

Meaning: Words (verb) Grammatical constructions Metaphors

Constructing Meaning

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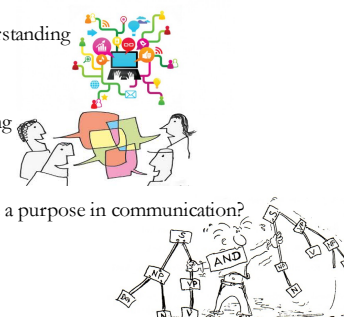
Meaning: Words (verb) Grammatical constructions Metaphors

How do we arrive at interpretations?

Machine translation, understanding

Language learning, teaching

Do syntactic patterns serve a purpose in communication?



Meaning: Words (verb) Grammatical constructions Metaphors

How do we arrive at interpretations?

Words
AND
Systematic grammatical patterns
Systematic metaphors

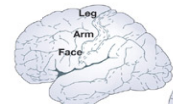
Also,
Context! (but not today)

Meaning: Words (verb) Grammatical constructions Metaphors

words

Paris, soccer, exam, bodice, lemonade, anaconda, wine, tornado, sleep

Meaning: Words (verb) Grammatical constructions Metaphors

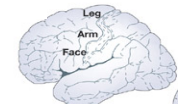


kick	hand	face
foot	grasp	kiss
leg	toss	nose
run	finger	forehead

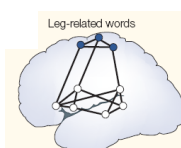
Meaning: Words (verb) Grammatical constructions Metaphors

Literal word meanings appear to be *neurally embodied*

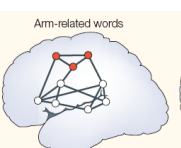
(eg. Johnson 1987, Pulvermüller 2001, Barsalou 2008)



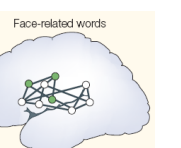
Leg-related words



Arm-related words



Face-related words



Pulvermüller (2003)

Meaning	Words (verb)	Grammatical constructions	Metaphors
A special role for the main verb:			
sneeze	→	Someone <u>sneezed</u> . Subject Verb	
eat	→	Someone <u>ate</u> something. Subject Verb Object	

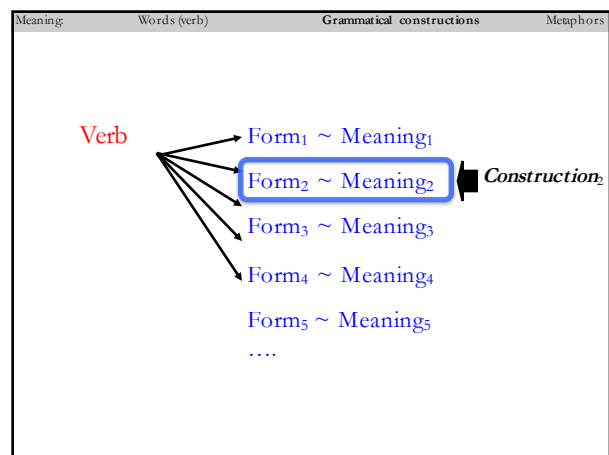
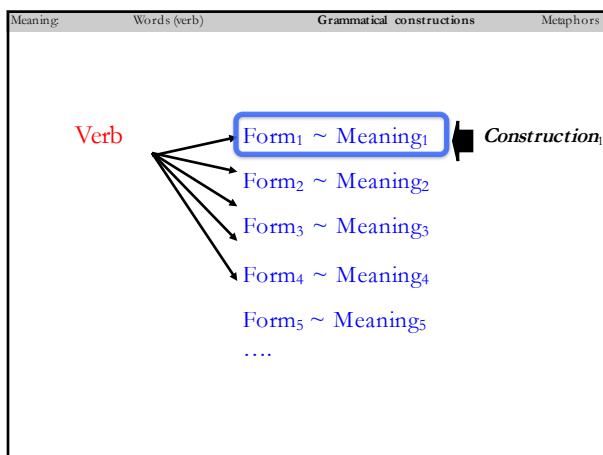
Meaning	Words (verb)	Grammatical constructions	Metaphors
Sort according to "overall sentence meaning"			
Subject argument			
<div> <div>salesman</div> <div>writer</div> <div>critic</div> <div>student</div> </div>			
<div> <div>sell</div> <div>write</div> <div>criticize</div> <div>study</div> </div>			
Verb	Participants sorted by verb		
Healy & Miller 1970			

Meaning	Words (verb)	Grammatical constructions	Metaphors
Is the verb the main determinant of sentence meaning?			
Hidden regularities in language beyond verbs...			

Meaning	Words (verb)	Grammatical constructions	Metaphors
They ate all the bacon.			
They ate the bacon up.			
They ate their way through all the bacon.			
The bacon! Gone!			
All the bacon was eaten.			

Meaning	Words (verb)	Grammatical constructions	Metaphors
Nouns (names, and other things) as verbs			
• "I'm gonna go <u>benadryl</u> myself to sleep."			
• "Christie just <u>Trump'd</u> the shit out of Rubio."			
• "few people want to be memorialized <u>um-ing</u> , <u>you know-ing</u> , and <u>remember that time when we got drunk-ing</u> their way into infamy."			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<i>She sneezed.</i>			Simple action
<i>She sneezed her tooth across town.</i>			+ Caused motion
<i>She sneezed a terrible sneeze.</i>			+ Creation
<i>She sneezed herself awake.</i>			+ Change of state
<i>She sneezed her way to the emergency room.</i>			+ Creation of a path and motion through it



Meaning Words (verb) Grammatical constructions Metaphors

She mooped her something. (double-object construction)

Verb Object1 Object2

What does *moop* mean?



Meaning Words (verb) Grammatical constructions Metaphors

Subtle semantic differences between constructions

a. Joe baked Sam a cake. (double-object construction)


Verb Object1 Object2

b. Joe baked a cake for Sam.

Meaning Words (verb) Grammatical constructions Metaphors

Subtle semantic differences between constructions



Joe married into the family. (intran. motion construction)

≠ Verb PrepositionalPhrase


Joe married his way into the family. (“way” construction)

Verb [<poss>way] PrepositionalPhrase

Meaning Words (verb) Grammatical constructions Metaphors

Wilhelm von Humboldt:
natural language makes “infinite use of finite means.”

I.e., we learn *constructions* with open slots.



Argument structure patterns:
Abstract forms can convey meaning, independently of main verb

(Goldberg 1995, 2006)	
Meaning	Form, Example
Double object construction “give”	S [V O _i O ₂] <i>She gave him something.</i> <i>She sniped him something.</i>
Intransitive Motion “go”	S [V PP] <i>She went down the street.</i> <i>The truck roared down the street.</i>
Caused-motion “put, move”	S [V O PP] <i>She put the ball in the box.</i> <i>She sneezed his tooth across town.</i>
Resultative “change-state, make”	S [V O AP] <i>He made her crazy.</i> <i>She kissed him unconscious.</i>

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>→ Formal patterns (<i>constructions</i>) contribute to interpretation... in many ways:</p>			

Meaning	Words (verb)	Grammatical constructions	Metaphors
Some constructions convey attitude			
NP, NP?	Incredulity		
(e.g., <i>Him, a presidential candidate?</i>)			
Why VP?	Disapproval		
(e.g., <i>Why get up so early?</i>)			
Got N?	N is highly relevant		
(e.g., <i>Got bacon?</i>)			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>Constructions involve: (Abstract) surface form Semantics (& other functions) Register, genre, dialect Connections to other constructions Clusters of exemplars</p>			

Meaning	Words (verb)	Grammatical constructions	Metaphors
Sort according to “overall sentence meaning”			
Construction			
	transitive	double-object	caused motion resultative
Participants were just as likely to sort by construction			
Verb	throw	Anita threw the hammer. Chris threw Linda the pencil.	Pat threw the keys onto the roof. Lyn threw the box apart.
	get	Michelle got the book. Beth got Liz an invitation.	Laura got the ball into the net. Dana got the mattress inflated.
	slice	Barbara sliced the bread. Jennifer sliced Terry an apple.	Meg sliced the ham onto the plate. Nancy sliced the tire open.
	take	Audrey took the watch. Paula took Sue a message.	Kim took the rose into the house. Rachel took the wall down.

(Bendall & Goldberg, 2000, *JL12*, see also Gries & Wulff 2004, Liang 2010)

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p><i>Jabberwocky</i> by Lewis Carroll</p> <p><i>'Twas brillig, and the slithy toves Did gyre and gimble in the wabe; All mimsy were the borogoves, And the mome raths outgrabe.</i></p> <p><i>"Beware the Jabberwock, my son! The jaws that bite, the claws that catch! Beware the Jubjub bird, and shun The frumious Bandersnatch!"</i></p> <p><i>He took his vorpal sword in hand: Long time the manxome foe he sought - So rested he by the Tumtum tree, And stood awhile in thought.</i></p>			
<p>Alice in Wonderland upon reading Jabberwocky: “Somehow it seems to fill my head with ideas”</p>			

Meaning

Words (verb)

Grammatical constructions

Metaphors

Lexical decision task: Trial Structure

+
(3000 ms)

“Prime Phrase”
(1000 ms)

+
(300 ms)

“Target Word”
(up to 1000 ms)

Example Prime Phrases

He daxed her the fap.

She jorped it miggy

He lorped it on the molp.

She vakoed it from her.

Johnson and Goldberg. (2012, *Lang & Cog Proc*)

Lexical decision task

made

gave

Meaning

Words (verb)

Grammatical constructions

Metaphors

Trial Structure

+
(3000 ms)

“Prime Phrase”
(1000 ms)

+
(300 ms)

“Target Word”
(up to 1000 ms)

Congruent prime construction	Target Words: High frequency associates
double object (V proN the N)	Gave
Resultative (V it Adjective)	Made
Caused motion (V it on the N)	Put
Removal (V it from proN)	Took

Johnson and Goldberg. (2012, *Lang & Cog Proc*)

Meaning

Words (verb)

Grammatical constructions

Metaphors

Trial Structure

+
(3000 ms)

“Prime Phrase”
(1000 ms)

+
(300 ms)

“Target Word”
(up to 1000 ms)

Construction (search string)	High frequency associate	Low frequency associate	Semantically related, non- associate
double object (V proN the N)	Gave	Handed	Transferred

Counts from Corpus of Contemporary American English (COCA)

Johnson and Goldberg. (2012, *Lang & Cog Proc*)

Meaning

Words (verb)

Grammatical constructions

Metaphors

Trial Structure

+
(3000 ms)

“Prime Phrase”
(1000 ms)

+
(300 ms)

“Target Word”
(up to 1000 ms)

Construction (search string)	High frequency associate	Low frequency associate	Semantically related, non- associate
double object (V proN the N)	Gave	Handed	Transferred
Resultative (V it Adjective)	Made	Turned	Transformed
Caused motion (V it on the N)	Put	Placed	Decorated
Removal (V it from proN)	Took	Removed	Ousted

Meaning

Words (verb)

Grammatical constructions

Metaphors

Trial Structure

+
(3000 ms)

“Prime Phrase”
(1000 ms)

+
(300 ms)

“Target Word”
(up to 1000 ms)

“He daxed him the jorp” + “Gave”
(Double object construction)

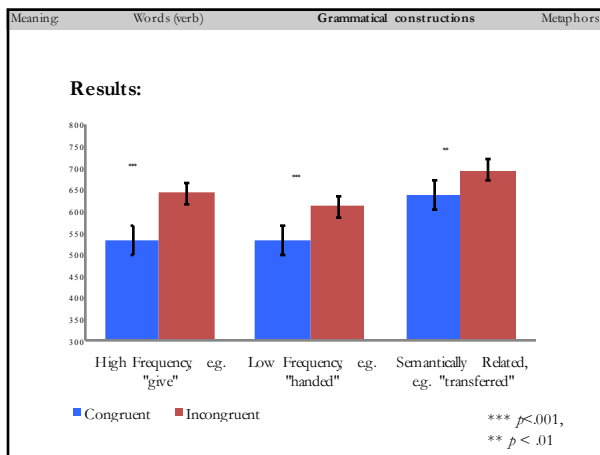
[Congruent]

“He blipped it from her” + “Gave”
(Removal construction)

[Incongruent]

Johnson and Goldberg. (2012, *Lang & Cog Proc*)

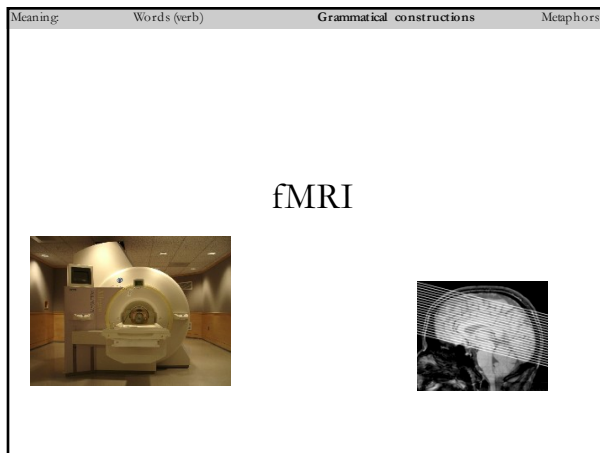
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Meaning: Words (verb) Grammatical constructions Metaphors

Is there a way to neurally detect a generalizations across individual verbs?

Can we detect individual constructions in the brain?



Meaning: Words (verb) Grammatical constructions Metaphors

Double-object construction vs. *To*-dative

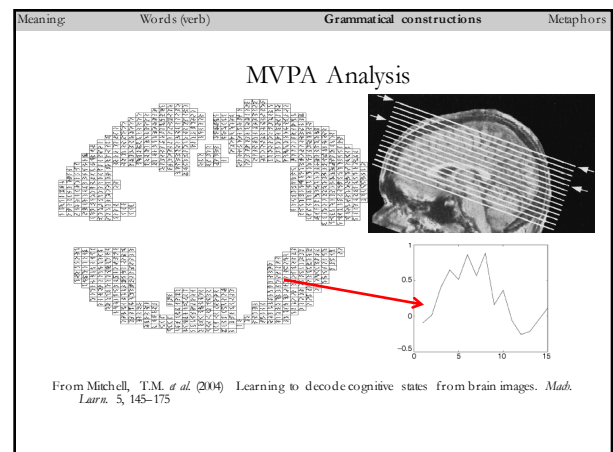
- Double-object construction
S [V O₁ O₂]
e.g. Mike gave Sue a cookie.
- Caused-motion ("to-dative")
Subj V [O PP]
e.g. Mike gave a cookie to Sue.

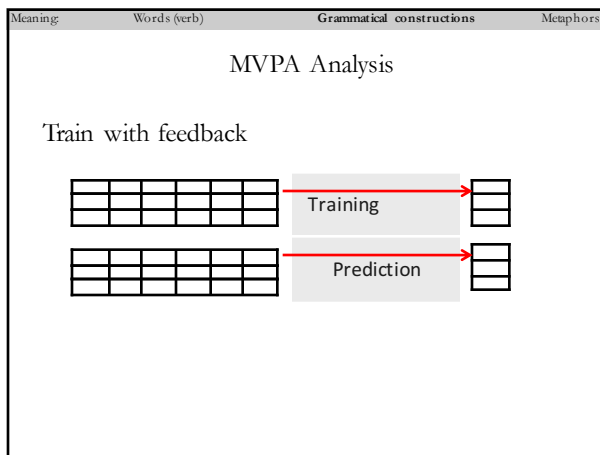
Meaning: Words (verb) Grammatical constructions Metaphors

Conditions

- Double-object
Sarah brought Steph a cake.
Joe awarded Liz a ribbon.
Heather showed Amanda a painting.
- To*-dative
Sarah brought a cake to Steph.
Joe awarded a ribbon to Liz.
Heather showed a painting to Amanda.

Allen, Pereira, Botvinick, Goldberg (2012, *Brain & Language*)





Meaning Words (verb) Grammatical constructions Metaphors

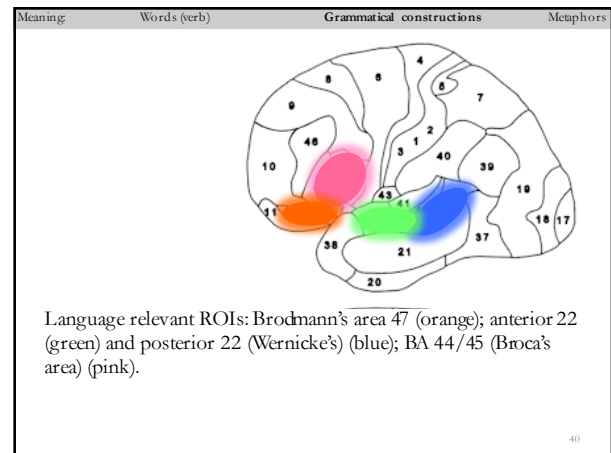
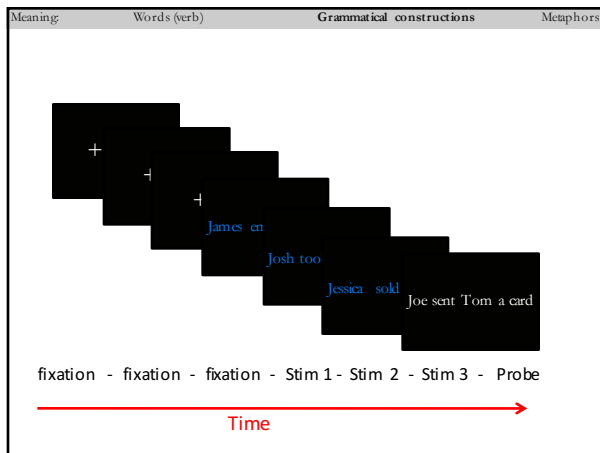
Control: Scrambled sentences as list of words

including the word 'to'

to, pencil, tossed, Sarah, a, Jen

excluding the word 'to'

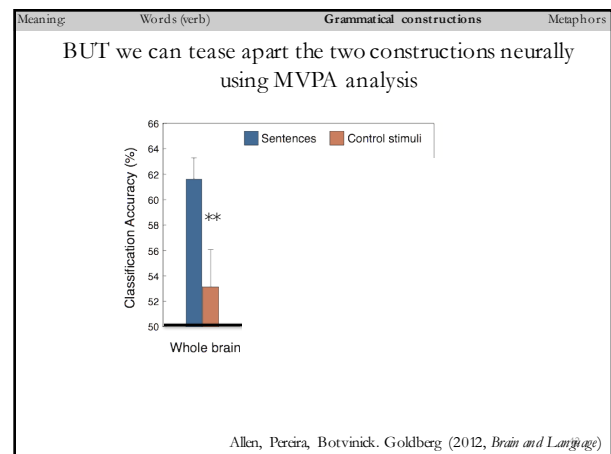
pencil, tossed, Sarah, a, Jen



Meaning Words (verb) Grammatical constructions Metaphors

As expected, the two constructions are not represented in distinct areas of the brain.

Allen, Pereira, Botvinick, Goldberg (2012, *Brain and Language*)



Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>L anterior BA 22 : Sentence-level semantic integration (Stowe, Haverkort, and Zwarts 2005; Noppeney and Price 2004; Vandenberghe et al. 2002); Conceptual combination (Baron 2011); morphosyntax in sentence comprehension (Dronkers et al. 1994; Hagoort 2005; Humphries et al. 2006); picture naming and word comprehension (Pobric, Jefferies, and Lambon Ralph, 2007); Jabberwocky type sentences (Mazoyer et al. 1993).</p>			
43			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>Note that general constructions were being distinguished, not particular words.</p>			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>Recall, Double-object construction → Transfer S [V O₁ O₂]</p> <p>She gave him a book. Transfer She shot him a look. Transfer ?</p> <p>Directing an Action as Giving an Object She <u>gave</u> him a look. She <u>tossed</u> a look <u>at him</u>. He <u>got</u> a look <u>from her</u>.</p>			
45			

Meaning	Words (verb)	Grammatical constructions	Metaphors
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46			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>Recall, Double-object construction → Transfer S [V O₁ O₂]</p> <p>She gave him a book. Transfer She shot him a look. Transfer She told him a story. Transfer ?</p> <p>Conveying information as T transfer She <u>gave</u> him a lecture. She <u>shared her thoughts</u> with him. She talked <u>to</u> him. He learned of it <u>from her</u>.</p>			
47			



Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>Recall, Double-object construction → Transfer S [V O₁ O₂]</p> <p>She gave him a book. Transfer She shot him a look. Transfer She told him a story. Transfer</p> <p>Conveying information as T transfer She <u>gave</u> him a lecture. She talked <u>to</u> him. He learned of it <u>from her</u>. Did you <u>catch</u> the story?</p>			
48			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>There are many Taste metaphors in English</p> <ul style="list-style-type: none"> • He was <u>bitter</u> over the breakup. • She told a <u>salty</u> joke. • What a <u>delicious</u> thought. • Let's <u>spice</u> things up. • She <u>peppered</u> him with questions. 			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>And other languages:</p> <ul style="list-style-type: none"> • Sie bekam ein nettes Kompliment. • She received a sweet compliment. • Er war wütend auf sie. • He was sour at her. • "He was angry with her." • Sie bekamen eine hohe Rechnung. • They received a salty bill. • "They received a high bill." • Die Idee ist total doof • The idea is completely banana • "The idea is totally dumb" 			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>Metaphors are pervasive in everyday communication</p> <p>Metaphors help us represent abstract concepts in more concrete terms (Lakoff & Johnson, 1980)</p>			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>What does it mean to say that conceptual metaphors "underlie" or "motivate" metaphorical expressions?</p> <p>When using metaphorical expression, can we <i>see activation</i> of the source domain representations?</p>			

Meaning	Words (verb)	Grammatical constructions	Metaphors
<p>If we think of highly conventional metaphors such as</p> <p><i>She received a sweet compliment</i></p> <p>Do we really think about <i>sweet taste</i>?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Francesca Citron Lancaster University</p> </div> <div style="text-align: center;">  <p>dreamstime</p> </div> </div>			

Meaning	Words (verb)	Grammatical constructions	Metaphors										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Metaphors</th> <th style="width: 50%;">Literal counterparts</th> </tr> </thead> <tbody> <tr> <td> <i>Sie bekam ein <u>süßes</u> Kompliment</i> She received a <u>sweet</u> compliment </td> <td> <i>Sie bekam ein <u>nettes</u> Kompliment</i> She received a <u>nice</u> compliment </td> </tr> <tr> <td> <i>Sie <u>versauerte</u> auf der Wartbank</i> The long wait let her become <u>sour</u> </td> <td> <i>Sie <u>langweilte sich</u> auf der Wartbank</i> The long wait let her become <u>bored</u> </td> </tr> <tr> <td> <i>Der Abbruch war sehr <u>bitter</u> für ihn</i> The break up was very <u>bitter</u> for him </td> <td> <i>Der Abbruch war sehr <u>schlimm</u> für ihn</i> The break up was very <u>bad</u> for him </td> </tr> <tr> <td> <i>Er bekam eine <u>gesalzene</u> Rechnung</i> He received a <u>salty</u> bill </td> <td> <i>Er bekam eine <u>hohe</u> Rechnung</i> He received a <u>high</u> bill </td> </tr> </tbody> </table>				Metaphors	Literal counterparts	<i>Sie bekam ein <u>süßes</u> Kompliment</i> She received a <u>sweet</u> compliment	<i>Sie bekam ein <u>nettes</u> Kompliment</i> She received a <u>nice</u> compliment	<i>Sie <u>versauerte</u> auf der Wartbank</i> The long wait let her become <u>sour</u>	<i>Sie <u>langweilte sich</u> auf der Wartbank</i> The long wait let her become <u>bored</u>	<i>Der Abbruch war sehr <u>bitter</u> für ihn</i> The break up was very <u>bitter</u> for him	<i>Der Abbruch war sehr <u>schlimm</u> für ihn</i> The break up was very <u>bad</u> for him	<i>Er bekam eine <u>gesalzene</u> Rechnung</i> He received a <u>salty</u> bill	<i>Er bekam eine <u>hohe</u> Rechnung</i> He received a <u>high</u> bill
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