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### WHAT YOU DON'T KNOW CAN HELP: THE ROLE OF UNCERTAINTY IN CREATIVITY

#### Introduction

Certainty equals death for creative process: quests ended before they are begun, imagination constrained, possibilities undermined. So why do we feel compelled toward certainty when creativity is fueled by the *uncertainty* inherent in taking risks and making mistakes? Explanations might include the structure of our ancestral brain (fear of the unknown), a psychological aversion to risk and loss (fear of diminished status either materially or emotionally), and the bias toward right answers in our outcome-centric culture (fear of failure). Nevertheless, it is uncertainty that opens imaginal realms of emergent possibility. Akin to other complex dynamic systems, creativity thrives on the informational disequilibrium that sparks change and new development. This chapter explores the dynamics of creative process, and proposes that uncertainty is a necessary condition for its generative power to flourish. From this perspective, grounded in my own practice as an artist, various strategies are suggested for turning uncertainty to creative advantage--not just tolerating it, but *cultivating uncertainty* in order to enhance creative and innovative potential. These non-methodical methods share the quality of deploying attention in defocused, nonlinear and unexpected ways that facilitate creative thinking across disciplines.

#### Uncertainty Anxiety

*Knowing what doesn't work can be as useful as what does. But if people do not perceive any "failure value" for projects that ultimately achieve no commercial success, they'll become less and less likely to experiment [and] explore. (Amabile, 1998, p.83)*

From Pandora to Eve, to cats killed by curiosity, warnings are everywhere against pushing beyond established limits. Such tales are compelling, in part, because they reflect the evolutionary pedigree of fear. In the primitive brain, fear circuitry was laid down first because survival depended less on reasoning than responding in-

stantly to perceived threats, including anything unfamiliar or ambiguous. Occasionally, this uncertain state gave rise to surprising spontaneous moves-- evasive, less predictable flight patterns, for example-- perhaps the positive expression of a primal impulse toward inventive/creative behavior.

Uncertainty-tolerance diminished as reason ascended to dominance. Although many people claim to value creativity, they are fundamentally uncomfortable with novel ideas and generally prefer what is familiar (Sternberg, 1997). Since originality by definition deviates from norms, the more original an idea is the greater the potential for discomfort: fear of the unknown stalls creative tasks; fear of losing status materially or emotionally stifles risk-taking; fear of making mistakes undermines authentic process.

The desire to minimize such anxieties in the workplace, studies reveal, can lead to rejecting creative solutions even when they are the stated goal (Mueller et al., 2012), particularly in corporate environments where success is often equated with consensus, control, and predictability. Creative problem-solving however, inevitably involves conflict, risk and unpredictability. In fact it is precisely uncertainty, the feeling of unsure footing in unfamiliar terrain, which mobilizes the imagination.

Just as a desire for security and certainty pulls us toward stability, an equally strong attraction to exploration and novelty pulls us toward instability. In border regions between the two, at the 'edge of chaos,' the known and the unexpected collide and generate new ideas. In this regard, creativity may be seen as a paradoxical unity of order and disorder, balance and disequilibrium, chance and design; in short, an interactive chaotic system.

### **Uncertainty, Chaos, Creativity**

*Chaotic systems are open, evolving... Each carries a far-from-equilibrium energizing potential promising new organization, complexity, change, and a chance for creativity (Richards, 2001, p.86).*

The view that disorder and aperiodicity could be a source of order and complexity in the natural world "verged on mystical," until chaos theory revealed how these qualities give rise to many of life's rich, coherent variations (Gleick, 1987, p.300). In chaotic dynamics, disorder triggers reorganization of information in non-obvious ways. Thus the uncertainty entailed in conditions of chaos animates creative process, actually enabling the emergence of creative ideas and new work. Key themes of this conceptual synergy between creativity and chaos are briefly summarized below, using a 5P framework that I have updated from the original 4P model (PERSON, PROCESS, PRESS, PRODUCT) by including PARTICIPANT-VIEWER, those outside observers whose very act of observation brings about variations in meaning

that uniquely alter the creative PRODUCT:

Like many aspects of life, creativity exhibits sensitive dependence on initial conditions, i.e. the PRESS of environment. Small perturbations can encourage or hinder us (PERSON), resulting in widely divergent and unpredictable yet constrained outcomes. Where familiar connections and prior knowledge are destabilized, creative ideation can advance unimpeded by the demands of logic. Throughout the PROCESS, nonlinear trajectories of thought unconsciously tend toward regions of nascent linkages and ideas, freely exploiting aleatoric elements. Within this liminal space of bounded instability, chance and intentionality co-determine unforeseen results. Creative PRODUCTS emerge over time from an autopoietic dialogue, transcending inert artifacts honed in a linear way as new developments arise from feedback and self-organization: evolving idea/product responds to artist, artist to evolving product. A cumulative “portrait” of trajectories and iterations, the finished state settles in two strange attractors that reflect intuitively suitable recombinations: the fundamental pleasures of novelty and fitness. Meaning and value, not necessarily inherent in the work, are formed reciprocally between a PARTICIPANT/ VIEWER and PRODUCT.

For purposes of our larger discussion, the creativity-chaos analogy bears fruit insofar as it suggests that uncertainty galvanizes the creative process, making it an essential condition for all forms of creativity.

### **Uncertainty Advantage**

*If habit is the great deadener, then uncertainty is the great enlivener*  
(Dilks, 2008).

A generalized urge toward exploration is contained in all mammalian brains, part of our evolutionary legacy that neuroscience identifies as a primal cognitive-emotive SEEKING/ Expectancy circuit (Panksepp, 2005, upper case in original). This neurodynamic system, really a combination of emotions including curiosity, expectancy and interest, seems to generate a psychological state of “invigorated and generalized engagement with the world at large” (pp.48-9) not unlike the optimal creative state known as flow. Evidence further indicates that SEEKING may be its own reward, more associated with process (anticipatory desire) than product (consummatory reward), suggesting that the ancestral urge to explore and investigate was not damped but driven by uncertainty. In a similar vein, studies by Zenasni, Besançon and Lubart (2008) show a significant and positive correlation between creativity and tolerance of ambiguity. They conclude that the ability to accept anxiety provoked by new situations empowers “intrinsically motivated exploration of novel, unusual or complex stimuli” (p.62). Here, art and science overlap.

Most artists experience chance, ambiguity and uncertainty as leverage for their creative process. For example, consider this description by Stravinsky:

*An accident is perhaps the only thing that really inspires us. A composer improvises aimlessly the way an animal grubs about, yielding to a compulsion to seek things out... So we grub about in expectation of our pleasure. Suddenly we stumble against an unknown obstacle. It gives us a jolt, and this shock fecundates our creative power (2003, pp.55-6).*

Creative process, though rooted in subject-knowledge, requires periods of “aimless” internal wandering. Supporting this concept, Smallwood and Schooler state that mind wandering may be the source of sudden ‘aha’ moments, insights seemingly appearing out of the blue, “because it shares important similarities with incubation processes related to creativity”(2006, p.956). Defined as a shift or drift of attention away from a primary task toward internal information, mind wandering addresses more remote goals that have eluded solving. Mason et al. conclude that such wandering from current goals may also be functionally significant because “SIT [stimulus-independent thought], as a kind of spontaneous mental time travel, lends a sense of coherence to one’s past, present and future experiences”(2007). Liberated and adrift in this turbulent phase space of what was, is, and could be, the imagination weaves new realities from the tension of opposites. A wandering mind is nowhere and everywhere, has a goal yet strays, has no single way and therefore access by all ways to emergent ideas.

Many ancient teachings endorse such wandering as a path that complements reason. The legendary Zen koan-- *What is the sound of a single hand?*-- uses paradox to demonstrate inadequacies of logical reasoning and provoke enlightenment in other ways. After all, the sound of a single hand cannot be heard with the ear. “Quite apart from seeing, hearing, perceiving and knowing, [insight is attained] where reason is exhausted and words are ended” (Seo, 2010, p.7). Foreshadowing the neuroscience, this eighteenth century teaching riddle ascribes to the unfettered mind the means to intuitively store, access and transform raw knowledge into new understandings that often arise from the paradox of balanced antinomies.

Contemporary scholars concur that imagining in paradox spurs creative leaps. In his seminal research on eminent creativity in the arts and sciences, Rothenberg proposed that the capacity to actively conceive of two or more coexisting opposites or antitheses, what he termed *Janusian* process, is the foundation of all creative thinking (1979, p.138). Janus, the two-faced Roman god of doorways, beginnings/endings and transitions after whom the process is named, perfectly embodies the ambiguous nature of creativity. Always looking simultaneously forward and back, he reminds us that beyond the limiting dichotomy of “either/or” there exists

a far more expansive “both/and” perspective, one that engages paradox to transcend linear thinking.

Paradox, because it ruptures habitual associations and facilitates exploration of fresh, unlikely connections, is an ongoing focus of creativity research. A 2011 study by Miron-Spektor et al., examined how paradox drives creativity in organizational behavior. They demonstrated that paradoxical frames—mental templates individuals use to embrace seemingly contradictory, non-rational statements or tasks—implicitly activate a sense of conflict that stimulates complex integrative thinking, and enhances creative/divergent thinking (p.238).

Similar results were attained in research comparing two investment banks with different uncertainty-management styles: the organization that ‘amplified’ employees’ uncertainty fared better than the one attempting to reduce it (Michel 2009). These seemingly counterintuitive findings suggest that an atmosphere of increased uncertainty minimizes reliance on routine, thereby promoting effective problem-solving in complex, rapidly changing circumstances. Additionally, the study indicates that people are generally more successful at certain complex tasks when they “know less,” i.e. venture beyond their expertise; that switching roles stimulates flexible, multi-dimensional thinking; and that incorporating contradiction in problem-solving leads to more creative solutions.

Not surprisingly, a recent survey of CEOs by IBM’s Institute for Business Value reported creativity as the most valued corporate leadership competency (Kern, 2010). Moreover, *creative disruption* was seen as vital for enterprises wanting to foster more innovative leaders: disrupting the status quo, disrupting existing business models, disrupting the emphasis on stability that can paralyze decision-making.

In academia as well, there is growing interest in pedagogy that proceeds at least in part by indirection, unpredictability and “not-knowing” (Irving 2001, Dilks 2008). Recognizing the power of uncertainty to stimulate creative cognition, educators have begun to include non-methodical methods that destabilize standardized information and dislodge pre-conceived ideas, encouraging exploration of those experiences that set us off-balance. Even the staid discipline of engineering acknowledges that, along with technical skill, students must be able to “see the familiar as strange, and the strange as familiar on a regular basis,” without rushing to a single “correct” solution (Stouffer et al., 2004).

### **Cultivating Uncertainty**

*At once it struck me, what quality forms a Man of Achievement--- NEGATIVE CAPABILITY, when man is capable of being in Uncertainties, Mysteries, doubts without any irritable reaching after fact and reason. John Keats (in a letter, 1817)*

Domain-knowledge supplies necessary raw material but is not sufficient for creativity, which depends heavily on heuristics or the way knowledge is combined. If creativity is about surprise, not predictability, and is fueled by its very indeterminacy, how might we develop those conditions that allow creative capacities to flourish? The following interactive approaches use uncertainty to increase creative potential:

**1. REFOCUS ON PROCESS.** Approach creativity as a fluid, open process instead of a fixed quantity of innate talent. Visualize process not results, exploration of new paths not exploitation of past success.

- **Transcending context.** Think trial and error, make informed guesses; build on unforeseen turns, learn from/use mistakes.
- **Chance/ accidents.** In the arts and sciences alike, “one heuristic can breach the barrier [of the ‘simply unthinkable’]: chance, which by definition is indifferent and beyond taste, habit and value. Harnessing chance as part of the creative process can therefore vastly enhance the probability for [something] truly original” (Prager, 2012).
- **Wandering.** To reignite stale thinking, turn to other interests unrelated to a current problem, allowing solutions to incubate and surface later.
- **Playing** with perspective, content, context, forming analogies, generates abundant alternatives (divergent thinking); logical (convergent) thinking subsequently tests and refines.

**2. HEIGHTEN UNCERTAINTY: MAKE THE FAMILIAR STRANGE.**

- **Multiple perspectives.** Incite imagination by disrupting what is expected, exploring unexpected points of view. Modify, reverse, rearrange, recombine, re-contextualize information; experiment; intensify ambiguity with mysteries, puzzles. Challenge traditional thinking, e.g. “Could this *not* be true?”
- **Conditionality.** The world is everywhere in flux, defying notions of ‘unconditional truth.’ Using probability statements encourages creativity by leaving information uncertain, therefore more available as creative fuel when contexts change. Langer’s study of creative uncertainty and probability statements presented an unfamiliar-looking piece of clean rubber to subject Group 1 as fact: “This is a dog’s chew toy.” Group 2 heard a conditional formulation: “This *could be* a dog’s chew toy.” When told they urgently needed to correct forms previously completed in pencil, only subjects introduced

conditionally to the rubber object thought of using it in the non-obvious way as an eraser (1989, p.120). Merely shifting from absolute statements to conditional mode led to more flexible thinking.

- **Counterfactuals** ask ‘what-if,’ shatter fixed mindsets, upend obvious scenarios, disrupt conventional understandings and branch into new ones. Imagine extreme *im*possibilities then identify conditions in which they might be realized.
- **Paradox.** As described above, oppositional pairings liberate the imagination, spark insight. A classic example is Einstein’s development of relativity theory from the contradictory formulation of being in motion and at rest at the same time.
- **Non-sense.** Surreal juxtapositions of apparently unrelated elements, e.g. images (Ernst, Magritte, Dali) or narratives (Kafka, Beckett), violate logical expectations, subvert familiar associations, and prime us for seeing novel, nonlinear connections. Use improbabilities; frame open-ended, provocative questions; structure tasks only enough to give directional clues.
- **Role-play** in varied, decentralized, even opposite responsibility fields brings fresh eyes to existing problems, promotes multiplicity, flexibility, originality, encourages experts to leave their information ‘silos’ and see things in new ways.

**3. REFRAME UNCERTAINTY.** Cognitive reappraisal/reframing alters context or message around fear-inducing stimuli to modify emotional response. Since uncertainty-avoidance is not an option for creativity, practice resetting the narrative from *Creative Uncertainty = anxiety/judgment/risk/loss = BAD*, to *Creative Uncertainty = advantage/exploration/inspiration/opportunity = GOOD*.

### Conclusion

Uncertainty enables us to learn from contexts of ambiguity and turn unpredictability to creative advantage. Without the frisson of uncertainty, there is no creativity. By non-methodical methods of chance, play and risk, through questions, contradictions and approximations, we wander, disrupt, deconstruct, and reconstruct countless fragments of memory, imagination, reason and emotion. In this errant process and its infinite emergent possibilities, creativity mirrors ambiguities of the human condition itself.

Uncertainty, then, is a vital transition state, a portal and porous space that privileges creativity. Like Janus’ double gaze, a doorway forever leading both inward and outward, creativity has no wrong side and no single right side. Yielding en-

tirely to the pull of instability/uncertainty may fail, of course, because novelty for its own sake ignores usefulness. But yielding too soon to the pull of stability/certainty will always fail creatively because habit stifles innovation. Heuristics that engage with ambiguity, multiplicity and change equip us to see, and make, the world anew. Whether corporate or personal, academic, scientific or artistic, this open-ended stance draws freely on mutually informing, information-rich spectra in any domain. Choosing to live the questions and embrace uncertainty deepens our creative capacities as seekers, imaginers, and innovators. For creativity, the only certainty is uncertainty.

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## References

- Amabile, T., 1998. How to Kill Creativity. *Harvard Business Review*, September, pp.77-87.
- Dilks, S., 2008. Teaching Uncertainty: The Danger is in the Neatness of Identification. <http://www.samuel-beckett.net/Uncertain.html>
- Gleick, J., 1987. *Chaos: Making a New Science*. New York: Penguin.
- Irving, A. and Moffatt, D., 2002. Intoxicated Midnight and Carnival Classrooms. *Radical Pedagogy*, Winter,4(1)
- Kern, F., 2010. What Chief Executives Really Want, *Bloomberg Businessweek*. [http://www.businessweek.com/innovate/content/may2010/id20100517\\_190221.htm](http://www.businessweek.com/innovate/content/may2010/id20100517_190221.htm)
- Langer, E., 1989. *Mindfulness*. Cambridge MA: DaCapo.
- Mason, M.F., Norton, M.I., Van Horn, J.D., Wegner, D.M., Grafton, S.T. and Macrae, C.N., 2007. Wandering Minds: The Default Network and Stimulus-Independent Thought. *Science*, January, 315(5810), pp.393-95.
- Michel, A. and Wortham, S., 2009. *Bullish on Uncertainty: How Organizational Cultures Transform Participants*. New York: Cambridge University Press.
- Miron-Spektor, E., Gino, F. and Argote L., 2011. Paradoxical Frames and Creative Sparks: Enhancing individual creativity through conflict and integration. *Organizational Behavior and Human Decision Processes*, (116) pp.229-240.
- Mueller, J.S., Melwani, S., Goncalo, J.A., 2012. The Bias Against Creativity: Why People Desire but Reject Creative Ideas. *Psychological Science*, 23(1), pp.13-17.
- Panksepp, J., 2005. Affective consciousness: Core emotional feelings in animals and humans. *Consciousness and Cognition*, 14(1), pp.30-80.
- Prager, P.A., 2012. Making an Art of Creativity: The Cognitive Science of Duchamp and Dada, *Creativity Research Journal*, 24(4), pp.266-77.

Richards, R., 2001. A New Aesthetic For Environmental Awareness: Chaos Theory, The Beauty of Nature, and Our Broader Humanistic Identity, *Journal of Humanistic Psychology*, Spring, 41(2), pp.59-95.

Rothenberg, A., 1979. *Emerging Goddess: Creative Process in Art, Science, and Other Fields*. Chicago: University of Chicago Press.

Schuldberg, D., 1999. Chaos Theory and Creativity, pp.259-272. In M. Runco & S. Pritzker, eds., *Encyclopedia of Creativity Vol. 1*, San Diego: Academic Press.

Seo, A.Y. and Addiss, S., 2010. *The Sound of One Hand: Paintings and Calligraphy by Zen Master Hakuin*. Boston: Shambhala.

Smallwood, J. and Schooler, J.W., 2006. The Restless Mind. *Psychological Bulletin*, 132(6), pp.946-58.

Sternberg R.J., O'Hara L.A., and Lubart T.I., 1997. Creativity as Investment. *California Management Review*, 40(1), pp.8-21.

Stouffer, W.B., Russell, J.S., Oliva, M.G., 2004. Making The Strange Familiar: Creativity and the Future of Engineering Education. *American Society for Engineering Education Annual Conference Proceedings*, #1615.

Stravinsky, I., 2003. *Poetics Of Music In The Form Of Six Lessons*, Cambridge: Harvard University Press.

Zenasni, F., Besançon, M., Lubart, T., 2008. Creativity and Tolerance of Ambiguity: An Empirical Study. *Journal of Creative Behavior*, 42(1), pp.61-72.