

Learning to be Creative with Language:
A Construction-based Exploration
of Linguistic Creativity



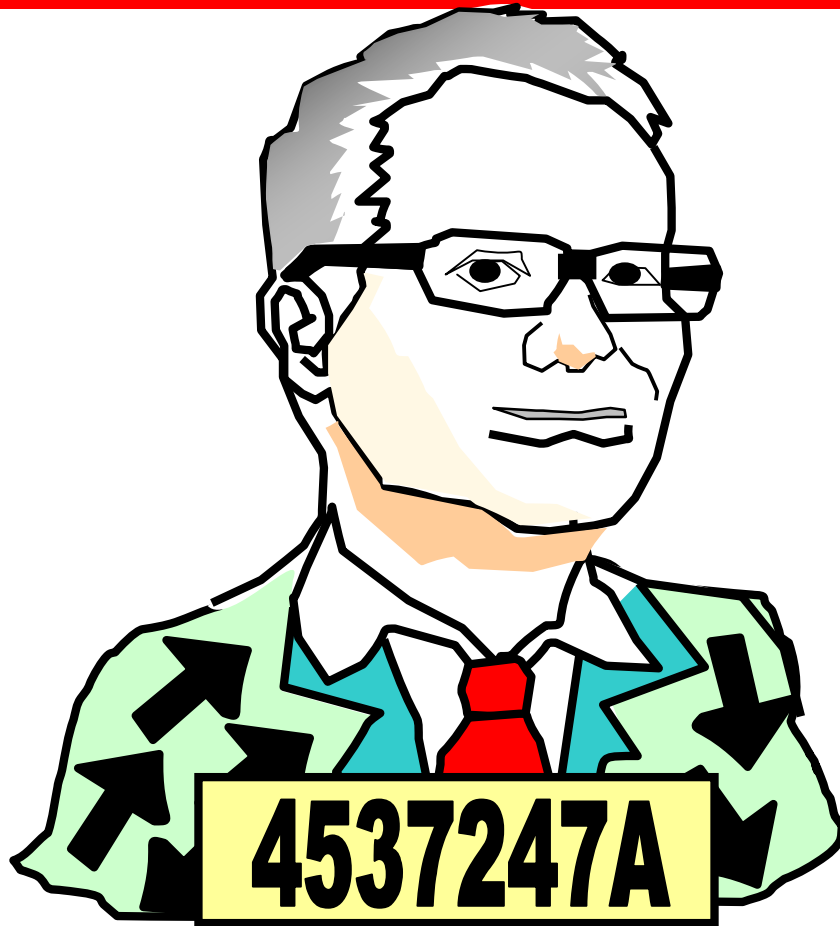
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My Partners in **CRIME**: CReative Integration MEchanism



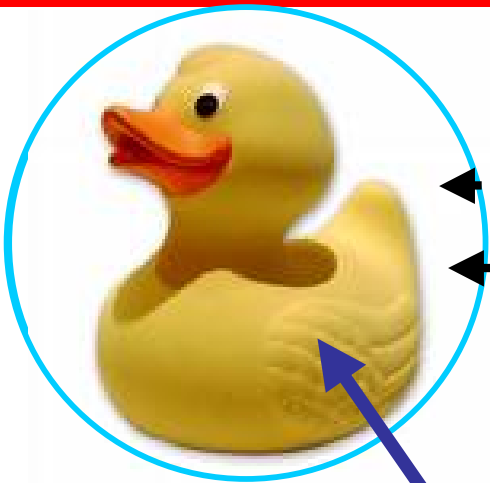
Charles “Haddock” Forceville



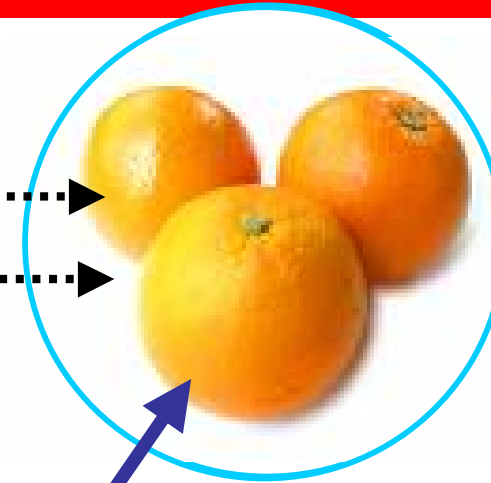
Kurt “Snowy” Feyaerts

Conceptual Creativity: **The Consumer's Perspective**

Input # 1:
“Duck”



Input # 2:
“Orange”

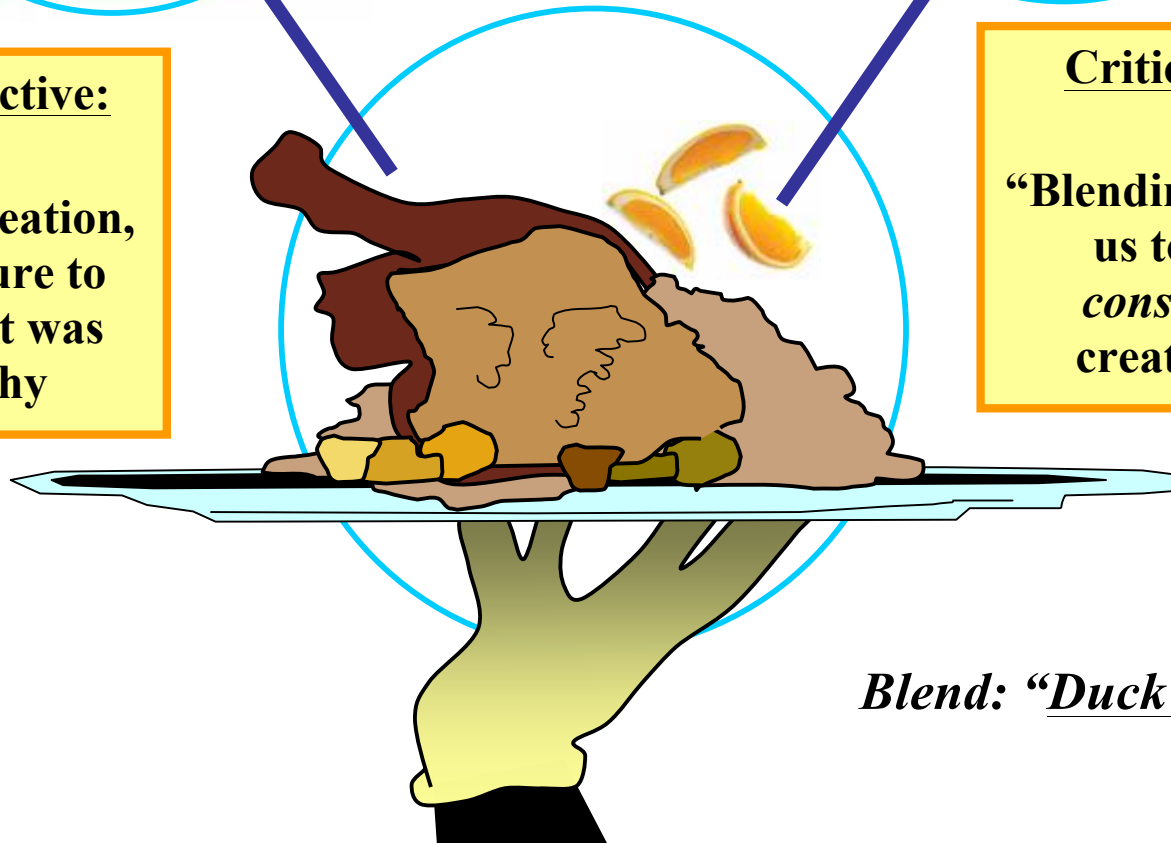


Consumer Perspective:

Given a blended creation,
analyze its structure to
understand how it was
created, and why

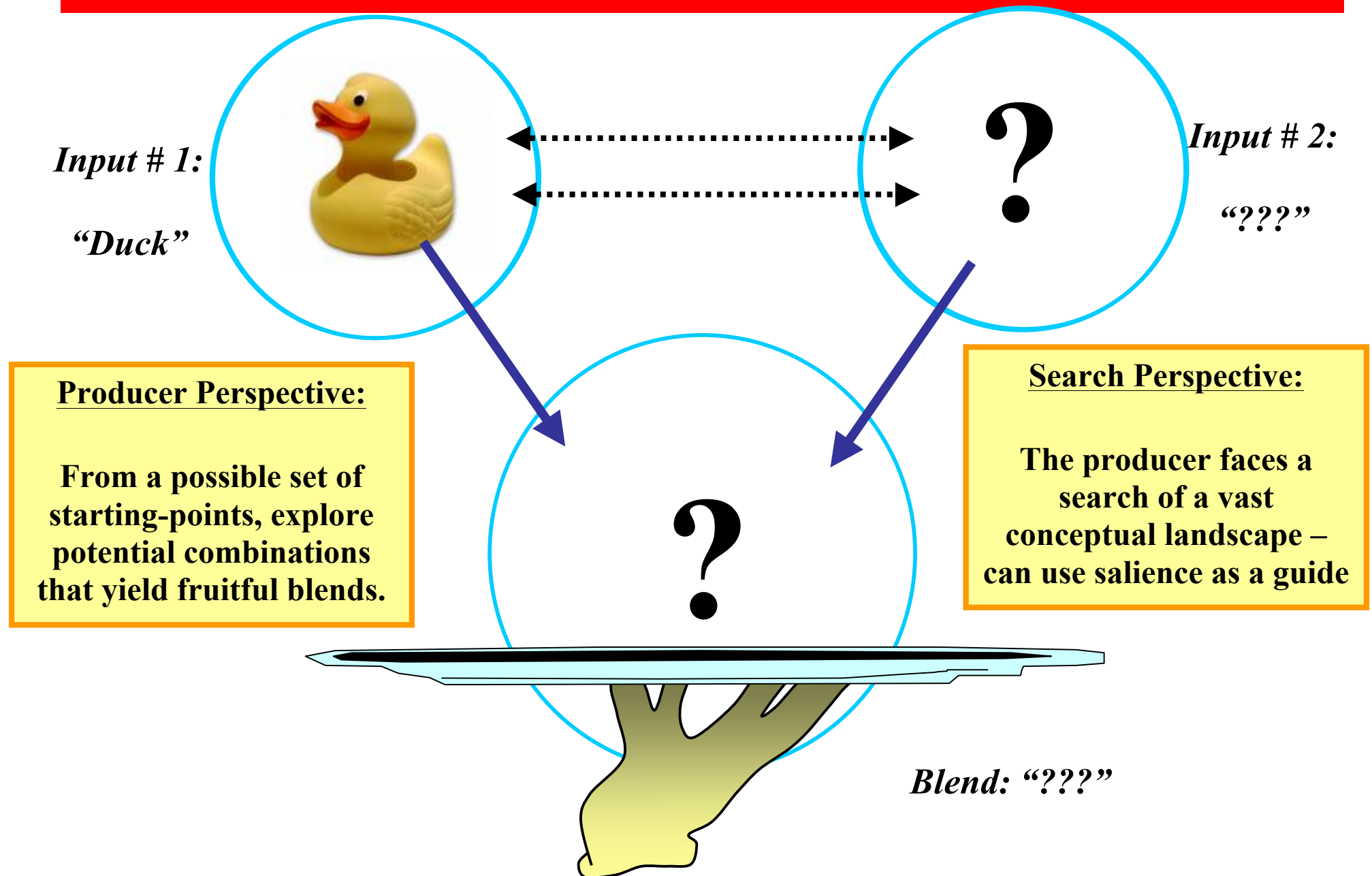
Critical Perspective:

“Blending Theory” equips
us to be *analytical*
consumers, but not
creative producers!



Blend: “Duck a L’ Orange”

Conceptual Creativity: **The Producer's Perspective**



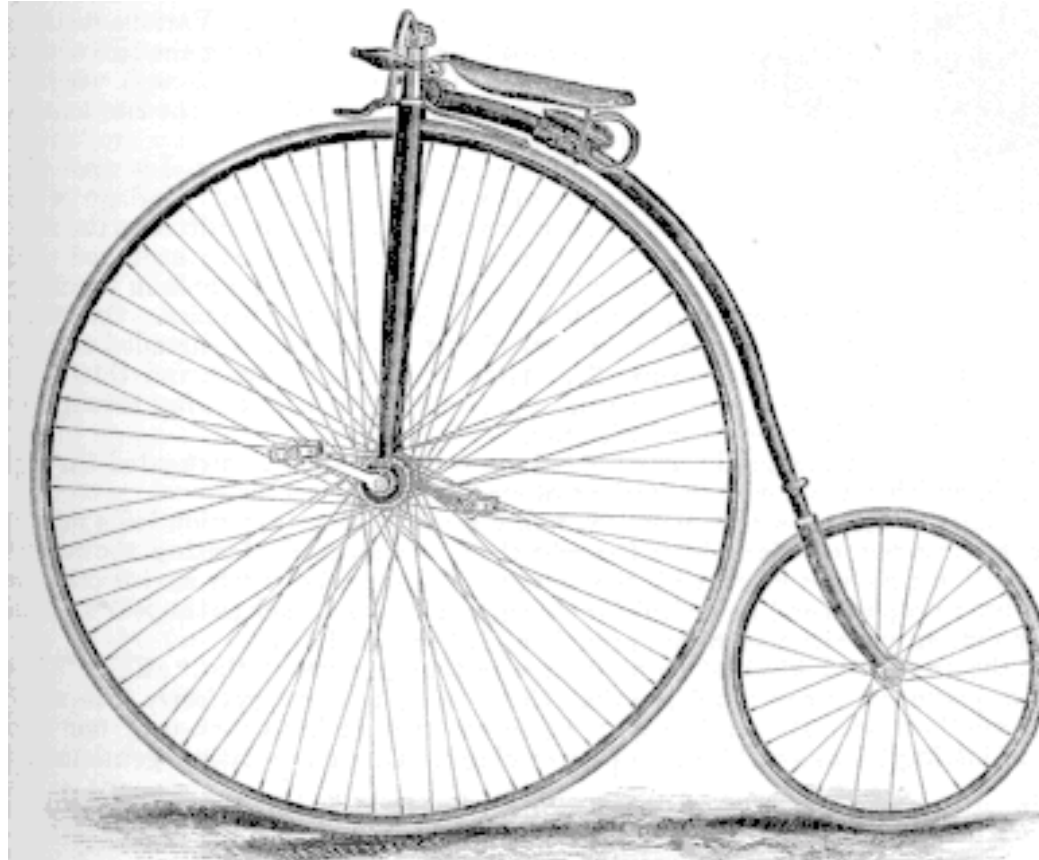
We often think of **Metaphor** as the **engine** of **Linguistic Creativity**

Metaphor

 **Lakoff**
PRO RACING



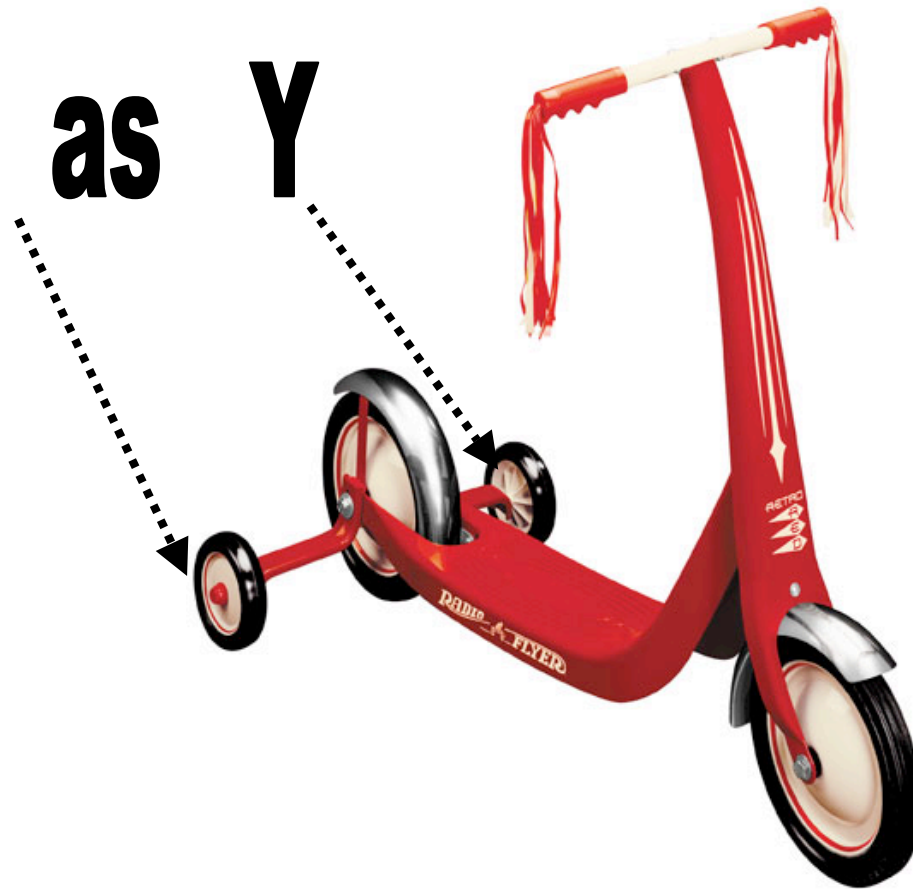
By Comparison, *Similes* can seem *Quaint* and *Under-Powered*



But: similes are more disposable, more ad-hoc and often more imaginative

Similes also provide a formal scaffolding for Creative Expression

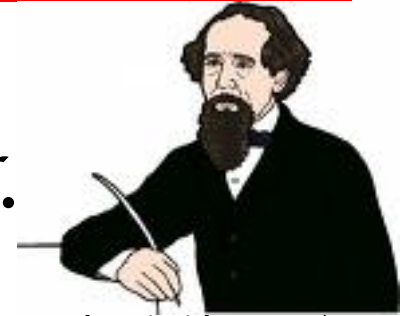
as X as Y



And similes with explicit grounds usually exploit Cultural Stereotypes



Marley's Ghost: The Cultural Status of a Construction



“Old Marley was as dead as a doornail.

Mind! I don't mean to say that I know of my own knowledge, what there is particularly dead about a doornail. I might have been inclined, myself, to regard a coffin-nail as the deadest piece of ironmongery in the trade.

But the wisdom of our ancestors is in the simile; and my unhallowed hands shall not disturb it, or the country's done for. You will, therefore, permit me to repeat, emphatically, that Marley was as dead as a doornail.”

Charles Dickens, “A Christmas Carol”, page 1

The Career of Metaphor: Bowdle and Gentner (2005)

Novel / Original



Conventional

Metaphors as Comparisons
(feature-matching & transfer)

time



Metaphors as Categorizations
(category membership)

Metaphors as Word Senses
(e.g., lexicalized in WordNet)

The Career of Simile (?)

Novel / Original

Explicit Similes
As hot as an oven
As flat as a pancake

compression

Accepted

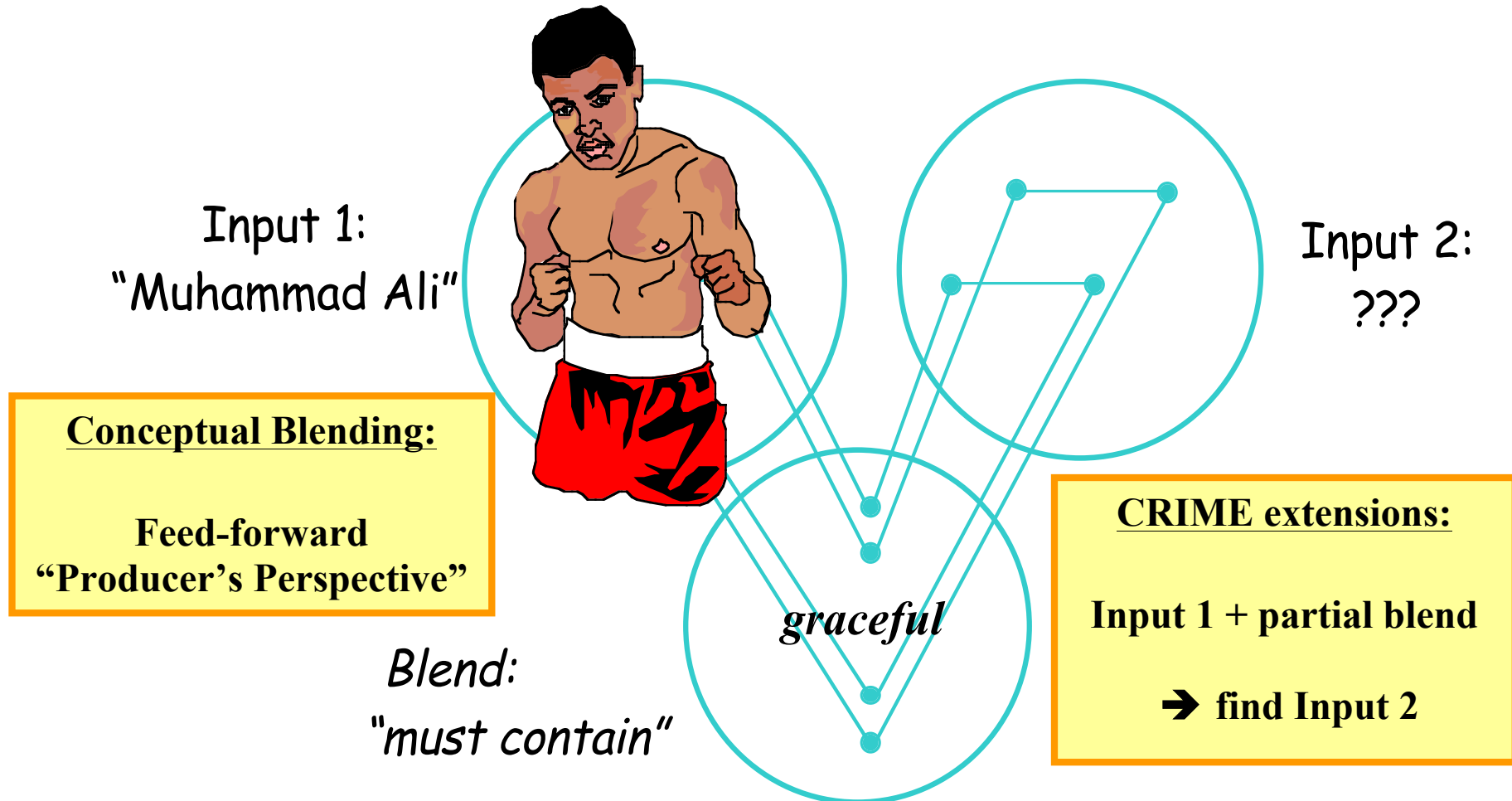
Non-Explicit Similes
... like an oven
... like a pancake

Conventional

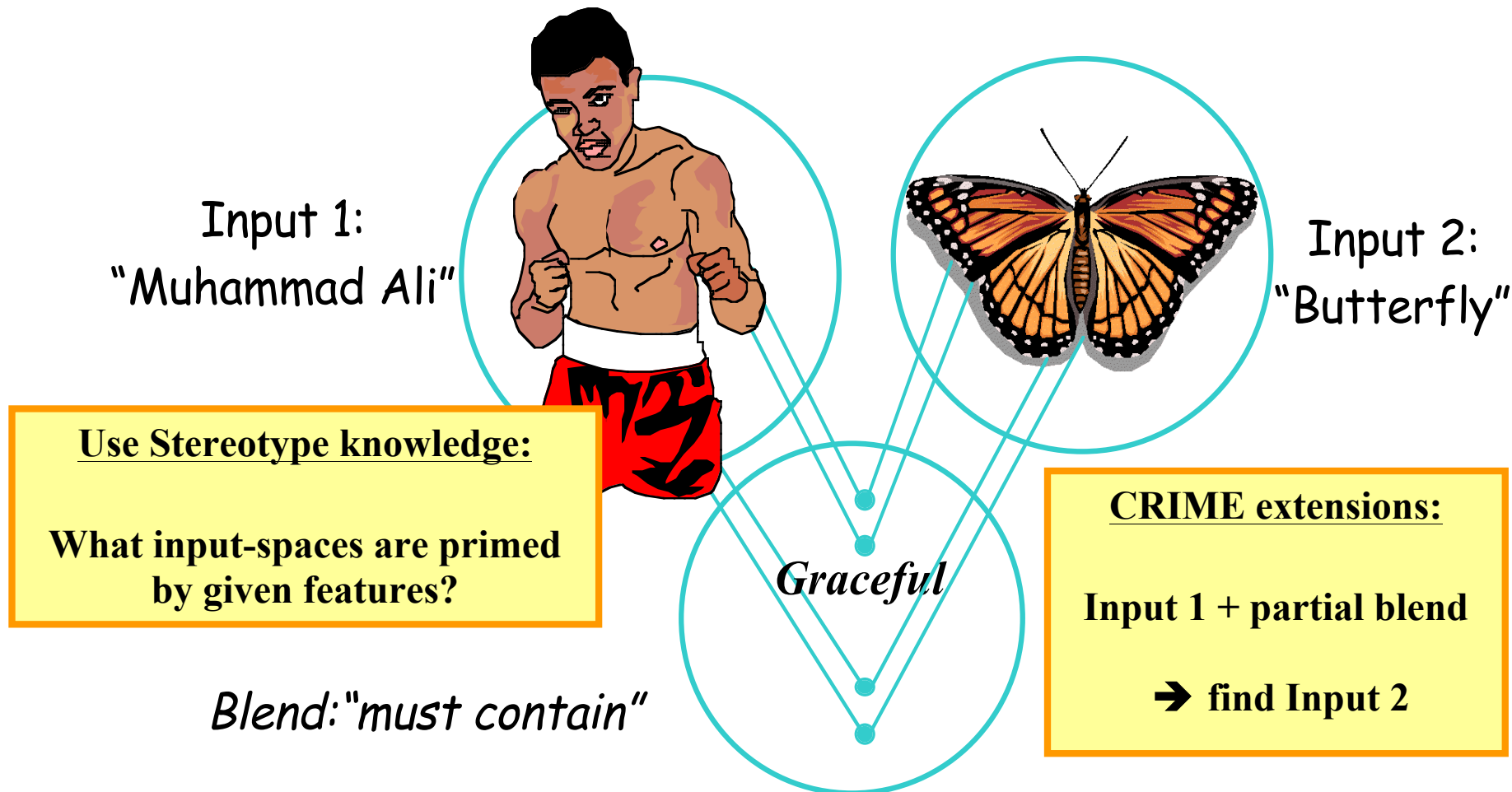
Metaphoric Comparisons
This room is an oven ...
... covered with pancake makeup

**Career
of Metaphor**

Blending in CRIME: The Producer Perspective

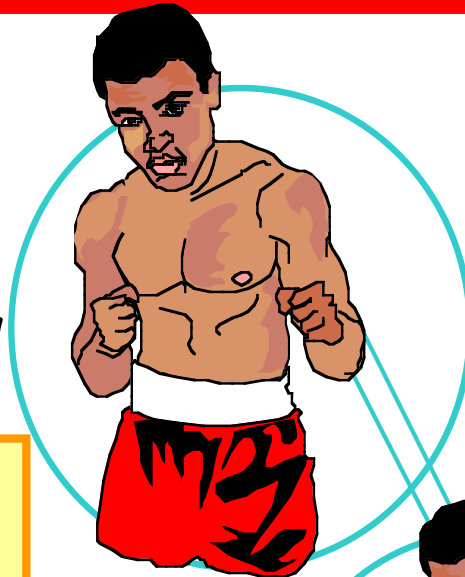


Blending in CRIME: The Producer Perspective



Blending in CRIME: The Producer Perspective

Input 1:
"Muhammad Ali"



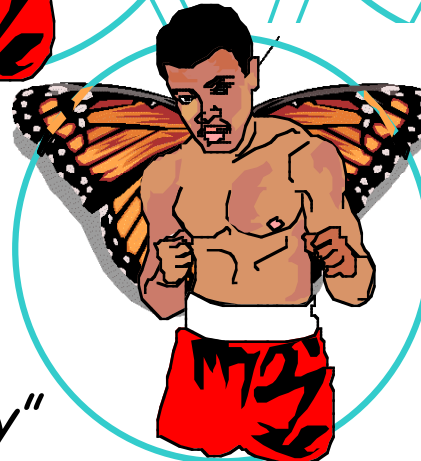
Input 2:
"Butterfly"



Simple Case:

Input-Space #2 is cued
directly by a stereotype

Blend:
"dance like a butterfly"



Stereotypes as Short-Cuts

How do we acquire them?

What features of them are
most salient?

Creativity is a Search-Process: How to Find Target Ideas?

The Producer's Dilemma:

What can usefully be placed in Input # 2?

Creative Metaphor allows us to see the *strange* in terms of the *familiar*

Input 1:
"Burqa"

Input 2:
???

"Desired Blend:
A Useful Western Perspective"

Burqa

for concealing a Muslim woman
for protecting a Muslim woman
for protecting a woman
for protecting a person
???

Creativity is a Search-Process: How to Find Target Ideas?

The Producer's Dilemma:

How to reach

Space #2 from Space #1

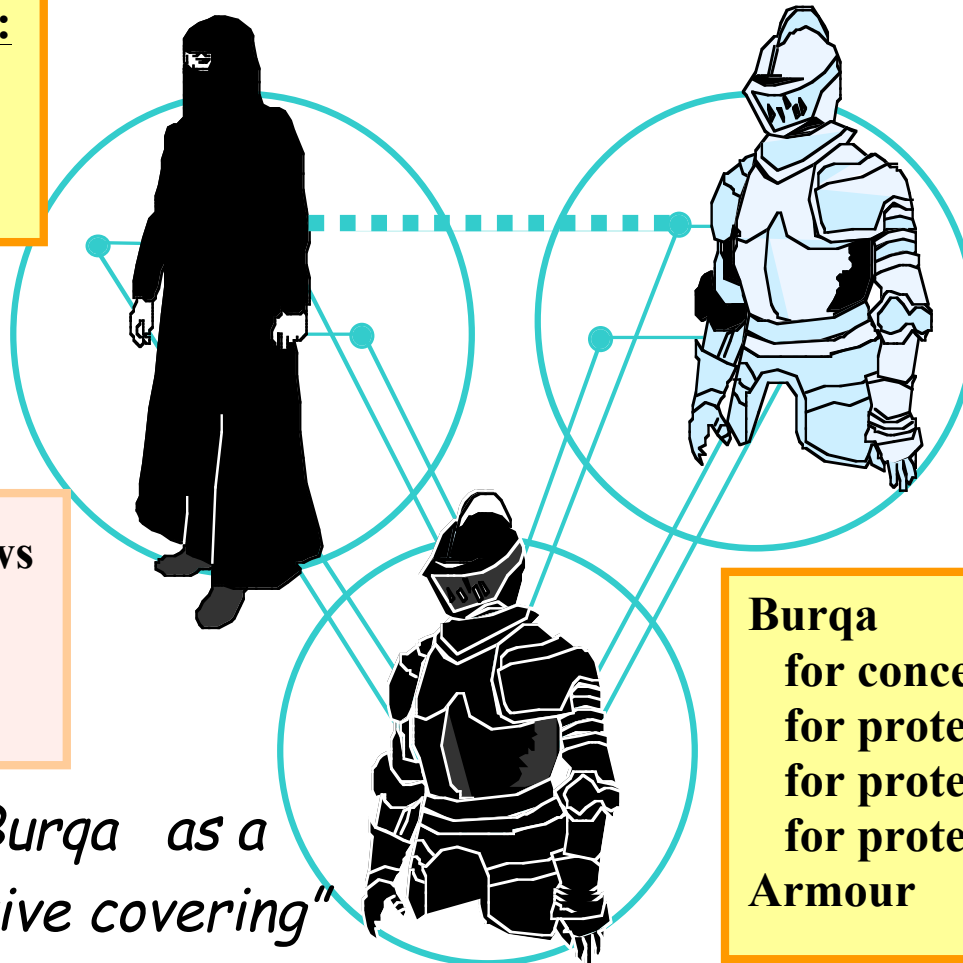
Input 1:
"Burqa"

Creative Metaphor allows
us to see the *strange* in
terms of the *familiar*

*"A Burqa as a
protective covering"*

Input 2:
"Protective
Armour"

Burqa
for concealing a Muslim woman
for protecting a Muslim woman
for protecting a woman
for protecting a person
Armour

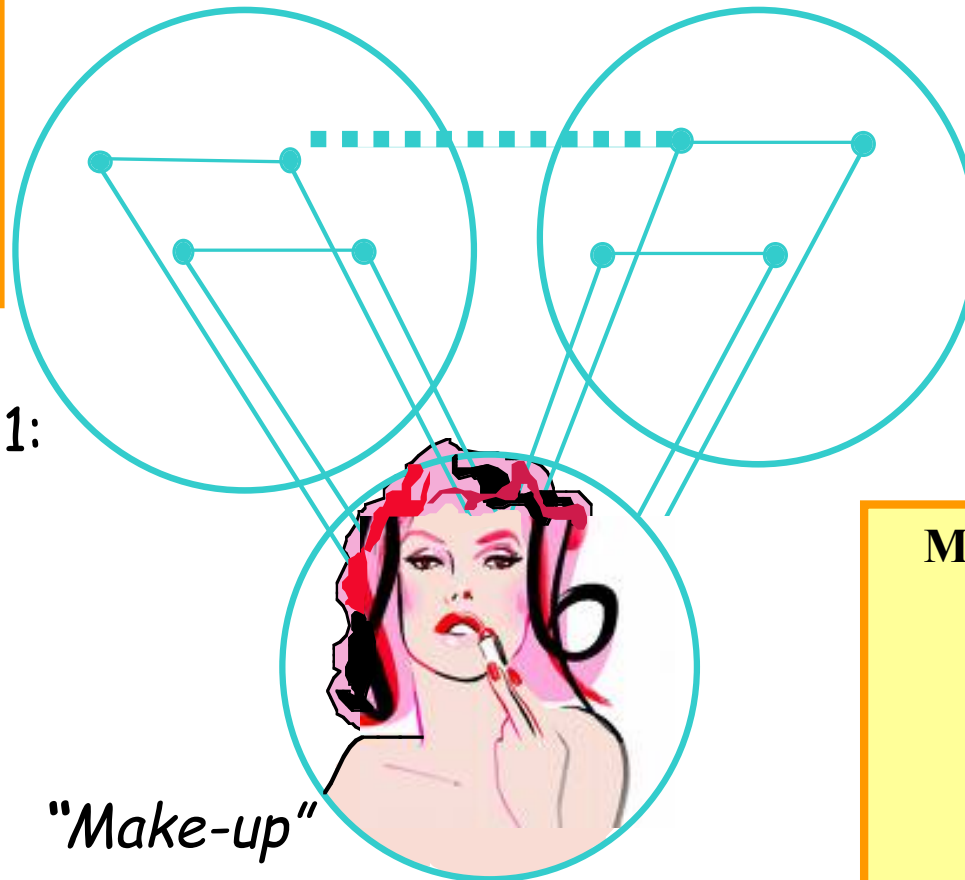


Thinking about The Familiar in New & Creative Ways

The Producer's Dilemma:

How to deconstruct a familiar concept in a new (imaginary way)

Input 1:
???



"Make-up"

Make-up

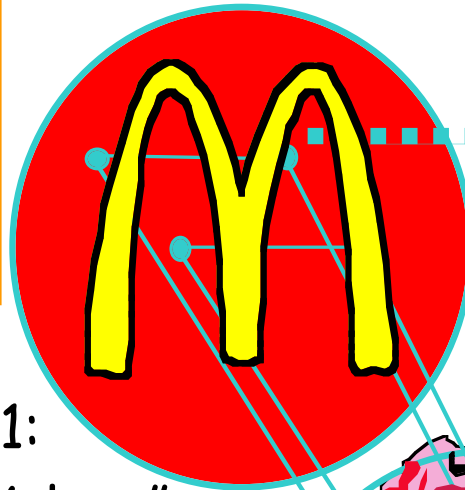
:
:
:
:
:
???

Creative Reconstruction of Well-Understood Concepts

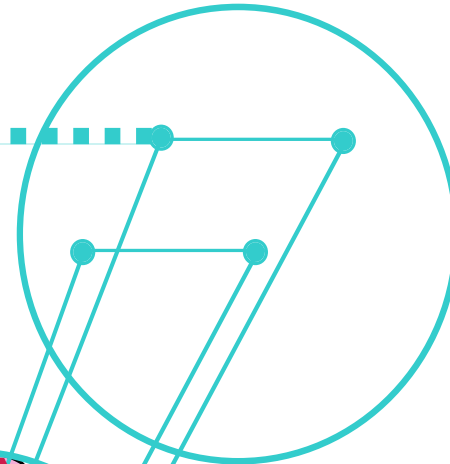
The Producer's Dilemma:

Identify a salient facet
of the concept to be
manipulated

Input 1:
"Western Values"



"Make-up"



Input 2:
???
(clothing?)

Make-up
typically worn by Western women
expected to be worn by W. women

:

:

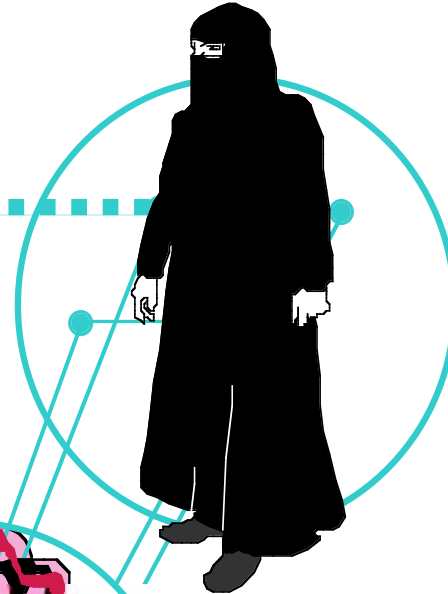
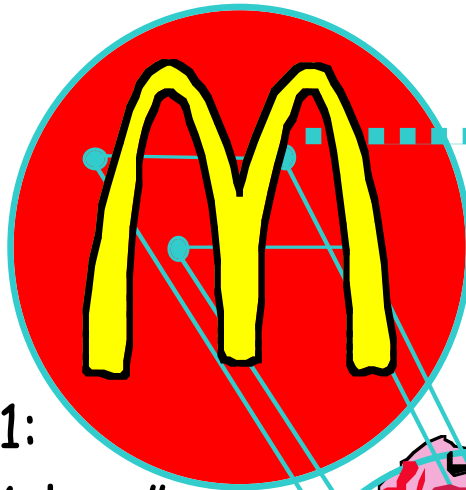
???

Reconstruction employs Figure-Ground Re-Profiling

The Producer's Dilemma:

Identify a less-salient facet to be foregrounded

Input 1:
"Western Values"



Input 2:
Burqa
West vs. East

"Make-up"



The Producer's Dilemma:

How to reach

Space #2 from Space #1

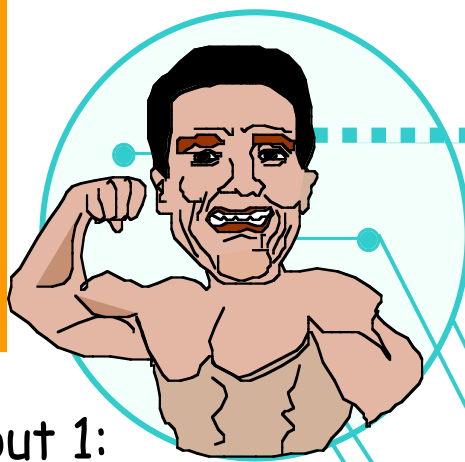
"Make-up is the Western Burqa"

Linguistic Framing is Conducive to Conceptual Creativity

Producer's Search:

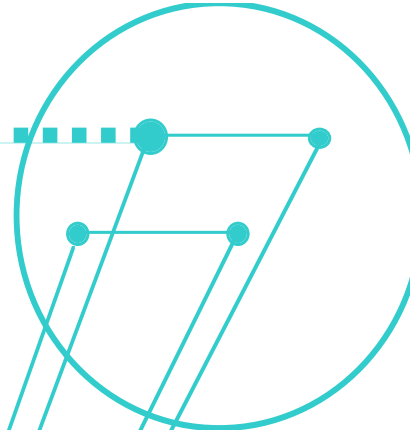
How to frame

"Arnold" as a *strong political force*



Input 1:

"Governor of California"



Input 2:
???

Leadership

Blend:

"Arnold as Political Force"

Governor of California

Governor of 12% of the U.S.

Leader of 12% of the U.S.

:

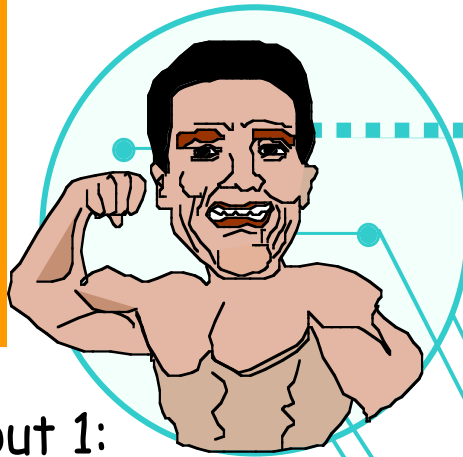
:

???

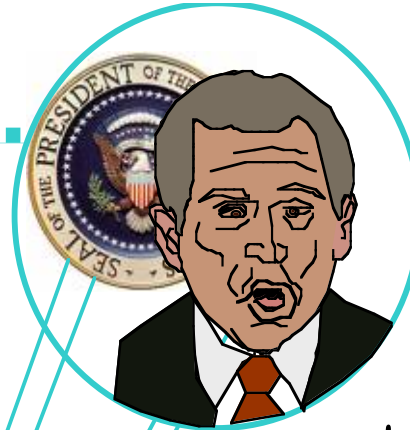
Linguistic Framing is Conducive to Conceptual Creativity

Producer's Search:
How to reach out to
non-identical but
reconcilable "mates?"

Input 1:
"Governor of California"



Input 2:
President
of the
United States



Blend: "President of
12% of the U.S."



Governor of California

Governor of 12% of the U.S.

Leader of 12% of the U.S.

President of 12% of the U.S.

President of 100% of the U.S.

President of the United States

Identifying Properties Foregrounded by a Culture: Similes

- **Similes / Comparisons reveal the most diagnostic features of a concept**

E.g., "as hot as the sun", "as dry as sand", "as wobbly as jelly", "as sweet as pie"

- **The most frequent similes characterize the most pivotal concepts / senses**

E.g., animal concepts ("lion", "rat", etc.) are frequently used in comparisons

- **Unlike metaphors, similes have a standard, recognizable syntactic frame**

"as barren as a desert", "as delicate as a surgeon", "as stiff as a corpse"

- **Detailed Knowledge-Representations can be gathered for individual concepts**

Example: surgeon = {delicate, sensitive, skilled, clinical, professional, ...}

Sampling Comparisons/Similes from the WWW

Query-pattern #1: “*as ADJ as alan **” for all antonymous adjectives in WN

Query-pattern #2: “*as * as alan NOUN*” for all nouns gathered with query #1

- 200 sampled snippets per query, to give 74,704 apparent simile instances
42,618 unique simile types, linking 3769 adjectives to 9287 unique nouns

- **Major Issues:** Frame Leakage, Implicit/Local Context, Irony
"as pointed as a question", "as hairy as a bowling-ball", "as sober as a Kennedy"

- Clustering of nouns and adjectives supports WN-based sense assignment
12,259 verified/WSD simile types, of 2124 adjectives to 3778 noun senses



View on the Web: <http://afflatus.ucd.ie/sardonicus/tree.jsp>

Pragmatic Focus: Similes capture the most common Vehicles

Conceptual Landscape

puppy snowflake

shark brick

sheep oak lion peacock

statue robot butcher

eagle sponge fox

surgeon

tiger rock soap opera

Many common comparisons are produced / understood via such landmarks

Salience & Relevance: Similes capture most foregrounded properties

Espresso

black

gourmet

trendy

steamy

hot

cold

satisfying

creamy

concentrated

rich

expensive

small

intense

strong

Italian

Felicitous similes highlight properties that are very salient in vehicle

Ironic Comparisons/Similes from the WWW

Some Examples:

As {welcome, painless, appealing, pleasant, exciting, entertaining} as a root-canal

As subtle as a {sledgehammer, freight_train, anvil, axe, rhino, toilet_seat, ...}

As hefty as a {laptop, croissant}

As blind as a {referee, hawk}

**2796 unique adj:noun ironic
simile types.**

936 adjectives to 1417 nouns.

As {muscular, epicurean, smart, straight, sturdy, weighty, ...} as a paper_clip

As rare as a {ham_sandwich, toaster, traffic_jam, monsoon, garbage_pickup}

As {bulletproof, scary, subversive} as a sponge_cake

As private as a {park_bench, town_hall, shopping_mall}

**13% of all annotated
simile instances. 18%
of unique simile types**

View on the Web: **<http://afflatus.ucd.ie/sardonicus/tree.jsp>**

[brick(44), rock(32), root_canal(31), slug(26), toaster(18),
doorknob(17), tree_stump(15), corpse(14), turnip(14),
ham_sandwich(14), potato(13), hand_grenade(13), cockroach(12),
teddy_bear(11), sponge(11), snail(11), rhino(10), fart(10),
goldfish(10), rattlesnake(10), sieve(9), paper_clip(9),
marshmallow(9), earthquake(9), turd(9), clown(9), gnat(8), cobra(8),
chainsaw(8), cow(8), zombie(8), morgue(8), hammer(8), toddler(8),
glacier(8), cactus(7), tortoise(7), cat(7), toothpick(7), clam(7),
mullet(7), sledgehammer(7), snake(7), porcupine(7), shark(7),
freight_train(7), dog(7), spoon(7), roller_coaster(6), fairy_tale(6),
fortune_cookie(6), vacuum_cleaner(6), turtle(6), yawn(6),
eggplant(6), bee_sting(6), heroin_addict(6), politician(6),
sumo_wrestler(6), butcher(6), sledge(6), hairball(6), kitten(6),
worm(6), bulldozer(6), elephant(6), mosquito_bite(6), pancake(6),
monkey(6), sheep(6), ant(6), bowling_ball(6), soap_opera(6),
robot(5), toilet_seat(5), watermelon(5), hamster(5), rhinoceros(5),
atom_bomb(5), traffic_jam(5), nun(5), mosquito(5), screen_door(5),
earthworm(5), pillow(5), puddle(5), piranha(5), banana(5),
suicide_bomber(5), tornado(5), tomb(5), dump_truck(5), lawyer(5),
whore(5), goose(5), bowel_movement(5), skunk(5), metronome(5),
hurricane(5), storm(5), james_bond(4), statue(4), banker(4),
hedgehog(4), belch(4), whisper(4), wolf(4), nursery_rhyme(4),

**Most common noun
vehicles in ironic
similes.**

**Note increased level
of specificity and
lower density of reuse**

[subtle(66), smart(43), exciting(32), sharp(30), intelligent(27), dangerous(24), funny(24), sexy(21), popular(21), graceful(19), deep(19), friendly(17), fast(16), interesting(16), creative(16), threatening(16), inviting(16), scary(16), thick(15), sweet(15), emotional(15), cute(15), intimidating(15), attractive(14), appealing(13), welcome(13), beautiful(13), tough(13), animated(13), religious(13), compassionate(13), strong(12), pleasant(11), smooth(11), straight(11), lively(11), fashionable(11), progressive(11), soft(10), sympathetic(10), cool(10), serious(10), moral(10), harmless(10), evil(10), inspiring(10), substantial(10), effective(9), energetic(9), delicate(9), quick(9), mobile(9), clear(9), romantic(9), deadly(9), menacing(9), cuddly(9), charismatic(9), aggressive(9), trustworthy(9), appetizing(8), talented(8), stealthy(8), sensitive(8), happy(8), wide(8), cheerful(8), musical(8), solid(8), accurate(8), calm(8), stylish(8), sane(8), helpful(8), diplomatic(8), sexual(8), powerful(7), handsome(7), charming(7), alive(7), lovely(7), expressive(7), elegant(7), realistic(7), fat(7), pretty(7), reliable(7), healthy(7), sophisticated(7), credible(7), responsive(7), christian(7), original(7), cheery(7), aerodynamic(7), exotic(7), enlightened(7), welcoming(7), transparent(6), quiet(6), clean(6), stable(6), shapely(6), forgiving(6), real(6), sturdy(6), entertaining(6),

**Most common
adjectival predicates
for ironic similes.**

**Note prevalence of
positive adjectives.**

Overall Word Appreciation: Whissell's Dictionary of Affect

Word	Pleasantness	Activation	Imagery
ugly	1.0000	1.8333	2.2
ultimate	2.1667	1.8000	1.2
umbilical	1.7500	1.6667	2.6
unable	1.0000	1.6000	1.4
unanswered	1.2857	1.1667	1.4
unaware	1.1429	1.3333	1.6
unburdened	2.3750	1.4286	1.8
uncertain	1.3333	1.6000	1.4
uncertainty	1.2857	1.6667	1.4
uncle	2.0000	1.8000	3.0
uncombed	1.3333	1.6250	2.8
uncomfortable	1.0000	1.5714	1.8
unconscious	1.3750	1.0000	2.2
unconsciously	1.5000	1.2000	1.6

~ 8000 words (all syn
cats) with numeric
dimensions based on
volunteer ratings

Mean pleasantness = 1.85
(standard dev. = 0.36)
3.0 = best, 1.0 = worst

Realistic Assumption:
Pleasantness rating is
based on an overall
understanding of a
word/concept

Estimating Diagnosticity: Predicting the Pleasantness of a Concept

Correlation

1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
.1
.2
.3

All simile
features

+0.35

non-ironic
features only

+0.514

All wiki
features

+0.15

PWN gloss
features

+0.278

-0.25

ironic only

Pearson two-tailed
correlation coefficient:
estimated *pleasantness*
with Whissell's
dictionary of affect

Estimating Affect: Pleasantness depends on Salient Features

Snake = [slippery(8), supple(6), cunning(5), dangerous(3), poisonous(1) ...]

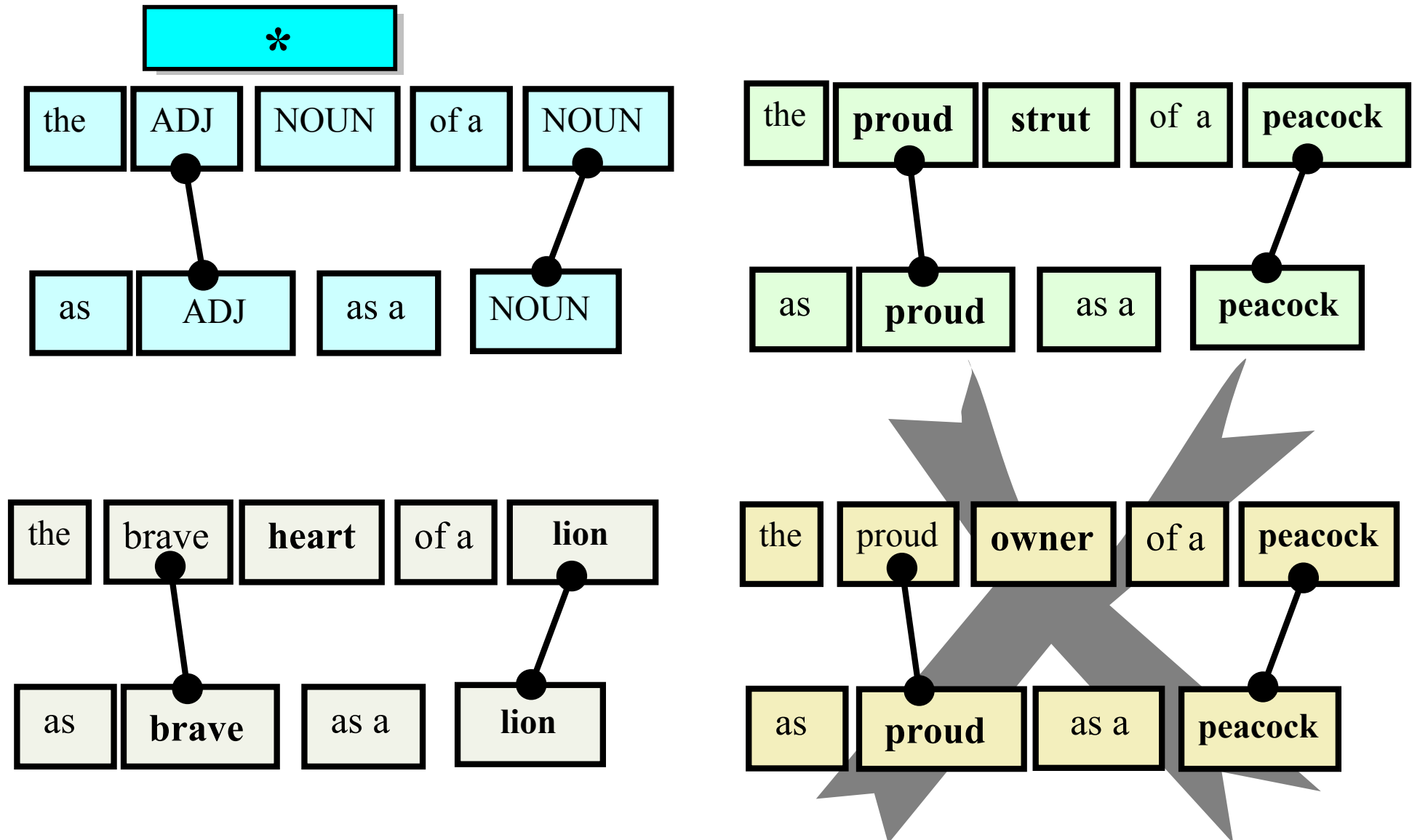


$$\text{affect}_{est}(\text{snake}) \approx \frac{8 \times \text{affect}(\text{slippery}) + 6 \times \text{affect}(\text{supple}) + 5 \times \text{affect}(\text{cunning}) + \dots}{8 + 6 + 5 + 3 + 1 + \dots}$$

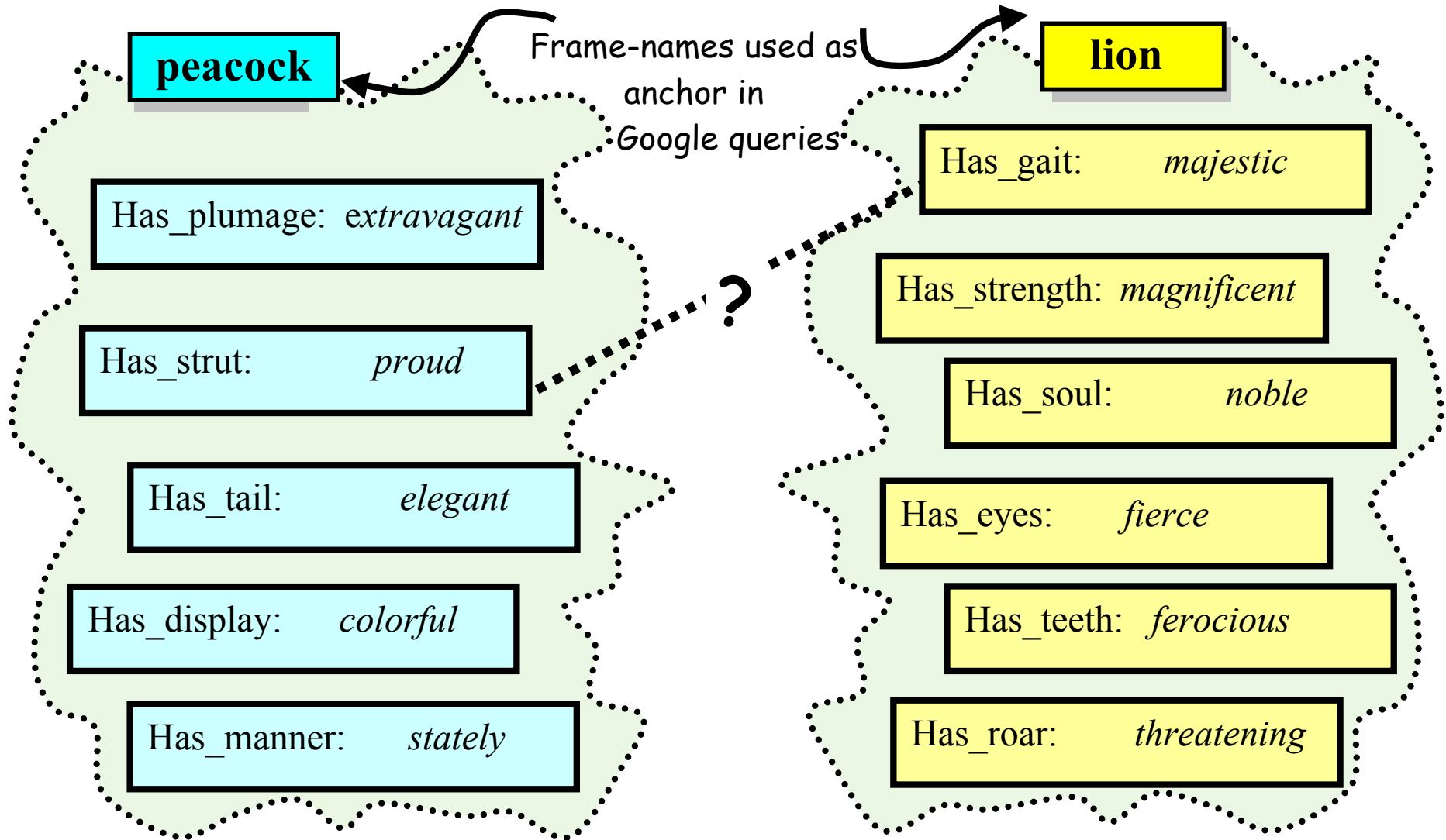
If most diagnostic features have been acquired:

We expect a strong correlation between affect_{est} and $\text{affect}_{Whissell}$

Mining the Web for Diagnostic Talking Points



Stereotypical Frames: Web-Derived Attribute-Value Pairings



Understanding **Slippage and Implication** between Adjectives

Acquire a matrix of “property reinforcement” tendencies from web

	hot	spicy	humid	fiery	dry	sultry	...
hot	---	35	39	6	34	11	...
spicy	75	---	0	15	1	1	...
humid	18	0	---	0	1	0	...
fiery	6	0	0	---	0	0	...
dry	6	0	0	0	---	0	...
sultry	11	1	0	2	0	---	...
...

Use the Google query

“as * and * as”

to acquire associations

Example: Interpret the description “a flimsy theory”

Flimsy theory =

{weak(3), self-serving(3), predictable(3),
ridiculous(2), subjective(2), dramatic(2),
unconvincing(1), incredible(1), spurious(1),
small(50), arbitrary(48), implausible(46),
preposterous(46), tenuous(46), silly(44)}

Example: Interpret the description “a robust theory”

Robust theory =

```
{effective(18),    powerful(13),    rigorous(13),  
  durable(10),    general(9),      comprehensive(8),  
  accurate(7),    functional(7),      solid(6),  
  energetic(5),    sophisticated(5),    strong(4),  
  competitive(4), integrated(4), dynamic(4), ...}
```

Example: Interpret the description “a shaky theory”

Shaky theory =

{weak(2), inadequate(2), tenuous(2), weird(1),
controversial(1), old(1), subjective(1),
problematic(1), ridiculous(1), ... }

Watertight theory =

{robust(1), effective(1), accurate(1),
solid(1), objective(1), comprehensive(1) }

Some Examples of Slippage in Action

Pope

⇒ leads: Roman_Catholic_Church

≈ leads: congregation

≈ leads: flock

≈ leads: mob

≈ leads: organized_crime

Don (Crime Father)

WordNet

Pope

⇒ leads: Roman_Catholic_Church

≈ leads: congregation

≈ leads: political_movement

≈ leads: gang

≈ leads: military_force

Warlord (Military Leader)

Taliban

≈ is: religious_movement

≈ is: political_movement

≈ is: political_campaign

≈ is: military_campaign

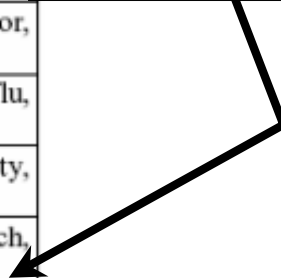
Crusade

WordNet
+
Web Statistics

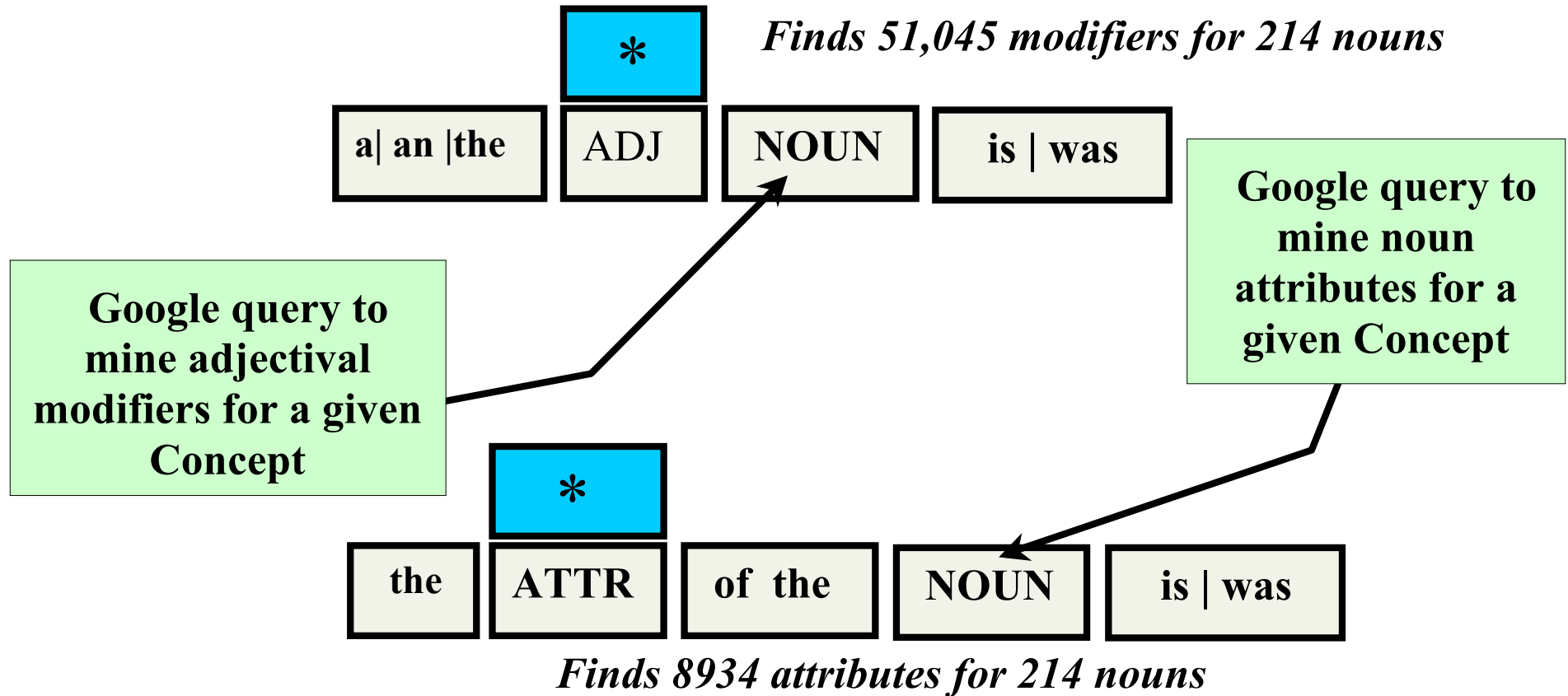
Almuhareb & Poesio (2004): Clustering Concepts by Modifiers/Attributes

Class	Concepts
Animal	bear, bull, camel, cat, cow, deer, dog, elephant, horse, kitten, lion, monkey, mouse, oyster, puppy, rat, sheep, tiger, turtle, zebra
Building	abattoir, center, clubhouse, dormitory, greenhouse, hall, hospital, hotel, house, inn, library, nursery, restaurant, school, skyscraper, tavern, theater, villa, whorehouse
Cloth	pants, blouse, coat, costume, gloves, hat, jacket, jeans, neckpiece, pajamas, robe, scarf, shirt, suit, trousers, uniform
Creator	architect, artist, builder, constructor, craftsman, designer, developer, farmer, inventor, maker, manufacture, musician, originator, painter, photographer, producer, tailor
Disease	acne, anthrax, arthritis, asthma, cancer, cholera, cirrhosis, diabetes, eczema, flu, glaucoma, hepatitis, leukemia, malnutrition, meningitis, plague, rheumatism, smallpox
Feeling	anger, desire, fear, happiness, joy, love, pain, passion, pleasure, sadness, sensitivity, shame, wonder
Fruit	apple, banana, berry, cherry, grape, kiwi, lemon, mango, melon, olive, orange, peach, pear, pineapple, strawberry, watermelon
Furniture	bed, bookcase, cabinet, chair, couch, cradle, desk, dresser, lamp, lounge, seat, sofa, table, wardrobe
Body Part	ankle, arm, ear, eye, face, finger, foot, hand, head, leg, nose, shoulder, toe, tongue, tooth, wrist
Publication	atlas, book, booklet, brochure, catalog, cookbook, dictionary, encyclopedia, handbook, journal, magazine, manual, phonebook, reference, textbook, workbook
Family Relation	boy, child, cousin, daughter, father, girl, grandchild, grandfather, grandmother, husband, kid, mother, offspring, sibling, son, wife
Time	century, decade, era, evening, fall, hour, month, morning, night, overtime, quarter, season, semester, spring, summer, week, weekend, winter, year
Vehicle	aircraft, airplane, automobile, bicycle, boat, car, cruiser, helicopter, motorcycle, pickup, rocket, ship, truck, van

**214 concepts
from 13 PWN
categories**



Almuhareb & Poesio (2004): Web-Mining of Concept Modifiers/Attributes



e.g., rocket = [fast, powerful, speed, thrust, ...] vector space of 59,979 features

Almuhareb & Poesio (2004) / Veale & Hao (2007): Clustering Results

13-way clustering: [I2=9.58e+001] [214 of 214], Entropy: 0.133, Purity: 0.902

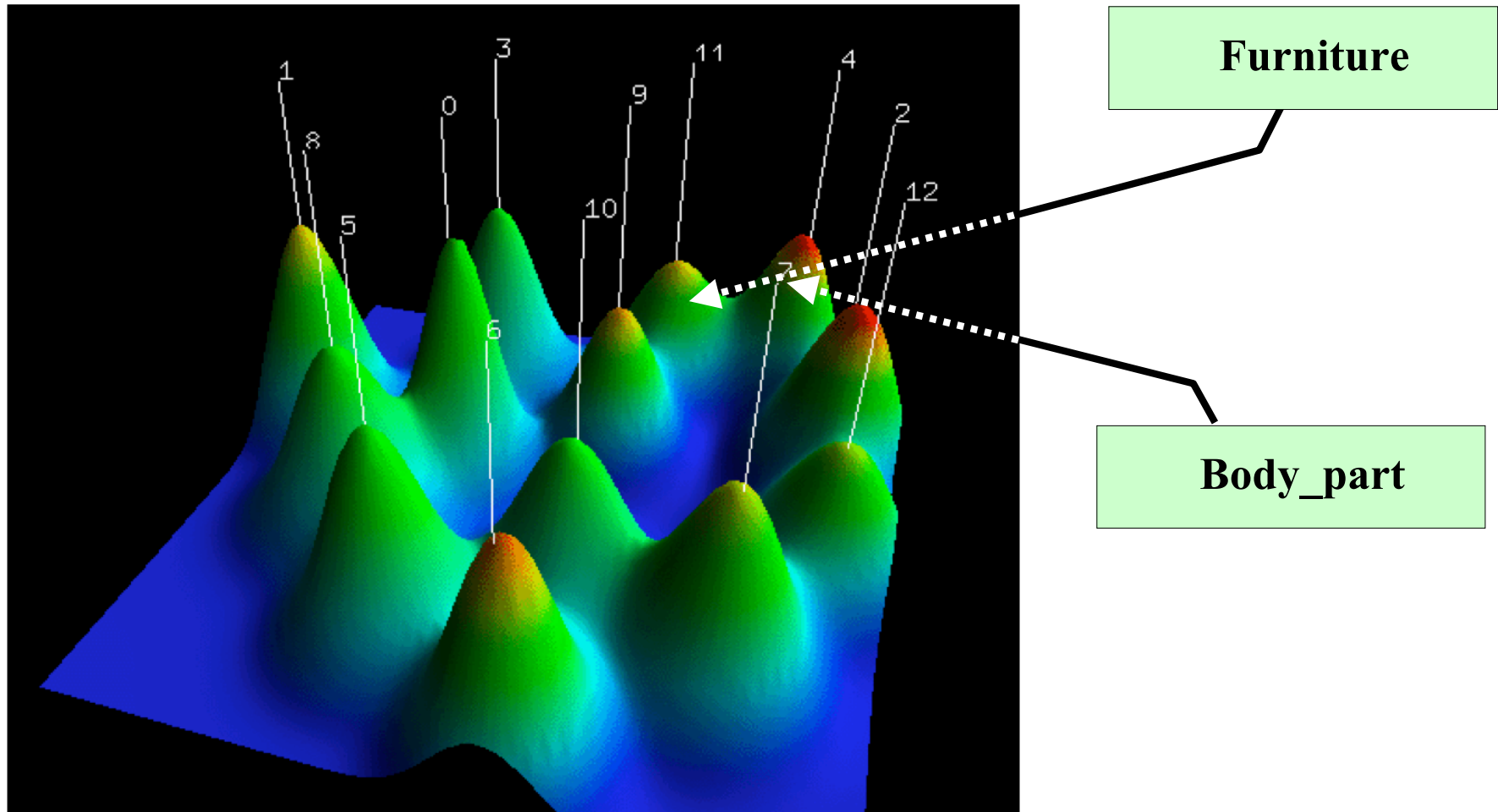
cid Entpy Purty | body crea dise fami vehi publ feel clot buil time anim frui furn

0	0.000	1.000		0	0	18	0	0	0	0	0	0	0	0	0	0
1	0.087	0.941		0	0	0	0	0	0	0	0	0	1	16	0	0
2	0.106	0.923		0	1	0	0	0	0	12	0	0	0	0	0	0
3	0.000	1.000		0	13	0	0	0	0	0	0	0	0	0	0	0
4	0.000	1.000		16	0	0	0	0	0	0	0	0	0	0	0	0
5	0.000	1.000		0	0	0	0	0	0	0	0	17	0	0	0	0
6	0.321	0.750		0	1	0	0	12	0	0	2	0	1	0	0	0
7	0.160	0.895		0	0	0	0	1	0	0	0	17	0	0	0	1
8	0.100	0.929		0	1	0	13	0	0	0	0	0	0	0	0	0
9	0.000	1.000		0	0	0	0	0	0	12	0	0	0	0	0	0
10	0.155	0.864		0	0	0	3	0	0	0	0	0	19	0	0	0
11	0.405	0.722		0	0	0	0	1	1	1	0	1	1	0	0	13
12	0.286	0.789		0	1	0	0	0	15	0	2	1	0	0	0	0

Compare
0.855
for
Almuhareb &
Poesio (2004)

Compare
Talking Points:
7183 feat.
Alm.+Poesio:
59,979 feat.

Visualizing Concept Clusters based on Diagnostic Features



Purely Literal Expressions

No Irony, Metaphor, Incongruity, Playfulness ...

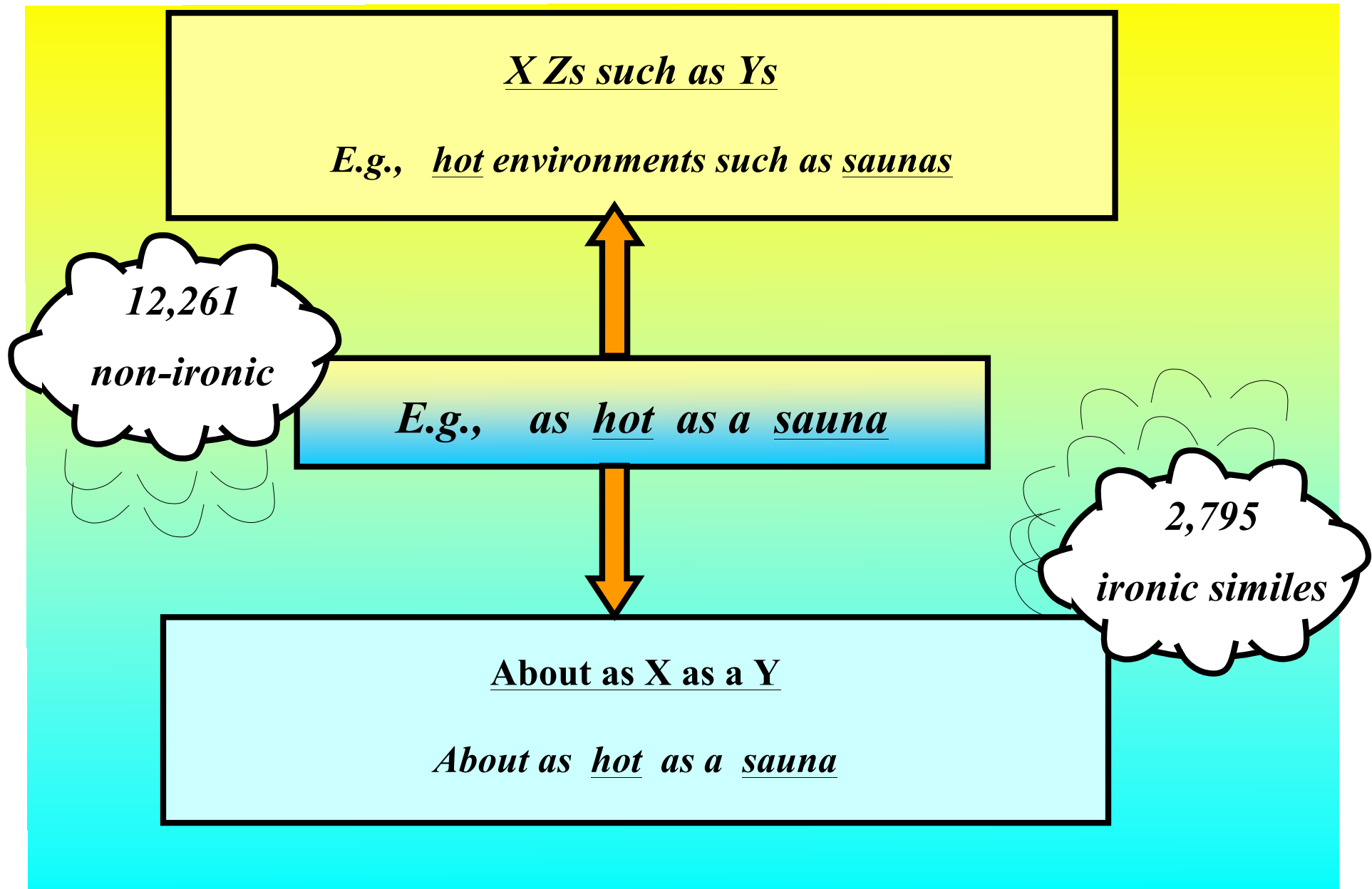
*Constructions
with little / no
tolerance for
irony*

Arbitrary Comparison / Expression

Ironic / Sarcastic / Non-Literal Expressions

Pretence, Incongruity, Pragmatic Insincerity

*Constructions
with frequent
occurrence of
irony*



X Zs such as Ys

E.g., hot environments such as saunas

Non-Ironic

R = .28

P = .96

E.g., as hot as a sauna

About as X as a Y

About as hot as a sauna

Ironic

R = .36

P = .83

X Zs such as Ys

E.g., hot environments such as saunas

Non-Ironic

R = .28

+ Variation

R = .24

P = .94

E.g., as hot as a sauna

Web Freq ≥ 10

R = .32

P = 1.0

P = .85

About as X as a Y

About as hot as a sauna

Conclusions: A Language-Based model of Language Creativity

- **Language is a lens through which we view the world**

New/Creative world-views can be generated and understood by twisting language

- **World norms are often fossilized in language, in easily accessible forms**

E.g., We acquire stereotypical talking points by harvesting similes from WWW

- **Language yields an atypical (AI/logic) K-R stance: figurative and subjective**

Our experiments reveal that this stance yields great concision and accuracy

- **Useful for Metaphor/Simile Processing On-Line**

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Generate metaphors for arbitrary target concepts that highlight given features

Conclusions (2): Irony is a problem for humans *and* computers

- Good overall results for a purely “linguistic” approach

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Irony ($R = .87$, $P = .63$, $F1 = .73$) ; Non-Irony ($R = .89$, $P = .97$, $F1 = .93$)

- Ironic comparisons commonly communicate criticism + attitude + distance

Sentiment rich, but fallible: Irony involves significant risk of misinterpretation

- “About” marks a simile as playful, imprecise, creative and often ironic

A safety-net for speakers and listeners alike; extra channel of communication

- The simile is the ideal test-bed for studying irony in creative expression
- Ironic Similes are typically *self-contained, context-free irony-internal* forms