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Responsibility and Imagination in the 21st Century

Abstract

Virtual reality (VR) systems reset the boundaries for activating and guiding our imaginations. So, we consider that VR might offer new insights for balancing our responsibility to promote the measured development of reason and ethical sensibilities in our children with our heritage of free speech. We look first to the insights from reflective VR users. Then we review some recent findings from neuroscience that relate to understanding VR users' experiences. Next we survey some key concepts that have emerged from recent philosophical reflections on the structure of technical information and hyper reality. We conclude by imagining a couple of promising paths for future exploration.

We tell ourselves and our children many stories about fantastical beings that exercise and challenge our imaginations. In part, we use many of these stories to help us gauge the emotional and intellectual maturity of our children. When we determine that a child can effectively recognize and resolve inconsistencies and ambiguities, we consider them to have reached "the age of reason." Similarly, we use certain stories to both cultivate and gauge people's ability to recognize and resolve emotional and ethical ambiguities.

That certain types of stories should not be told to the young is obvious. This same insight also warrants our protection of vulnerable people from the moral hazards inherent in some stories /narratives that feature emotional and ethical confusions for which they are developmentally unprepared. So, for example, most parents restrict their children's access to explicit and graphic depictions of human cruelty.

Our communal concern about appropriate access for children to violent, amoral, or scandalous stories extends back to at least Plato's discussion in The Republic. It is an old debate: prudent education and protection of our young and vulnerable versus censorship by the Guardians. But in our time, we have new types of story tellers—and particularly persuasive ones in the form of virtual reality systems. These systems reset the boundaries for activating and guiding our imaginations. So, we consider that virtual reality (VR) might offer new insights for balancing our responsibility to promote the measured development of reason and ethical sensibilities in our children with our heritage of free speech.

We look first to the insights from reflective VR users. Then we review some recent findings from neuroscience that relate to understanding VR users' experiences. Next we survey some key concepts that have emerged from recent philosophical reflections on the structure of technical information and hyper reality. We conclude by imagining a couple of promising paths for future exploration.

Stories in VR

In our time, VR systems are increasingly powerful and pervasive as story tellers. They also pose especially vexing problems relating to moral hazard because many of them generate interactive scenarios of graphic violence and immoral behavior that reward users for engaging in them. In this regard, we recall a recent U.S. Supreme Court decision that struck down a California law prohibiting the sale or rental of M-rated ("mature") video games to minors (under 18 years old).[2]

Speaking for the majority in this 7-2 decision, Justice Antonin Scalia seemed dismissive of concerns about violent video games:

> Like protected books, plays and movies, they communicate ideas through familiar literary devices and features distinctive to the medium…Grimm's Fairy Tales, for example, are grim indeed…And Hansel and Gretel (children!) kill their captor by baking her in the oven.[3]

Scalia's analogy seems to portray stylized depictions of violence in a conventional children's story book and the effortless procurement of simulated cruelty and crime in graphically vivid and interactive media as essentially equivalent forms of communication—despite their distinctive features.

But VR systems have distinctive characteristics that set them apart as unusually insistent and brilliantly compelling story tellers. In particular, we note two characteristics described by Jonathan Steuer: vividness and interactivity.[4]

Vividness

Vividness is the force that virtual reality exerts on a person. Vividness has two dimensions: *depth* refers to resolution (degree of realism), and *breadth* is the number of human senses a VR device addresses.[5]

For example, consider Manhunt, a third-person stealth horror video game. This "game" lets users select from an array of weapons: plastic bags, baseball bats, crowbars, various sharp blades, chainsaws, and of course, guns. If the user runs out of virtual health, virtual painkillers can also be had. Advanced users can progress to the bloodier yellow level and finally to the red level.

> If the lock-on is red, then the player strangles, punches, and snaps the enemy's neck while the enemy groans in pain and suffers from lack of oxygen. The game's graphic presentation of the executions are accentuated in a style reminiscent of a snuff film, and the game encourages players to execute enemies as brutally as possible.[6]

Interactivity

As an example of interactivity—the force that a person exerts on virtual reality—consider Mortal Kombat's[7] very graphic fatalities (as killings are called), that require a series of interactive button-pressing. For even more interactivity, plug into Scarface: The World Is Yours on a Wii device[8]. Now, the user's whole body can engage Tony Montana's world of selling cocaine, paying off the police, killing, stealing, and other bad behaviors necessary to take complete control of Miami's Little Havana[9].

Among the many user reports of the unique force exerted by VR systems, one noteworthy report comes from Jennifer Kahn who, together with Jaron Lanier (a pioneer in VR), visited the Virtual Human Interaction Lab at Stanford University. The lab manager, Cody Karutz, escorted Kahn to the lab's "experimental room:"

> A squat chamber paneled in gray-and-tan fabric. A thin orange carpet covered a "haptic floor" that can vibrate and judder…in one corner of the room, a plastic headset and goggles hung droopily from a long black cable. Karutz clamped them firmly to my head, tight enough to block out the light. When he launched the first simulation, I found myself standing in what appeared to be the same room as before, but there was a deep rectangular pit in front of my feet.

> The pit simulation, Karutz explained, can be used to test the degree to which cognitive knowledge—in this case, the knowledge that the floor does not contain a pit—is capable of overriding gut instincts and fear. Because the simulation realistically mimics the visual experience of a fall, many people do topple over, and may even feel their gorge rising, as though they were falling through space.
>
> Karutz offered to spot me if I wanted to try stepping off the edge, but, to my bafflement and shame, I found that I was paralyzed. When I admitted this to Lanier, he confessed that he had had the same experience—"I build these things and I couldn't do it!" Few people in fact can.[10]

Confusion

Here is a clear example of how VR systems can interfere with and scramble our efforts to distinguish reality from fantasy. This potential to evoke and reinforce cognitive ambiguity, coupled with the characteristic vividness and interactivity of VR realizations, gives us good reason to consider VR systems as a distinct species of story-teller. We distinguish a difference in kind, not just degree. Mortal Kombat is not just another story like one that I can find in my quaintly illustrated copy of Grimm's Fairy Tales!

Hansel and Gretel illustration by Arthur Rackham, 1909

Hansel and Gretel illustration by Ludwig Richter, 1842

Neuroscience on VR

At the end of the last century, Herbert Krugmann performed pioneering neurological research on the left-and right hemispheres of the human brain. He attached electrodes to TV viewers heads, and in repeated trials, noted that:

> …the brain waves switched from predominantly beta waves, indicating alert and conscious attention, to predominantly alpha waves, indicating an unfocused, receptive lack of attention: the state of aimless fantasy and daydreaming below the threshold of consciousness.[11]

Now, in the early years of the 21st century, we have much more data and new ways of talking about brain processes. By way of a very fast review, we depend on Daniel Kahneman's 2011 summary of the current research and insights about how the human brain interprets sense data and directs the formation of decisions.

In *Thinking, Fast and Slow,* Kahneman organizes the current findings from cognitive and social psychology in a dialectical model of two linked systems that cannot be reduced to neural activity in any specific region of the brain. Kahneman calls them System 1 and System 2, and he invites us to think of these two systems as "agents with their individual abilities, limitations, and functions."[12] Here are brief "profiles:"[13]

System 1 - FAST	System 2 - SLOW
Operates automatically and quickly, with little or no effort and no sense of voluntary control	Operations require attention and are disrupted when attention is drawn away.
Generates rapid and often precise intuitive judgments, but also prone to make systematic errors in specified circumstances—with little understanding of logic and statistics.	Constructs thoughts in an orderly series of steps— often associated with the subjective experience of agency, choice, and concentration.
Continuously generates impressions, intuitions, intentions, and feelings.	If endorsed by System 2, impressions and intuitions turn into beliefs, and impulses turn into voluntary actions.

Let's focus on cognitive illusions, ambiguity, and framing—only three phenomena cited by Kahneman that bear on our effort to characterize the cognitive confusion engendered by VR systems.

Cognitive Illusions

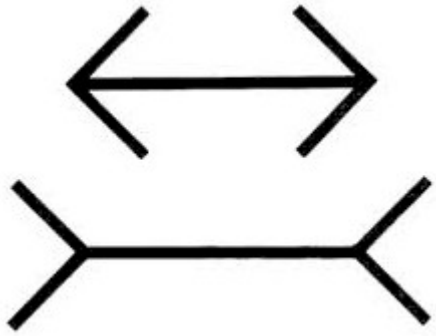

Figure 1

If you have already encountered the famous Müller-Lyer illusion, you know that, contrary to first appearance, the horizontal lines are in fact identical in length. Kahneman notes:

> To resist the illusion, there is only one thing you can do: you must learn to mistrust your impressions of the length of lines when fins are attached to them. To implement that rule, you must be able to recognize the illusory pattern and recall what you know about it. If you can do this, you will never again be fooled by the Müller-Lyer illusion. But you will still see one line is longer than the other.[14]

Ambiguity

The two exhibits below are ambiguous: [15]

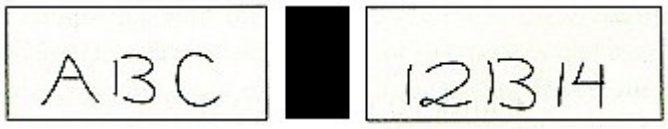

Figure 2

Did you read the display on the left as A-B-C and the one on the right as 12-13-14—even though the middle items in both displays are identical? Why did you not read them as A-13-C or 12-B-14? Kahneman explains that "The entire context helps determine the interpretation of each element. The shape is ambiguous, but you jump to a conclusion about its identity and do not become aware of the ambiguity that was resolved."

> The most important aspect of (this example) is that a definite choice was made, but you did not know it. Only one interpretation came to mind, and you were never aware of the ambiguity. …Conscious doubt is not in the repertoire of System 1.[16]

Biases

Besides context-dependent interpretations of ambiguity, System 1 has many other cognitive biases like:

- *Anchoring* effect that "occurs when people consider a particular value for an unknown quantity before estimating that quantity."[17]
- *Availability* biases in which "our expectations about the frequency of events are distorted by the prevalence and emotional intensity of the messages to which we are exposed."[18]
- *Framing* biases in which "logically equivalent statements evoke different reactions" because of the associations they bring to mind.[19](363

But instead of carefully monitoring and controlling these associations, System 2 is often "out to lunch."

System 2 is chronically lazy. For example, do not try to solve this simple puzzle—just listen to your intuition:

A bat and ball cost $1.10.
The bat costs one dollar more than the ball.
How much does the ball cost?

A number came to your mind—most probably—ten cents. Kahneman observes that "The distinctive mark of this easy puzzle is that it evokes an answer that is intuitive, appealing, and wrong.[20]

> Because System 1 operates automatically and cannot be turned off at will, errors of intuitive thought are often difficult to prevent. … Even when cues to likely errors are available, errors can be prevented only by the enhanced monitoring and effortful activity of System 2.[21]

So, System 1 is continuously vulnerable to cognitive illusion, ambiguity, framing, and other neurological biases; and System 2 is often napping. This brain function dynamic explains the powerful disorientation that can be evoked by VR systems like the pit simulator at Stanford.

Philosophy of VR

Now we turn quickly to the philosophy language game. Again, only a fast review of a few key concepts related to the VR experience is possible. In our time, philosophers like Jean Baudrillard, Albert Borgmann, Daniel Boorstin, and Umberto Eco have investigated VR or "hyper reality." We focus here on Albert Borgmann's ideas because they are rich and well elaborated within a robust theory of technological information.

Borgmann distinguishes three types of information:[22]

Types of Information	Example
Information *about* reality (Low resolution: little information about the excitement and shock we might expect or want.)	A magazine ad for the latest version of Grand Theft Auto (GTA): The Lost and the Damned. We see that the first exciting and shocking episode is now available for download for PlayStation 3, Xbox 360, and Games for Windows-Live.
Information *for* reality (Medium resolution: depends on imagination)	A collection of the scripts, storyboards, software code, and other design specifications for this GTA episode. In comprehending this design documentation, we would realize the information through our imaginations, memories, and other cognitive faculties.
Information *as* reality (High resolution: the information is realized for us.)	A copy of the GTA episode on CD. Through the machinery of the game device, the high-resolution information on the CD is realized for us; and the structure of the sign (the CD's data) is as detailed as the structure of the thing the sign refers to (a realistic audio-video simulation of exciting and shocking events).

Ambiguities

Within the conceptual framework traced above, Borgmann identifies distinct dimensions of ambiguity. First, Borgmann claims that there is real ambiguity in actual reality that: "… is resolved through engagement with an existing reality, with the wilderness we are disagreed about, the urban life we are unsure of, or the people we do not understand.[23] Further, he identifies at least three forms of information ambiguity: symbolic, technical, and virtual:

Symbolic Ambiguity

When a person is informed by a sign about some thing, sometimes the sign wobbles. Borgmann notes that an object can oscillate "between sign and thing or suddenly revert from reference to presence." He cites the example of puns as a "play on sign and thing, letting two references collide in one and the same thing…"[24]

Technical Ambiguity

Borgmann understands technical ambiguity in the context of Claude Shannon's pioneering work, "The Mathematical Theory of Communication"—that proposed a way to measure information and to judge the fidelity and economy of information transmission. As Borgmann puts it, Shannon's theory "suggested that the value of information lies in its contingency, its unpredictability."[25] Hence, a surprise has high information value, but it generates ambiguity in our assessments of the probability of how often, or even if, it will occur again.

Virtual Ambiguity

A clear example of virtual ambiguity is the experience of Jennifer Kahn in the Virtual Human Interaction Lab. Borgmann explains: "…virtual reality provides no information about the world out there and is in this regard totally ambiguous. Inevitably, the VR user encounters virtual ambiguity—ambivalence about attending to the gravity of reality or the triviality of his disburdened world:

> To secure the charm of virtual reality at its most glamorous, the veil of virtual ambiguity must be dense and thick. Inevitably, however, such an enclosure excludes the commanding presence of reality. Hence the price of sustaining virtual ambiguity is triviality.[26]

The allure of virtual reality leads the user down a path of sustained ambiguity into a virtual fog of confusion—an "impossible union of unencumbered glamour and profound engagement (that) must sooner or later fall apart and settle for triviality or gravity."[27]

Virtual Fog

Escaping into a virtual fog, the VR user can become disoriented by ethical ambiguities. As examples, Borgmann cites the distortions of *eros* (the erotic life), and *thanatos* (the solemnity of death), through glamorization and trivialization. And what Borgmann says about the corruption of *eros* in virtual sex, he could have said just as easily of the perversion of *thanatos* in virtual violence*:*

> Virtuality has extricated sex from the depths of real life and made it available as a diversion that would be harmless if it were not for the disabilities and displacements it abets in real life.[28]

Borgmann's conception of virtual fog leads to the conclusion that virtual violence can be morally precarious—in part because of its trivialization of horror, its glamorization of physical force, and its ambivalence about ethical import. Indeed, Borgmann, notes that VR entertainment devices "may be more seductive and addictive" than games, novels, and television and "so intensify the familiar moral concerns about distraction, isolation, debilitation, and indoctrination."[29]

Even in rough outline, Albert Borgmann's theory of information reveals the perversion of our ambivalence about the ethical squalor and brilliant excitement of virtual violence.

New Imaginings

The foregoing reviews converge to the conclusion that the ability to resolve ambiguity at various levels is considerably undermined by the dynamics of increasingly powerful video games and mobile apps—not to mention VR technology.

Ambiguity Resolution Quotient

Instead of the common "age-appropriate"[30] rating methods, we can imagine a test that calibrates a person's ability to detect and resolve various types of ambiguity. In *Thinking Fast and Slow*, Kahneman describes:

> …a Cognitive Reflection Test, which consists of the bat-and-ball problem and two other questions, chosen because they also invite an intuitive answer that is both compelling and wrong.[31]

Shane Frederick, the test's author, studied students who score very low on this test. "The supervisory function of System 2 is weak in these people… Individuals who uncritically follow their intuitions about puzzles are also prone to accept other suggestions from System 1. In particular, they are impulsive, impatient, and keen to receive immediate gratification."[32]

Perhaps a similar test could be used as an "entry challenge" embedded at the front ends of problematic VR and other video systems?

Strengthening System 2

In the vortex of vivid, interactive, and cognitively confusing or ambiguous video experiences, we cannot expect the young and weak to have an alert and strong System 2. So, another possible path forward is the development of video-assisted, critical-thinking curricula for primary and secondary schools. Along this path, we imagine our children learning ambiguity-detection heuristics, and practicing and refining their intellectual habits with System 2 flexing and strengthening exercises.

In this 21st century, permeated by shocking depictions of violence, infiltrated by crude and lurid media, and titillated by glamorized vice, our responsibility for new imaginings seems clear—and all too pressing.

NOTES

1. Plato, and G. M. A. Grube, *Republic*. Indianapolis: Hackett Publishing, 1992. 377c. Print.

2. BROWN, GOVERNOR OF CALIFORNIA, Et Al. V. ENTERTAINMENT MERCHANTS ASSOCIATION Et Al." *FindLaw.com*. 27 June 2011. Web. 30 July 2011. <http://laws.findlaw.com/us/000/08-1448.html>.

3. Timothy Egan, "Sex, Violence and the Supreme Court." *Opinionator - NYTimes.com*. 7 July 2011. Web. 14 July 2011. <http://opinionator.blogs.nytimes.com/2011/07/07/sex-and-the-supremes/?ref=opinion>.

4. See: Jonathan Steuer, "Defining Virtual Reality: Dimensions Determining Telepresence." *Journal of Communication* 42.4 1992. 73-93. Print.

5. Albert Borgmann, *Holding On to Reality: the Nature of Information at the Turn of the Millennium.* Chicago: University of Chicago Press, 2000. 183. Print.

6. See: "Manhunt (video Game)." *Wikipedia, the Free Encyclopedia*. Web. 24 Aug. 2011. <http://en.wikipedia.org/w/index.php?title=Manhunt_(video_game)>.

7. See: "Mortal Kombat." *Wikipedia, the Free Encyclopedia*. Web. 24 Aug. 2011. <http://en.wikipedia.org/wiki/Mortal_Kombat>.

8. See: "Scarface: The World Is Yours." *Wikipedia, the Free Encyclopedia*. Web. 24 Aug. 2011. <http://en.wikipedia.org/w/index.php?title=Scarface:_The_World_Is_Yours>.

9. For examples of the vividness and interactivity of violent VR, see: "Manhunt - Executions." *YouTube - Broadcast Yourself.* Web. 24 Aug. 2011. <http://www.youtube.com/watch?v=PGuhX5AmjuA>. Also see: "The Most Violent Game in the Internet." *YouTube - Broadcast Yourself.* Web. 24 Aug. 2011. <http://www.youtube.com/watch?v=SOizFODD3tk>.

10. Kahn, Jennifer, "The Visionary." *The New Yorker* 18 July 2011: 46-53. Web. Speaking of her experience in the labs experimental room, Kahn poignantly notes: “Karutz offered to spot me if I wanted to try stepping off the edge, but, to my bafflement and shame, I found that I was paralyzed. When I admitted this to Lanier, he confessed that he had had the same experience—‘I build these things and I couldn’t do it!’ Few people in fact can. ‘The pit is a great example of how you can use virtual reality to really get at something deep in how people perceive the world,’ he said. ‘It’s such a richly detailed window into what works and doesn’t work in our own psyches.’”

11. Joyce Nelson, *The Perfect Machine: Television and the Bomb*. Philadelphia: New Society Publishers, 1992. 69-70. Print. In a revolutionary experiment, Krugmann attached electrodes to TV viewers’ heads, and in repeated trials, he noted that: ...the brain waves

switched from predominantly beta waves, indicating alert and conscious attention, to predominantly alpha waves, indicating an unfocused, receptive lack of attention: the state of aimless fantasy and daydreaming below the threshold of consciousness." In Krugmann's and similar experiments, the beta waves produced by the left hemisphere (the locus of sequential, rational thinking), are submerged by the alpha waves generated by the right hemisphere (the locus of pattern recognition and unconscious emotional involvement). "The individual's world-view, or basic feeling-orientation in the world, seems to be consolidated in the right hemisphere, which functions according to imagery, analogy, feeling-states, moods, and sensations."

12. Daniel Kahneman, *Thinking, Fast and Slow*. New York: Farrar, Straus and Giroux, 2011. 21. Print.

13. *Ibid*., 24. Here are more detailed "profiles" of System 1 and System 2:

System 1 - FAST	**System 2 - SLOW**
Circa 1970: Referred to as right hemisphere- alpha waves.	Circa 1970: Referred to as left hemisphere- beta waves.
Operates automatically and quickly, with little or no effort and no sense of voluntary control.	Operations require attention and are disrupted when attention is drawn away.
Capabilities include innate skills that we share with other animals. Contains the model of the world that instantly evaluates events as normal or surprising.	Allocates attention to the effortful mental activities that are demanding, including complex computations.
Provides the impressions that often turn into beliefs, and it is the source of the impulses that often become our choices and actions.	Operations are often associated with the subjective experience of agency, choice, and concentration.
Offers a tacit interpretation of what happens to us and around us, linking the present with the recent past and with expectations about the near future.	When we think of ourselves, we identify with System 2, the conscious, reasoning self that has beliefs, makes choices, and decides what to think about and what to do.
Source of our rapid and often precise intuitive judgments. But also prone to make systematic errors in specified circumstances. Little understanding of logic and statistics.	Only this slower system can construct thoughts in an orderly series of steps.
Operates without our conscious awareness of its activities-- effortlessly originating impressions and feelings that are the main sources of the explicit beliefs and choices of System 2.	Takes over when things get difficult, and it normally has the last word.

14. *Ibid*., 27.

15. *Ibid*., 79.

16. *Ibid*., 80.

17. *Ibid*., 119.

18. *Ibid*., 138.

19. *Ibid*., 363.

20. *Ibid*., 44.

21. *Ibid*., 28.

22. Borgmann, *Holding*, 2.

23. *Ibid*., 185.

24. *Ibid*., 19-20.

25. *Ibid*., 133.

26. *Ibid*., 189.

27. *Ibid*., 191.

28. *Ibid*., 191.

29. *Ibid*., 189.

30. See: *Entertainment Software Rating Board (ESRB) – Philosophy.* Web. 29 Aug. 2012. <http://www.esrb.org/about/index.jsp>

31. Kahneman, *Thinking*, 48.

32. *Ibid*., 48.