal/spiritual experiences but that they can both occur in the same group of individuals or under similar circumstances. Galloway’s study, in particular, showed that in-depth attention to flow itself can be transformative in the transpersonal sense. Privette’s (1983) original conceptual paper on the relationship between peak experience and flow offers the best understanding of similarities and differences.

To summarize these sections on consciousness associated with video game play, clearly video game play captures gamers’ attention and enhances it. This

is enabled in part by the degree of presence or immersion felt in the game with the result that over time the gamer becomes absorbed and eventually experiences flow. This absorption and flow overlap in ASC experiences and perhaps in the development of HSC at its best but may also lead to addiction at its worst. It should be noted that none of this is especially surprising as games are specifically designed to be easy to learn. The literature is clear that players who can get absorbed and into a flow in gaming learn and keep coming back for more. Not generally considered until now, however, are further potential effects on consciousness due to game play in terms of the emergence of characteristics of higher states of consciousness. These will be taken up next.

VIDEO GAMING AND POTENTIAL INDICATES OF HIGHER STATES OF CONSCIOUSNESS EMERGENCE

Some research now suggests that video game play is associated with at least one experience thought to have some relationship to the development of HSC: lucid dreaming. The term “lucid dreaming” has been somewhat variously defined. Alexander et al. (1990) characterized it as part of the ongoing experience of an inner wakefulness that is continuous in waking, sleeping, and dreaming. Gackenbach (1991)⁴ distinguished between lucid dreaming, as active dream wakefulness, and witnessing dreaming, as more removed and uninvolved from the dream activity while the dreamer is still fully aware that it is a dream. Researchers tend to view lucid dreaming as being aware that one is dreaming while the dream unfolds with variations of what one is aware of from waking life. They also factor in dream self-reflectiveness and dream control into their definitions (Gackenbach & LaBerge, 1988; Kahan, 1994). These definitions are from a cognitive science view of consciousness in sleep. The emergence of waking consciousness in sleep has long been recognized by several eastern wisdom traditions as associated with the development of spiritual realization or, in the language of this paper, the development of consciousness.

Maharishi Vedic Science discusses the ongoing experience of an inner wakefulness as an experience of an absolute, unchanging field of existence that is continuous in waking, sleeping, and dreaming (Gackenbach & Karpen, 2007). Tibetan Buddhist teachings speak of lucid dreaming as part of the steps towards enlightenment. For instance, in a meeting with western researchers, the Tibetan Dalai Lama pointed out that “The main purpose of dream yoga in the context of tantric practice is to first recognize the dream state as dream state” (Varela, 1997, p. 129). So although Western psychology views lucid dreaming as an interesting anomaly of sleep, with implications for the nature of consciousness in sleep, Eastern thought places considerably more importance upon lucid dreaming but within a broad context of various practices designed to develop consciousness.

Dreams and Video Game Play

Despite the immense popularity of video games, there has been very little research examining the effects of video game play on ASC, no less HSC.

Dreams, an altered reality that our brains construct anew every night, are one such ASC. Media use effects on dreams have been examined by Van den Bulck (2004) who concluded that “media influence on dream content was not limited to excessive media users” (p. 43). Part of this research was an examination of computer games and dreams. Van den Bulck found that computer games were less likely to show up in nightmares than television was and that computer games were also present in pleasant dreams for the children he investigated. Players of the puzzle-type game called Tetris reported intrusive, stereotypical, visual images of the game at sleep onset (Stickgold, Malia, Maguire, Roddenberry, & O’Connor, 2000). Bertolini and Nissim (2002) recognized fragments or characters from the video games in the material of children’s dreams. They concluded that due to this radical change in children’s play patterns, they must now incorporate video games into their child therapy practice. Finally, Schredl, Anders, Hellriegel and Rehm (in press) reported that “interindividual differences in nightmare frequency were not explained by interindividual differences in TV viewing or computer game playing habits” of 11 to 13 year olds.

In a study examining 27 high end gamers by Gackenbach, Matty, Kuruvilla, Samaha, Zederayko, & Olishefski (in press), 56 dreams were content-analyzed using the Hall and Van de Castle (1966) system as delineated by Schneider and Domhoff (2006). The largest effect size for these video game players’ dreams was evidenced in larger numbers of dead and imaginary characters, aggression/friendliness percentage, and physical aggression than the Hall and Van de Castle norms. Large effect sizes were also found in gamers’ dreams for lower bodily misfortunes and lower in dreams with at least one instance of friendliness. The fewer bodily misfortunes would seem to indicate that they are winning at their aggressive dream battles. This is not surprising given all their practice while awake in virtual reality battles (i.e., the majority of the interviewees expressed a preference for role playing games with a battle motif such as World of Warcraft or first person shooters). Another interesting finding is the higher incidence of dead and imaginary characters. This certainly seems to characterize the virtual world of many of today’s games showing up in their dreams. In fact, in interviews, one gamer commented that there is no reason to be a human in a game as they have fewer powers than other types of creatures.

Thus, to date, media use and especially video game play show some dream incorporation. Given that the major function of dreams is to process new information, this would be expected. But what has not been examined until now is how media use, as most immersively experienced in video game play, can affect the very nature of consciousness in dreams, e.g. lucid dream emergence.

Video game play and consciousness development research program: Methods and Findings

In a series of research and scholarship begun in 1998 Gackenbach and colleagues⁵ have discussed the theoretical basis and some empirical evidence for some expanded consciousness experiences occurring among high end video game players. The following observations relevant to the proposed association

between lucid dreams and video game play have emerged from the players' point of view: "I've had lots of dreams where I've seen it in first and third person, ... It's like, 'Oh, wow, now I'm a player in Halo'" (McLean, 2005, para 11). An informant from Gackenbach, Zederayko, Kuruvilla, & Olischefski, (2007) noted, "Sometimes if I have a dream I'll be in the dream experiencing the dream and I'll think to myself that I know that this is a dream."⁶

The basic methods and findings of this series of studies will now be briefly summarized. In addition to lucid dreaming frequency, different studies in this series examined other variables thought to be indicative of consciousness development. These variables are in the main taken from the conceptualization of Hunt (1995) concerning experiences which have been seen as indicative of consciousness development. They are divided into those experiences which occur at night and those while the person is awake.

As noted, lucid dreaming is one such sleep experience but another is witnessing sleep/dreams, awareness while in dreamless or dreaming sleep. This state of witnessing is most often characterized as the dreamer being not only aware of the true nature of the state of consciousness, but also as observing the self in the dream world rather than being caught up in the dream reality. Dream control is also important for the Buddhist suggestions on the use of lucid dreaming. There is substantial research demonstrating that control of dreams is easier when lucid (Gackenbach & Bosveld, 1989). Thus these three dream variables were asked about in most of the studies done by the Gackenbach group. Other sleep questions inquired about varied from study to study, but included negative experiences of the night - like nightmares and night terrors, and experiences thought to be directly related to daytime media use, i.e., video game and media dreams.

Another type of dream thought to be related to the emergence of HSC is archetypal or mystical dreams. These are defined in the questionnaires used as:

dreams that carry a sense of importance, awe and fascination. They may be reminiscent of mythology, or fairy tales, or be felt to have a religious/spiritual significance. This type of dream may still be remembered years later. Such dreams can carry with them a deep sense of significance to one's life either on a personal level and/or on a broader level.

Waking experiences asked about included precognitive, mystical, and out-of-body experiences. These were defined in the various questionnaires as:

Out-of-Body Experiences: Occasionally people may experience a sense of being above their body and looking down on it from a different vantage point. This experience could be fleeting, or it could continue for some time and has been called an "out-of-body" experience. How often do you have out-of-body experiences?

Precognitive Experiences: During waking you may experience knowledge of someone else's thought or actions at a distance. You have no possible rational explanation for how this is possible, or precognition: that is,

knowing what will happen in the future but with no possible basis in ordinary anticipating. This might include seeing unusual phenomena, which other people may not be able to see. How often do you have these precognitive experiences?

Mystical Experiences: During waking you may experience a sense of oneness and unity in all things, along with experiences of awe, bliss, and/or wonder. Sometimes this involves a sensation of melting or fusing with one's surroundings, feelings of being overwhelmed by a sense of love or compassion. Some of these experiences can be very hard to put into words. How often do you have these mystical experiences?

All of the above have been associated with, or clearly indicative of, the emergence of HSC (Hunt, 1995; Lukoff & Lu, 1988). Finally used in some of these studies were scales measuring the self-perception of mystical states (Cloninger, 2004), flow (Chou & Ting, 2003) and absorption (Tellegen & Atkinson, 1974).

In terms of video game measures assessed in this series of studies, simple frequency of play was always asked about but most often it was combined with other high-end video game indicators such as number of games played, age play began, and length of play sessions. Controls depended on the study but the most often used were motion sickness and dream recall. Due to its association with presence in the VR literature, motion sickness susceptibility during play was asked about and then controlled for in many analyses. Another control variable always used was dream recall either as self-report or word count. This comes from the dream literature as it is confounded with incidence reports of intense dream types such as lucid, nightmare, and archetypal dreams.

The association of lucid, control, and media dreaming to video game play has been the most robust across these studies of sleep variables, while absorption and flow scores associated with video game play were the most robust for the waking variables. The results of these studies are summarized in Tables 1 and 2.

Video Game Play and Consciousness Development Research Program: Discussion

One way to consider which HSC variables were more likely to be associated with high-end game play relative to low-end play for these seven studies is to look at the percentages under each variable name. As explained in the table, these percentages are the number of times a clearly positive association between video game play and the variable of interest was obtained divided by the total number of times it was assessed. As noted in Tables 1 and 2, following the percent positive findings were the percent negative and the percent of no association. Blanks in the table meant that the particular variable was not assessed in terms of its association to video game play.

The most robust associations for dreams were between lucid, control, and media dreams and video game play. It is worth pointing out that the two

TABLE 1
Summary of the Relationship Between Video Game Play and Types of Dreams

Study with data collection method ¹ Dream Variable ²	Gackenbach & Preston, 1998 <i>online</i>	Nery & Preston, 2005 <i>Face to Face</i>	Gackenbach, 2006 <i>Face to Face</i>	Gackenbach & Reiter, 2007 <i>online</i>	Gackenbach, et al. 2007 ³ <i>Face to Face</i>	Gackenbach, in press ⁵ <i>online</i>
Lucid Dreams 79%/17%/14% ⁶	+	- +	+	+	+	+
Observer Dreams 50%/20%/30%			+ 0	+	+	-
Control Dreams 80%/0%/20%			+	+	+	+
Nightmares 25%/42%/33%	0	0		+	-7	- +
Night terrors 38%/63%/30%	-	- +		+		
Archetypal or mystical 35%/13%/50%	- +	0		+	+	- +
Media or video game 85%/17%/0%				+	+	

¹Data collection was by questionnaire in all cases except Gackenbach et al. (2007) which was derived from open ended interviews. Some questionnaires were administered in face to face settings while others were online.

²The relationship between dream type and video game play in table cells is indicated with a blank, +, - or 0 with + = positive association; 0 = no relationship; - = negative association; and blank means dream type not asked about.

³These findings in the online segment of Gackenbach (2006) were shown to be due to a ceiling effect such that the participants from the online group were all high end video gamers.

⁴The lucid, observer, and control dream findings are for video game dreams only from high end video game dreamers.

⁵This is the methodologically best study because it used only dreams recalled the morning after they occurred from a night where the subject was well rested. These dreams were examined as a function of media use (including video game play) the day before the dream (Gackenbach, in press)

⁶These percentages represent the data summary across studies. The first one is the percent of positives, the second is the percent of negatives, and the third is the percent of no relationships. All are relative to the total number of times the variable was asked about in the studies. Thus for lucid dreams, a positive association between video game play and lucid dreaming was obtained 5.5 times out of 7 inquires thus 79% of the time while a negative association (more lucid dreams with less video game play) was obtained in part of one study thus 1/2 of 7 inquires or 7% of the time. Finally, no relationship was found between these two variables once out of 7 times and thus 14% of the time.

⁷Content analysis of high end gamer dreams found lower bodily misfortunes despite high physical aggression, leading to this conclusion that they were not nightmares (i.e., they were not defeated).

TABLE 2
Summary of the Relationship Between Video Game Play and Waking Consciousness Experiences

Study with data collection method ⁸ Variable ⁹	Gackenbach & Preston, 1998 <i>online</i>	Nery & Preston, 2005 <i>Face to Face</i>	Gackenbach, 2006 <i>Face to Face</i>	Gackenbach, 2006 <i>online</i>	Gackenbach & Reiter, 2006 <i>online</i>	Gackenbach, et al. 2007 <i>Face to Face</i> ¹⁰	Gackenbach, 2007 <i>online</i>
Precognitive Exp. 50%/25%/25% ¹¹	+			0	+	-	
Mystical or spiritual 50%/30%/20%	-	+		0	+	-	
OBE Experiences 40%/20%/40%	+	+		0	0	-	
Meditation 50%/25%/25%	+	-		+	0		
Prayer 0%/67%/33%		-		0	-		
Mystical Scale 33%/17%/50%		+	-	0			
Absorption Scale ¹² 50%/0%/50%		+	0	0	+	+	0 ¹³
Flow Scale ¹⁴ 100%/0%/0%					+	+	

⁸Data collection was by questionnaire in all cases except Gackenbach et al. (2007) which was open ended interviews. Some questionnaires were administered in face to face settings while others were online.

⁹The relationship to video game play and various waking consciousness experiences in table cells is indicated with a blank, +, - or 0 with + = positive association; 0 = no relationship; - = negative association; and blank means measure not taken

¹⁰The various waking variables are from opened ended interviews with high end gamers and qualitative analyses of same.

¹¹These percentages represent the data summary across studies. The first one is the percent of positives, the second is the percent of negatives and the third is the percent of no relationships. All are relative to the total number of times the variable was asked about in the studies. Thus, for precognitive experiences a positive association between video game play and reports of these experiences was obtained twice out of 4 inquires thus 50% of the time while a negative association (more precognitive experiences with less video game play) was obtained in one study thus 1 of 4 inquires or 25% of the time. Finally, no relationship was found between these two variables one out of 4 times and thus 25% of the time. In some studies two types of findings were reported and thus each was weighted 1/2 in these summaries.

¹²Absorption was part of the mystical scale or from interview questions in some studies. The full Tellegen scale was used in one study (Gackenbach, 2007b). Additionally absorption and video game play has been reported by others as noted earlier.

¹³No association between video game play and absorption except that motion sickness and starting to play at an older age were so associated.

¹⁴As noted earlier other researchers have also found a positive association between flow and video game play.

negative dream types, nightmares and night terrors, were not so associated. Of the waking variables, flow resulted in the strongest positive association to game play, especially in the context of other researchers reporting these associations. Absorption was variously measured in this series of studies and showed a resulting association half the time. But, given its positive association to game play in other research and its strong contribution to the concept of flow, it is concluded that it is an important aspect of game play. Several other variables were at 50% or higher in positive associations to game play. Specifically, observer dreams, precognitive experiences, mystical experiences, and meditation were somewhat positively associated with video game play.

It is especially noteworthy in terms of the higher states of consciousness and video game play hypothesized association, that the lucid dreams finding was found in the methodologically tightest study (Gackenbach & Kurvill, 2007). In this study only dreams from the night before of well-rested participants were examined as a function of overall media use (including video game play) the day before the dream. This extends the previous video game play associations to the entire realm of electronically mediated communication. In the factor analyses of self reports from the next day after the reported dream, interactive media (i.e., computers and video gaming) loaded the highest with lucid and control dreaming. However, also loading significantly were audio (i.e., radio) and audio/video (i.e., TV) media.

Another interesting comparison which offers further insight into what circumstances, other than high end playing, lead to the association of HSC variables and game play can be gleaned when comparing two of the online studies (Gackenbach, 2006; Gackenbach & Reiter, 2007). Because the pattern of associations to HSC variables was different for Gackenbach and Reiter (2007) than from the previous online questionnaire (Gackenbach, 2006), a comparison of the two online groups for video game play variables and demographics was undertaken. Variables which showed no sample differences were sex, frequency of play, length of typical and last playing session, number of video games played, and most types of video games. In other words, one can argue that both online groups represented high end players. Yet one group showed no associations to the HSC variables while the other showed a lot of such associations (see Tables 1 and 2). Specifically almost all the dream variables and some of the waking variables showed a positive association to game play in the Gackenbach and Reiter study but not the online portion of the Gackenbach (2006) study due to a ceiling effect.

Where group differences across studies were found was in terms of variables that may offer some explanation. Specifically the Gackenbach and Reiter (2007) sample was significantly younger and less educated, but most importantly, they started playing earlier in their lives and peaked in their play earlier as well. They also reported less motion sickness than did the data collected online the previous year with the older sample. The motion sickness difference and the age differences offer a potential explanation. According to the VR literature (Preston, 1998) less motion sickness when in or exiting VR implies more absorption into the virtual environment, in this case the game

world. The youth variables suggest that the HSC effects that are being examined may only show up for those that have begun play earlier in life when there are various important changes in brain growth.

A second caveat regarding the mixed findings for the waking variables thought to be indicative of the development of HSC regards the wording of the items in some of the scales. The flow during gaming findings were totally consistent both for these studies and for those studies done on this question by others (Voiskounsky, Mitina, & Avetisova, 2004; Chou & Ting, 2003; Choi & Kim, 2004). The instrument measuring flow used in some of these studies and the ones mentioned in Table 2 was worded specifically to the game playing experience. All other wordings of all waking variables did not mention gaming. There was one exception in that absorption and flow in the interviews were inquired about specific to the gaming experience (Gackenbach et al., 2007). The point is that consciousness development experiences may be happening but are not reported if players are not asked about them. Experiences, sounding very much like those in the classic absorption scale by Telligren, are recorded in the video game flow scale such as time distortion and attentional focus. So although there was less responsiveness to these when they were worded generically, positive responses associated with high-end gaming occurred with specific attributions to the gaming setting were made.

Additionally, Subrahmanyam et al. (2001) pointed out that most studies on attention, and other related cognitive variables as related to technology-use, measure short term effects, while few look at the long term implications. It can be argued that such longer term effects are the focus of the Gackenbach group's series of studies. These video game researchers note that, "computer hardware and software evolve so quickly that most of the published research on the cognitive impact of game playing has been done with the older generation of arcade games and game systems" (Subrahmanyam et al., 2001, p. 13). Thus marginal effects with less sophisticated systems may show larger and more long-term effects as the apparatus improves and children begin playing earlier and earlier (Gackenbach, 2006). This caveat is important to note in reporting the relationship of video game play to dream forms and other indicators of the development of consciousness.

A second rapidly changing demographic of game play is the reality that children are playing earlier in their lives thus one might expect various electronic media effects to become more pronounced in the future (Gillispie & Gackenbach, 2007).

SUMMARY

To conclude, although there does seem to be some relationship between selected HSC variables and video game play, the exact nature of this relationship needs to be further explored. First, all work is correlational so that attributions of causation are not justified and remain to be explored. Another methodological consideration is that it is perhaps as much of a

mistake to lump puzzle-game players in with first person shooter-game players as it is to lump lucid dreams in with mystical experiences. The former variable, game type, was considered in several studies (Gackenbach, 2006; Gackenbach & Reiter, 2007) and no one type of game emerged as especially likely to be associated with HSC variables. Gackenbach and Reiter (2007) went further with this question and examined game structure in addition to game type, and no particular aspect of game play preferences emerged as especially associated with flow.

What seems strongest is the lucid and control dreaming - video game playing link as well as the various characteristics of flow most especially absorption. It is relevant here to note that meditators report dreaming lucidly more than non-meditators (LaBerge & Gackenbach, 2000; Snyder & Gackenbach, 1988). In fact, there is strong sleep laboratory collected data on the presence of consciousness in deep sleep among meditators (i.e. witnessing sleep: Mason, Alexander, Travis, Gackenbach, & Orme-Johnson, 1995). Thus parallel findings for lucid dreamers, meditators, and gamers are of interest for this discussion.

First, superior spatial skill has been shown in gamers (Greenfield, 1996; Subrahmanyam, Greenfield, Kraut, & Gross, 2001), lucid dreamers (Gackenbach, Heilman, Boyt, & LaBerge, 1985; Snyder & Gackenbach, 1988, 1991) and meditators (Dillbeck, Assimakis, Raimondi, Orme-Johnson, & Rowe, 1986; Jedrczak, Toomey, & Clements, 1986; Manjunath & Telles, 2004). Likewise, the association of a lack of motion sickness during play in gamers (Preston, 1998) is similar to the superior vestibular function in lucid dreamers (Gackenbach, Sachau, & Rokes, 1982; Snyder & Gackenbach, 1991) and meditators (Gelderloos, 1987; Yang, et al., 2007). Lucid dreaming and absorption have been shown to be associated (Glicksohn, 1990; Fassler, Knox, & Lynn, 2006; Schredl & Erlacher, 2004) as have meditation and absorption (Weinstein & Smith, 1992; Holzel & Ott, 2006). So it is not surprising that an activity which requires high absorption, video game play, would result in more lucid dreams. However, given this pattern of similarities between gamers, lucid dreamers, and meditators, it could be that there is a self selection going on in that those who have better spatial skills, more inclined to absorption, and better vestibular systems might thus prefer video game play. While this could be the case, the Gackenbach (in press) studies, showing that a range of electronic media use are associated with lucid dreaming, argue more for a media effect than a self selection effect. Another perspective on the lucid dreaming – video game association is simply practice. If one is spending several hours a day in a technologically created alternative reality (VR) is it really any surprise that when presented with another alternative reality (i.e., dreams), that gamers easily recognize it for its true state?

These associations are interesting but a look at first person reports is also illuminating. Gackenbach et al. (in press) conducted hour long interviews with 27 hard core college student gamers about their experiences of self, dreams, and altered states of consciousness relative to their gaming. Some had the

experience of feeling like they were outside themselves which is nicely explained by this young student:

You're just kinda there, and then you know that you're there but it's almost kind of a delayed reaction. Like you know that you're physically there but you know that you're physically in your body, but for me it's a more mental point of view, for others it could be more of a spiritual point of view, like you're outside of yourself and you realize, like you can't look into your eyes but you feel I guess that you're looking from an inch to the left, or an inch to the right kinda thing so you're sort of outside yourself.

This from another informant not only speaks to their oft remarked sense of separation but takes it into the transpersonal realm while denying that it is possible;

It's almost like that thing where you lose feeling with your body and it's almost like you're splitting up, like I don't believe in the spiritual thing but it's just kinda like you know you feel like you're just... I don't know it's just a really weird feeling and kind of overcomes you. You start to not physically feel the connection from here to there to your hands but your hands are still moving when you think about it and it just feels really weird.

This informant talks about witnessing his dreams, an experience which Gackenbach (1991) has argued is a more advanced form of lucid dreaming:

Well I had the sense that I was looking for something and witnessing the act happening. I don't know how other people dream but generally when I dream I'm watching myself dream, like you're sort of out of body and I see myself doing things...I know that the representation is me and I have conscious control over all of the actions so I know that it's me.

When asked by the interviewer, "But do you feel more present to the watcher [or the dream ego]?", the gamer informant replied:

Ya I guess it would definitely be a stronger inclination to the watcher. But I do have that awareness of self as well.

Finally, this gamer speaks of witnessing while awake and playing, "I've just noticed that sometimes I'm just there as a hovering spirit watching things go on and I don't really have a role." Over half were judged to have said they lost awareness of themselves and their surroundings while playing like this comment, "that's usually that mindlessness that I get after I have a very long RPG session." These interview remarks are consistent the thesis of this paper that HSC experiences may occur as a function of video game play.

Regarding the use of multiple measures of HSC, Hunt (personal communication, June 13, 2005) has suggested that the emergence of these attributes thought important to the transpersonal perspective might all correlate at lower levels, but at the higher levels break out as unique paths of development. In

other words, correlations of various indicators of HSC may be confusing, or simply lumped together to some degree at the lower levels of consciousness development. They might only emerge as unique factors at the higher levels. Others have viewed these transpersonal variables in a more hierarchical perspective with, for instance, lucid dreams preceding the mystical states (Gackenbach, 1991; Gackenbach & Bosveld, 1989). In either case, parallel lines of development or hierarchical development, various amplifiers may be able to bring out those attributes associated with the development of consciousness. Ones most often examined include meditation (Alexander et al., 1990), but also the use of drugs (Walsh & Grob, 2005), dream recall (Hunt, 1991), enhanced self awareness (Hunt, 1991), flow experiences (Csikszentmihalyi, 1988b; Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005), and now perhaps video game play.

However, one might ask if this entire pattern of associations is simply a result of the pre-trans fallacy. Certainly these findings do not imply that technological augmentation of experience, whether playing video games or experiences in other technologically mediated environments, is a significant approach to the development of HSC. What it indicates is that all possible experiential methods, including these, have the capacity to impact, to some extent, the development of consciousness. What is important here is the widespread use and absorption into video game play by today's youth and young adults and that such extended play is having positive as well as the much touted negative effects (Anderson & Dill, 2000).

To conclude, it has been suggested herein that the existence of higher states of consciousness has been reasonably established in the research literature as developed through appropriate cultural amplifiers. This article suggests how the role of the technologically mediated communication, especially video games, are affecting HSC functioning as evidenced especially by the experience of lucid dreaming and flow experiences in game players. Thus, it is suggested that exposure to such technologies may be changing the nature of consciousness in a positive manner. One might wonder if just as the baby boom generation sought altered and then higher states of consciousness through drugs and various esoteric practices, including meditation, current young generation's immersion in different sorts of alternative realities might be similarly motivated, with similar outcomes. Or perhaps more broadly the current high end immersion in VR by gamers is just the leading edge of a century of media exposure and immersion which is affecting how we all experience reality and transcend its confines.

NOTES

¹ Virtual reality here is used in its most broad sense and is not meant to be restricted to 3-D worlds. Although 3-D worlds are better at creating virtual realities they can be experienced in 2-D worlds and indeed in text based worlds like the original MUD's (multiuser domains) online. VR here is thus the experience of another reality or world through technological mediation.

² Mystical experience generally means either a transitory or permanent experience with unique qualities that have been described in a variety of ways. For instance, in review of the work on the mystical experience, Lukoff and

Lu (1988) acknowledged that the "definition of a mystical experience ranges greatly" (p. 163). Maslow (1969) offered 35 definitions of transcendence, a term often associated with the mystical experiences. Lukoff (1985) identified common characteristics of mystical experience, such as ecstatic mood, a sense of newly gained knowledge, perceptual alterations, mythological elements, but no conceptual disorganization. In the late 1970's researchers began to empirically define higher states of consciousness (HSC), including the mystical experience, using a range of assessment instruments. In a recent review of assessment vehicles, MacDonald (2000) noted that a categorization of spirituality instruments has emerged. Included in their list is what he calls an "Experiential/Phenomenological Dimension" which includes mystical scales and peak experience scales among others.

³Although altered states of consciousness (ASC) should not be confused with HSC there is some overlap. Various wisdom traditions speak of specific ASC experiences as part of HSC. For example, while an out of body experience is an altered consciousness experience, it can occur in various pathological conditions but it is also reported as associated with, if not central to, experiences of HSC.

⁴This distinction was conceptualized based upon conversations with the late Charles Alexander, a major researcher and theorist among Transcendental Meditation scientists.

⁵Gackenbach, 2005, 2006, 2007a, 2007b; Gackenbach, Guthrie, & Karpen, 1998; Gackenbach & Karpen, 2007; Gackenbach & Preston, 1998; Gackenbach, Matty, Kuruvilla, Samaha, Zederayko, & Olishefski (in press); Gillispie & Gackenbach, 2007; Nery & Preston, 2005; Preston, 1998, 2007.

⁶This quote is from a powerpoint presentation at a conference by Gackenbach, Zederayko, Kuruvilla, & Olishefski, (2007).

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