Reflections on Real Presence by a Virtual Person
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The author has lived in San Francisco while working as a full time virtual faculty member for Michigan State University for nearly six years. Unlike most humans, she spends a larger proportion of every day as a virtual person than as a physical person.   This article is adapted from a keynote speech delivered at the Fourth International Workshop on Presence in Philadelphia, May, 2001. Personal narrative style is used to explore issues and to question some of the research community's prevailing assumptions about presence.

Lombard and Ditton's (1997, Presence Explicated, para. 1) frequently cited conceptualization defines presence as a "perceptual illusion of nonmediation" which occurs "when a person fails to perceive or acknowledge the existence of a medium in his/her communication environment and responds as he/she would if the medium were not there." The underlying assumption is in the absence of technology, everyone experiences continuous presence at a constant intensity throughout their lives.

Instead, this article suggests presence is not a constant of everyday nonmediated experience. Careful consideration of unmediated (real) presence might help conceptualization and study of mediated presence.

Perfectly mediated sensory stimuli do not automatically induce continuous presence.

Presence research has emphasized engineering the senses more strongly than engineering the mind. We look for ways technology can more closely approximate human sensory

experience and then examine the impact of those technologies on presence. Sensory realism is certainly an important influence on presence, but there is more to the story. Even a simulator providing perfectly mediated sensory perception might not automatically induce a strong, perceptual sense of presence because reality does not always induce a strong continuous sense of presence.

I had the opportunity to experience the U.S. Space and Rocketry Center's Space Camp in Huntsville Alabama as part of baseline research toward creating a virtual Space Camp. Space Camp is normally reserved for 5th graders, but a group of 12 adults from Michigan State University, Apple Computer, and ETI Entertainment got to pretend to be fifth graders and go through several mission experiences.

Approaching Space Camp by cab, what appeared to be a collection of distant church spires turned out to be Titan rockets. Walking under a Space Shuttle and through Rocket Park, the visceral impact of the size of these space objects sends bolts of realization and shock. They are enormous! You don't realize how big from watching a launch on television. I was able to climb around in the Enterprise space shuttle capsule, peek inside myriad storage drawers, wonder at the thousand buttons along the walls and ceiling in the cockpit. I was physically on a real shuttle, with my natural human auto-stereoscopic full field of view, complete passive haptic feedback, and natural navigation (walking, climbing, sitting, bending, and touching). Despite this total physical realism, far beyond what simulations today can provide, I did not particularly feel like I was there.

Expectations, cognitive schemas, and familiarity impact presence.

I was physically inside of a space shuttle which had actually been in space, but I did not feel what I imagine it would be like to experience being on space shuttle. I knew both too much

and too little to feel strongly present. I knew enough about space travel to believe there must be a lot more to the experience than I was getting. Although real, my shuttle was inside a large building, not on a launch pad or up in space. I wasn't weightless or worried about getting home safely or feeling the discomfort of extreme acceleration. I couldn't look out the window and be awed by the oneness of planet earth or the vast emptiness of space. Had my shuttle visit occurred after rather than before the loss of the Columbia shuttle, my impressions would have focused on a sense of loss and danger.

I knew too little to feel as much presence as someone who had actually flown on one might have felt climbing around this shuttle. Such a person would know what the buttons do, how items stored in the drawers are used, and how the drama of space travel happened in a shuttle. The artifact of the shuttle might have triggered their mental model of the full ("in situ"?) shuttle experience, which I could only wonder about. Expectations, lack of familiarity, limited prior experience, and limited cognitive schemas dampened my sense of presence.

A demanding or frustrating task interferes with physical presence.

We donned flight suits and met for our first mission briefing. Space Camp runs time synchronized group role-play simulations in which each group member is assigned a NASA role and title. For mission one, there were three locations: Mission Control, Shuttle Cockpit, and Shuttle Passenger Bay. Participants were given two notebooks for their position: one the complete time-based mission script with the lines they say and activities they perform highlighted, and one a background information notebook with details about their role and task. I was a mission scientist. Training was brief and the trainer talked too fast for taking notes. The simulation started with the countdown clock set to takeoff minus 10 minutes.

During the first 8 minutes my "scientist" colleague and I were supposed to complete physical exams of the payload specialists and report results to the shuttle commander. It was hard to remember exactly where to find supplies and what to do. As the countdown ticked quickly by it took a stressfully long time to take temperature and blood pressure readings for two people with only one set of instruments.

Shortly after we achieved orbit, it was time to let the EVA repair team out of the airlock to repair the satellite. We forgot one step in opening the airlock, causing the entire crew to get sucked out to their deaths. However, time continued and so did we, after noting that the entire crew had been killed once so far. We climbed the ladder into the cockpit and tried to locate and set the correct 12 switches (from among about 1000 possible switches) to prepare the science lab for our entry. Then we proceeded to the lab to conduct experiments in space. I spilled (real) chemicals on the floor. My polymer did not harden the way it should have. I reassured my partner, whose experiment took longer than mine, that he still had plenty of time before landing. It turned out I was reading the timeline for the two hour mission, not the 90 minute mission. So, the shuttle landed without us having returned to our stations or performed our landing tasks. (We died again.)

I felt like an idiot the entire time. But, the question is, did I feel present, did I experience a sense of being on a shuttle mission? Some presence researchers (Dillon et al, 2001; Meehan et al., 2001) have compared heart rate and skin conductance in virtual experiences with heart rate and skin conductance in parallel real experiences. Finding identical heart rate and skin conductance in the virtual and real experience would provide evidence of a similar experience of presence. It is possible my heart rate and skin conductance might have resembled that of an astronaut, but for the wrong reasons. My thoughts and emotions were stressfully focused on

trying to accomplish my assignments correctly and on time. Many perceptual stimuli I would have liked to pay attention to had to be ignored to fulfill my assignment. I did not achieve the kind of insights about shuttle missions I had hoped to experience. I didn't have time to feel much other than frustration.

Time pressured tasks, even if they are not frustrating, pull attention away from other non-task related current sensory stimuli (virtual or real), potentially reducing the experience of presence. Frustration interferes with presence by drawing mental focus onto negative feelings instead of onto the task or environment.

Sensory stimuli which engage psychic energy yield strong presence.

Csikszentmihalyi (1990) introduced the concept of flow, a common characteristic of optimal experiences. Flow occurs along a vector separating boredom and anxiety. People experience flow when they are sufficiently challenged to do their best, yet not challenged too much beyond what they can achieve.

According to Csikszentmihalyi, flow involves the investment of all psychic energy in an interaction. Flow involves intense concentration, to the exclusion of worry or attention to irrelevant thoughts. Presence is not synonymous with flow. A very strong sense of presence is likely to occur during flow experiences. However, unlike flow, presence is not always an optimal experience. One can feel present in unpleasant, unsatisfying experiences.

For the next, longer mission, I requested a less busy task that would allow me more time to observe. I was assigned to be at Mission Control in charge of communication with Space Station. I had a few role play lines to read at specific points the script, but mostly my assignment was to watch the clock and send faxes to Space Station at key points in the mission informing them of unexpected disasters they had to deal with (such as meteor storms and alien viruses).

During this mission I had time to reflect and observe as well as to participate. I was able to shoot still photos and video of the other positions in Mission Control and Space Lab. I had time to be amazed at the extent to which space missions are driven by a mission critical clock, how busy people are, how much success and survival depends on many people working together.

From moment to moment throughout the 2.5 hour mission I was aware of experiencing rich verbal, social, and physical sensory stimuli all adding to my understanding of Space Camp missions. I was not bored or anxious. I don't think I was challenged so much as interested. I felt strongly and actively present perceiving the external experience. Consistent with Csikszentmihalyi's idea of flow, being assigned the same position for that mission a second or third time would not have been nearly as interesting and I would not have stayed as present throughout the 2.5 hour role play. Novelty matters. To maintain a sense of flow in an experience, the experience needs to change as familiarly develops. Similarly, the level of presence induced will relate to the novelty and predictability of an experience, whether that experience is mediated or unmediated.

Presence is not experienced the same way, with the same intensity or same frequency by everyone. Furthermore, an individual will experience presence differently at different times.

I flew to Alabama for 1.5 days with the express goal of understanding Space Camp well enough to develop a virtual space camp. It was imperative to acquire a big picture perspective in my limited time. If that had not been a pressing motivation, I might have been content to experience what it is like play any of the other mission roles. Personal goals, needs, and interests may influence the experience of presence. On a different day or with a different goal, I might have felt differently present and I might have attended to different stimuli during the same experience.

Someone else assigned to fax warning messages every 15 or 20 minutes might have felt bored and unimportant instead of feeling they had been granted a special opportunity to see the big picture. Someone else might feel more involved, more attuned to the simulated mission from moment to moment, if they were in the hot seat, acting out the role of Space Shuttle Commander. There are individual differences in how and when presence is experienced. Different individuals may pay attention to totally different stimuli and may feel differently present than another person in the same circumstance. The particular sensory stimuli an individual will notice and pay attention to depends upon past experience and current emotional state as well as the nature of the stimuli.

The experience of presence varies from moment to moment.

Ijsselstein and de Ridder (1998) found that the extent of presence experienced in a virtual environment changes continuously. Slater and Steed (1994) measured breaks in presence -- shifts away from feeling located in a virtual experience to being aware of the physical world.

Although the subjective feeling of presence appears to vary from moment to moment, presence is often measured as if it were a static long-term internal state. Researchers expose subjects to a mediated experience that may last anywhere from minutes to hours and then ask "how present did you feel?" For example, Lessiter, Freeman, Keogh, and Davidoff (2000, para. 10) developed the ITC-SOPI scale for cross media presence using 44 strongly agree-strongly disagree items. These items factor into physical space, engagement, naturalness, and negative effects. The items ask about presence overall, e.g., "I had a sense of being in the scenes displayed" or "I felt involved (in the displayed environment)". Perhaps the scale should be changed from strongly agree/strongly disagree to very often/never.

Because our definition of presence has focused only on presence in mediated experiences, as far as I know presence researchers have not studied the experience of presence in real life. We need to do so. How often and for how long do we feel present in a typical day? How frequent and strong a sense of presence does each of us experience throughout a typical day in unmediated life? How different is the duration, frequency, and intensity of presence experienced in an afternoon at a beach in Tahiti compared to presence experienced during a bus ride crossing the U.S.?

Different individuals experience different amounts of presence in daily life.

Sas and O 'Hare (2001) investigated the relationship between a Myers Briggs Type Indicator, other cognitive factors and their effect upon the sense of presence in a virtual experience. Differences found were not statistically significant, but their sample size was small. And they did not measure presence in the real world.

The Meijers-Briggs personality test types people as being dominantly sensate or intuitive. Keirsey's online Temperment Sorter survey describes overall statistics for these personality tests. A majority of people (close to 85%) are sensory types who are "more at home in the physical material world (AdvisorTeam, 2003, Sensory (S) vs. Intuitive (N), para. 2). According to Keirsey, sensate types "focus on what is happening in the here and now" while intuitives focus on "the abstract, conceptual world of ideas - inferences, theories, daydreams, musings, speculations, symbols." (AdvisorTeam, Sensory (S) vs. Intuitive (N), para. 3) Intuitives and sensates are differently aware of the physical world. Presence for an intuitive is likely to be more conceptual, while presence for a sensate would be more perceptual. Sensates are probably more present more of the time than intuitives. I am strongly intuitive, with very low sensate scores. When I think about presence, I think of those relatively rare periods when my usually

unrelated-to-the-world-around-me train of thought is most closely tied to current sensory input. Different members of the research community have different personality types and are more conscious of their physical surroundings more of the time. Our personal experiences of presence are not the same, contributing to different conceptualizations.

How much presence is enough?

How much presence is enough? Shin and Kim (2001) describe a process of tuning the level of presence – adding or removing attributes of a virtual experience expected to increase presence. They created a virtual fish tank and varied field of view and realism of fish movement. The highest sense of presence was achieved with wide field of view and realistic fish movement. However, the largest gain in presence came from wide field of view. Even the less realistic fish movement yielded more presence seen with a 180 degree field of view than the more realistic fish movement seen with a narrow (120 degree) field of view. Shin and Kim's study was motivated by cost-benefit analysis: what was the least amount of system resources needed to offer a desired level of presence.

Cost benefits aside, more presence is not always better. For designed, mediated experiences, the purpose of the experience may inform how much presence is optimal. Too much presence may distract from a task by pulling attention away to irrelevant external stimuli. Not enough presence may be boring, not stimulating enough to engage the participant. Pacing also matters, particularly for experiences of longer duration. Is it better to achieve numerous moments of moderate presence, or one or two peak moments of extreme presence? Some individuals are probably presence junkies, seeking intensity all the time. Others are the opposite, avoiding being present as much as possible.

Pres*ence requires a context.*

Presence requires a context. Although the duration of feeling present may be very short, presence is dependent upon a context larger than that moment to comprehend the experience before you can feel present in it. What if my physical body was magically transported to an entirely different situation for half a second and then transported back. For example, I am sitting at a desk using my computer. Suddenly for half a second I am at a table in a dimly lit restaurant. Then back at my desk. Let's say I really was physically present in the restaurant for that half second. Would I have felt present? Probably not. There was no time to comprehend what was going on within or around me. How much context is needed before the feeling of presence occurs? How much sense-making precedes feeling present? It depends on the complexity of the experience. Virtual experiences can easily include jumps in time and space. Building in enough time and enough contextual cues allows the participant to adjust to the switch, enhancing the experience of presence.

More complete sensory input is not always better.

The impingements on our senses are fragmented and incomplete. We "commit closure, mentally completing that which is incomplete based on past experience." (McCloud, 1993, p. 63).   In an example comic frame, comic book artist and philosopher Scott McCloud draws a shelf in a grocery store. Nine 32 oz. bottles of Pepsi are arrayed on the shelf. On no bottle can we read more than a piece of the label. The mind fills in the entire word (Pepsi) from seeing fragments. In a more dramatic example, McCloud uses two frames. In the first frame, a bad guy holds up an axe above an innocent victim's head and says "now you die." (McCloud, 1993, p. 66).   The second frame shows the outside of an apartment building. A dialog box coming from a window says "Aieeeeeeeeeeeee!" The reader's imagination completes the action. Not just in

comic books but also in real life we commit closure all the time. We perceive incomplete fragments and try to build coherence by filling in what we can't perceive.

McCloud describes the comic book audience as a silent collaborator whose imagination fills in change, time, and motion between the discrete comic frames. Different media require varying amounts closure to be provided by the audience. It may be that stronger presence occurs when the audience needs to commit less closure. Media which provide richer sensory detail induce a stronger sense of being there. Hearing a voice scream invokes more presence than reading "aieeeeeeeeeeeee." Would a movie using the same shot sequence as McCloud's axe sequence, cutting to an exterior shot of the building when the scream occurs, invoke more presence than showing the impact of the axe? Probably not. Presence leaves less to the imagination. Imagining engages attention but pulls consciousness slightly away from external stimuli. This does not mean that more presence is better. A movie can provide a more compelling audience experience (for me, at least) by varying the level presence and engaging the audience to provide closure.

Do we need to be attending to all current impingements to the senses to feel present, or can one focus attention on a particular perception (such as the voice of someone on the telephone, or one particular actor on the stage)? Is presence stronger when attention is focused or diffused across more stimuli and more senses? Does a close-up induce more presence than a wide shot, or vice versa? In a wide shot, the audience can choose what to pay attention to. There is less room choice of what to look at in a close-up. Presence may involve directed attention.

Marshal McLuhan differentiated media as hot or cool depending upon how much involvement on the part of the viewer is required to experience media content (Morisse and

Lehmann, 2003). McLuhan classifies comic books, icons, and television as cool, requiring

audience collaboration. Radio, photographs, and movies are hot, providing rich, fairly complete

sensory perception. Hot media provide rich sensory content, frequently flooding the senses.

Cool media engage cognition to interpret and react to less complete sensory content. Both forms

of media can result in a strong sense of presence. But which media temperature invokes the

strongest sense of presence?

We notice the anomalies, the bumps in the road, more vividly than we experience

expected and repetitive sensory input. Biking along a mountain road beside the Pacific Ocean

trying to notice when I felt present, the ocean views were spectacular. But when I hit bumpy

patches of road I was more aware of being on bicycle, more aware of the feel of the road, more

focused on incoming sensory stimuli. The bumps reminded me of the physical world and

required enough attention to verify the bumps did not present a danger of destabilizing the

bicycle. The bumps were more interesting to look at and to ride over than smooth road. When

the road was consistently bumpy for a while that too became routine and I lost focus again.

External novelty, danger, change, and variation pull us into a state of presence. A constant state

of high presence without variation may not occur naturally.

Presence can include conceptual AND perceptual processing.

Is presence exclusively perceptual or can conceptual processing occur as part of feeling

present? Waterworth and Waterworth (2001) posit that we shift *focus* between concrete

processing (attending to perceptual stimuli present in real or virtual world) and abstract

(conceptual) processing. They describe concrete processing as presence and abstract processing

as absence. Presence is "a conscious emphasis on perception of currently present stimuli rather

than on conceptual processing" (p. 211). They suggest attention is a limited commodity. More mental focus on presence corresponds to less mental focus on absence and vice versa.

The Space Camp mission sense of presence I described earlier felt stronger when I engaged in more conceptual processing. Reactions to the impingements coming through the senses (whether real or virtual) can be conceptual or concrete. Presence can encompass both concrete and abstract thought, so long as it is closely tied to current impingements to the senses. Presence happens in real time. Presence involves perceiving and reacting to current sensory stimuli. The reaction can be emotional, cognitive, or physical.

I disagree slightly with the Waterworths. I argue that abstract and concrete processing can both be part of presence, so long as both are closely tied to current sensory stimuli. Presence occurs during periods of time when cognition (processes such as perception, attention, learning, thought, and affect …) is closely tied to current perceptual stimuli.

Presence can be voluntary and learned.

Is feeling present an art? Is it voluntary or involuntary? Can it be learned?

Some professions require an intense, purposive state of presence on the job. Air traffic controllers, surgeons, musicians, and live TV directors focus intensely on external stimuli. They must maintain a high state of directed presence while performing their job. For them, presence is voluntary and learned.

Presence is probably developmental. Young children live in the moment. Their thinking is concrete (the world is what they see). They pay attention to the details they experience, and tend to be interested in everything (N. Lownds, personal communication December 20, 2002). Around age 10 thinking begins to become more abstract, increasingly so through adolescence. Cognitive development correlates with learning how NOT to be present.

Being present in the moment, noticing, participating in, and fully appreciating what is happening now, is a central concept in meditation and many eastern philosophies. The Buddhist concept of mindfulness focuses attention to present time reality. Mindfulness "sees things deeply, down below the level of concepts and opinions" (Gunaratana, 2002, Mindfulness (Sati) and Insight (Vipassana) Meditation, para. 5). The teacher on one of my yoga tapes urges her students to "always follow the breath, be completely present breath by breath" (Carlson, 1996). Being present in the moment is considered a learnable and desirable skill.

Presence researchers who study television, movies, and other passive media mostly consider passively induced presence. Those who design interactive virtual experiences can engineer a task or game in a virtual environment that requires active presence to accomplish. It is the task more than the environment that causes presence. Alternatively one can create a virtual experience filled with wonder and beauty which entices the participant to be actively present to fully enjoy the experience.

Virtual experiences can be designed for participants who want to increase their ability to be present, a conscious collaboration between the participant and the experience with a goal of high levels of presence. For example, Centerpointe Research Institute sells a progressive series of audio stereoscopic patterns of tones intended to induce deep meditative states (Harris, 2002).

Be present to what?

I have so far avoided specifying what people are being present to when they experience presence. Researchers often distinguish physical presence and social presence. Physical presence implies being present in (or present to) the virtual or real environment: being *there*.

Physical presence emphasizes that a virtual environment feels like a physical environment. Social presence implies that being with someone virtually feels like being with them physically.

Those of us who study presence do so because it fascinates us. The variability in definitions is probably due to variations in our fascination. I am more interested in virtual experiences than in virtual places. Place is part but not all of an experience. So I think about being present to an event, to a task, to an experience – whatever stimuli are most compelling, interesting and available in the real or virtual world. I am less interested in the illusion of nonmediation. Fooling the senses is not the achievement I seek. I would rather engage the being.

I am very new to yoga. As I began to adopt a daily yoga routine, I realized it would be more in the spirit of the discipline to try to stop thinking about work the whole time. I kept wondering "be present to what?" during yoga. Certainly not to how tired my arms felt. My bodyworker/healer (yes, I am a true Californian now) gave a yoda-like, yogi-like, appropriate answer: "yes, that is always the question, isn't it..." (J. Eiman, personal communication, December 9, 2002).

For the purpose of a defining the presence construct, I propose it doesn't matter exactly what we are present to, as long as we are present to what is present. Different people will notice and focus on different stimuli, as we do all the time. They bring a unique history, mood, interests, and goals. The experience of presence is different for each person. For the purpose of yoga, I'm still thinking about "be present to what."

An anonymous reviewer of this article wrote:

It's interesting that even though a person has to learn the skills or habits needed (which could be either a passive or active process) and volunteers to experience presence (which sounds active); using the learned skills is often automatic (like reading and filling in the

mind's eye view of the representation of the words in the book). In fact, can't too active an orientation 'ruin' presence?

Obviously my goal of completely confusing all issues has been met so it is almost time to conclude this article. What can ruin presence? Presence is not always desirable. During dental surgery, being absent is advisable. I close my eyes during movies anytime scary music starts to play and keep them closed until the scary music stops specifically because I want to ruin presence. Not being present is not only about avoiding unpleasant things. Thinking about ideas, events, and people outside of the currently present sensory stimuli is incredibly important to most intellectual pursuits. Therefore, presence can only be considered ruined when an individual very much wants to experience presence but looses focus, or when the designers of an experience very much want participants to experience presence, but the participants either do not become engaged at all or they engage but get distracted.

Designed experiences may unintentionally interfere with presence. Interactive narratives stop the action and wait for the audience to choose what happens next from an onscreen menu. This interrupts the sense of presence, jumping participants from passive viewing to active choosing in an unnatural way. A less disruptive interaction would be for an onscreen character ask the viewer, "should I go out with this person or not?" The viewer simply says "yes" or "no" and the action continues, branching to follow a storyline based on the viewer's decision.

The idea of ruined presence implies presence had been achieved but is lost. Since is presence is a constantly varying state, falling out of presence is a temporary lapse. It should often though not always be possible to re-enter intense presence even if some moments have been lost.

Synthesis: Presence occurs when we react to stimuli our senses tell us are present at each moment. Presence occurs during periods when cognition is closely tied to current perceptual stimuli…

A conscious effort or task-oriented need to stay focused on the moment facilitates but is not required for feeling present. Perceiving an immediate danger would also encourage close attention to current sensory impingements. Complex, compelling, or intense stimuli that change over time facilitate but are not required for feeling present. Presence requires a context and can be enhanced by familiarity, prior experience, and a rich cognitive schema. Presence varies in duration, intensity, and complexity. Presence can be an active, voluntary state of focusing on one or more currently present sensory stimuli or an involuntary reaction when sensory stimuli compel our attention.

In Figure 1 the vertical axis shows how closely cognition is tied to current perceptual stimuli. Around the center is a black region, the zone of presence, the set of currently present perceptual stimuli within which, when cognition focuses here, presence is achieved. Sometimes there are more or stronger stimuli than other times, reflected by the peaks and valleys. Dots (white or black) are the closeness of cognition to current perceptual stimuli at different points in time. Going up from the center cognition moves further and further away from current stimuli as we are lost in thought and increasingly removed from current stimuli.

Three hypothetical examples (playing racquetball, watching a movie, and driving on a highway) are used to show mapping of cognition in relation to current perceptual stimuli. Playing racquetball requires intense concentration on current sensory stimuli, and thus results in very strong presence. Good players achieve stronger presence and deeper experience of flow than poor players, because of their skill at the game.   Each dot represents a hypothetical discrete

measurement of the association of current cognition with current perceptual stimuli. The frequency of measurement is unspecified – more research is needed to know how often to measure presence! During competitive racquetball play, cognition is always within the zone of presence. Compare this to watching a movie. There are boring parts where the mind is not processing much at all. Compelling moments due to content or visual and auditory effects wrench cognition into synch with current stimuli. Some of the time the movie content sparks day dreams about somewhat related topics. Finally, driving on a highway involves long periods of being lost in thought, combined with moments of danger (or navigation) drawing cognition quickly into synch with current perceptual stimuli.

Figure 1 is similar to Waterworth and Waterworth's axis of presence and absence. However, unlike their approach, both perceptual and conceptual cognition can occur in the zone of presence, so long as the cognition is stimulated by sensory events. We lose presence when we stop paying attention to current sensory events, either from boredom or from becoming exclusively involved in thoughts or daydreams and forgetting about or ignoring sensory events.

My extremely helpful anonymous reviewer interjects one last question:
"If the thought one is lost in is related to sensory perceptions (e.g., imagining being by a lake with a lover at a picnic in the rain), could the person experience high presence even in the long periods of being lost in thought?"

We must be present to what is present. Hallucinations would count as current perceptual stimuli, since the hallucinator believes the stimuli are currently present. Meditation is a state of focused perception. It would count as focus on currently present stimuli even though eyes are usually closed and the stimuli of interest are the breath, body, and unseen universe.

Recalling sensory details of a past experience is like presence insofar as the attention to sensory perceptions, but re-living is not the same as living the first time. Memories involve less reaction, less external variability than presence. Dreaming usually involves presence – we feel like we are reacting to currently present stimuli. Anything can happen and what does happen is beyond our conscious control. In daydreams, we are the author. I think it would be unusual to be surprised by a sensory stimulus in a daydream. We create, and perhaps then react to our own storyline. But nothing about the day-dreamed sensory stimuli is external, they are under our control. Presence is reacting to the external world or what seems like the external world, as it happens.

Social presence occurs during periods when social cognition is closely tied to current perceptual stimuli

I have intentionally left out social presence from the discussion, because I think it is a very different kind of presence. But the proposed presence definition can be applied in a parallel definition of social presence. Social presence occurs during periods of time when social cognition is closely tied to current perceptual stimuli. Social cognition includes processes such as perception, attention, social judgments, affect, expectations, thought, and connectedness (Forgas, 2001). Three examples are shown in Figure 2 below: thinking about a friend, talking on the phone with a boss, and going on a first date. Thinking about a friend who is far away is by definition removed from current sensory stimuli (assuming you are not looking at a photograph or being reminded of the person by some current perceptual stimulus). Social cognition is not closely tied to current sensory stimuli. A phone call with our boss likely involves a mix of social cognition based on present stimuli, some boredom and some thoughts wandering (depending on how long the call lasts, our relationship with our boss, who the boss is, whether the caller is

multitasking and doing other things during the call, etc.). A first date inspires close attention to current sensory stimuli, with high stakes and lack of familiarity. Social cognition will be closely tied to current perceptual stimuli.

Conclusion.

What does presence have to do with technology? Nothing. What does technology have to do with presence? Technology can be used to design and deliver experiences. Establishing explicit presence goals should help designers make design decisions and test prototypes to be sure the intended effects are being achieved. Designers should consider the nature of presence they intend to be experienced. Ideally, what should participants feel present to – a task, one or a few particular stimuli, or perhaps a gestalt impression? Is the participant provided with many possible stimuli to be present to, or is presence more directed to the designer's goals? Are "bumps in the road" built in to pull attention back to current perceptual stimuli? Mediated experiences may have presence consequences such as focusing, limiting, amplifying, or extending normal sensory stimuli. Even when technology is involved, it is the experience itself (the mediated experience) and not technology alone that engages the subjective experience of presence.

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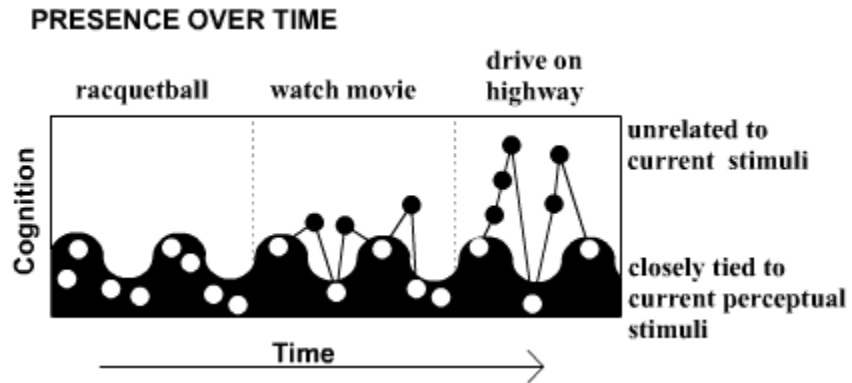
Figure 1: Presence Over Time

Figure 1 Caption: Competitive racquetball involves intense concentration. Depending upon the

content, watching a movie involves periods of intense focus and periods of contemplation

unrelated to the current movie stimuli. Driving on a highway invokes the least presence.

Figure 2: Social Presence Over Time

SOCIAL PRESENCE OVER TIME

Figure 2 Caption:

Thinking about a friend involves very little attention to current perceptual stimuli. The mind

wanders during a phone call, but presence is very focused on a first date.