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Creativity:
A Gap Analysis

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Abstract

Arguably, our current understanding of creativity has a few gaps that might benefit from some analysis. In the paper, I review the main empirical findings and theoretical proposals on the core cognitive processes of creative thinking, outlining some of the deficiencies therein. I then develop a meta-analysis of the interactions between the main components of the creative universe; namely, the World, Language and Experience. In this analysis, I try to show that creativity often emerges at the interstices between some aspect of the World and our Experience (our understanding of the World), or some aspect of the World and Language (our linguistic descriptions of that World), or some aspect our Experience and Language. To demonstrate these points, I use this analysis to explain the emergence of extreme literary creativity in Ireland at the turn of the last century. More generally, it is hoped that this analysis offers a new perspective on all aspects of creativity and how they might be approached.

Introduction

Where do we go to find acts of creativity? There are obvious places that I will visit here – the novels and poetry of Nobel laureates – but there are also less-obvious places, for example, in the humour of everyday life. "Ordinary people" are often very creative in their everyday interactions, particularly when humour is involved (Koestler, 1964). Recently, over Christmas, when the snowy, cold weather kept everyone indoors for several days; a friend describing the experience said that she had "Cavan fever" rather than "cabin fever"[1]. Though it came from a slip-of-the-tongue the act of turning it into a joke was a creative step. On such occasions, jokes often arise from some tension between the reality of the specific situation (the World), the inherent vagueness of language (Language) and our individual store of knowledge about things (our Experience). In this essay, I will consider how creativity tends to arise when gaps open between these three domains, what happens in the interstices between the World, Language and Experience.

I will mainly consider the impressive shores of eminent creativity (creativity with a big-C; Stein, 1953), the sort that wins Noble prizes played out against the backdrop of 100 years of Irish history. However, at base, I do not consider these creative acts to be any different from the ones that shaped the Cavan joke (creativity with a little-C; Richards, 2007). Big-C creative acts may take longer to come to fruition and involve significant effort, knowledge and talent but I believe that the essential cognitive mechanisms involved in those acts are no different to those involved in the everyday joke. The forces that produce the creative product, the tensions that strain to birth something; all of these things are basically the same in both cases. Indeed, I would argue that, one of the central challenges of creativity research is to explain how this could be so.

Approaches to Creativity: On Being Found Wanting

When one scans the landscape of creativity research, it is hard to feel warm inside. There is a unity missing; a unity built from a core set of empirical findings accompanied by a clear theoretical statement about how those

[1] Cavan is a windswept, underpopulated, cold, wet, boggy and generally abandoned part of Ireland that people tend to avoid.

cognitive processes deliver creative products. Perhaps creativity is too close to requiring an "all-of-cognition" explanation to yield a simple, clear account? Consider what we can say about core empirical findings and current theory.

Core Empirical Findings

Cognitive Psychology is a like Venice where the piles are phenomena. Most Cognitive Psychology courses and their textbooks try hard not to sound like a list of empirical findings scantily clad in reified theories (see Eysenck, 1984; Eysenck & Keane, 1990, 2010). The discipline is less often captured by unified theory and more often characterized by collections of phenomena (e.g., the McGurk Effect, Halo effect and so on).

Keeping this in mind, the key question is "what are the cognitive phenomena that define creativity". Notably, the list seems *not* to be very long if one scans the textbooks and handbooks of the field (e.g., Solso, MacLin & MacLin, 2008; Matlin, 2009; Eysenck & Keane, 2010; Kaufman & Sternberg, 2010; Sternberg & Sternberg, 2011). Most list the same well-worn phenomena, many of which are rather old as discoveries and few of which are that impressive. The short list includes:

- *Incubation*: Many discoveries occur after a period of *not* working on the problem and emerge fully-formed into consciousness (e.g., Poincare's, 1913, discovery of non-euclidean geometry; see also Wallas, 1926). This phenomenon, leads to the (sarcastically said) helpful advice "to set the problem aside after working on it for a time" !

- *Insight/Aha/Eureka Moments*: Are those flashes of genius (that often occur after a period of incubation; Wallas, 1926; Koestler, 1964); the sudden understanding that emerges, on occasion, to deliver the solution to a standing problem that is often quite hard to replicate in the laboratory. In some respects, the shape of insight has been better characterized by metacognitive feeling-of-knowing measures (Metcalfe, 1986; Metcalfe & Weibe, 1987; Metcalfe & Shimamura, 1995)

- *Analogy and Metaphor*[2]: Analogy is often implicated in cognitive acts that lead to creative products and the cognitive processes involved have been extensively examined (Koestler, 1964; Keane, 1988; Hofstadter & Farg, 1995; Gentner, Holyoak & Kokinov, 2000). More broadly, the role of metaphor in thinking has been recognized as important too, not just in the arts but also in the sciences (Hesse, 1966, 1980; Gruber, 1974, 1981).

- *Conceptual Combination*: Many of the Darwinian approaches to creativity (Campbell, 1960; Simonton, 1997, 1999; Albert, 2010) along with some cognitive theories (Ward, Smith & Finke, 1999; Estes & Ward, 2002) place a central emphasis on conceptual combination as a fundamental of cognitive process in creativity. In its linguistic form, the process of combining concepts has been tested extensively and modelled computationally (Medin & Shoben, 1988; Smith, Osherson, Rips & Keane, 1988; Wisniewski, 1996; Costello & Keane, 2000). Perhaps the main problem with this proposal is that researchers possibly mean very different things in their usage of the term "combination".

- *Expertise*: Finally, taking a problem space perspective (Simon, 1981, 1988), another line of research shows that creativity often arises out of deep expertise in a given domain; the so-called "10,000-Hour Rule" capturing that idea that often a lot of domain-specific knowledge formed through years of practice underlies creativity (Gardner, 1993; Ericsson, 1999; Howe, 1999, 2001, 2008; Weisberg, 1999, 2006; Kozbelt, 2008; Gladwell, 2008).

Beyond these phenomena not a lot sticks out as empirical pointers to the core cognitive processes involved in creativity. Note, it is not my intention to downplay the excellent work done on the wider context of creativity (Amabile, 1983, 1996; Csikszentmihalyi, 1996; Simonton, 2004; Galenson, 2008) or, indeed, the work that has been done in the psychometric tradition (Terman, 1926; Wallach & Kogan, 1965; Guilford, 1968; Torrance, 1968;) but these approaches advance the *context* of creativity, not our understanding of the specific cognitive processes that it uses. What is surprising is that this state of affairs persists, despite the fact that creativity has become a heavily-

[2] Often grouped as Conceptual Blending.

researched area and, in its business-guise as "innovation", is a multi-million dollar industry.

So, why is empirical progress so poor? Perhaps, as many argue, creativity is not really a unitary phenomena, but just entails the recruitment of fairly normal cognitive processes often driven by great effort, persistence, and motivation (Finke, Ward, & Smith, 1992; Smith, Ward & Finke, 1995; Weisberg, 1993, 2006). It involves many aspects of "normal" cognition just applied in some extraordinary way and we should not be looking for a cognitive mother-load that underlies all creative thought.

Theoretical Approaches

The empirical picture is not helped by the state of theory in the field, where there is not a lot of convergence. Kozbelt, Beghetto & Runco's (2010) review lists 10 categories of theory (e.g., cognitive, psychometric, systems, evolutionary) that range over the "6 Ps" of the phenomenon (person, process, product, place, potential, and persuasion). They also cut up the space of theories on the basis of whether they are predominantly concerned with big-C creativity (eminent creativity, objectively identified major works of art or science) or little-C creativity (everyday creativity, more subjective, self-defined events)[3]. Though all of these contributions are clearly useful and take us further in constraining the creativity space and assessing the important factors surrounding the creative act, they leave the Cognitive Psychologist looking at his/her hands. When you search all of these theories for pointers to key processes you are not taken far beyond those highlighted in the list of empirical phenomena.

Where to Go from Here?

There is a well-known joke, in Ireland, about a tourist stopping his hire car on a small country road by a mud-covered peasant leaning over a gate, and asking for the directions to Dublin, to which the reply is "Well, sir, if I was you, I wouldn't start from here.". The joke is sometimes classed as racist (depending on who is telling it) but my own view is that the peasant is being

[3] Indeed, Beghetto & Kaufman (2007) argue for a 4-way cut between different categories of the behaviour.

quite counterfactually creative. Sometimes it really *is* a good idea to take some other starting point, not the one that immediately presents itself to you. This is what I try to do in the remainder of this chapter, to start from a very different position on the road and see where it takes us. So, I start with an Irish mystery that has obsessed me for many years.

Writer	Born	Died	Nobel Prize
George B. Shaw	1856	1950	1923
William B. Yeats	1865	1939	1925
James Joyce	1886	1941	-
Samuel Beckett	1906	1989	1969
Seamus Heaney	1939	-	1995

Table 1: *Birth & Death Dates of Five Irish Writers*

The Irish, Nobel-Prize Mystery

Given what could be glossed as "a general lack of progress", creativity research cries out for a new perspective to wrench us free from current approaches. So, in the remainder of this paper I try to sketch a new angle on it in an attempt to yield some new insights.

The ideas in this paper arise from an effort to explain a mystery that occurs in Irish literature at the turn of the 20th century. Between 1850 and 1950, five individuals are born that shape and shake Irish literature written in the English language. Four of these writers win the Noble prize for Literature and the fifth is always assumed to have won one, but did not. The Nobel laureates are Shaw, Yeats, Beckett, and Heaney (see Table 1); with Joyce being the unexpected odd man out [4].

Over this 100-year period, from the mid-1800s these five writers have a significant impact on world literature. In one sense, they come out of nowhere, there is no obvious precedent before them. So, what caused this explosion of creativity?

[4] Arguably, Heaney is an outlier from this group, as he was born in a very different time; though his rural upbringing in N. Ireland and obvious legacy from the earlier group ties him in.

As we shall see, the history of Ireland at this time involves significant cultural, demographic and linguistic upheaval that changed the world in which these writers lived. I will argue that these changes created gaps between the normal operation of language, the individual's conception of the world and that world itself; gaps that presented an enormous potential for creative acts, acts that favoured these five writers to create great works of art. But, before we can solve this mystery, we need to sketch the three domains of this cognitive universe in which creativity occurs; the World, Language and Experience.

The Cognitive Universe

To expand the present perspective we need a broad framework within which we discuss cognitive acts of creation. Perhaps somewhat controversially, I am going to posit that cognition occurs between three main interacting domains: the World, Language and Experience.

The World: The world is the physical reality that is outside of us -- the birds, bees, trees, rocks and stones; often called the Environment. I am assuming that we all agree it is real and not imagined by us in some dream; though it is largely interpreted through our various sensory systems (vision, taste, olfaction, proprioception and so on). We have a sense that it is very real and when we bump off things they feel hard and it hurts, though much of the time we merely sample it in a fairly sketchy way. Indeed, we are creatures that rely very heavily on vision to interpret this world, what Joyce famously called "the ineluctable modality of the visible".

Experience: By Experience, I mean everything that is in our respective heads; also, often called Knowledge. All the knowledge, memories, sensations that we have encountered in our lives and recorded along with whatever innate machinery supports the acquisition of such information. In Cognitive Science, Experience is captured by a menagerie of representational notions with many different names: schemata, memories, scripts, concepts, semantic networks, MOPs and so on. Experience to a large degree determines who each of us are individually and it regularly determines what we will do, think and feel in

everyday life. When we loose it, as in Alzheimer's disease, we loose our selves[5].

Language. By Language, I mean that specific part of our experience that handles our ability to comprehend and produce speech, to understand the written word and produce it ourselves; the whole set of implicit rules we use in linguistic interactions with one another. We appear to be first among species in these abilities and they appear to have given us a big evolutionary leg-up, to the point where we are now smart enough to destroy our own planet. Language, as they say, changed everything.

All cognition occurs in the interactions between these three domains. As we move around our world -- at work, play and rest -- we encounter and manipulate the physical world using our knowledge of things, we describe these activities to others and plan together to achieve more long-term goals (like organizing dinner parties). As this is the world in which we live, it is the same world in which we create. My proposal is that many creative acts emerge at the interstices between these three domains, in the thread-wide gaps between Language and Experience, between Experience and the World and Language and the World (via Experience).

Before we attempt to solve the Irish Nobel-Prize Mystery, we need to consider how creative acts operate in the gaps between these three domains of the World, Experience and Language. Along the way, we will see that many instances of creativity are unified by a consideration of these interactions; from the novels of William Borroughs to the pop songs of David Bowie, from Roman soothsaying to the formulation of brand names and, indeed, the writing of nobel-prize-winning literature.

The Interstices between Experience & The World

Though we have a great sense that the world is there before our eyes and ears we now know that most of what we perceive is a function of what we *expect* to see and hear. A hundred years of research on visual illusions and weird cross-modal influences (like the McGurk effect; McGurk & McDonald, 1976)

[5] I realize that I am parting company here with the non-representational camp, those connectionist hordes, that reject the positing of internal, mental representations to handle knowledge.

show us that we sample the world, in a fairly sketchy way, and our brain fills in the gaps based on our knowledge and prior experience with that world (and presumably innate constraints acquired through evolution). This is not to say that the world is not accurately perceived, the methods we use to see, hear and touch it are clearly fit for purpose, to prevent us killing ourselves or making serious errors about what is out there.

According to cognitive theory, such interactions between Experience and the World are handled by the processes of perception and categorization. As I look at an object -- like my coffee mug on this desk -- my perceptual system gleans the necessary information from the environment and my categories tell me that that things that look like that, smell like that and that are held like that, tend to be COFFEE-MUGS (where the capitals indicate the knowledge of coffee-mugs not the mug itself). Categorization is quite routine as a cognitive act, it moves swiftly to capture and label the world around us. This categorical knowledge is structured in a variety of ways in the mind and can be deployed readily and efficiently to get us about the world (c.f., Eysenck & Keane, 2010).

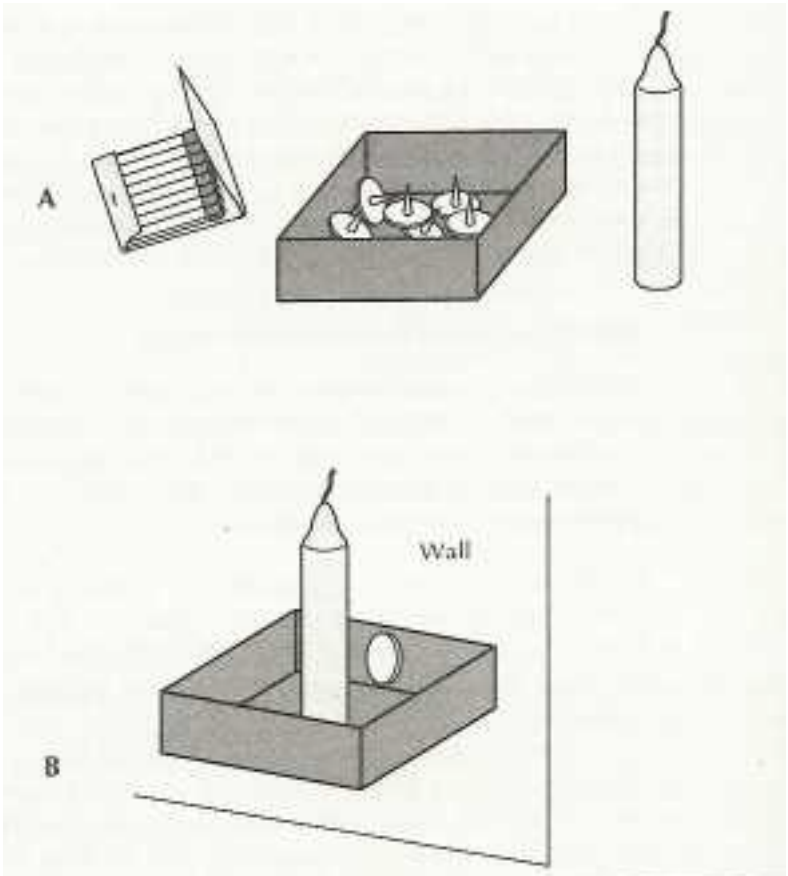

Figure 1: Duncker's Candle Problem, (a) showing the initial state of the problem and (b) the insightful solution using the matchbox as a candle holder (from Duncker, 1945, released from copyright to Wikipedia Commons)

Re-Categorizing the World Using Experience

Indeed, as the Gestalt Psychologists showed us, our dependency on 'normal' categorization often stifles our creative abilities. We know from insight experiments that we often cannot re-conceive of an object in the world as something else, something with a different function when we need to change some aspect of the world to solve a problem (so called, functional fixedness, see Duncker, 1945, and Figure 1). So, in Duncker's candle problem when we need to use the matchbox as a candleholder our normal categorization of it as a "container for matches" stops us re-conceiving or re-categorizing it as a candleholder. Functional fixedness is an important phenomenon as it shows us that creativity begins when we move away from routine categorization of the world, when we attempt to re-imagine that world. It is when we start to re-interpret the categorical status of an object in the World, we start to see creativity emerge.

So, it is not surprising that early psychometric approaches to creativity have focused on this re-conception process as an index of creativity, employing the Unusual Uses Test (see Guilford, 1968; Sternberg & Lubec, 1995), where people are asked to find as many different uses for a brick as possible (Hudson, 1966). Using measures of frequency (how many uses one finds), fluidity (the ease with which one produces them) and elaboration (how well they are explained), psychometric approaches have developed indices for creativity, though whether they predict creativity in particular domains is perhaps questionable.

However, at the heart of these efforts is an attempt to map a process that works at the interface between Experience and the World. The Unusual Uses Test clearly has "something" to do with creativity because it tries to tap the comprehension processes that can project very different categories on to an object, as mundane as a brick, to generate novelty. So, it and insight problems can be seen as demonstrations of how the gaps between Experience and the World can be exploited to create new meaning.

Using the World's Objects as Symbols for our Experience

The re-categorization that occurs in insight problems picks at the loose threads in the stitching that joins our Experience to the World. In this step, we see the beginnings of a key realization, essential to any creative act, that the World is not what it seems, that it is only what it seems because we all agree and choose to conceive of it in a certain way.

In insight problems, this consensus understanding of the World is stretched as we assert new functions/meanings for an object. However, this sort of re-interpretation is always grounded in the actual physical object, it is practical in the sense that we cannot assert fanciful properties that will not hold. For example, in an insight problem, it would not help me to assert that the box is actually made of gas as part of a solution to put my hand through the box. The re-categorization has to be grounded in what physically can be done with the object. This *modus operandii* makes sense in such practical construction problems, when you are trying to find a practical, physical solution to a problem. But, in other contexts, people go further than re-categorizing the function of an object, they assert that the object is actually something completely different; that the object is really a *symbol of something else*.

Many different cultures attribute very different symbolic significances to the objects in their World, often arising from their particular philosophical or religious beliefs. In Western culture, the moon can signify madness or romance depending on the poetic context adopted. In recent years, the banking conglomerate -- HSBC -- has run a series of adverts showing objects and the widely differing symbolic significance that can be attached to them in different cultures. In one advert, a new-born baby is shown labeled as an "object of love", "legacy", and "expense". In another, an empty water bottle is labeled with the words "healthy", "fashionable" or "wasteful" (see www.hsbc.com). What is striking about these symbolic assertions is the surprising variety of meanings that can be attached to different physical objects in different cultures.

The Swiss linguist, Ferdinand de Sassure, talked about the arbitrariness of the linguistic sign, but what we are seeing here could be called "the arbitrariness of the asserted symbol". What exactly constrains us in attaching a particular

symbolic meaning to an object? Can any significance be attached to any object or is there something about the physical object that constraints the use of some meanings over others? To put it another way, would a symbolic attribution fail under some conditions; if I assert that the picture of a new-born symbolizes "murder" is that unworkable as a symbol for some reason[6].

The creative activity of attributing symbols to physical objects appears to be a semantic Wild West, where almost anything goes, once you can wrap the symbolic attribution in some explanatory framework. Intuitively, the constraints seem to be very loose, indeed so loose that symbolic attribution potentially allows great creativity in what people can do. This creative step works in the gap between Experience and the World, it goes beyond what is given in the world and then applies our knowledge to provide an explanatory context for the symbolic attribution.

This takes us to our next case of interaction -- between Experience and the World -- where we seem to create whole patterns of attribution that parallel the World and provide re-interpretations of that World.

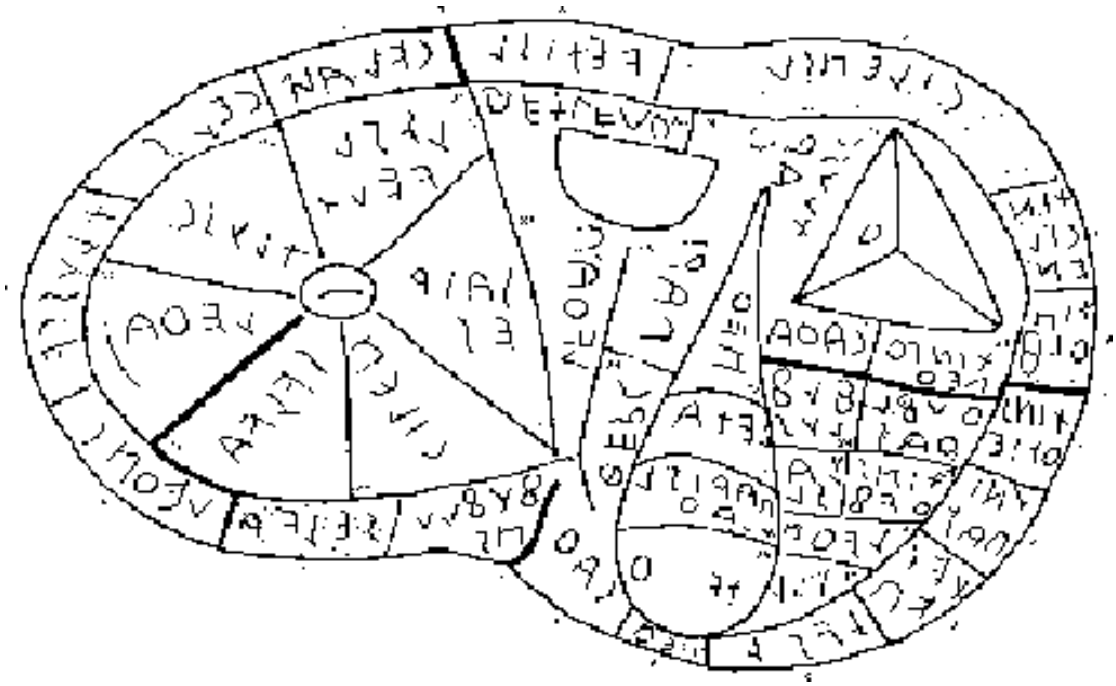

Figure 2: Drawing of the Etruscan "Liver of Piacenza"

[6] Even as I write this, I immediately think of T.S. Eliot's "Journey of the Magi" in which the birth of Jesus is seen by one of the Wise Men as a harbinger of death, the death of the old religions and old beliefs.

(reproduced from *Wikimedia Commons*)

Systems of Symbols Parallel the World

Of course, we rarely simply pick a single object to which we then attach symbolic significance, it is more likely that several objects are given some symbolic significance and connected together in some way. Before I argue for religion and science as instances of these activities, let me make a more plausible argument for soothsaying, as it can seem so much stranger.

When I read accounts of Roman history, I am always struck by how they constantly read omens into everyday events. Many of these symbolic attributions seemed quite arbitrary: two eagles circling the Senate could be a good or bad omen, could represent the founders of the city or foreign foes. So much so, that soothsaying often seems more like an indirect way to sway public opinion than any real attempt to understand the signs from the Gods.

Consider the humble mouse; for us it often connotes meekness, smallness and Disney comedy. In Roman thought, the mouse was associated with the earth and soil and was often seen as the embodiment of plague and crop devastation. It was viewed as a "prodigious" and "foreboding" animal by Virgil and Seneca. So much so that military operations in the 2nd Punic War (208 BC) were suspended after reports that mice were seen nibbling gold in a temple. Here the mouse is invested with a symbolic meaning, as is the gold and the action of the mouse eating; each part of the real-world event has a parallel symbolic import of destruction. A parallel symbolic explanation is mapped onto the (unassuming) physical world. Furthermore, such constructions were not just created on the fly, but were often passed down through generations as systematic explanations for events in the World.

Not many people recognize the word "haruspex" these days, but it comes from the Latin root "auspex" which has the recognizable plural "auspices", under whose authority we often act. Haruspicy is the inspection of the entrails of sacrificed animals for the purposes of divination and prediction of the future. Figure 1 shows a sketch of a bronze Etruscan artifact called the "Liver of Piacenza" (Van der Meer, 1987). Notice how the liver is segmented into different regions that have different symbolic meanings; the relationships between these regions (and their relative health) are also significant in the

divination. Here we have a systematic, symbolic system that is being overlain on a physical object, for the purposes of divination. Again, creativity is manifest in the manipulation of our experience as it is applied to the physical world.

It is a short step, to move beyond this type of divination to systems of religious belief and scientific theory as other manifestations of this sort of creative construction of systems of ideas. In religion, there is usually a systematic belief system that is mapped to things in the world, things that are given certain symbolic significance (e.g., the lamb of God in Christianity). In Science, we construct similar symbolic schemes when we say that this object is really something else and bears these hidden dependencies to other objects; these lumps of rock are planets or asteroid belts and gravity holds them in orbit around this larger body we call a planet.

The creation of such systems of symbolic meaning is non-trivial; most major religions or scientific theories are based on the creative work of many people over significant periods of time. What they all have in common is the creation of new ways of interleaving our knowledge with the physical world, to create new meanings for its brute reality, meanings that go beyond what it presents to us. They are about the interaction between Experience and the World.

Summary on Experience & the World

The preceding discussion poses an argument that the essence of creativity lies in moving away from the 'standard' conceptions of the physical world; as our Experience is applied to the World in ways that are offset more and more from "mundane" categorizations we start to see the emergence of more creative products. As such, the creative act consists of stepping beyond "normal" conceptions of the world or regular categorizations of its objects. In insight problems, this step is tempered by the practical test of whether new functions can indeed be asserted of the objects in the world. In more complex belief systems -- such as soothsaying, science and religion -- the coherence of the attributed symbolic system seems to be a key constraint on the creative process. For scientific theories, the test presumably lies in their explanatory

plausibility, their parsimony and predictive accuracy[7]. For religions, the test may be the encompassing plausibility of the beliefs for living in the World. However, the key step from the standpoint of creativity is that the interface between Experience and the World should be the focus of research.

The Interstices between Language & Experience

Just as creativity arises at the interface between Experience and the World, it also arises at the interface between Language and Experience itself. Our notion of Experience, here, is one of all the knowledge that resides in people's heads (both acquired and innate). As such, it is clear that Language must be a subset of this knowledge, perhaps with a strong innate component, shot through with a lifetime's experience. Language itself is a separate and distinctive symbolic system with its own rules of combination (and levels of analysis; e.g., phonetic, morphological, syntactic and so on). This separateness allows Language to act on Experience in many varied ways, bridging the gap between the two symbolic systems.

Trivial examples of this occur in everyday life when accidental word combinations suggest new jokes or ideas (as in "Cavan fever"). More generally, we often develop, what might be called, *language specifications* for a problem the exact meaning of which needs to be cashed out. For example, often when designing an experiment you say something like "we need a comprehension task that will not interfere with the learning task but one that is quite hard to do". This is a general, language specification of a solution but exactly what form it can take has to be cashed out using Experience; a specific comprehension task needs to be identified (e.g., sentence reading) and we need to develop some estimate of the difficulty of that task (e.g., the syntactic structure of the sentence).

These are just some anecdotal ways in which Language seems to support the re-configuration of our Experience to drive the creative process. But, how can Language achieve this, more directly?

[7] I am conscious here of the danger of just swapping one word for another; notions like "explanation" and "plausibility" in turn depend on our knowledge. There are some circularities to be avoided.

Creativity Arises in Language's Imprecision

It is well known that Language is imprecise at several levels. Put another way, what this means is that word-tokens do not always have unique, or even identified, conceptual referents when we use them. Trivially, we know this when we consider all the possible distinct scenarios that even the simplest sentence can realize; "The cat sat on the mat" can describe an infinity of scenarios involving different specific cats sitting in different ways on different parts of a large number of very different mats. That this is the case for, what is often called, literal meaning suggests that when we entertain polysemy -- where the same word token can apply to distinctly different meanings, the possible alternative meanings increases even more. One of Shel Silverstein's (1996) humorous poems for children says "I'll grow a foot before I am 10" and then shows an ticked-off kid with a foot growing directly out of the top of his head (see "Short Kid" p. 101). Finally, when we start to use Language metaphorically its relationship to Experience becomes stretched even further; the metaphoric "My love is like a green, stinging nettle" arguably has the power to change one's conception of love.

"A blonde to make a bishop kick a hole in a stained glass window."
"Moose Malloy looked about as inconspicuous as a tarantula on a slide of angel food."
"I like smooth shiny girls, hard-boiled and loaded with sin."
"He was worth looking at. He wore a shaggy borsalino hat, a rough gray sports coat with white golf balls on it for buttons, a brown shirt, a yellow tie, pleated gray flannel slacks and alligator shoes with white explosions on the toes"

Table 2: Some Raymond Chandler Metaphors from *Farewell My Lovely* (1940)

There a many instances of creativity that hinge on Language's interaction with Experience. Koestler (1964) probably made the most of such a mechanism when he argued that *bisociation* (a type of analogical juxtaposition) often hinged on word ambiguities; that is, where two apparently incompatible frames of thought are brought into correspondence suddenly by being linked through the pivotal ambiguity of a word token. It is also

commonplace to recognize the shaping of suitable metaphors as a creative act in itself (see Table 2 from some Raymond Chandler metaphors). However, there are also many instances of creativity that highlight how structural aspects of language (its syntax, if you like) can be used to re-configure concepts to create new meanings; instances that are interesting because they highlight the separateness of the Symbolic-Language system from the Symbolic-Experience system. Several are listed below.

The Link Between Bowie & Burroughs. It is not entirely obvious how the pop start, David Bowie, might be related to the beat novelist, William Burroughs. However, both used the aleatory creative technique of cut-ups. That it, some of their writings (songs and novels) were in part created through cutting up text into words or larger segments and then re-combining these randomly to create a new text with new meanings[8]. This is a very concrete instance of externalizing the language system as written text-segments and then re-arranging them to suggest new ideas. As such, it concretely manifests the way in which creativity can emerge from re-configuring Language segments and applying them to Experience to "see what they mean".

Sound Cut-ups in Liff. This type of interaction between Language and Experience does not seem to be limited to the re-combination of words with one another; it also seems to apply at a phonetic level, to the sounds within words and their re-combination. My best example of this is Douglas Adams & John Lloyd's book "The Meaning of Liff" (1983) in which the authors take place names and use them to create "a dictionary of things that there aren't words for yet". Though there seems to be no inherent reason why toponyms from around the world should seem apt as the names for various emotions and experiences these neologisms work. Table 3 shows some examples. Some of these coinings work because they sound like words we already know and this sound similarity carries parts of meaning to the asserted meaning, supporting its comprehension. I would class this as another type of interaction between Language and Experience but one that works at the level of word-sound-parts or, more technically, phonetic units. The phonetic units of the new word, access words with the same/similar phonetic parts and the

[8] Interestingly, at one stage, Burroughs (2001) suggested that it might be a good technique for divination.

recombination achieved supports the proposed meaning for the new word, giving it plausible meaning.

BANFF (n.) Pertaining to, or descriptive of, that kind of facial expression which is impossible to achieve except when having a passport photograph taken.
BALLYCUMBER (n.) One of the six half-read books lying somewhere in your bed.
BILBSTER (n.) A pimple so hideous and enormous that you have to cover it with a sticking plaster and pretend you've cut yourself shaving.
SHOWBURYNESS (abs. n.) The vague uncomfortable feeling you get when sitting on a seat which is still warm from somebody else's bottom.
SCRONKEY (n.) Something that hits the window as a result of a violent sneeze.

Table 3: Some New Words from Adams & Lloyd's
The Meaning of Liff (1983)

Recombinatory Brand Names: This general method of breaking up words or re-combining words to create new meanings is also used in more mercantile settings. In creating new brand names in advertising, marketing companies often explicitly use such techniques. Consider the following proposed brand-name-creation strategies from a marketing magazine (Smashing Magazing.com, 2009):

- *Compound (YouTube)*: Two whole words, often two nouns, stuck together.
- *Phrase (Six Apart)*: Words put together according to normal grammatical rules. Phrase names can be similar to compounds, but can have different pattern of syllabic emphasis.
- *Blend (Microsoft, Farecast)*: A blend combines a part of a word with another word or word part.
- *Tweaked Word (Flickr, Zune):* The real word is changed in some small way; spelling or added sound.
- *Affixed Word (Friendster):* New words created by sticking a prefix or suffix onto an existing word.
- *Made-up name (Etsy, Odeo):* Completely made up.

It is interesting to note how many of these strategies seem to correspond to the various strategies adopted in choosing suitable place names in "The Meaning of Liff". The commonality between the two is, of course, that Language can be manipulated in itself and then projected onto one's Experience to come up with new concepts or convey new ideas.

Poetry Creating Worlds. At the beginning of this section, we talked about how sometimes Language permits us to abstractly define something, that is then "filled out" when we apply it to our Experience. I gave the example of designing an experiment, where one can generate a high-level description of a solution, without knowing what it really is: "we need a comprehension task that will not interfere with the learning task that is quite hard to do". This may just seem like a high-level requirements-specification but there appear to be cases of creative acts that emerge from using poetry in a similar way. There are, at least, two science fiction/fantasy writers who claim to have used poems as a guide for the worlds created in their novels.

Philip Pullman's (2007) "His Dark Materials" trilogy is said to have drawn inspiration from Milton's (1667) "Paradise Lost"; the following lines being mentioned:

> *Into this wilde Abyss,*
> *The Womb or nature and perhaps her Grave,*
> *Of neither Sea, nor Shore, nor Air, nor Fire,*
> *But all these in their prengant causes mixt*
> *Confus'dly, and which thus must ever fight,*
> *Unless th'Almighty Maker them ordain*
> *His dark materials to create more Worlds,*
> *Into his wilde Abyss the warie fiend*
> *Stood on the brink of Hell and look'd a while,*
> *Pondering his Voyage; for no narrow frith*
> *He had to cross*
>
> (Book 2, lines 910-920) *Paradise Lost*, Milton

As you read these lines, out context, it is really quite hard to understand exactly what they are about. However, the words and metaphors have a distinct feeling-tone to them and it is easy to see how they might be used to "inspire" the description of a fantasy world. If you have read the later books in Pullman's trilogy it is uncanny how what happens appears to be a fleshing out of this part of the poem. The novelist appears to have used the poem as a high-level specification for the world created in the novel. Pullman is not alone in using this creative strategy; another notable example is Dan Simmons' "Hyperion Cantos" (Simmons, 1989, 1990) a series of science fiction novels that draw on Keats' poem "The Fall of Hyperion: A Dream".

Summary on Language & Experience

Just as in the section on the interaction of Experience and the World, in this section on the interaction of Language and Experience, I have tried to advance the argument that the essence of creativity lies in moving away from the 'standard' conceptions of our knowledge of the world; when Language is applied to Experience it can re-configure that experience in new ways, ways that often herald the emergence of creative products. Granted, the products of this re-configuration often have to be evaluated (e.g., cut-ups might just result in nonsense and not as Burroughs' argued the hidden meaning in the text). But, the creativity is, as it were, leaking from overlaying one symbolic system on another, exploiting the offset or discontinuities between them.

The Interstices between Language & the World

Unfortunately, it is not possible to talk about the pure interaction between Language and the World, as it is always filtered by Experience; so, this is a necessarily short section.

A Different Research Program for Creativity

In this paper, I have been purposefully speculative and relied almost wholly on anecdotal evidence to try to frame a new perspective on creativity. At the beginning of the paper, I asked the question: "Where do we go to find creative acts?". Traditionally, people have looked to problem solving or fluency tests (like the Unusual Uses Test). Here, I have tried to look at works of literature, poetry, and metaphor. I believe that these ideas could radically re-focus the

research program for creativity; the new program can explain many previous findings (e.g., why insight experiments tell us something about creativity) but also contextualizes this prior work, showing that they are often the tip of a much larger set of behaviours (involving, for example, analogy, metaphor and conceptual combination). So, what is the new program?

I would argue that it is a program that demands a re-focusing onto the key points of interaction between the three domains. It is interesting that for many complex reasons the interstices between the World, Language, and Experience have not been major focii for cognitive research[9]. Consider some of the (new) questions that arise when one considers the interactions between these domains:

- What are the "natural" limits to the use of Experience to interpret the World; for instance, can any physical object be used to symbolise any idea? Intuitively, it seems there must be limits or rather constraints that make one symbolic attribution better than another? But, what are these constraints?
- When any symbolic attribution is attempted, it seems to need a supporting conceptual structure; for example, I can see a baby's birth as a death in Eliot's poem but only as a metaphorical death of an old belief systems and I need to have the Wise King's supporting explanation of this to make the attribution work. So, this suggests that apart from the question of attaching some meaning to a physical object there is a explanatory coherence issue; the attribution must be supported conceptually by previous knowledge (i.e., there is a plausibility constraint; see Costello & Keane, 2000; Connell & Keane, 2006)
- This raises further questions about this supporting conceptual structure; namely, that presumably some of its relational structure must have parallel actions/events in the world (if one part of the goat liver is bad and is *next to* another part then that predicts something; there is a parallel in the symbolic interpretation); it seems that symbolic coherence in the set of attributions to physical objects/actions is required

[9] Though the embodied cognition literature is making up for this oversight.

- Then turning to creative individuals, what is it about their conceptual systems that allows them to do this more/better than others, to maintain and build such attributional schemes; we know that many pragmatic directions on creativity talk about the ability to maintain ambiguity, to abandon previously held understandings and so on; this perspective promises to ground those pragmatic suggestions in distinct set of cognitive processes
- Finally, on a wider stage, if there are disruptions that cause discontinuities between linguistic systems, experiential ones and the world (e.g., in language change or cultural upheaval) there should be a greater-than-usual opportunity for creative acts (possibly acts of the sort produced by Irish writers)

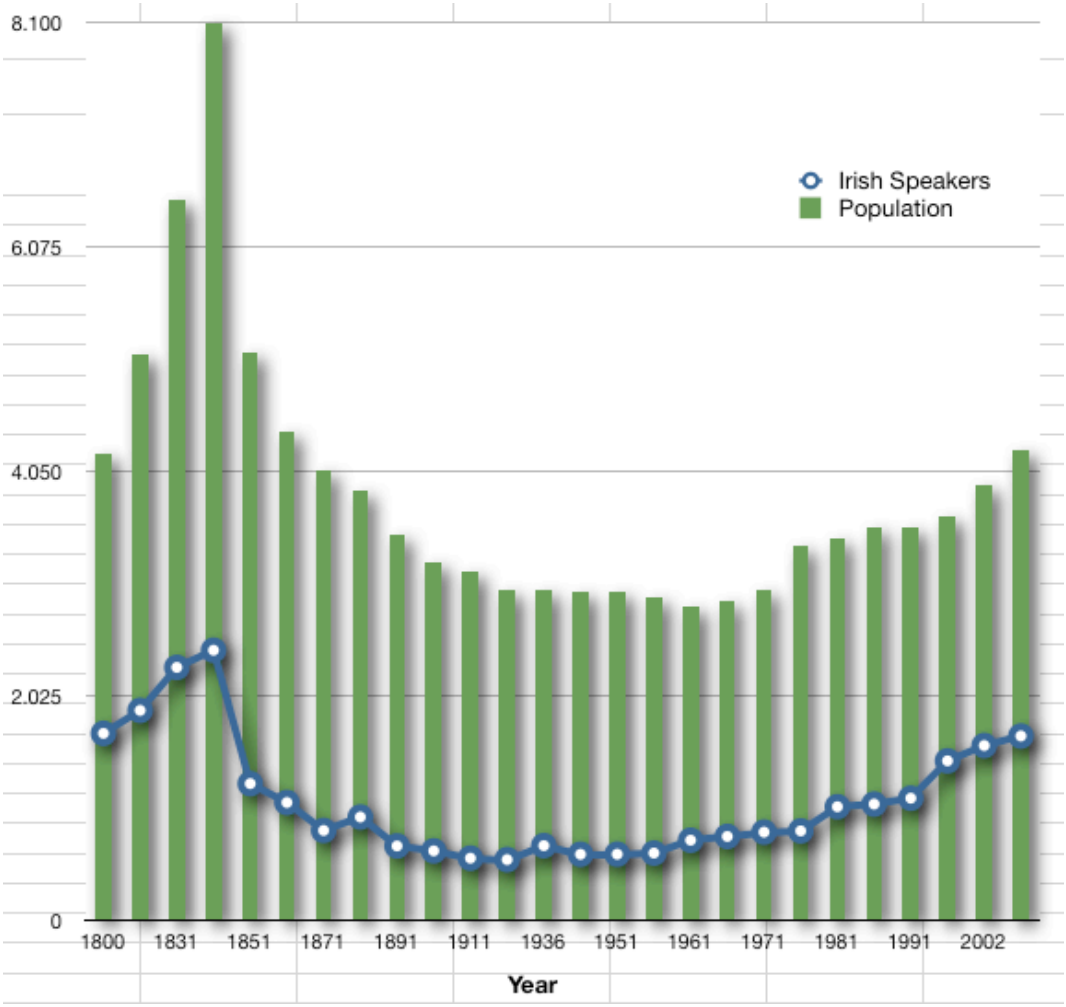

Figure 2: Population of Ireland (in millions) &
Number of Irish Speakers in that Population (1800-2006)

Solving the Irish Mystery

So, where does this leave us on our Irish Mystery; the question of why five individuals emerge at a particular time in Irish History to make major creative contributions to literature? The true answer is big and complicated and must have a lot to do with the (often nationalistic) motivations that emerge when countries gain their sovereignty and independence. But, apart from this nation-identity building aspect, there are a few smoking guns on the floor.

First, between 1840 and 1960, Ireland witnessed a massive population collapse, partly, as a result of death in the Great Irish Famine and, partly, as a result of subsequent emigration (see Figure 2). Broadly speaking, the population of Ireland accelerated from around 4 million in 1800 up to about 8 million by 1840, spiking before going into a free-fall that only turned around in the 1960s. While many famines across the world have recorded greater numbers of deaths, the notable aspect of the 1840s Irish Famine was perhaps its relative impact on the country; in effect, the Irish population was reduced by 2/3rds over the next half century. The impact of this demographic change was considerable. It physically changed the countryside in that many of the holdings of tenant farmers were cleared from the land; whole regions in the west of Ireland were emptied, creating a landscape of ruined cottages and dead villages. The social impact was perhaps even more pronounced; in general, the famine disproportionally impacted the poorer strata of society, removing the lowest economic rungs. So, the more bourgeoise strata remained. As a result, Ireland became a very conservative and religious country (Catholic) forming itself, on independence, into a stagnant state dominated by religious, political and business oligarchies (see Lee, 1989; Garvin, 2005).

Second, for the most part, these writers lived through a period in which there was also massive linguistic change; in that the Irish Language (Gaelic) was in decline as the population moved to speaking English, heavily influenced by the introduction of a primary school system delivered through the medium of English. Figure 2 shows the decline in Irish speakers throughout the 1800s

reaching a low in the 1920s before recovering somewhat[10]; Independence occurred in 1922, from which point Irish was re-introduced at Primary and Secondary levels as the official second language of the country.

These changes radically impacted the established dependencies between the World, Language, and Experience and for the population as a whole and these writers, in particular. Joyce has his main character, the young artist Stephen Dedalus, in "Portrait of an Artist..." (1917) say as much when talking to the English Jesuit Dean at his University (the one that was to become UCD):

> *The language in which we are speaking is his before it is mine. How different the words HOME, CHRIST, ALE, MASTER, on his lips and on mine! I cannot speak or write these words without unrest of spirit. His language so familiar and so foreign, will always be for me an acquired speech. I have not made or accepted its words. My soul frets in the shadow of his language (ch.5).*

Dedalus was born into a middle-class, urban family that did not speak Irish and yet the character has this strong sense that the English he speaks is not his language, that something is awry.

A more commonplace example can be found in place names, as they suggest that the language change engendered greater ambiguity in English (as spoken in Ireland), as it seemed to operate in a shadow cast by Irish. During the 1800s, Ireland was mapped by British cartographers who promiscuously anglicised the names of places they encountered. In some cases, this re-naming completely changed the original Irish name (e.g., *An Tochar* became *Roundwood*) but mostly the naming was a phonetic anglicisation of the original Irish name; *Ath na mBo* became *Annamoe*, *Rath Droma* became *Rathdrum*, *Beal Guala* became *Belgooly*, *Baile Ui Thaidhg* became *Ballyheigue*, *An Aill* became *Naul*. Of course, in English these names are just sounds, but in Irish they mean something; *Ath* is a river ford, *Baile* is a town, *Rath* is a fort, *Beal* is the mouth of river, *Aill* is a cliff and *Bo* is a cow. Putting it together, for instance, *Annamoe* translated into *Ath na mBo* means "The river ford of the cows". So, an Irish person using these names in English has another layer of

[10] It is amazing to think that, as a result of emigration, in 1890 the East Coast of the United States is estimated to have had 400,000 native Irish speakers.

meaning, that must spill over into one's general experience and use of the language. For a writer these experiences must have a major impact on their sensibilities.

The language being used by Irish-English speakers in everyday life has ambiguities that are not perceived by English-English speakers. This state-of-affairs must have caused a greater self-consciousness about the rules of language. Furthermore, the World in which these writers lived and their Experience of it had changed so much, that the words available must have seemed inadequate to capture reality. The World as interpreted through that Language and their Experience must have shimmered, inviting greater levels of meaning than first seemed apparent. Is it any wonder that some of these writers -- notably, Yeats, Joyce and Beckett -- became the Modernists that deconstructed literature in the English language. As the leaders of Modernism, the felt they could only reject the traditions of the past given their experience of the modern world. Their own experience of language exposed its conventions and they went on to extend that experience to all of English literature.

As I said earlier, these changes created gaps between the normal operation of language, the individual's conception of the world and that world itself; gaps that presented an enormous potential for creative acts, acts that favoured these five writers to create great works of art.

Conclusion

Theoretical frameworks are neither right not wrong, they are simply helpful or unhelpful; they either suggest a new way of thinking about things or they do not. Here, I have tried to advance a new framework for thinking about creativity. My strategy has been to attempt to shift your perspective on creativity, to shift your conception of it slightly, so that gaps open up, gaps that productively suggest new ways of approaching its phenomena.

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