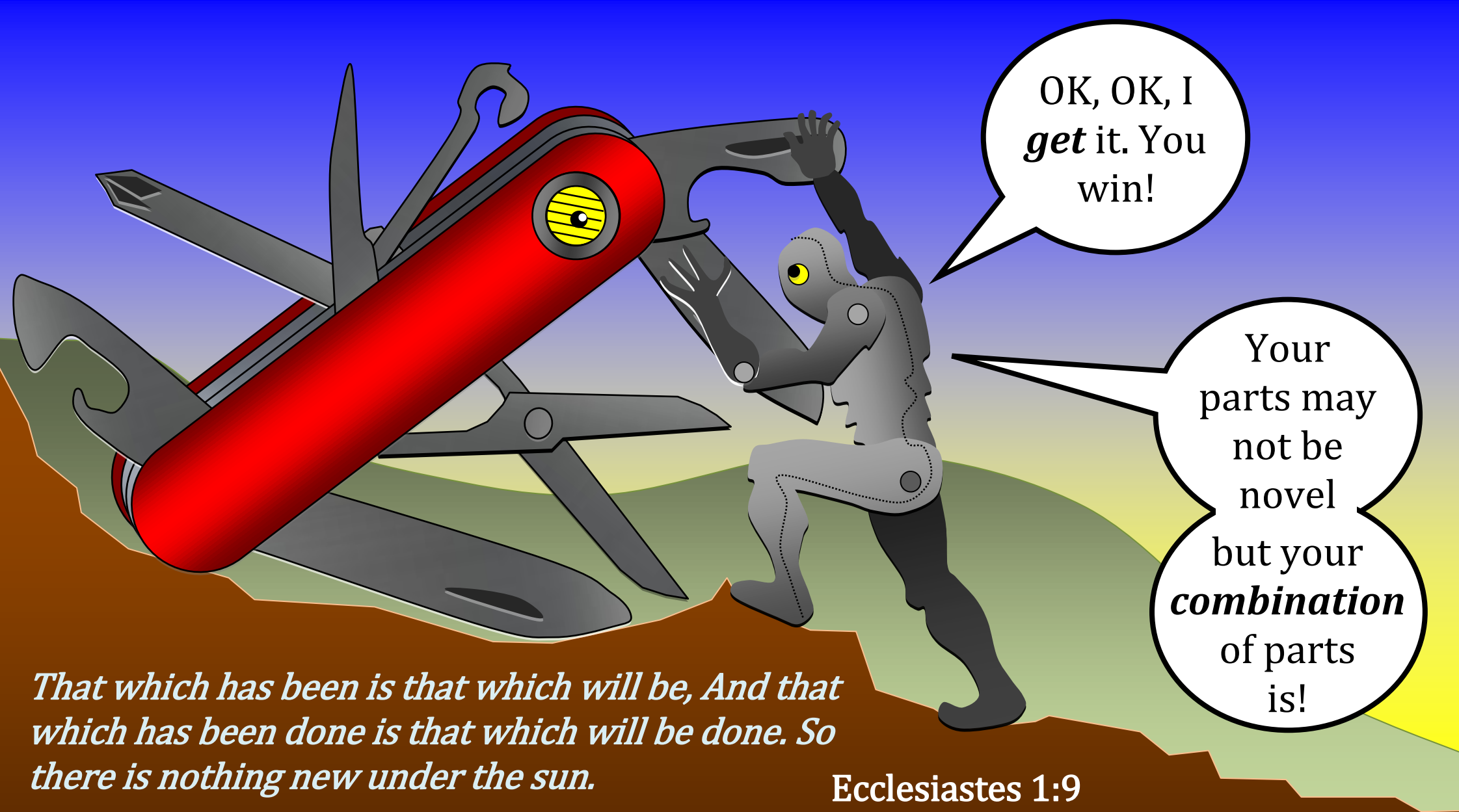


# Some Assembly Required



## Combinations and their Attributes



*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**

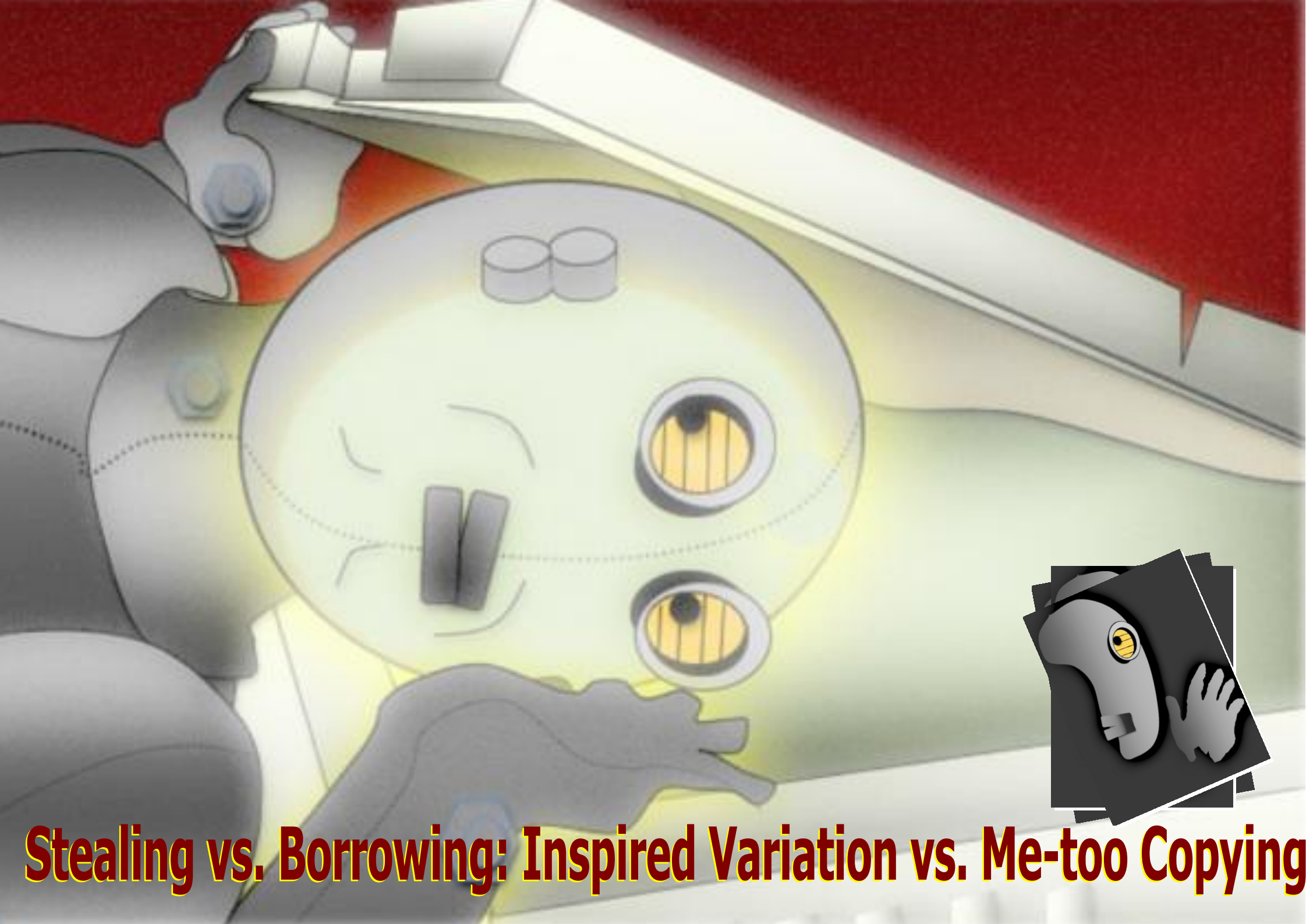
*"Android" is a "**stolen**  
product" and I am going to  
"declare **thermonuclear war**"  
on Google and Samsung*

*"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.**"*

Good  
artists  
**borrow**

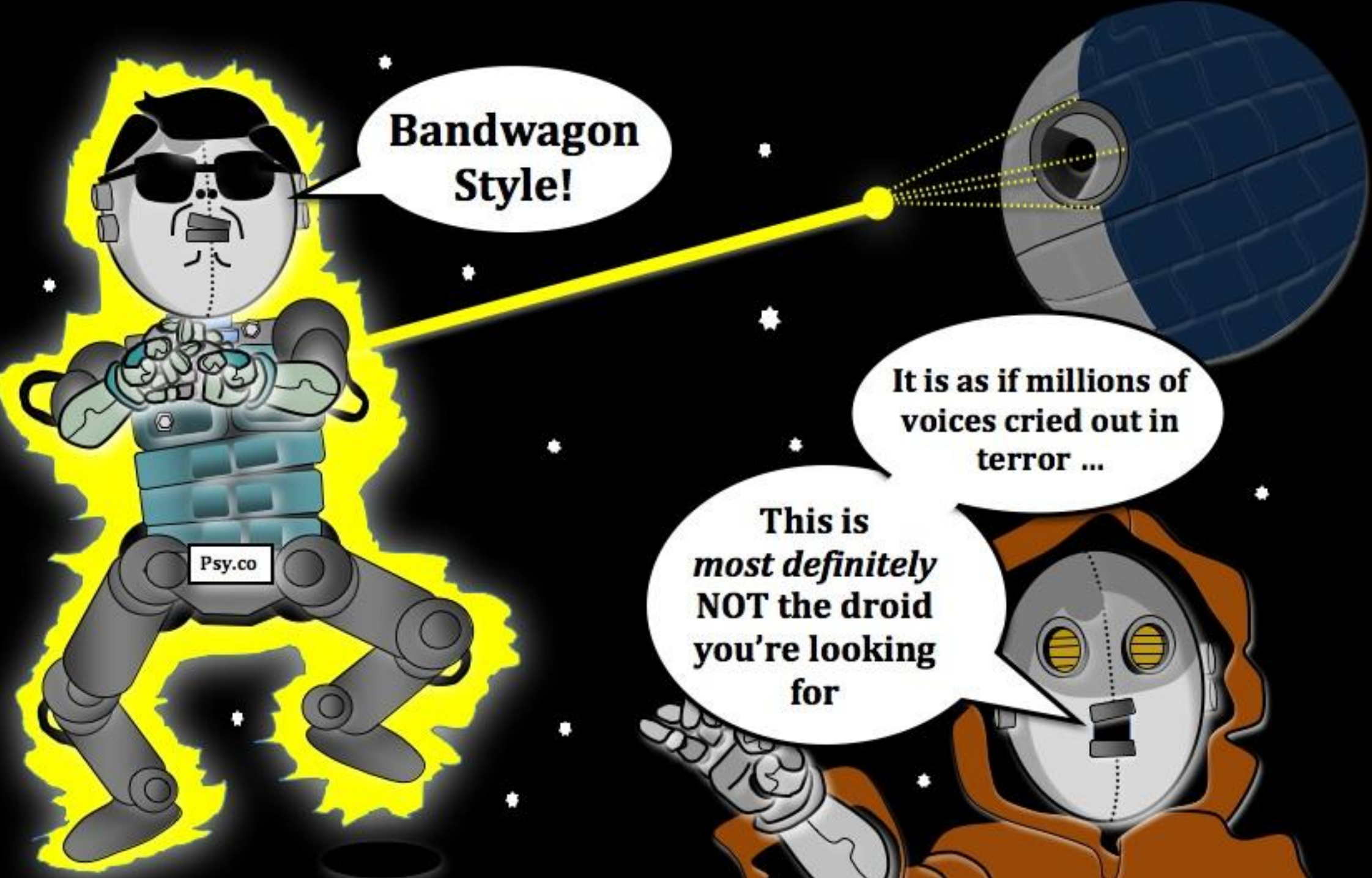
*Ssshhhh*  
**Great**  
artists  
**steal**





**Stealing vs. Borrowing: Inspired Variation vs. Me-too Copying**





**Bandwagon  
Style!**

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

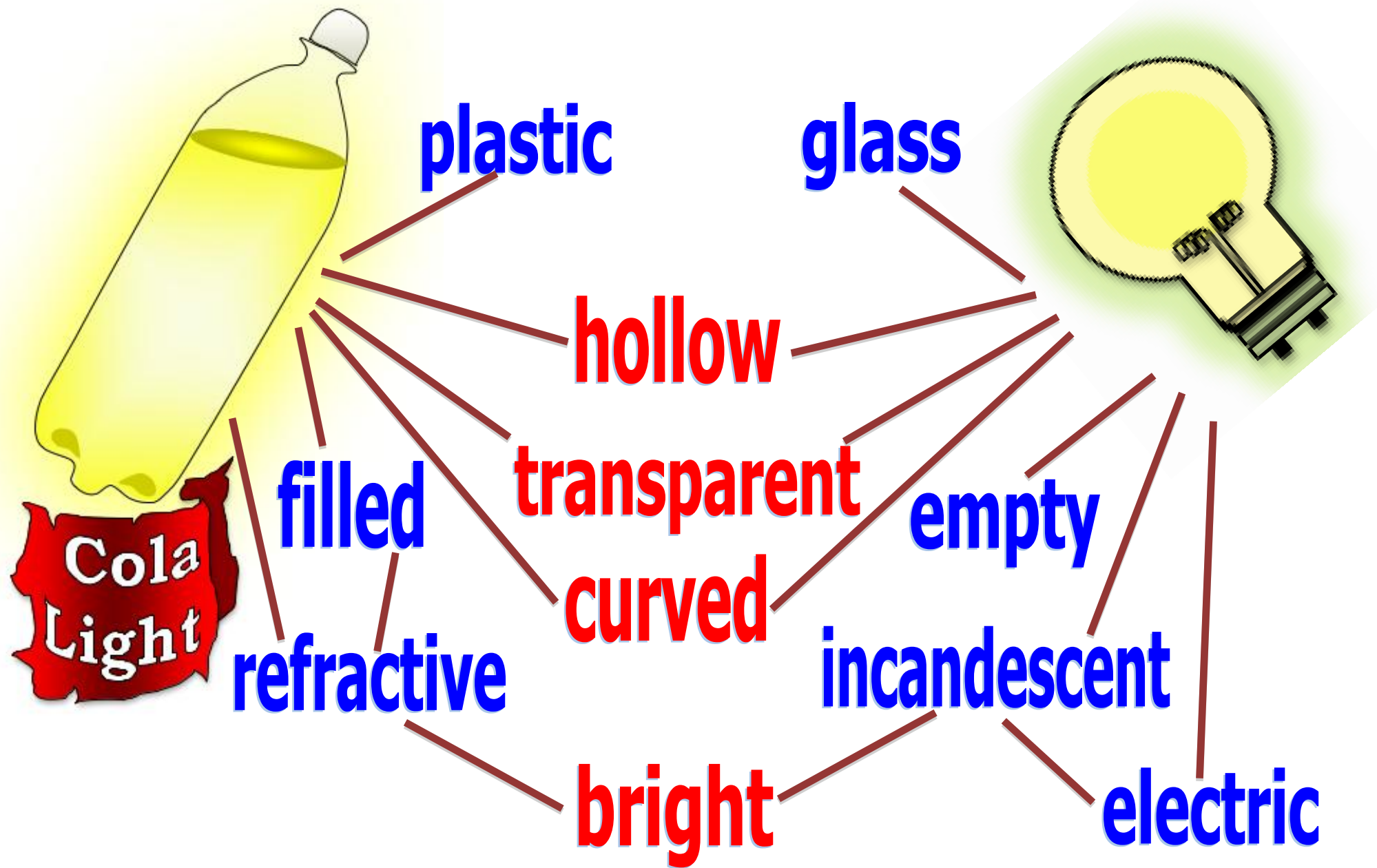
**This is  
*most definitely*  
NOT the droid  
you're looking  
for**

**Minor Variation mostly yields Pastiche, not Creative Novelty**





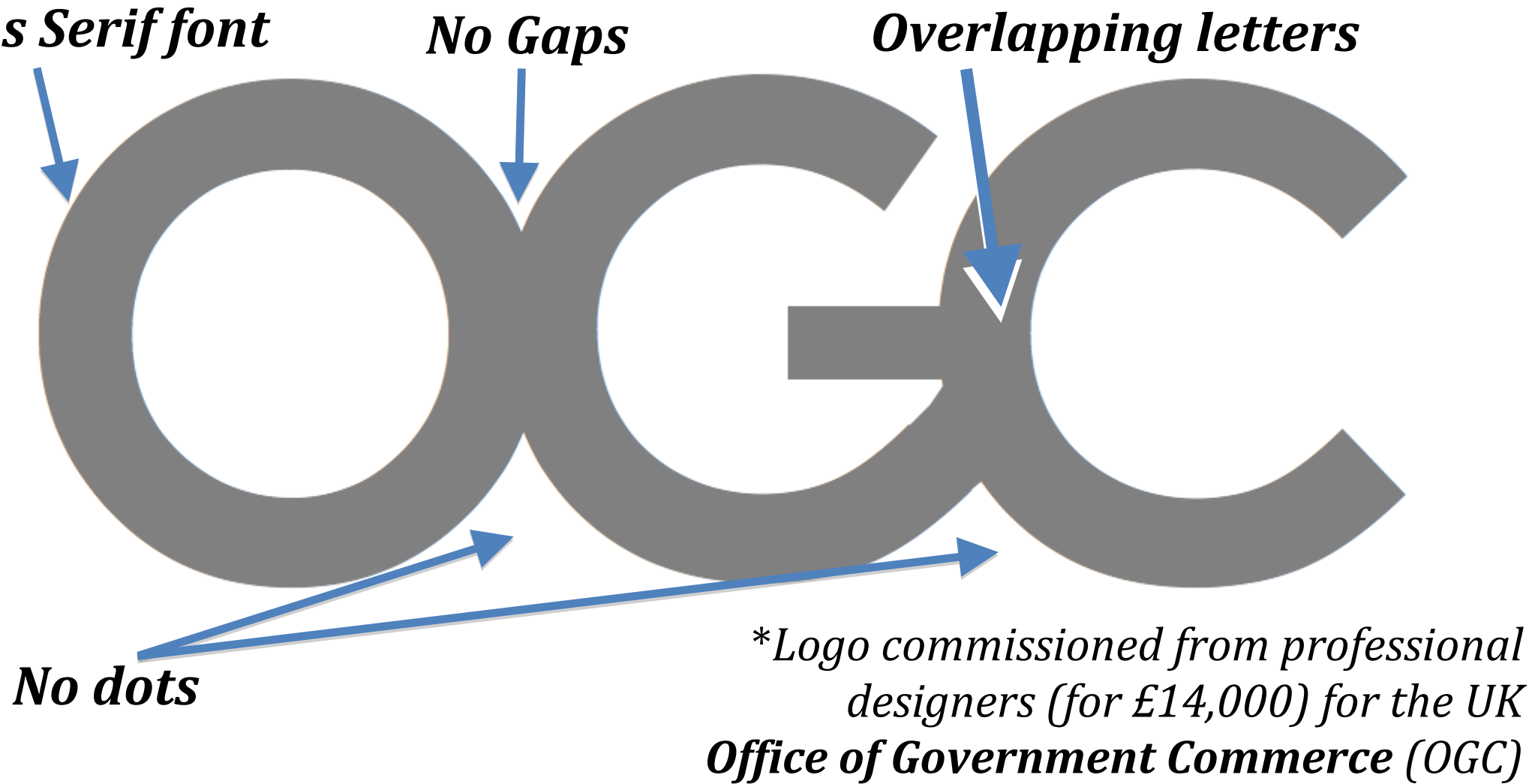
**Insight into how something can be creatively used,  
improved or replaced: observation & analysis**



**Attribute Analysis suggests analogies, connections**



# Combinations can produce interactions of subtle attributes



Creativity is often a matter of recognizing this potential



The effects of this combination may only be perceptible after a **90-degree rotation!**

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

Mr. Nigel Tufnel,  
*Spinal Tap*







horizontal  
vertical

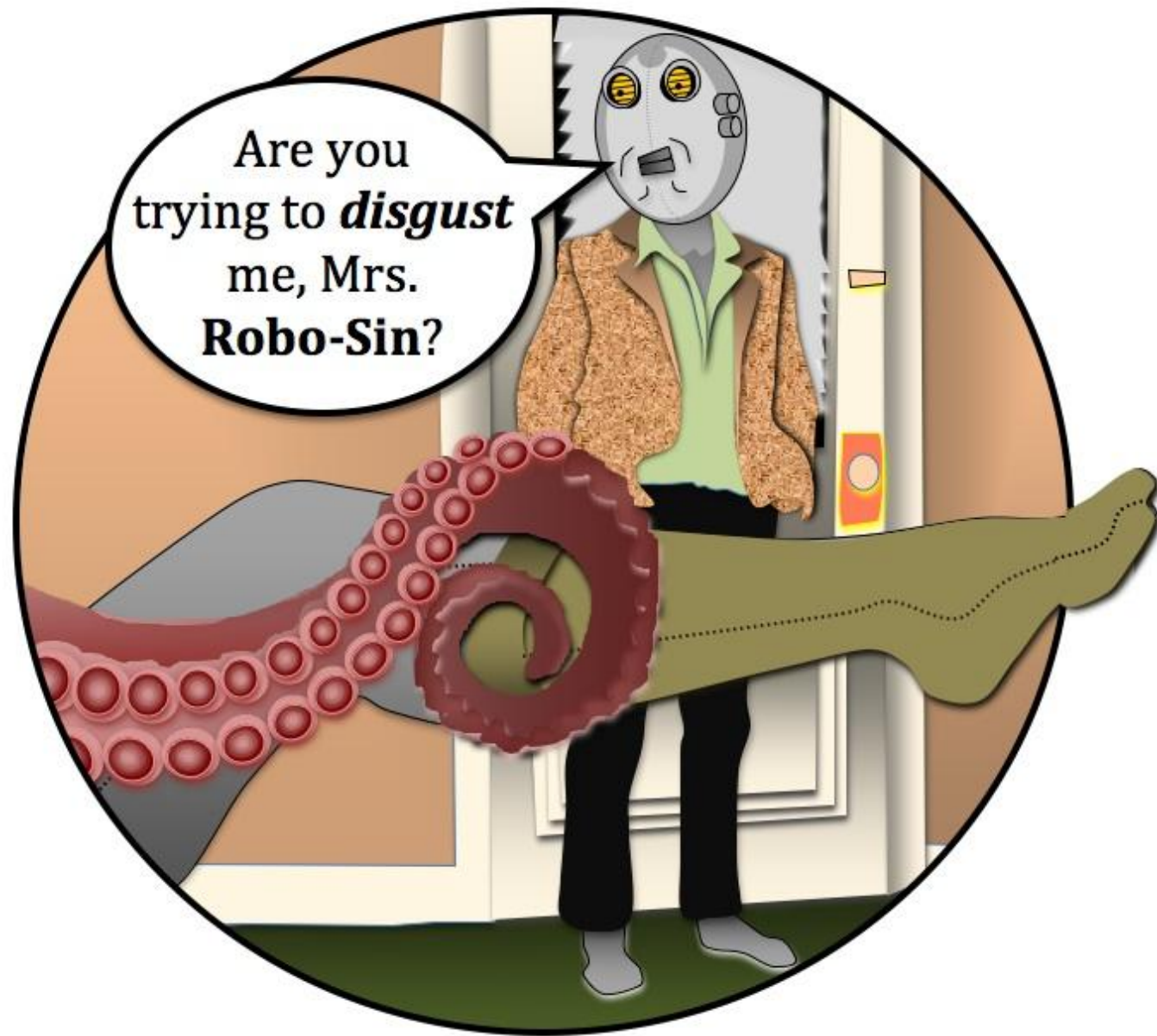
stripes

star

*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



# Attribute Analysis

of ideas, people,  
places, things

## 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**

**Darth Vader**

# Engage System 1 and 2



Gender: male

Categories: Fictional Villain, Fictional **Father**

Specific Domain: **Star Wars, the Dark Side**

General Domain: **science fiction**

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

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

Walter White, The Smoking Man

"Jaws"

(James Bond)

Morgana

(King Arthur)

Saruman

(LOTR)

(Star Trek)

Khan Noonien Singh

Bane

**Select an attribute and think of other, similar concepts with the same quality:** → **Compare & Contrast**



# Follow the Attributes

to related ideas,  
people, places ...

## 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 →

Morphemes →

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

*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**

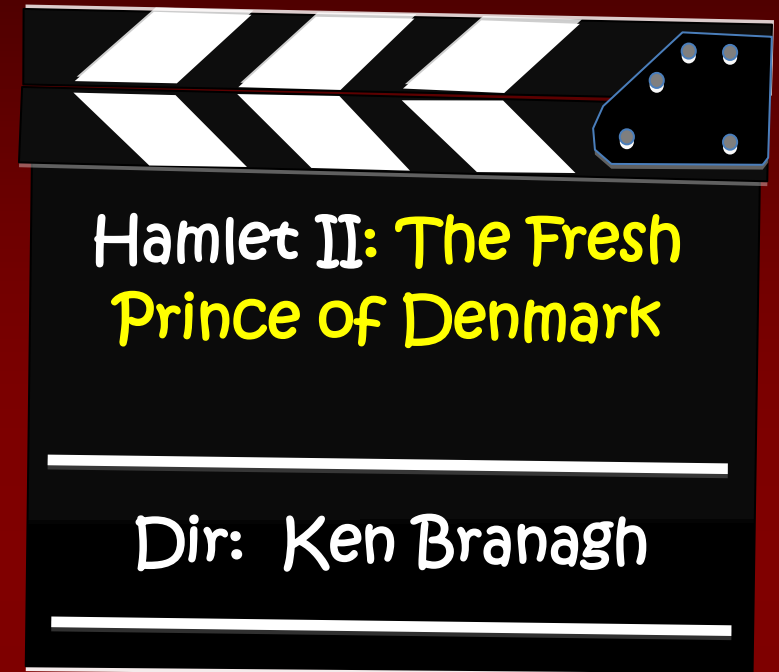
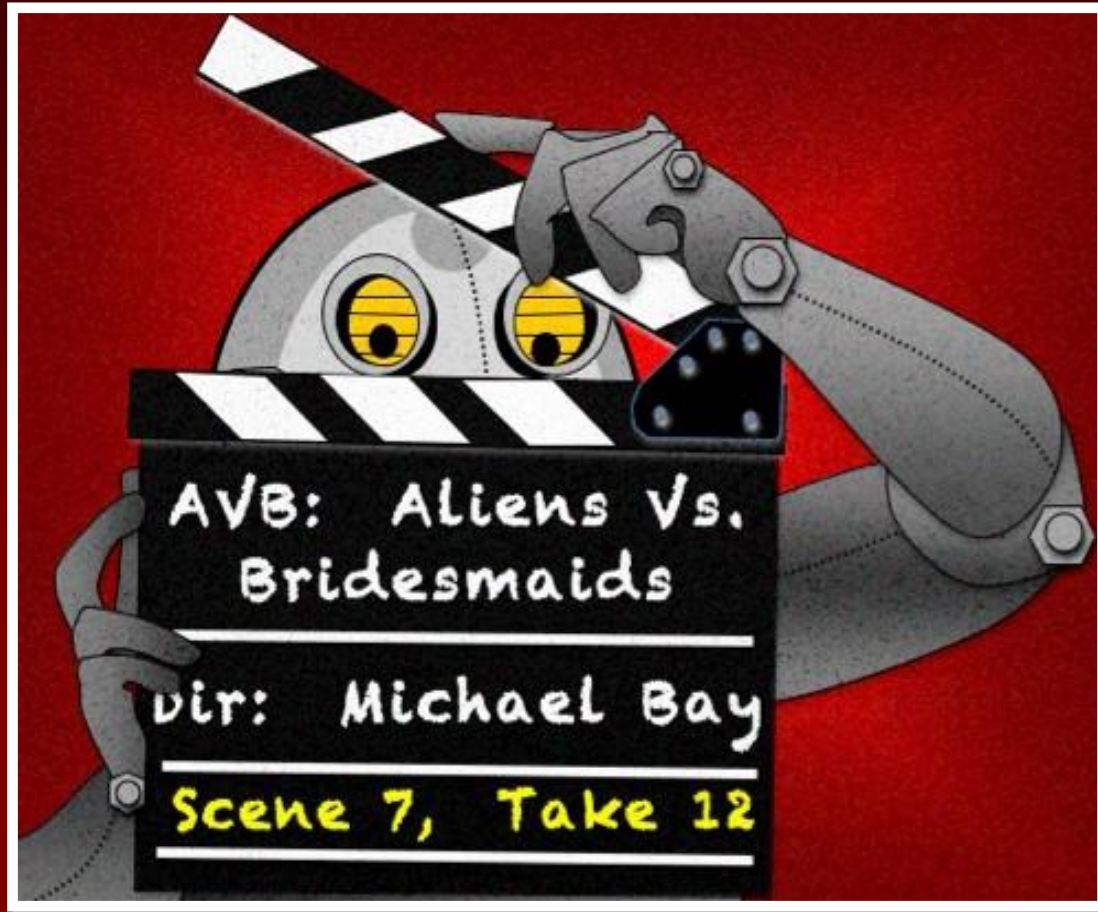
# Hollywood Movies

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







**Attribute- and Morphological Analysis  
May Suggest a Great Many Combinations**

**So how do we rate, rank and reject combinations?**



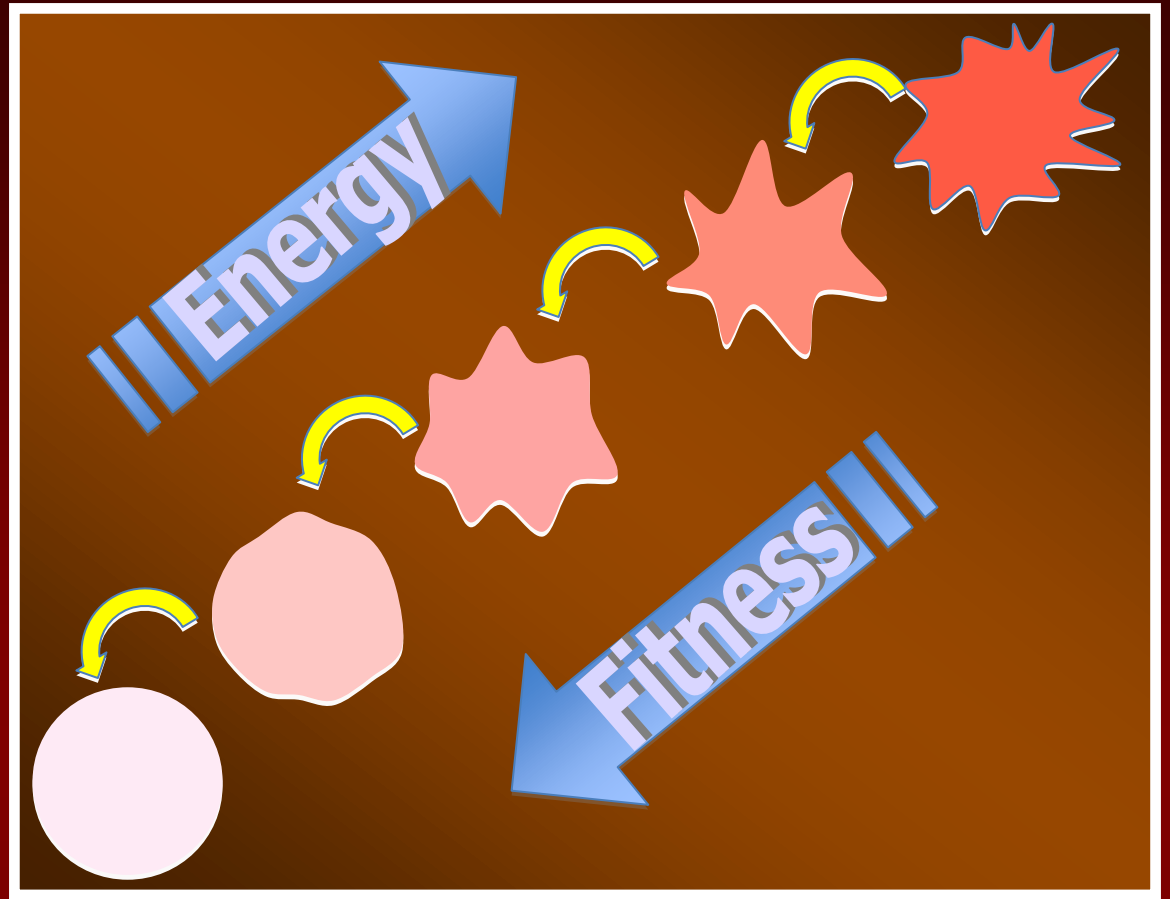


**Answer: Cross-Consistency Analysis (CCA)**





**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**



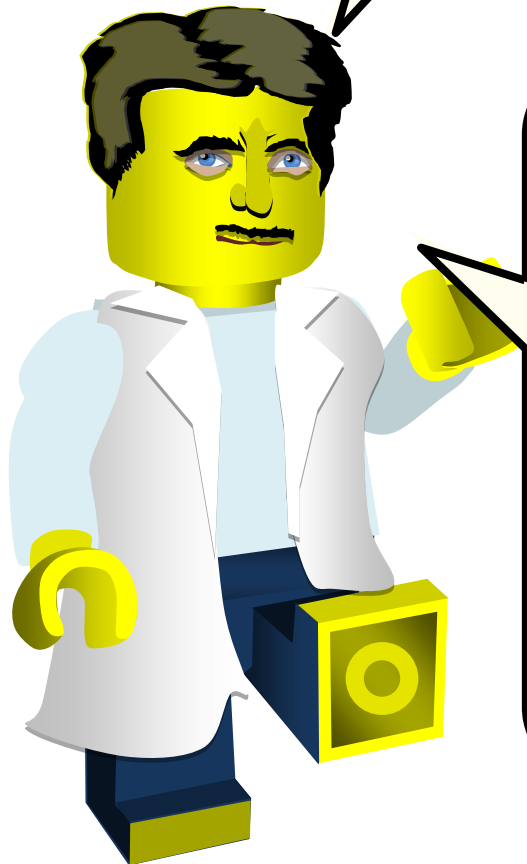


**Genetic Algorithms: a population of attribute combinations**

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

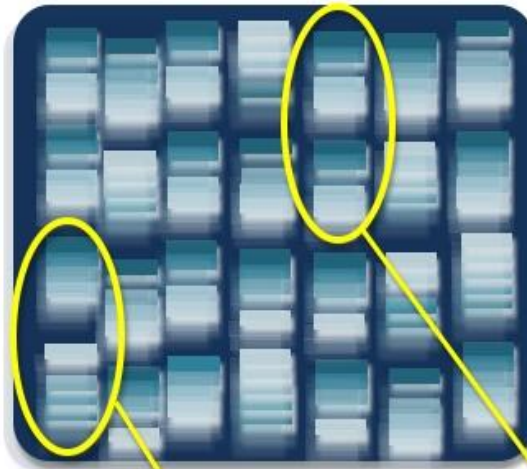
**New combinations from old: Recombinant Creativity**

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.

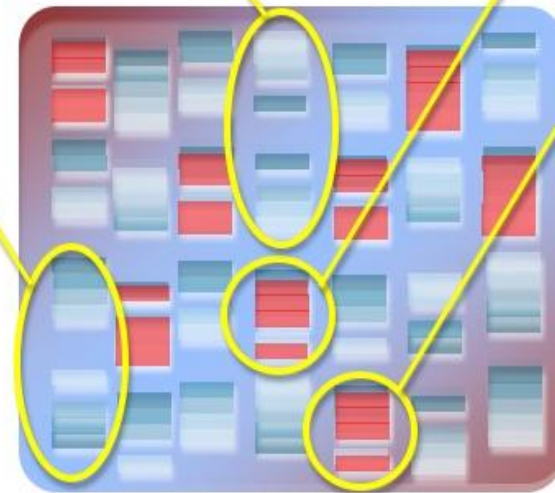
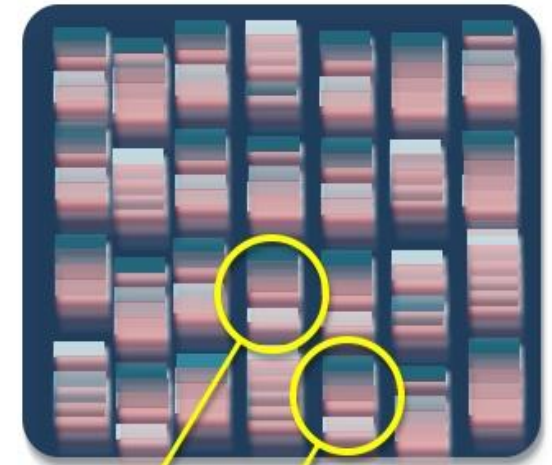


Blending does a **selective projection** of attributes / morphemes from each of the input spaces into a new, distinct **blend space**.

**Input Genome #1**



**Input Genome #2**



**Blended Genome**

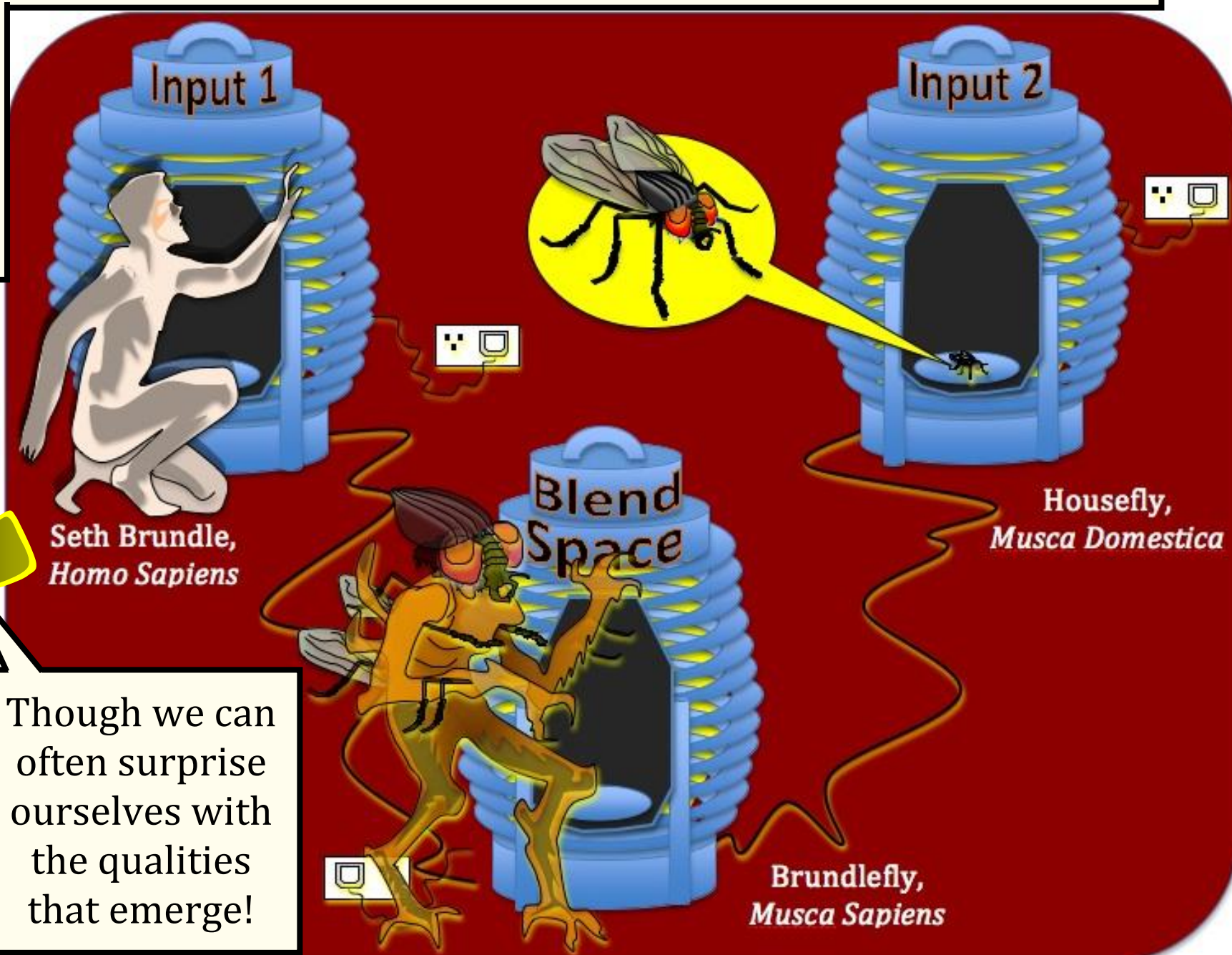
*\*Conceptual Blending Theory: Mark Turner & Gilles Fauconnier*

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!



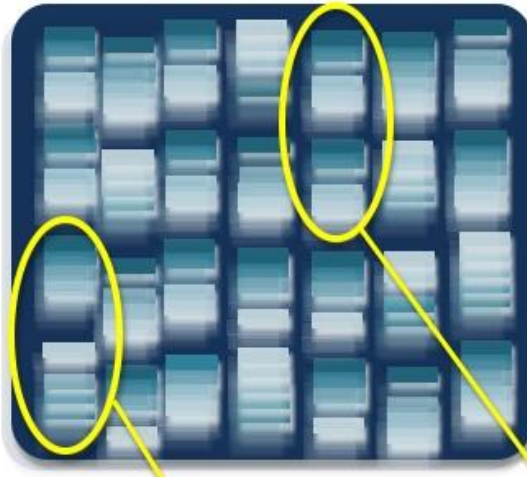


To craft an insightful metaphor from what we *already know*, deconstruct a known concept *as though* it were a *deliberate blend* of two others concepts.

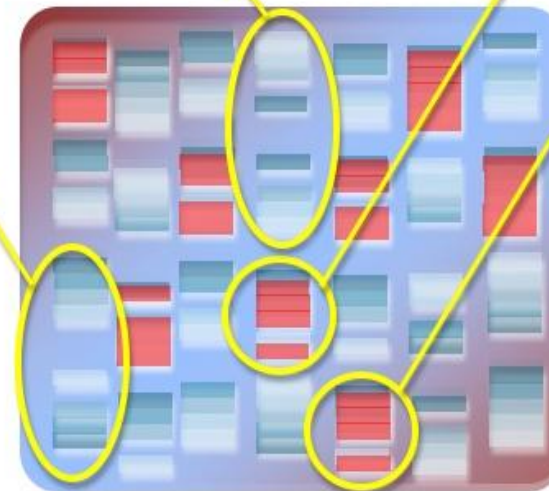
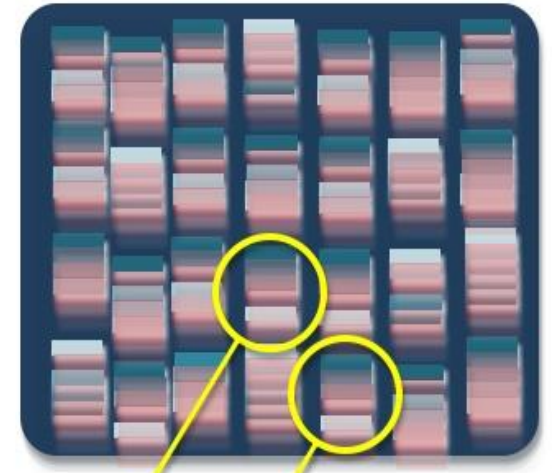


E.g., observing similarities between **Rapper & Poet** and between *Rapper & Comedian*, imagine *Rapper* as a deliberate blend of *Poet & Comedian*.

**Input #1: POET**



**Input #2: COMEDIAN**



**Blend: RAPPER**

**Rapper:**  
from Poet?  
*Metaphor-*  
*composing.*  
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*"



**MetaphorIsMyBusiness**

@MetaphorMagnet

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



**MetaphorIsMyBusiness**

@MetaphorMagnet

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



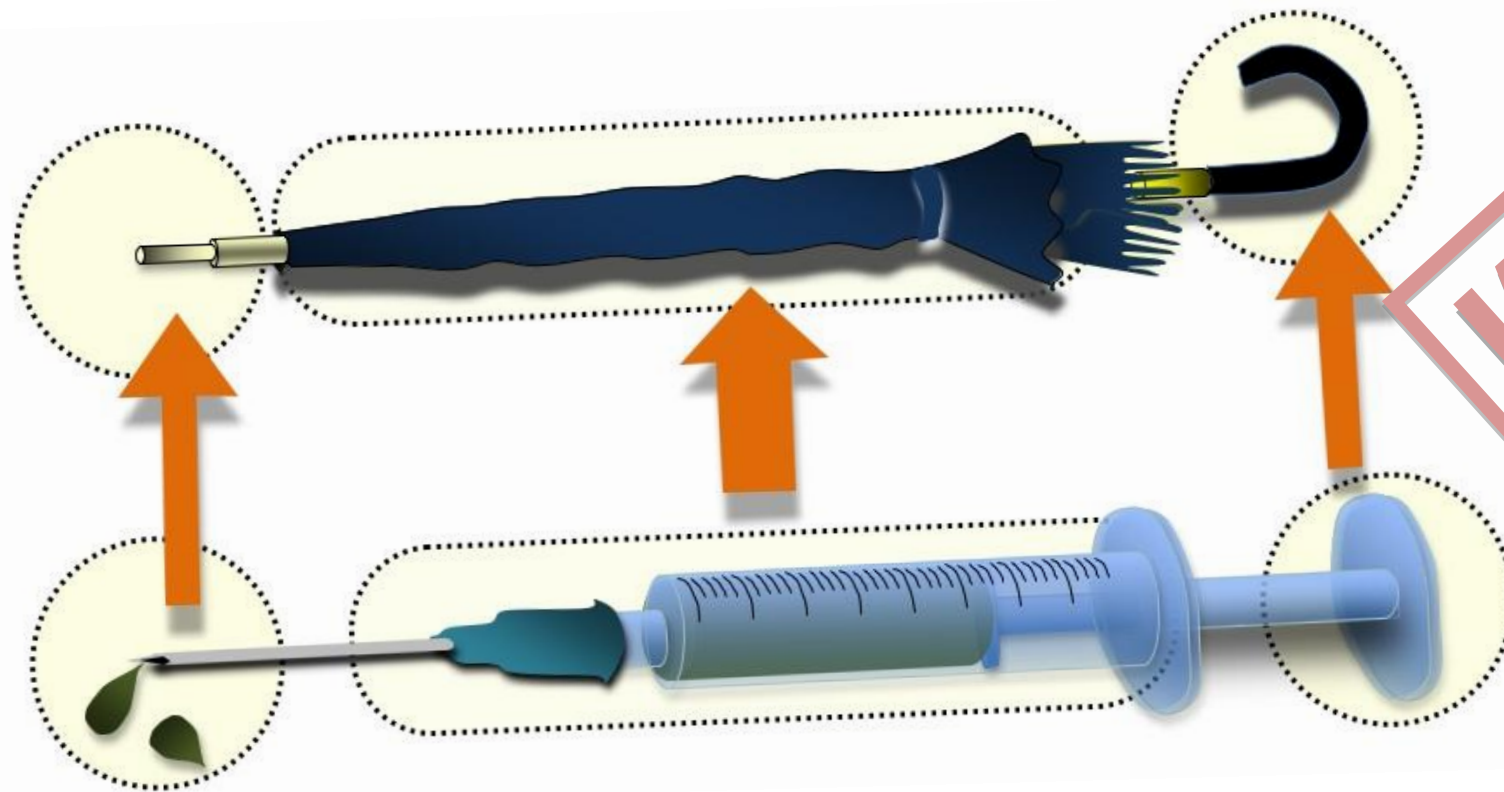
**MetaphorIsMyBusiness**

@MetaphorMagnet

Scientist. noun. A thorough cross of 1 part monster-creating warlock to 1 part gadget-using spy. **#ScientistOrSpy**  
**#ScientistOrWarlock**

Georgi Ivanov Markov

# Wide-Domain blending: Tools

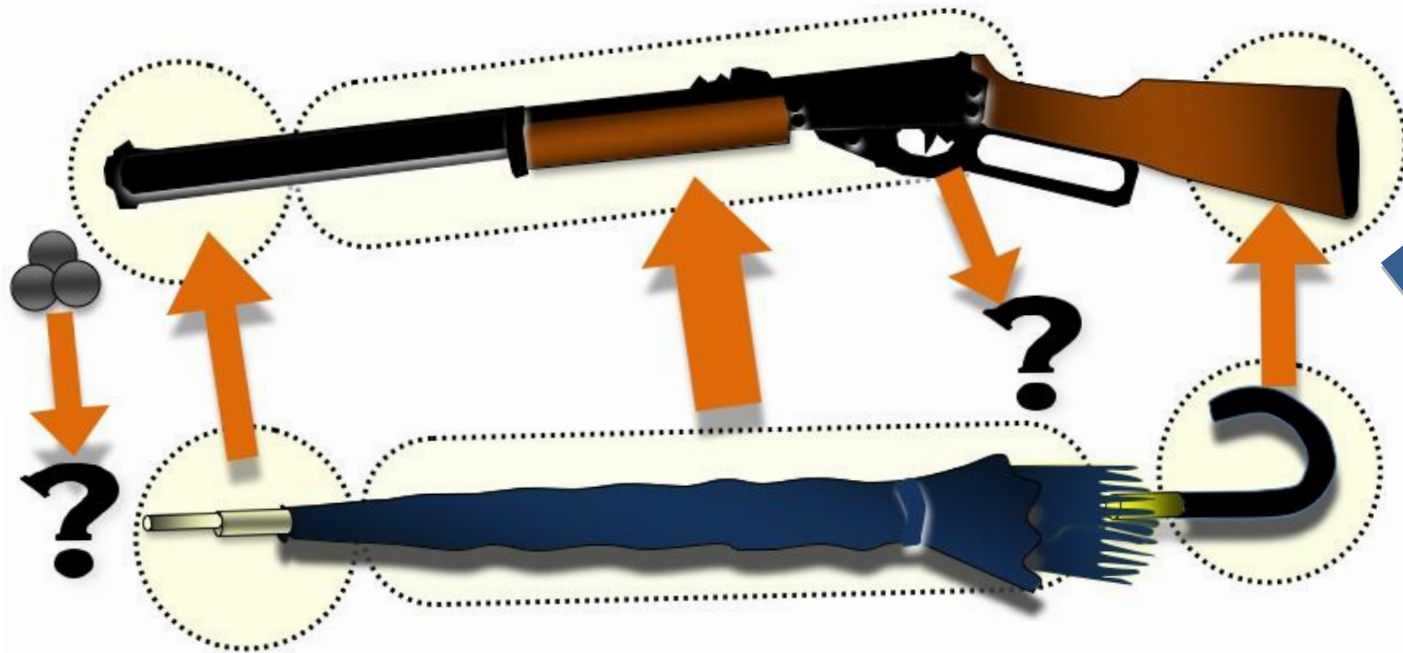


Terminate with extreme prejudice

ending is everywhere: from surf'n'turf to KGB gadgets  
the key creativity question is: how to choose input elements?



**Georgi Ivanov Markov**



**Terminate with extreme prejudice**

**Different input combinations yield more/less efficacy**  
**Different input combinations have different emergent properties**

# Impossible blends for Possible Solutions

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**

Summit

Summit

Day 1

Day 2

+

Base

Base

dawn

dusk

dawn

dusk



Summit

Summit

Day 1=2

Base

Base

dawn

dusk







## Play Time



**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.