

Becoming Interesting:

Movement and Attention Design

"...movement is reality itself..."

-Henri Bergson

"Perhaps the sole goal on earth toward which human-kind is striving consists merely in this continuous process of attaining the goal; in other words, it consists in life itself, and not really in the goal..."

-Dostoevsky

The focus required to play the dance-themed arcade game “Dance Dance Revolution” is remarkable. One must pay careful attention to the constantly changing visual cues on the screen, remain acutely aware of the current position of the feet, and coordinate one’s physical movement with a symphony-like precision. It is the perfect melding of mind and body, and its success has led to a thriving field of motion-based arcade and home video games.

What Dance Dance Revolution does marvelously, and what newer devices such as the Nintendo Wii and Microsoft Kinect are built around is the exploitation of a fundamental and seemingly-blatant fact of human functions and perception: that movement is an essential (perhaps the most essential) consideration for engaging human attention. In this paper I’ll divide movement into three separate—though overlapping—categories: bodily movement, visual movement, and what I’ll call “manipulative movement.” All three have extremely useful and unique applications in design aimed at grabbing and holding attention, and thus warrant their own individual discussions. But it is perhaps the very concept of movement-in-itself, on an ontological level, which engenders any specific type of movement with a special power to engage the human

mind, and it is this notion that will become my first primary concern. Following the writing of Henri Bergson, we shall see that movement is fundamental to both perception and to external reality itself, and that it is valuable to explore any causal links between certain basic conditions of existence and specific human psychological desires: so that perhaps to satisfy the certain psychological urges needed to be met in order for a human to grant attention to something, an attention designer might need only to recreate—or rather reemphasize—to some extent a constituent part of reality. In our case, that constituent part of reality will be *movement-in-itself*.

But first, I think it is beneficial to briefly clarify the need and utility of a discussion of attention-engaging techniques in design. We are living in what many writers are fond of calling an “attention economy.” The attention economy represents at its most basic level a shift in the scarce commodity that drives the supply and demand at the heart of certain current economic spaces. It is “a system that revolves primarily around paying, receiving, and seeking... the attention of other human beings,” because, “in the new economy, capital, labor, information, and knowledge are all in plentiful supply.... What’s in short supply is human attention” (Goldhaber 2, Davenport and Beck 2). In a vast departure from traditional market-driving scarce resources such as labor (the U.S., for instance, has a substantial excess of available skilled and unskilled labor¹), the new scarce resource which is beginning to drive the economy is human attention, and the new raw material in the attention economy is information. Value is then created in the attending to this information. Worker productivity is more and more being judged on the ability to efficiently attend to vast amounts of information, so that “understanding and

¹ “Economic New Release,” U.S. Bureau of Labor Statistics.

managing attention is now the single most important determinant of business success (Davenport and Beck 28). Concurrently, the value of media properties is increasingly being judged not by direct advertising revenues (as in traditional network TV) or by direct pay-service revenues (as in cable TV), but by attention—or in the parlance of the Internet, *hits*—directed toward the property (which can be demonstrated by Internet TV streaming service Hulu: though traditional economic pressures are compelling the service to experiment with an upper-level pay service, the non-pay sections is immensely more popular—and differing little in features from the pay service—and the 90 seconds of ads run during programming pales in comparison to the nine minutes of ads running during the same program on network TV—a 6:1 difference).

Michael Goldhaber, one of the people to first use the term, emphasizes that the attention economy is “an all-encompassing system that structures human life to a very large extent,” and not “simply one particular stage or way of looking at what [traditional economists] take to be eternal, namely the economy based on money, markets and standardized industry” (Goldhaber 3). To those traditional economists, “the ‘economics of attention’ is only the study of how best to deploy and structure attention to greatest effect in the race for money,” but this is entirely missing the point that Goldhaber and other writers and economists are making: the attention economy is an entirely new economic way of thinking, in which attention takes on and holds the value that once only money held (Goldhaber 3). Attention is a new major currency in itself, and it is owned and spent ceaselessly by every living human being. Thus, as Richard Lanham writes, “it should not surprise us that the dominant discipline, the economics that matters in this new

theater, is design” (Lanham 17). Design in the 21st century, whether in education or business, the Internet or real cities, is going to be fully obsessed with attention.

I would argue that movement needs to be a fundamental consideration in attention design. The three types of movement I’ve identified—bodily, visual, and manipulative movement—each alone amplifies the engagement potential of human interfaces. But before individual discussions of each of these, I think it best to bring up the most basic yet complex question: what exactly is *movement-in-itself*?

To formulate a basic idea of movement, we’ll take a lesson from early 20th century French philosopher Henri Bergson, whose basic ideas and concepts would find their scientific footing in what would one day be called neuroscience. Giles Deleuze boils down in a basic sense the core of Bergson’s viewpoint: that “movement has two aspects. On one hand, that which happens between objects or parts; on the other hand, that which expresses the duration of the whole” (Deleuze 11). The first typifies the traditional view of movement as seen by mechanics and human intellect, the motion of one object across a line of space; but according to Bergson, this is a false movement, relegating motion to “an abstraction or a symbol” (Bergson 202). For in reality, “movement is distinct from the space covered. Space covered is past, movement is present, the act of covering” (Deleuze 1). In other words, it is never a being (as in, that there is movement), but a becoming—never measurable or dividable. However, in the traditional view, movement can be *infinitely* divided up into smaller and smaller movements (hence Zeno’s Paradox and the myriad of other space and time paradoxes). Real movement itself then, according to Bergson, “is rather the transference of a state than of a thing” (Bergson 202). Real movement itself is not summed up, for instance, by the motion of my finger moving

closer to my keyboard and decreasing the distance between them (this is an intellectual abstraction for the sake of measurement). Rather, it is the *system*, the whole that contains the keyboard, my finger, and everything else, which is *changing*, which is moving.

To help clarify this, Bergson's conception of time, Duration, is needed. Duration is pure becoming, is change itself, and cannot ever be divided into smaller pieces. His best metaphor for it (though necessarily imperfect) is that of a rubber band being stretched from a single point outward without stopping, so that it could never be divisible because it is always changing—Duration, then, is pure mobility; it is the *motion* of the elastic, not the measured space over which it stretches. Duration solves many of the traditional paradoxes of space and time because it separates time from the spatial conception people traditionally have of it and relegates it to that of something beyond space, something synonymous, in the end, with consciousness. Without delving too far into Bergson's conceptual framework, we can say that at least now we have a slew of synonymous terms: Consciousness is Duration, Duration is qualitative, systemic change, and change is movement itself.

There are many important implications to this. First of all, to return to the traditional view of movement, as an abstraction which occurs in the intellect. The intellect always works in the past (with what I just saw, not what I am presently seeing), and views things as immobile sections. Bergson uses the metaphor of the cinematic device to illustrate this. In cinema, a camera translates real movement itself into a bunch of immobile instances (typically 24 frames a second), and then these static frames are put into a projector that adds an abstract movement to them, thus giving the illusion to the audience that they are watching real motion. The intellect works in the same way. It takes

real movement, breaks it down into immobile, divisible instances, and then reconstitutes the movement. As Bergson states, “instead of attaching ourselves to the inner becoming of things, we place ourselves outside them in order to recompose their becoming artificially. We take snapshots, as it were, of the passing reality....” (Bergson, *Creative Evolution*, 306).

Bergson points out that it is only *intuition*, which is in the present, that can fully communicate with pure movement-in-itself. It, like the present, is simply *becoming*. Now, even when we try to grasp this, we of course must intellectualize, so that, as Deleuze says, “whether we would think becoming, or express it, or even perceive it, we hardly do anything else than set going a kind of cinematograph inside us” (Deleuze 2). But this point, that “we touch the reality of [an] object in an immediate intuition,” and not intellect, is the important thing to keep in mind (Bergson 77).

Another implication of Bergson’s conception of movement and Duration is that we get an answer to a problem that has long bothered both philosophers and scientists (particularly Bergson). As Bergson sums up, if you separate consciousness from the outside world, you have “two different worlds, incapable of communicating otherwise than by a miracle—on the one hand, that of motion in space, and the other hand, that of consciousness with sensations” (Bergson 202). But Bergson’s concepts do away with this problem, equating real movement to “quality [mental sensation] itself, vibrating, so to speak, internally, and beating time for its own existence through an often incalculable number of moments,” which thus “cannot be without some likeness to the continuity of our own consciousness” (Bergson 202-203). Again, real movement is not the movement of a single object or part, but the change of state of a whole system. Consciousness, then,

must be included as a part of this system; and consequently, it must be viewed as fundamentally interwoven with reality, with movement itself.

The point I am trying to emphasize and the point Bergson concludes, is that there is “no impassable barrier, no essential difference, no real distinction even, between perception and the thing perceived, between quality and movement” (Bergson 218). Bergson goes even further, stressing that “pure perception, which is the lowest degree of mind—mind without memory—is really *part of matter...*” (Bergson 222). Pure memory is the only thing completely internal to the human mind. Pure perception, as demonstrated in Bergson’s conceptual framework, is external, part of matter itself (I will explore this in more detail later in the section on manipulative movement). We go about our days at an in-between point, between pure memory and pure perception. But the important thing to stress is that perception exists in the object being perceived, and this has enormous consequences for designing attention. It is up to the external object to engage us. This is not just a decree of good design; it is a fact of fundamental reality. If an external object to attend to does not engage us, the mind uses memory as a way to project something novel onto the external object, in the attempt of attention to “seek constantly to find out something new about [the object],” as James states (James 273). But the point of attention design is to avoid this, to engender the external object itself with enough to adequately engage one’s perception.

Which brings us to a dilemma of design in the 21st century, where the majority of our interfaces are becoming digital, *unreal*, and thus not carrying the same level of immediate importance that similar objects in reality might have. Things that, on an intellectual level, most people know are fake could do well to emphasize reality (or

reemphasize it, considering virtual objects in, say, cyberspace, are not totally transcendent of reality) in hopes that the more one emphasizes this, the more an attending subject's intuition can dominate intellect in the initial encounter with the interface, and the more one is able, at the most primal levels, to give attention to something. A bottom-up approach, involving the engagement of intuition—the most basic level of perception—is much more effective at engaging the subject than the top-down approach which starts at intellect. Again, I believe the best way to tackle this approach—to engage a subject at a primal level through emphasizing something's realness—is with imbuing an object with movement. And again, this is because movement itself is the fundamental quality of not only reality, but of consciousness.

Here we have an interesting link between an ontological reality and psychological desire. Is it not true that we desire only to attend to things that move, that change? As Ribot points out, attention “is an exceptional, abnormal state, which cannot last a long time, for the reason that it is in contradiction to the basic condition of psychic life, namely change” (Crary 64). As James writes, “No one can possibly attend continuously to an object that does not change” (James 272). Thus, when designing attention and attempting to predict the desires of users, one perhaps needs only to follow the translation process from the very structure of reality itself, to the fundamental workings of human perception (a part of that structure), to the desires and urges at higher levels of human consciousness (still embedded in and the result of the structure). In our case, we see clearly that movement and change stretch from opposite ends of the human psyche.

Now, keeping in mind the power of movement in general, let's delve into the three specific categories of movement I mentioned earlier. To begin with visual movement:

There is only a difference in degree, not in kind, between mechanically reproduced visual movement on, say, a screen, and movement in the real world. As Deleuze writes in his books on the cinema, although Bergson's cinematographic analogy was used to understand false movement, Bergson did not give a close-enough examination to the cinema (still in its infancy during his lifetime) and therefore was unable to see that the cinema actually exposed what Bergson himself exposed in his writing: the movement-image. Although Bergson's original analogy is still a helpful tool in understanding the intellect's relationship with movement, it is not an adequate description of the reality of the mechanically produced moving image (referred to simply as cinema by Deleuze). Rather than presenting to us the individual photographs that make up a filmstrip, the cinema actually presents us with "an intermediate image, to which movement is not appended or added; the movement on the contrary belongs to the intermediate image as immediate given. It gives us a section, but a section which is mobile, not an immobile section + abstract movement" (Deleuze 2). Animated film is perhaps the easiest in which to grasp Deleuze's concept. As with Bergson's treatment of real movement in itself, in the animated film the "drawing no longer constitutes a pose or a completed figure, but the description of a figure which is always in the process of being formed [becoming] or dissolving through the movement of lines and points," thus the cinema "does not give us a figure described in a unique moment, but the continuity of the movement which describes the figure" (Deleuze 5).

Although Deleuze is specifically investigating film, the equivalence he shows between movement in the real world and movement on a cinema screen can be brought to bear on any device with a display for the moving image, from the television to an iPhone. Again, there is only a difference in degree, not in kind, between real and mechanically produced visual movement, and in fact there are some instances of the latter which lessen the degree of difference to such an extent that the body is not able to recognize any distinction. Take, for example, a scenario of full virtual reality. One's vision would not be able to discern any difference between reality and a virtual reality perfected to the point of complete double, and so our bodies would react accordingly: a danger coming at us will make us run out of the way; a surprise around a corner will make us jump in fright. Barring the intellectual knowledge that one is in a virtual reality, the danger and consequences of virtual movement are just as important and attention-grabbing as in reality.

So movement on a screen can be counted along with movement in the real world to simply be called visual movement. Visual movement in itself is appealing for reasons already discussed: because movement is the very heart of consciousness, time, and reality, we are most engaged by objects that show us this; at the same time, there is a physiological response to movement in the form of danger assessment. There have been many studies, especially in young children, demonstrating the power of visual movement with engagement and focus. One study involving a math test given to children with ADHD found that when the test itself offered high levels of within-task visual stimulation, students completed more problems, completed more problems correctly, and were less active than when faced with low within-task visual stimulation or with

competing stimulation.² Another study had four-, six-, and eight-year-old children focus on a computer-generated display showcasing color, complexity, incongruity, and movement while viewing time was measured; movement was found to increase attention and also was one of the variables not affected by age.³ In fact, there are perhaps as many uses for visual movement in engaging adults as there are in engaging children. In a recent article written for the official Editor's Guild of America magazine, a Hollywood editor lays out what he sees as the main component of engaging images, which he terms "frequency." An engaging visual image is not necessarily the one with the most fast-paced cuts or camera movements: it's the one with the highest "frequency" of interesting visual information. A static, lengthy shot may still be visually engaging because it has high rates of visual change within it, as "the simple act of the shapes crossing each other, frame by frame, can be seen to increase the frequency of the shot. As every frame presents a different picture spatially unique from the next, the human eye is kept very busy, and the frequency of interest is greatly increased" (Petschek 24). We can see clearly that visual movement, whether incorporated into a math test or used to attract one to an ad, demands human attention.

Secondly, we have bodily movement as an engagement tool. Simply watch a soccer goalie as the ball is brought closer and closer to the net; he is anything but static, bouncing, flinching, and swaying ceaselessly as he awaits the inevitable movement that will have to be made to stop the ball from going into the net. Indeed, as Bergson writes, "we commonly act our recognition before we think it.... Movements, accomplished or

² Lee, David; Zentall, Sydney, "The effects of visual stimulation on the mathematics performance of children with ADHD."

³ Lema-Stern, Sandra, "Children's Visual Attention: Effects of Color, Complexity, Movement, and Incongruity."

merely nascent, ” prepare the summoning of the proper memory image useful to the task at hand, “or at least mark out the field in which we shall seek the image we need. By the very constitution of our nervous system, we are beings in whom present impressions find their way to appropriate movements” (Bergson 95). As the soccer goalie is awaiting the ball, he is constantly twitching alive the memory of what it is he needs to do in order to stop the ball. By engaging his bodily movement with the mental processes of both keeping an eye on the ball and recalling what the correct movement will be to stop it, the soccer goalie can be said to be “in the moment”—fully engaged with the task at hand.

This melding of mind and bodily movement is well documented as an engagement technique, especially in tasks that require a large amount of vigilance. Sports psychologists talk about “flow states,” which represent the optimal level of engagement for performers, where “there is no difference between what they are thinking and what they are doing.”⁴ Movement meditation, such as Gurdjieff, is becoming increasingly popular in the West as a remedy for those who would like to meditate but do not have the concentration for it. Moving one’s body in certain movement patterns during meditation helps limit the distractions that the body itself causes, and studies show that when compared to other forms of meditation, “Gurdjieff meditators showed greater cortical specificity—the ability to activate areas of the brain necessary to the task at hand while leaving irrelevant areas of the brain inactive. Potentially, these findings suggest applicability in maladies that range from attention-deficit disorder to obsessive-compulsive disorder.”⁵ Another study aimed at children involved documenting the

⁴ “Attention and Concentration Training in Sport,” 2.

⁵ Cohen, Judith, Cheryl Laskowski, and Betty Rambur. “The Experience of Movement Meditation: A Dance of Rhythmic Paradox and Time,” 65.

correlation between hyperactivity and the early integration of body movement and attention and found results that suggest that “the dynamic integration of movement and attention early in life may have functional significance for the development of attention problems in childhood.”⁶ Thus, attention design (especially digital design) would do well to integrate body movement into the tasks at hand, for the body as well as the mind must be engaged for optimal attention (the two are fundamentally integrated, as Bergson shows us; and furthermore, moving one’s body additionally integrates one into the system which one is engaging with, emphasizing that one is a part of the stream of movement).

Finally, we’ll look at a third type of movement that I will call manipulative movement: for it represents the reverberation one’s movement has on the whole. This is a similar concept Bergson uses to describe real movement-in-itself (becoming, the change of state of the whole) but at a smaller scale (closed systems as opposed to the whole universe) and used for the practical purpose of illustrating one’s place and potential in that system. Specifically, it satisfies the urge to express one’s sense of free will, for a manipulative movement shows that a movement from my body is not just a “movement from a movement,” but that my body “really adds something new to the universe and to its history” (Bergson 18).

A simple example of manipulative movement is touching a still pool of water with a finger and causing ripples to flow out and change the quality of the pool of water. A more abstract instance is when the term “movement” is used in the philosophical sense by Nietzsche and Deleuze, to symbolize what proper philosophy should attempt to accomplish: namely, the movement of forces or desires, the creation of radically new

⁶ Friedman AH, Watamura SE, Robertson SS. “Movement-attention coupling in infancy and attention problems in childhood.”

concepts, the change of the system, and not merely a reflection upon abstract philosophical ideas. Manipulative movement is, in short, the relationship between a volitional act of one's body and the perceptible change of the system. It is different from both visual and bodily movement, but could involve both—or neither. One could write a message of suggestion about a website on a chat forum, for instance, and subsequently have the website's manager write back stating that the suggestion has been listened to. Though there is neither significant visual or bodily movement involved, movement still occurred because the system has changed, and perhaps has accelerated its becoming new based on your suggestion—what's more, is that this was most likely very satisfying, for you have exercised free will and proven your influence over this system.

The root of the satisfaction of manipulative movement can be found in Bergson's writing on some of the most fundamental aspects of perception. Bergson writes: "My body, an object destined to move other objects, is, then, a center of action... [it is] an object capable of exercising a genuine and therefore a *new* action upon surrounding objects..." (Bergson 20). At the same time, the objects around this center of action actually "send back, then, to my body, as would a mirror, its eventual influence; they take rank in an order corresponding to the growing or decreasing powers of my body. *The objects which surround my body reflect its possible action upon them*" (Bergson 21). The design implications of this couldn't be greater: the degree of our attention to an object is based on the amount of influence we can have over it. The more interactivity an object or interface has, and the more one can make simple actions that influence it, the more one will desire to engage with it on a fundamental level.

The desire for manipulating movements has long been put to practical use in the kindergarten classroom in order to engage children in learning certain skills and concepts. One often finds in a classroom shape or rod materials of varying colors and sizes in which children construct structures or patterns. As children build and experiment with manipulative materials, “they develop richer ways of thinking about mathematical concepts such as number, size, and shape” (Resnick 1). Mitchel Resnick and the MIT Media Lab have been working on a new class of materials called “digital manipulatives,” which insert programmable computer chips and sensors into various building blocks, thus dramatically increasing the amount of concepts one can engage children with. Indeed, concepts that were once introduced at the university level, such as dynamic systems, are now accessible to children through their manipulation of these now moving and interacting digital manipulatives. Their goal, Resnick states, “is not to help users accomplish some task faster or more effectively, but rather to engage them in new ways of thinking” (Resnick 3). Engaging kindergarteners with concepts once only accessible through advanced mathematical techniques like differential equations stands as testament to the engaging power of manipulative movement.

Let’s return once more to video games. They are now as much a signifier of childhood as is a ball or doll. Few things engage children as powerfully as video games. I’d posit that this is because video games package all three types of movement into a single task (attending to one’s character, for instance). There is the obviously large amount of visual movement present on the screen; there is the bodily movement required to control one’s character (bodily movement in video games, in fact, has dramatically increased in recent years, starting with the full-body engaging Wii—and this has proven

such a successful attention-holding technique that all three major home video game systems now have their own version of this); and finally, there is the manipulative movement, the perception that one is directly changing this video game world, creating and moving forces from one's own volition. There is, consequently, some interesting research on the effectiveness of video game attention, especially regarding children with attention disorders. There is a known increase in body movement when a child is performing a vigilance task—one such study featuring learning-disabled and “normal” children found that (a) body movement increased throughout a vigilance task, (b) increased rates of external stimulation resulted in *decreased* levels of body movement, and (c) learning-disabled children differed from controls in showing higher levels of body movement and poorer vigilance performance.⁷ Remarkably, however, another study published more recently compared the body movement of ADHD and non-ADHD children while playing video games. Yet contrary to expectations, “an analysis of the data did not reveal any statistically significant differences in the frequency, type, and severity of body movements between the ADHD and non-ADHD boys...”⁸ The fact that the number of body movements was close to zero for children with ADHD, this seems to indicate that the children were “engrossed in the task at hand. In other words, the boys diagnosed as ADHD behaved no differently to the non-ADHD boys during computer game play, thereby demonstrating the effect that this activity had in reducing body

⁷ Rugel, Robert P; Cheatam, Douglas; Mitchell, Annette, “Body movement and inattention in learning-disabled and normal children.”

⁸ Farrace-Di Zinno; Douglas, Graham; Houghton, Stephen; Lawrence, Vivienne; West, John; Whiting, Ken, “Body movements of boys with ADHD during computer video game play,” 607.

movements.”⁹ So perhaps one way of decreasing the educational divide between attention-disorder children and non-attention-disorder children is through interactive video games—for perhaps, while children with attention disorders seem to have difficulty in “making things interesting” for themselves, the solution is engendering the task or object to be attended to with enough interest in itself.

The more attention becomes a dominant educational, cultural, and economic issue, and the more we need to externally engage it, the more our attention designs need to turn to the fundamentals; the more they need to encounter and work with not just stop-gap measures or echoes of other issues, but fundamental reality. Movement is that reality.

⁹ Ibid 616.

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