9. Creativity.

9.1CREATIVITY AND INTELLIGENCE:

Creativity is sometimes broken up into divergent thinking and convergent thinking; though I argue that essentially same processes are involved in both.

Divergent thinking is <u>measured</u> using Torrance test of <u>creative thinking</u> (TTCT) TTCT consist of both verbal and figural parts. Divergent thinking is also measured by Guilford's Alternate uses task n which one has to come up with as many uses as possible for a common household item. . These creativity test results are scored keeping in mind a number of different creativity criteria. The most common criteria are:

1. **Fluency**: which captures the ability to come up with many diverse ideas quickly. This is measured by the total number of ideas generated. I call this the speed of ideation

2. **Flexibility:** which captures the ability to cross boundaries and make remote associations. This is measured by number of different categories of ideas generated. I call this the breadth of ideation.

3. **Originality**: which measures how statistically different or novel the ideas are compared to a comparison group. His is measured as number of novel ideas. I call this the uniqueness /novelty of ideation.

4. **Elaboration**: which measure the amount of detail associated with the idea. This I think is not relevant to creativity per se (as per my limited definition of creativity) , but elaboration has more to do with focussing on each solution/idea and developing it further - perhaps a responsibility more in alignment with that of Intelligence. I call this depth of ideation.

Convergent thinking is <u>measured</u> by tests like remote associations test or insight problems. These problems are solved when you apply one of the methods below:

1. **See problem from a different perspective**. To me this looks like how quickly you can adopt multiple perspectives - the speed with which you can take alternate perspectives and is similar to fluency.

2. **Make unique association between parts of the problem**. This looks again similar to flexibility or how fluid is your categorisation schema enabling you to think out of the box and not be limited by typical categories or associations.

3. **Take a novel approach (and not the typical approach) to problem solving**. To me, this again looks similar to Originality.

Creativity is also defined as coming up with something that is both novel and useful. At which point I am reminded of a quote by Oscar Wilde, that "all art is useless, we can forgive man for making a useless thing as long as he does not admire it. The only excuse for making a useless thing is that one admires it intensely. ' by which I understand that art need not be useful or fulfil the criteria of utility, but is more measured by whether it fulfils the criterion of aesthetics or beauty. As long as one considers art as an integral part of creativity, I think we need to make room for beauty as part of defining what is creative: **creativity = utility + beauty+ novelty.**

Taken together I argue that these criteria/strategies/definitions that are used to measure and define creativity and solve creative problems, also hint at the underlying factor structure of creativity.

I propose that creativity is tripartite:

1. The first factor is of **UTILITY**: whether one produces something that is useful. As evident from the alternate uses task the utility of something is ambiguous and context dependent. Creativity is the ability to deal with this inherent ambiguity, be comfortable with it and look at things from multiple simultaneous perspectives to find useful contexts.

Politics (leadership) epitomizes this ability. This is also related to speed and fluency with which you can hold multiple representations or generate multiple ideas. Taken to an extreme this may result in flight of ideas and racing thoughts typical of mania. Relating to personality constructs this is measured by feelings/ actions facets of openness to experience. The product associated with this type of creativity is typically an invention. In terms of existing schemata, you use multiple schemas simultaneously or let the member belong to multiple categories.

2. The second factor is **BEAUTY**: whether one produces something that is appealing and aesthetically satisfying. Beauty sometimes lies in making remote associations (think mixing of metaphors etc). Creativity is the ability to think beyond conventional boundaries or categories, loosen up the associations and make

remote associations between and within categories. Art epitomizes this ability. This is also related to flexibility with which you can walk across categories and disciplines. Taken to extreme this may lead to apophenia (or seeing patterns everywhere and correlating everything in a loose framework), over-inclusive delusions, and scizotypy or even full blown schizophrenia. Relating to personality constructs this is measured by aesthetics facets of openness to experience. The product associated with this type of creativity is typically a new stylistics. In terms of existing schemata, you loosen your schemata boundaries and let them overlap.

3. The third factor is **NOVELTY**: whether one produces something that is really unique and novel and unheard of before. Novelty is creativity that is not just combinatorial but perhaps associated with transforming and transcending. The role of imagination is prominent here. Also serendipity and latent thinking is more prominent here. Mythmaking / religion epitomizes this ability. This is also related to originality where a truly unique take is evident. Fantasy and role playing are important. Constructs like distractibility and latent inhibition are also relevant here. Taken to extreme this may result in attention problems associated with ADHD always being enthralled by something novel rather than paying attention to routine but boring stuff. Relating to personality constructs this is measured by fantasy facets of openness to experience. The product associated with this type of creativity is typically a social innovation. In terms of existing schemata, you transform your schemata and create new categories by principle of accommodation.

That to me is the crux of creativity, but to those who think applying intelligence and refining your creative insight is also part of the creative process, I propose a fourth part:

4. The fourth factor is **VERIDCIALITY**: whether what one has come up with is TRUE/ replicable/verifiable. Intelligence is the ability to see if the solution actually solves the problem. The solution (let's say a psychology theory) may be beautiful, useful (as in folk psychologies typically are- they help in predicting though the intuition behind them may be incorrect) and novel, but it may not be true. It may not lead to genuine understanding of the issues involved. Intelligence implies the ability to discern wheat from the chaff.

Science epitomizes this ability. This is also related to elaboration where you can focus on one stream of thought/ idea and take it to logical conclusion adding

details. Taken to extremes this hyper focus, obsession with one idea, obsession with details may lead to conditions like autism. Relating to personality constructs this is measured by intellect facets of openness to experience. The product associated with this type of intelligence (creativity) is typically a scientific research. In terms of existing schemata, you assimilate things in your existing schemata and are obsessed with/trying to elaborate a particular scheme/category.

From the above it is clear that creativity is associated with the psychotic spectrum (Schizophrenia, bipolar, and ADHD) and there have been extensive studies documenting association of each with the overall creativity and more specifically with the particular factor of creativity with which they are more prominently associated - (e.g. Beauty/ art/schizophrenia connection or Novelty/fantasy/pretend play/ADHD connection). Also it is equally clear that Intelligence as such is associated with autistic spectrum with many autistic savants again proving the rule.

But intelligence itself is not a unitary construct; I believe it has a tripartite structure mirroring that of creativity. To elaborate, Intelligence was typically split into Gf and Gc before CHC theory introduced many other factors. Gf or fluid intelligence is itself supposed to be made up of inductive reasoning (generalizing from specific cases and reasoning) and deductive reasoning (step by step logical deduction). Gc or crystallized intelligence is supposed to be using memory, existing associations, analogies etc.

Intelligence can also be correlated to executive functions. Executive functions can be split into processing speed, working memory and planning. In terms of attention, the same can be said to be made up of selective attention (orienting quickly to stimuli), Vigilance or sustained attention (alerting) and executive attention network or Divided attention (simultaneous attention). Miyake and Friedman's model (and many others) treat these as set updating (quick addition or deletion of contents), set shifting (flexibility to switch between different tasks) and set initiation (inhibiting prepotent responses).

Intelligence (and creativity) can also be related to the various types of minds that dual process theories, and Stanovich in particular, hasproposed. As per that model there is algorithmic mind (associated with inductive part of Gf- fluid intelligence) and reflective mind (associated with rational or critical thinking- the deductive part

of Gf). I would like to add a remembering mind to the mix (associated with crystallized intelligence Gc) and of course there is an autonomous mind (or A TASS in Stanovich's terminology) which is associated with the system 1 intuitive thinking or creativity in my views.

To sum up, The three broad factors of intelligence are:

1. **Processing speed:** related to inductive part of Gf, selective attention and set updating. This is measured using problem solving especially puzzles. This is also the algorithmic mind using the method of simulation (Stanovich). This parallels fluency/utility facet of creativity.

2. (**Working) memory**: related to crystallized Gc, sustained attention and set shifting. This is measured using ability to recognise explicit patterns and analogies. This is also the remembering mind using the method of serial associative cognition (Stanovich). This parallels flexibility/ beauty facet of creativity.

3. **Planning:** related to deductive part of Gf, divided attention and set initiation. This is measured using abstract reasoning and inhibition tasks like the stroop task. This is also the reflective mind using the method of TASS override (Stanovich). This parallels originality/novelty facet of creativity.

For the same of completeness we can add system thinking or autonomous mind to the mix.

4. **System 1 thinking:** related to intuition, automatic execution, and set unawareness. This can be measured using responses on species congruent problems like a social version of the wason selection task. This is the Autonomous mind using the method of TASS built-in adaptive intelligence or heuristics and biases. This system is also thought to be related to creativity as per this article by Scott and Singer.

In the next post I will take the argument a notch up and try to show how **creativity: Intelligence:: awareness (consciousness) : attention.**

9.2 CREATIVE THINKING: What is creative thinking?
Creative thinking is a process, such as brainstorming or lateral thinking (Business Dictionary, 2009), which improves the ability to be creative and be able to look at situations from a fresh and sometimes unorthodox perspective. Creative thinking is a process that helps you be in an optimal state of mind for generating new ideas (Infinitive Innovations , 1997), unique-to-you ideas that you did not practice earlier (CBS Interactive Inc., 2000). This process of creative thinking entails reviewing relevant information, ideas and/or solutions to create new novel ideas and perspectives.
Creative thinking transforms closed-ended situations into open-ended situations, freeing solution providers from their strict logical confines allowing them to think in other than logical terms avoiding blocks by bringing flexibility into the situation definition (Collins, 1981).

Why should we use creative thinking?
Creative thinking allows us to not only solve problems, but it allows us to progress and to create better solutions for already solved problems. Creative thinking allows us to create solutions for situations before they become problems. Creative thinking allows us to recognize that a situation is going to manifest, to understand the ramifications of solutions before we implement them. Creative thinking allows us to unlearn that which we have already learned.

Everyone has the capacity for creative thinking and to some of us it comes naturally. Even so, just learning it is not enough. Once you learn how to think creatively you have to practice and apply it.