Lexical Factors ~~versus~~ and the Hierarchy of the Senses in Synesthetic Metaphors

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Introduction

Synesthetic metaphors are cross-domain mappings between sensory modalities: one sensory experience (the target) is described in terms of another sensory modality (the source)

Smooth voice (TOUCH → SOUND)

Symphony of lights (SOUND → SIGHT)

For lack of a better word, it smells "purple" (SMELL ← SIGHT)

Introduction

Synesthetic metaphors show directional preferences: mappings between two sensory modalities are often preferred in one direction (X → Y) over the other (X ← Y)

The complex of directional preferences is traditionally presented in terms of a hierarchy of the senses, such that upward mappings are preferred over downward mappings

Introduction

Accounts of directional preferences invoke two types of factors

Perceptual factors

Differences between the senses themselves, with a direct real-time effect on synesthetic mapping

(speculated)

Lexical factors

Differences between the words associated with the senses, with an effect on synesthetic mapping

(corroborated)

Introduction

Are there perceptual factors that effect directional preferences?

If not, what does the hierarchy of the senses represent?

Is it merely descriptively adequate, and not explanatory at all?

Do we need a hierarchy of the senses?

Introduction

Are there perceptual factors that effect directional preferences?

To answer this question, one must control for lexical factors

I use copulative perception verbs within synesthetic analogies

Experimental evidence indicates a perceptual effect, but one that is too specific to support the hierarchy of the senses

Road map

- Introduction
- Background
- Present goals
- Experimental study
- Conclusions

Background

Ullman (1945, 1957) collected synesthetic metaphors in poetry & literary prose:

Target

Source

Byron	*Touch*	*Heat*	*Taste*	*Scent*	*Sound*	*Sight*	*Total*
Touch	—	8	3	3	76	31	121
Heat	2	—	2	—	11	9	24
Taste	1	—	—	1	7	8	17
Scent	—	—	—	—	3	2	5
Sound	—	—	—	—	—	11	11
Sight	5	3	—	1	21	—	30
Total	8	11	5	5	118	61	208

(Ullman 1945, p. 814)

Background

Ullman arrived at several generalizations:

1. Most synesthetic mappings are from lower senses to higher senses
2. TOUCH is the most common source
3. SOUND is the most common target

See also Dombi 1974, Day 1996, Shen & Cohen 1998, Yu 2003, Strik Lievers 2015, Winter 2016

Background

Shen (1997) & colleagues (2008, 2009) found experimental evidence for the same directional preferences:

1) *Warm bitterness*
(TOUCH → TASTE)

2) *Bitter warmth*
(TASTE → TOUCH)

Upward mappings as in (1) are judged as more natural, recalled better & are easier to generate a context for than downward mappings as in (2)

Background

Shen speculated that embodiment effects mapping:

Proximal senses (TOUCH, TASTE) are more embodied, & hence more cognitively accessible, than distal senses (SIGHT, SOUND)

In general, most metaphoric mappings are from more accessible to less accessible domains (Lakoff & Johnson 1980, 1999)

Degree of embodiment is a perceptual factor

Background

Winter (2016) found that a sensory word's likelihood to be mapped onto another sensory domain:

- increases with affectivity (& that SMELL & TASTE words tend to be more affective)
- decreases with iconicity (& that SOUND words tend to be more iconic)

Affectivity & iconicity are both lexical factors

Background

Strik Lievers & Winter (2018) found that sensory words are not distributed evenly across lexical categories:

- TOUCH has a high proportion of adjectives
- SOUND has a high proportion of nouns

Most synesthetic mappings are from adjectives to nouns

Distribution across lexical categories is a lexical factor

Background

Converging evidence from corpus and experimental studies show robust directional preferences in synesthetic metaphors

Lexical factors have been shown to effect synesthetic mapping, partially explaining some directional preferences

Perceptual factors have been hypothesized, but have not been manipulated directly nor successfully isolated

Goals

Are there perceptual factors that effect directional preferences?

To answer this question, one must control for lexical factors

But many sensory words are highly idiosyncratic & comparisons across modalities are often impossible (Levinson & Majid 2014)

Goals

I control for lexical factors using copulative perception verbs

X looks / sounds / smells / tastes / feels P

- Closed set of verbs with comparable meanings
- One-to-one relation between verbs & senses
- Synesthetic mapping via analogy structure

X VERBs like Y VERBs

Goals

Naturally-occurring examples:

the painting looks like my music sounds (SIGHT ← SOUND)

Debussy can sound like Monet looks (SOUND ← SIGHT)

it tasted like tobacco smoke smells (TASTE ← SMELL)

it smells like how it feels when you step into a warm building from the cold (SMELL ← TOUCH)

Experimental study

Materials: four lists of 20 synesthetic analogies

8 nouns per verb

- Concrete
- Inanimate
- Frequent subjects of the verb

looks

house

dress

furniture

shoes

park

outfit

ring

painting

Experimental study

Materials: four lists of 20 synesthetic analogies

8 nouns per verb

12 adjectives

- Antonym pairs
- 6 modality-general
- 6 modality-agnostic

good	*bad*
interesting	*boring*
strong	*weak*
familiar	*strange*
huge	*tiny*
expensive	*cheap*

Experimental study

Materials: four lists of 20 synesthetic analogies

8 nouns per verb

12 adjectives

I like how this coat feels. In a way, this coat feels like an expensive soup tastes. (TOUCH ← TASTE)

I like how this soup tastes. In a way, this soup tastes like an expensive coat feels. (TASTE ← TOUCH)

Experimental study

Participants: 48 monolingual English speakers recruited online

Procedure: participants rated how natural each sentence is on a scale of 1 to 7

Analysis: linear mixed-effects model

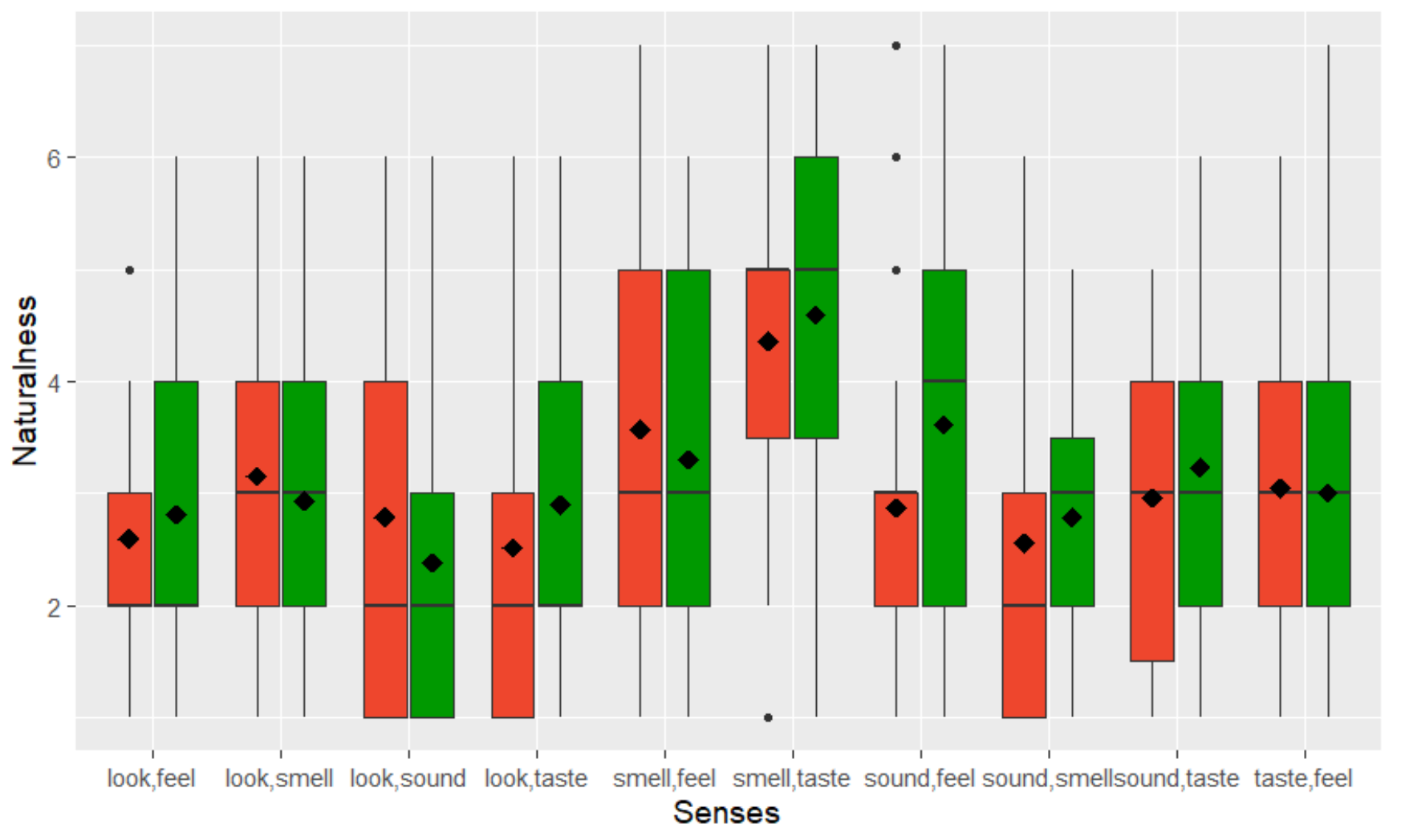
$$\text{Rating} \sim \text{Direction} * \text{Senses} * \text{Valence} + (1|\text{subject}) + (1|\text{item})$$

Experimental study

Results:

Upward

Downward



Experimental study

Results:

No main effect for Direction ($\beta = 0.054$, SE = 0.087, $t = -0.619$, $p = .536$)

Multiple main effects for Senses, especially for SMELL ↔ TASTE

($\beta = 2.203$, SE = 0.302, $t = 7.285$, $p < .001$)

Main effect for Valence ($\beta = 0.745$, SE = 0.137, $t = -5.434$, $p < .001$)

One significant interaction between Direction & Senses, specifically for SOUND ← TOUCH ($\beta = 0.994$, SE = 0.383, $t = -2.596$, $p < .01$)

Experimental study

Discussion:

Novel evidence for a perceptual effect on directional preferences;

SOUND ← TOUCH is more natural than TOUCH ← SOUND

This specific effect is in keeping with previous empirical findings;

SOUND ← TOUCH is consistently the most frequent mapping

But this effect is too specific to arise from previously hypothesized perceptual factors, e.g. embodiment

Conclusions

Directional preferences in synesthetic metaphors are not reducible to lexical factors; perceptual factors are also at play

Perceptual factors of TOUCH & SOUND make them good source & target domains, respectively

These perceptual factors do not constitute a single hierarchy of the senses

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Warm thanks

TEMPERATURE

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