Some Assembly Required

Combinations and their Attributes

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That which has been is that which will be, And that which has been done is that which will be done. So there is nothing new under the sun.

Ecclesiastes 1:9

Combinatorial Creativity views the creative product as a novel, useful & apt combination of existing elements.
So what does this mean for "Originality"?

Is anything truly original?

"The secret to creativity is knowing how to hide your sources."

Albert Einstein
“Great artists steal” y’know!

Too late, darn it! Nothing left but broken windows

Hmmm, Now there’s an idea ...
“Bill, you’re ripping us off! I trusted you, and now you’re stealing from us.”

“Well, Steve, I think there's more than one way of looking at it. I think it's more like we both had this rich neighbor named Xerox and I broke into his house to steal the TV set and found out that you had already stolen it.”
“We have always been **shameless** about stealing **great ideas**.”

**BUT**

“Android” is a “**stolen product**” and I am going to “declare thermonuclear **war**” on Google and Samsung

“The only problem with **Microsoft** is they just have no taste, they have **absolutely no taste**. I don’t mean that in a small way. I mean that in a big way, in the sense that they don’t think of original ideas and they **don’t bring much culture into their product**.”
Stealing vs. Borrowing: Inspired Variation vs. Me-too Copying
Minor Variation mostly yields Pastiche, not Creative Novelty

Bandwagon Style!

It is as if millions of voices cried out in terror ...

This is most definitely NOT the droid you’re looking for
Insight into how something can be creatively used, improved or replaced: observation & analysis
Attribute Analysis suggests analogies, connections.
Combinations can produce interactions of subtle attributes

Sans Serif font
No Gaps
Overlapping letters

No dots

*Logo commissioned from professional designers (for £14,000) for the UK Office of Government Commerce (OGC)

Creativity is often a matter of recognizing this potential
Mr. Nigel Tufnel, Spinal Tap

It's such a fine line between stupid and clever. Yeah.

The effects of this combination may only be perceptible after a 90-degree rotation!
Zara’s child pyjamas with stripes and “sheriff’s star”

Concentration camp uniform with yellow “Juden star”

Little details are magnified by apt/inept combinations
What do you call a female octopus? Why?
Let's analyse its attributes, and those of other females.
Problem: How to see Korean cuisine as a convenience food?

Solution: A clever blend of culinary attributes
Darth Vader

Gender: male

Categories: Fictional Villain, Fictional Father

Specific Domain: Star Wars, the Dark Side

General Domain: science fiction

Neg Qualities: evil, violent, unfeeling, malevolent, raspy, ruthless

Pos Qualities: skillful, graceful, balletic, cunning, tall, strong, spiritual

First. systematically enumerate the qualities and key attributes of a product or idea
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Walter White, The Smoking Man

“Jaws” (Star Trek)

Goodman Noonien Singh

Morgana (King Arthur)

Saruman (LOTR)

Bane

Select an attribute and think of other, similar concepts with the same quality:
Bane

Gender: male

Categories: Fictional Villain, Fictional Terrorist

Specific Domain: DC Comics, Gotham

General Domain: comics

Neg Qualities: raspy, unintelligible, evil, malevolent, bitter, twisted, ruthless, drug-dependent

Pos Qualities: muscular well-built strong action-oriented athletic, cunning

Move from Concept to Attribute to Other Concepts to Explore a Space of Creative Possibilities
### Attributes as Morphemes: Morphological Analysis

#### Dimensions

<table>
<thead>
<tr>
<th>Board type</th>
<th>Resource</th>
<th>Objective</th>
<th>Strategy</th>
<th>Randomness</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Playing Card</td>
<td>Progress most</td>
<td>Connect</td>
<td>None</td>
</tr>
<tr>
<td>Checkerboard</td>
<td>Stone</td>
<td>Finish first</td>
<td><strong>Form words</strong></td>
<td>Dice</td>
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<tr>
<td>Map</td>
<td>Building</td>
<td>Acquire most</td>
<td>Block</td>
<td>Spinner</td>
</tr>
<tr>
<td>Circuit</td>
<td>Army unit</td>
<td>Deplete most</td>
<td>Trade</td>
<td>Shuffle</td>
</tr>
<tr>
<td>Track</td>
<td>Spell</td>
<td>Cover most</td>
<td>Encircle</td>
<td><strong>Jumble</strong></td>
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<tr>
<td><strong>Grid</strong></td>
<td>Play Money</td>
<td><strong>Biggest score</strong></td>
<td>Alliance</td>
<td>Blindfold</td>
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<tr>
<td>Maze</td>
<td>Counter</td>
<td>Last longest</td>
<td>Capture</td>
<td>Coin toss</td>
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<tr>
<td>Path</td>
<td><strong>Letter tile</strong></td>
<td>Kill opponent</td>
<td>Bluff</td>
<td>Timer</td>
</tr>
<tr>
<td>Honeycomb</td>
<td>Hit Points</td>
<td>Find treasure</td>
<td>Form patterns</td>
<td>Short Straw</td>
</tr>
</tbody>
</table>

**Developed by Fritz Zwicky**
Now isn’t this much better than *Scrabble*?

Close Domain blending: Games
This seemed to work so much better on *paper.*

To Appreciate the ubiquity of Combinatorial Creativity,

Check out the patent record: USPTO.GOV
Hollywood Movies are attribute-driven combinations of familiar elements, settings, tropes, characters & plot devices.

The results can be innovative or cliched, perpetuating higher-level tropes or creating new ones.

Arnold Schwarzenegger
He was sentenced to burn for a sin he didn't commit!

I'm so back, Schatzi!
Praise the Lord und pass the AMMO

Now to save his eternal soul, Dante Schultz must

ESCAPE FROM HELL
A Bisociative Production of an Alan Smithee film
Attribute- and Morphological Analysis May Suggest a Great Many Combinations

So how do we rate, rank and reject combinations?
A + B + C =

Are you talking to me?
Are you talking to ME?
Make my day, punk!

KA-CHING!

Horrorshow!

Answer: Cross-Consistency Analysis (CCA)
Cross-Consistency Analysis (CCA) Sums all the scores/values for each pairwise attribute combination to reject combinations with incompatible attributes/morphemes and identify combinations with the highest sum of scores.
So CCA uses a "scoring function" to evaluate combinations.

This scoring function can be used to explore the space of morpheme combinations to find the highest scoring combinations, using e.g. Simulated Annealing.
Genetic Algorithms: a population of attribute combinations

GAs promote fitness/novelty by mating highest-scoring combinations in a population and culling the weakest

New combinations from old: Recombinant Creativity
Think of our knowledge of a topic (its attributes, roles, etc.) as its *genetic material*. A *conceptual blend* splices the DNA of two concepts into a single hybrid whole.

Blending does a *selective projection* of attributes / morphemes from each of the input spaces into a new, distinct *blend space*.

*Conceptual Blending Theory: Mark Turner & Gilles Fauconnier*
A nice example of DNA splicing and Conceptual Blending is offered by the film The Fly, in which a scientist accidentally blends his own DNA with that of a fly.

In metaphor generation we intentionally create just this kind of hybrid.

Though we can often surprise ourselves with the qualities that emerge!
To craft an insightful metaphor from what we *already know*, deconstruct a known concept *as though* it were a *deliberate blend* of two others concepts.

E.g., observing similarities between **Rapper** & **Poet** and between **Rapper** & **Comedian**, imagine **Rapper** as a deliberate blend of **Poet** & **Comedian**.

from Comedian? Publicity-garnering.
@MetaphorMagnet uses the **Keats Heuristic** by packaging the metaphor as a dictionary entry in the style *(a bot can dream!)* of Ambrose Bierce’s *The Devil’s Dictionary*.

@MetaphorMagnet uses the Google n-grams to characterize the blend itself, by finding an attested combo of a target property with a word denoting “mix” or “blending”.

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Rapper. noun. A funky hybrid of 1 part metaphor-composing poet to 1 part publicity-garnering comedian. #RapperOrComedian #RapperOrPoet

Genius. noun. An accomplished mix of 5 parts eccentricity-developing misfit to 4 parts wit-sharpening comic. #GeniusOrComic #GeniusOrMisfit

Scientist. noun. A thorough cross of 1 part monster-creating warlock to 1 part gadget-using spy. #ScientistOrSpy #ScientistOrWarlock
Wide-Domain blending: Tools

Terminate with extreme prejudice

Blending is everywhere: from surf'n'turf to KGB gadgets

The key creativity question is: how to choose input elements?
Terminate with extreme prejudice

Different input combinations yield more/less efficacy
Different input combinations have different emergent properties
One morning, exactly at sunrise, a Buddhist monk began to climb a tall mountain. The narrow path, no more than a foot or two wide, spiraled around the mountain to a glittering temple at the summit. The monk ascended the path at varying rates of speed, stopping many times along the way to rest and to eat the dried fruit he carried with him. He reached the temple shortly before sunset.

After several days of fasting and meditation, he began his journey back along the same path, starting at sunrise and again walking at variable speeds with many pauses along the way. His average speed descending was, of course, greater than his average climbing speed. **Prove** that there is a single spot along the path the monk will occupy on both trips at precisely the same time of day.

This problem was made famous by Karl Duncker and Arthur Koestler
Splitter!

Imposter!
The cut-up technique and other surrealist approaches to *chance generation* were inspired by games that artists would play in cafés. Decades later, these techniques have not lost their playful quality, and the schoolyard game MadLibs (in which players provide a list of words that are then placed into an unseen template to produce a funny text) owes a great deal to the surrealist technique (and café pastime) *Exquisite Corpse*.

Let’s turn the Cut-Up Technique into a Board Game that can be played at parties. Cut-up fragments (from a given domain, such as movie titles, song lyrics, newspaper headlines or personal column adverts) can be printed on playing cards, so that players can be dealt an initial hand of random cut-ups from the deck. Under certain circumstances, a player can discard a card, take a new one, or trade cards with another player. To heighten the element of chance, a dice is also used, and an egg-timer is employed to impose time constraints on player actions.

- Sketch some rules for the Cut-Up Game to allow players to take new cards, discard old ones, or trade cards.
- We characterized the game as a board-game. What specific role might the board play in this game?
- How might the dice be used to increase the elements of chance and of strategy in this game?
- Suppose the cards are color-coded to indicate the general category of a cut-up fragment. What categories and color-codes would you use to ensure a playable and enjoyable game that combines strategy and chance?
- Suppose we implement a computer-based version of this game. How might we implement an intelligent computer player that can play a good game against human players? Could humans tell a computer player from another human player?

**Extra credit:** How would you allow a player to trump and claim another’s cut-up by adding cards of their own.