Usage-Based Lexical and Constructional Semantics

Operationalising emergent grammar through the analysis of behavioural profiles

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TransCrit
Transferts critiques anglophones

Aim:

Identify challenges for

Usage-Based Model of Language and Behavioural Profile Analysis

a. to the description of extra-linguistic concepts

(typical of Cognitive Linguistics, Cross-Cultural Pragmatics, Critical Discourse Analysis etc.)

b. bottom-up description of grammatical constructions

(potential way of improving the theoretical rigour and explanatory adequacy of Construction Grammar)

Outline:

1. Very *brief* summary of the Usage-Based Model and the Behavioural Profile Approach

2. Case Study: Challenges for describing extralinguistic concepts using lexical semantics

    The concept of ‘anger’ cross-culturally

3. Case Study: Challenges for identifying grammatical constructions as emergent phenomena

    Future alternations in English

1. Theoretical and Methodological Assumptions

1.1 Usage-Based Model – emergent patterns in use = structure in a speech community

(Langacker 1987, Hopper 1987, Tomasello 2003, Bybee 2006, Goldberg 2006, Schmid 2020, *inter alia*…)

Formalisations of model Langacker (1987) and Hopper (1987),

Idea Humboldt and his notions of Energeia and Ergon

you begin with activity (*energeia*) and end up with product (*ergon*)

- structure is a result of building
- grammar is a result of use

grammar is “emergent”, never fixed

It is like a garden path

A pattern, a set of re-occurring

form-meaning pairs

So, our object of study is non-discrete and constantly changing

And potentially differs from speaker to speaker

but also for a given speaker…

1.1 Usage-Based Model – but it gets worse…

Grammar results from usage and is determined by patterns (not discrete rules) that emerge from that usage.

Explanatorily powerful grammars must parsimoniously account for this structural complexity.

Grammaticality in Cognitive Functional Linguistics (most usage-based research is Cognitive or Functional)
(Lakoff 1987, Talmy 1987, 2000, Langacker 1987, Goldberg 1990, Schmid 1993, but also most functional grammar)

Grammaticality is determined by concepts (functions) that are categories determined by prototypes (not truth conditions) which are based on human experience and determined by general cognitive skills

Grammar is, therefore, inherently
non-observable, non-discrete, dynamic and varied

That is the challenge Cognitive and Functional Linguists face in accounting for language

Our object of study is non-observable and non-discrete and varied and dynamic

That’s quite a difficult thing to describe scientifically….

1.2 Behavioural Profile Approach

Non-observable patterns in usage as an index of grammar

I will assume the audience is familiar with this kind of research.

However, in case it is less common here than in Europe,
I wish go over some simple examples before we look at challenges that it faces

1.2. Behavioural Profile Approach – A qualitative-quantitative method

Cognitive Linguistic tradition (Dirven *et al*. 1982, Rudzka-Ostyn 1989, 1992, Geeraerts *et al*. 1994, Gries 1999)

Lexicographic tradition (Apresjan 1974, Apresjan *et al*. 1995, Atkins 1987, Atkins & Levin 1995).

In the 2000s

Lexical synonymy / constructions (Divjak 2004, 2006, Divjak & Gries 2006, Glynn 2008, Janda & Solovyev 2009 …)

Lexical polysemy / constructions (Gries 2006, Glynn 2007, 2009, 2010a, 2010b, Krawczak 2010…)

Constructional polysemy and alternations (Grondelaers 2000, Gries 2001, 2020, 2003, Heylen 2005, Hilpert 2009…)

It is basically the same thing as Content Analysis, Sentiment Analysis and Pattern Grammar

In contrast to Vector / Bag of words and N-Grams / Skip Grams b/c it focuses on meaning not form

1.2 Behavioural Profile Approach – A qualitative-quantitative method

Gries & Divjak (2009:61) coined the term the **Behavioural Profile Approach** and formalised the procedure into distinct steps

1. Sample - Corpus: Data collection and tokenisation

Retrieval of a representative sample of phenomenon in question from a corpus

Being careful to control random variables that might affect their "behaviour" such as register, style, dialect, genre

2. Analysis - Behaviour: Manual analysis and annotation

Manual analysis of usage-features (characteristics of use) of the instances in the sample

Typically, the lexeme or construction is masked from the annotator, multiple annotators are used, and the semantic features are operationalised in various ways from substitution tests to Likert scales.

3. Results - Profile: Quantitative modelling of metadata

Calculation of the co-occurrences of the different usage-features and the evaluation of the patterns of co-occurrences using statistical analysis. Cluster analysis and Correspondence analysis are 2 popular exploratory techniques in the field, predictive analysis is usually some form of regression (usually logistic) or classification (usually CART)

1.2 Behavioural Profile Approach

A mundane lexical example of *jinzhang* its synonyms and the French equivalences

Near synonyms for *jinzhang* ‘nervous’ 紧张 in Mandarin and French (from a recent Master thesis by Jing Bai):

jinzhang 紧张 ‘nervous’; *huangzhang* 慌张 ‘flustered’; *buan* 不安 ‘uneasy’; *tante* 忐忑, *jiaolu* 焦虑 ‘anxious’

nervosité; *nerveux*, *angoisse*; *anxiété*; *trac*; *stress* (vt); *stress* (sub.); *Inquiet*

Annotated for

1. degree of intensity estimated on a 9-point Likert scale, then reduced to 3 levels,

2. duration of the experience estimated again on a 9-point Likert scale, then reduced to 3 levels

3. prosody of causal event, positive, negative or neutral

4. anticipation of the event – foreseen or unexpected

With these factors, we obtain distinct patterns of use,

which can be interpreted as indicative of differences and similarity in meaning

1.2 Behavioural Profile Approach – A mundane lexical example of *jinzhang* and its synonyms

A simple MCA will plot these usage “equivalences”

1.2 Behavioural Profile Approach – A mundane example with rob-steal constructions in English

I expect the audience is familiar with Bresnan's Dative Alternation – such studies are the bread and butter of this research tradition

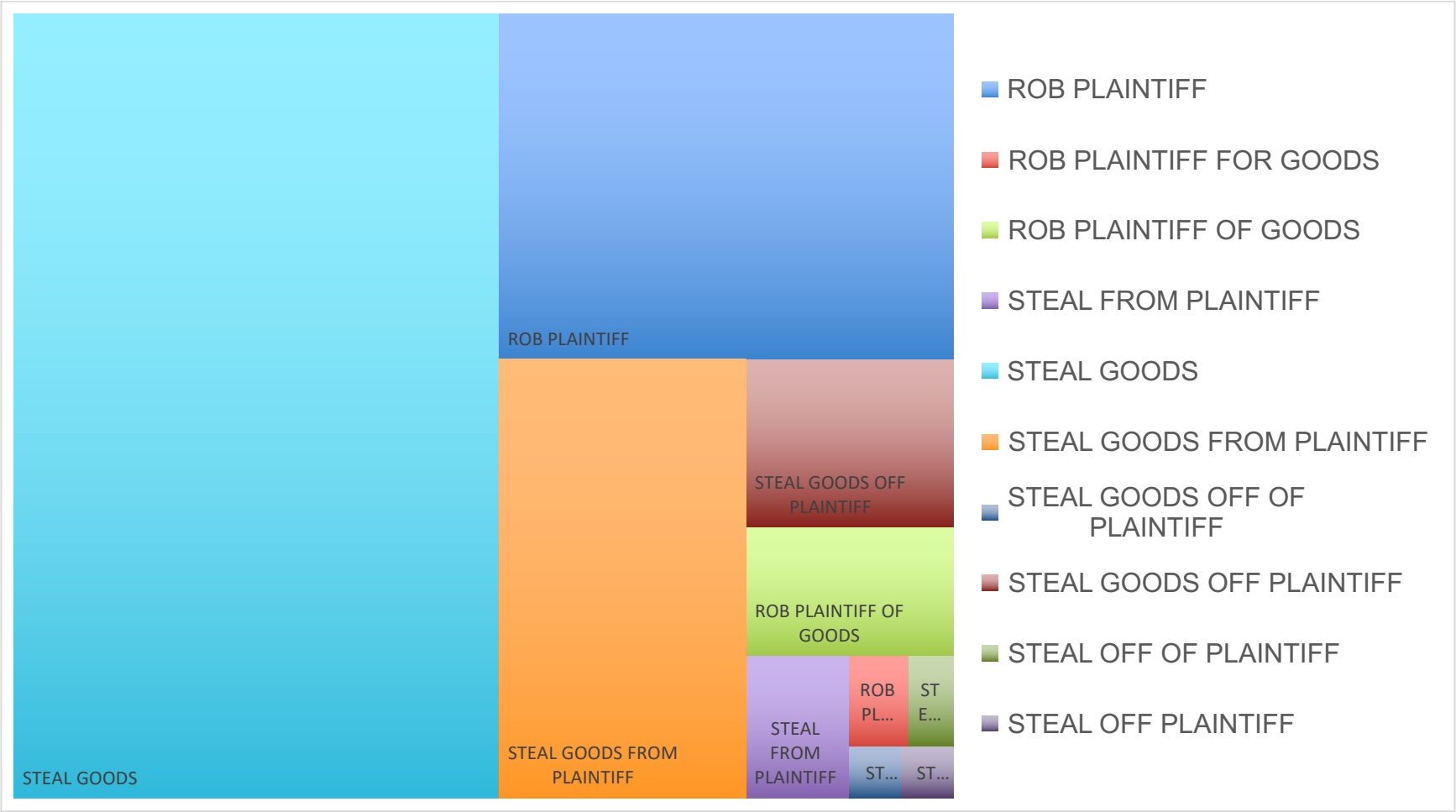
Using regression analysis, we can model speaker choice between
Agent + STEAL + Goods (*from* Plaintiff)
Agent + ROB + Plaintiff (*of* Goods)

This is a trivial difference to model with effectively perfect accuracy based on salience of the Patient
but we can also look at constructional variation

1.2 Behavioural Profile Approach – A mundane example with rob-steal constructions in English

Although there are 2 argument structure constructions for stealing in English,

there are 10 of Argument Structures + Complement Valency Patterns combinations



1.2 Behavioural Profile Approach – A mundane example with rob-steal constructions in English

If we annotate instances the following features, we can cluster the predicate – construction combinations

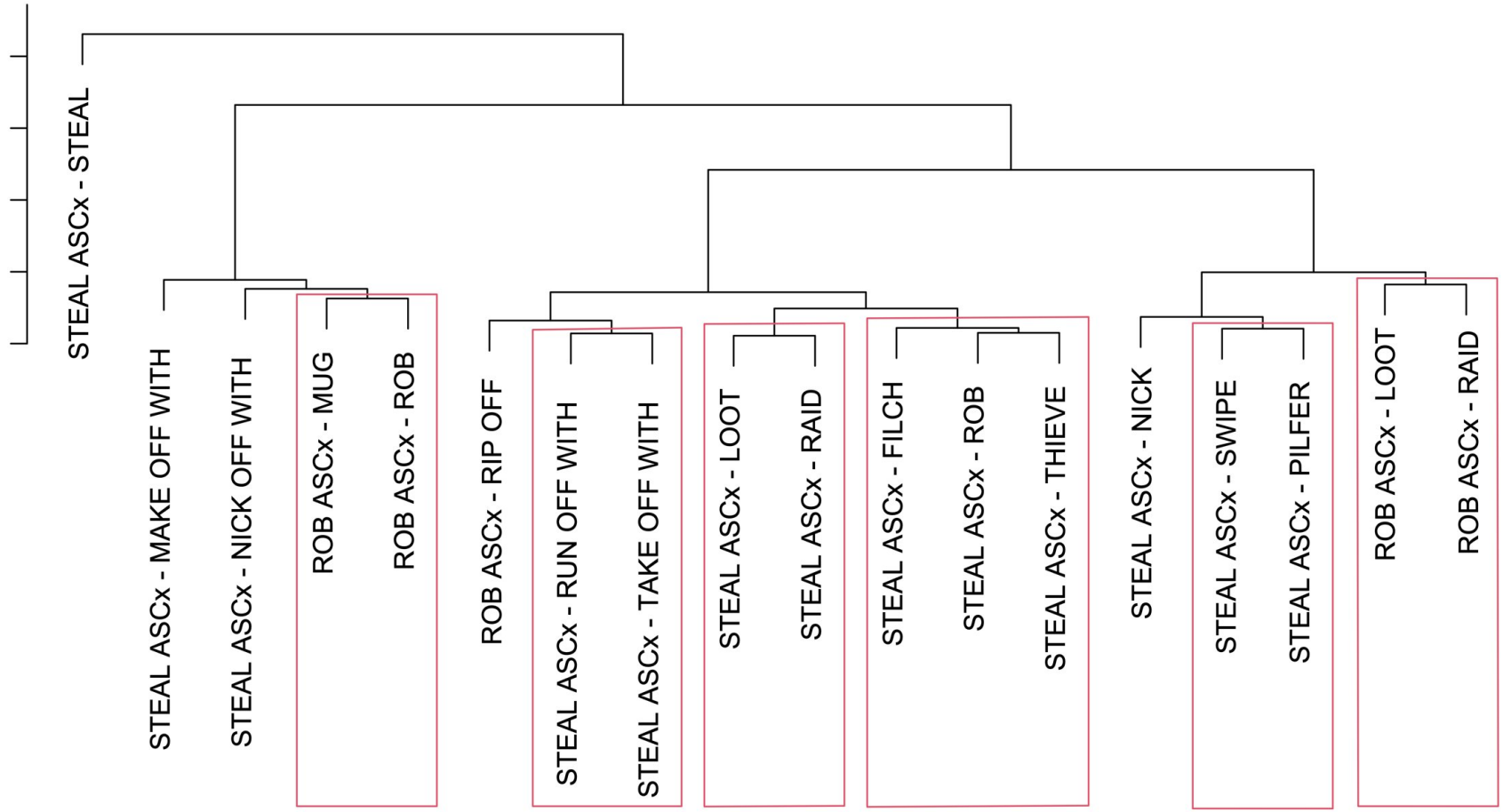
Goods Schematicity: Abstract; Concrete

Goods Value: Scale of 3

Agent Intention: Scale of 3

Event "Criminality": Scale of 3

Plaintiff Grievance: Scale of 3



2. Case Study – Application of behavioural analysis to socio-cultural phenomena

Socio-cultural phenomena / extralinguistic concepts:

Cognitive Models (Lakoff 1987, 1993)

Critical Discourses (Fairclough 1989, Wodak 1996)

Cultural Concepts (Wierzbicka 1985, 1997)

Conceptual Metaphors (Kövecses 1986, 2000)

2.1 Established problems for conceptual analysis with BPA

Tokensiation and Representativity

2.2 Behavioural Profiles applied to Social Psychology

ANGER in American English, British English, Czech and Slovak

2.3 Behavioural Profiles applied to Conceptual Metaphors

ANGER in American English, British English and Russian

2.1 Established challenges for applying behavioural analysis to extra-linguistic concepts

2.1.1 Tokenisation / itemisation

You can't automatically search a corpus for a concept!

Analytical Solution 1 - Keyword based tokenisation - Concept operationalised with a set of lexemes

Stefanowitsch (2004, 2006), Glynn (2012, 2014, 2016)

Analytical Solution 2 - Continuous text-based tokenisation (MIP / MIPVU)

Pragglejaz (2007), Steen *et al.* (2010), Marhula & Rosinski (2014)

2.1 Established challenges for applying behavioural analysis to extra-linguistic concepts

2.1.2 Representativity of results relative to traditional corpus methods

Weaknesses: Small sample size = low representativity

Subjective analysis = high possibility of bias

Strengths: Subjective analysis = low noise / high accuracy

Subjective analysis = fine-grained analysis / semantic detail

Quantitative interpretation = low possibility of bias

2.2 Cognitive Model of ANGER in English, Czech and Slovak

conducted with Juliana Zmetáková

Palacký University, Olomouc (Czechia EU)

Aim

Corroborate results in social psychology (GRID project)

2.2 Data

Comparable corpora are essential in cross-linguistics analysis

Personal diaries (blogs):

If one of the aims is to compare the results with psychological research

Personal diaries are good for this because:

(i) Emotions are discussed at a personal, experiential level

(ii) Language is informal and narrative, maximising the probability of descriptive usage

Study based on 800 examples of frequency-determined keywords

(4 most frequent per language)

British – 80 examples of each *angry*, *annoyed*, *pissed off*

American – 80 examples each of *angry*, *annoyed*, *mad*

Czech – 30 examples each of *zlobit se*, *štvát*, *naštvaný*, *nasraný*

Slovak – 30 examples each of *hnevat' sa*, *štvat'*, *nahnevaný*, *naštvat'*

2.2 Analysis - Anger Semantic Frame

(Developed with C. Soriano – GRID project)

Cause

Emoter

Receiver

I'm angry with Sam because Jamie broke the CD!

Receiver and Responsible are often same participant

Typically either Cause **OR** Responsible/Receiver are lexico-grammatically foregrounded

Responsible

2.2 ANALYSIS - Usage / Semantic Profile Features

Inter-rater Agreement Scores (Cohen Kappa) > .80

Formal Features

Lexeme:	*angry*; *mad*; *annoyed*; *pissed off*; *zlobit se*; *štvát*; *naštvaný*; *nasraný etc*.
Class:	Predicative; Attributive, Verb
Construction:	Pred. Adj. *about* NP; Pred. Adj. *at*; Pred. Adj. *because* etc.
Person	1st person, 2nd person, 3rd person
Tense, Aspect… *etc*.	

Emoter Features

Gender:	Male, female, both, unknown
Engagement:	Engagement with Responsible
Aggression:	Degree that the emoter expresses aggression (5-degree Likert scale)
Control:	Does the emoter have ability to change the cause?
Behaviour:	Self Depreciation; Change Cause; Verbal Violence, Physical Violence; Complain; Social Expression of Anger, No expression…

2.2 ANALYSIS - Usage / Semantic Profile Features

Receiver Features

Gender:	Male, Female, Both, Unknown
Behaviour:	Withdrawal, Aggression *etc*…
Receiver Participant:	Receiver is Responsible or other

Cause Features

Norm Violation:	Does the Cause break social norms?
Injustice:	Does the Cause result in injustice to the emoter?
Predictability	Is the cause predictable to the emoter?
Cause Type:	Behaviour; Feelings; Event; Action; Work; Inanimate Object; Illness; Missing Something

Responsible Features

Responsible Type:	Lover; Family; Friend; Self; State of Affairs; Inanimate Object; Specified Known Person; Specified Unknown Person; Unspecified Person
Resp. Intention:	Whether the Cause was the intended by the Responsible
Resp. Participant:	Responsible is Cause or other.

2.2 Results

Traditionally, BPA has been used to look the near-synonymy relations between lexemes

Producing a map / network of how the different ways of expressing a concept are related and differ.

This map describes but can also predict speaker choices between lexemes and constructions in different usage contexts.

I will assume the audience is familiar with this kind of results, which although interesting are relatively trivial methodologically in 2024.

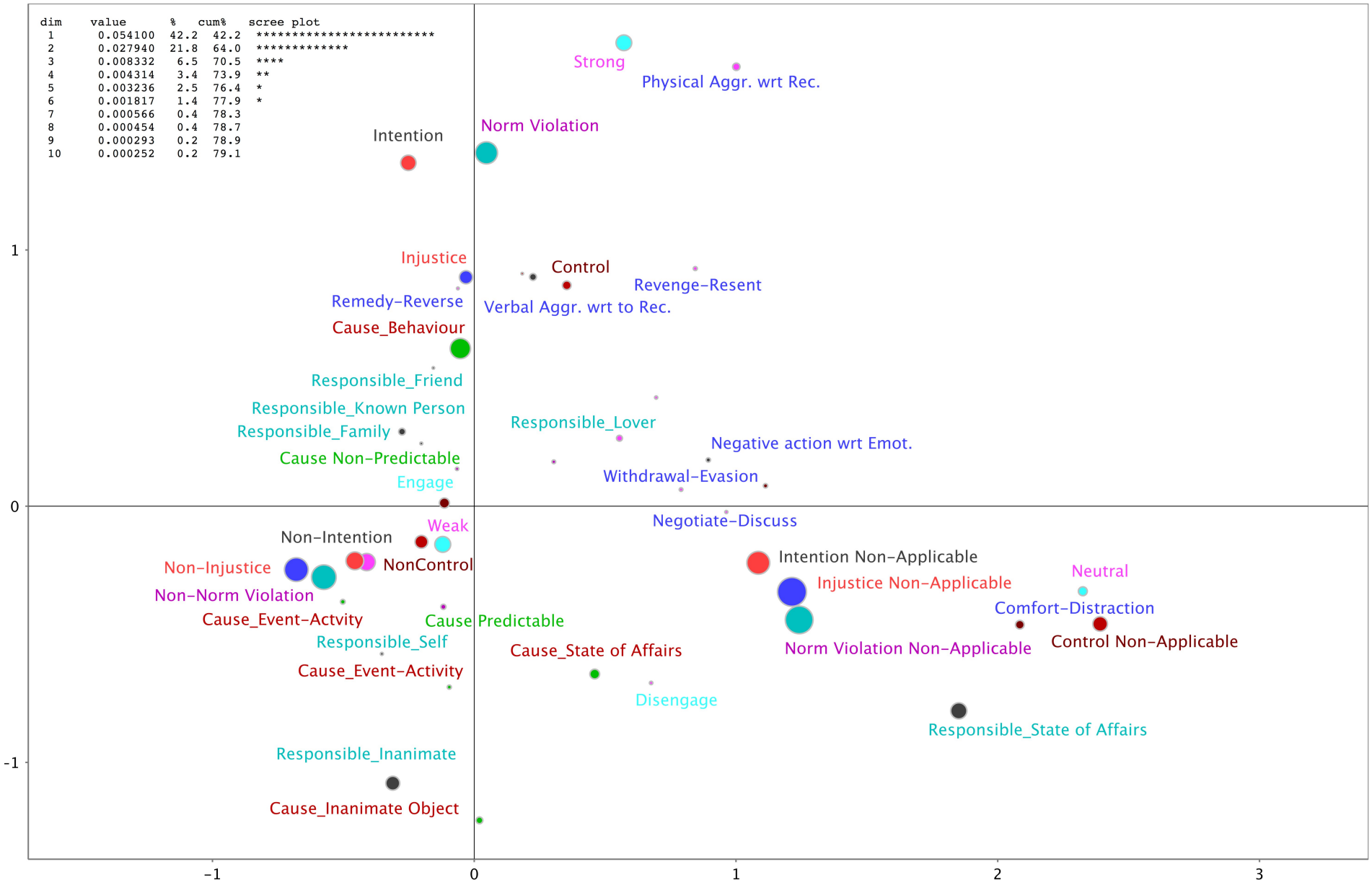
Instead

what happens if we remove the lexemes and map the usage events associated with the concept?

Without the structuring offered by discrete categories like lexemes

After all, we know concepts are not actually discrete and reified

2.2 Results - Multidimensional Associations between Actor Features without Lexemes or Language



2.2 Results. Emotion Universals and Underlying structure, Comparing Results with GRID

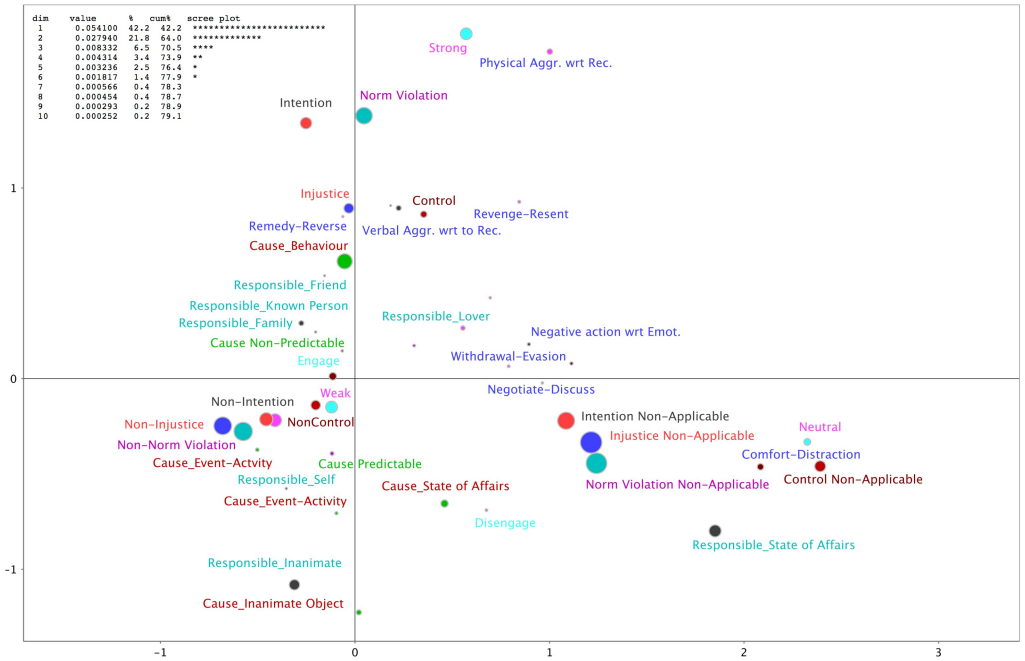
Without lexemes to structure the correlations,

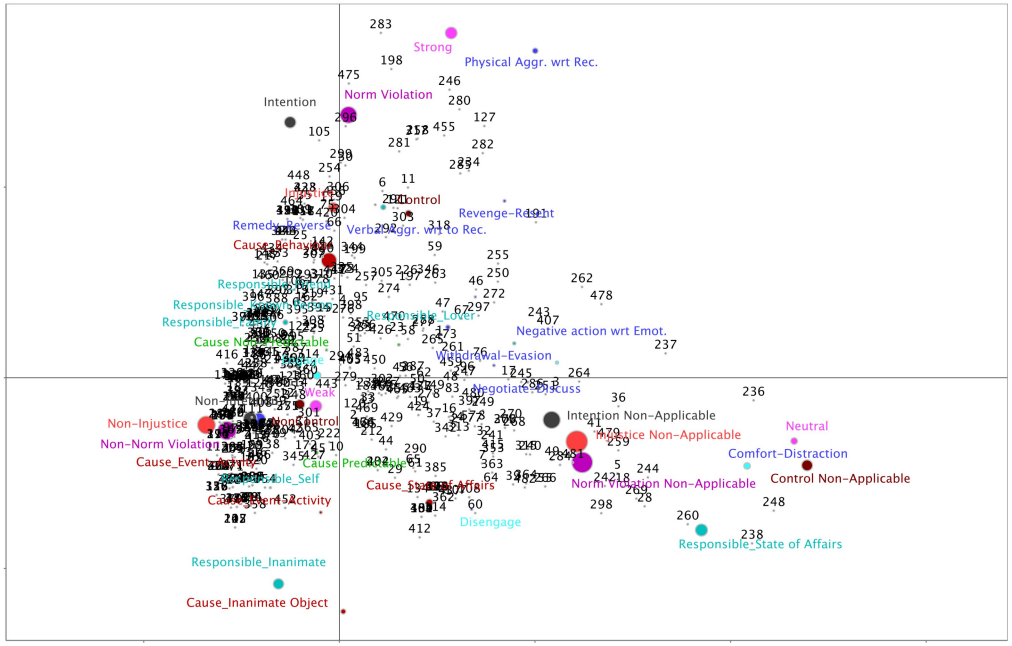
how do we identify the underlying structure of the associations?

We can apply cluster analysis to the examples

or

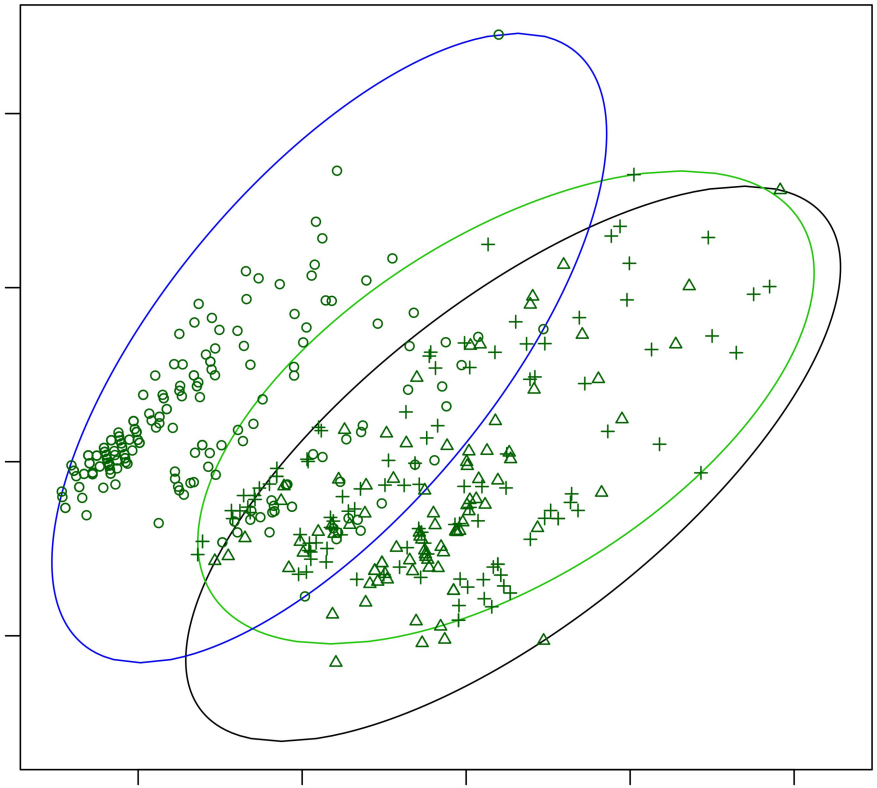
We can run cluster analysis on the output of the correspondence analysis



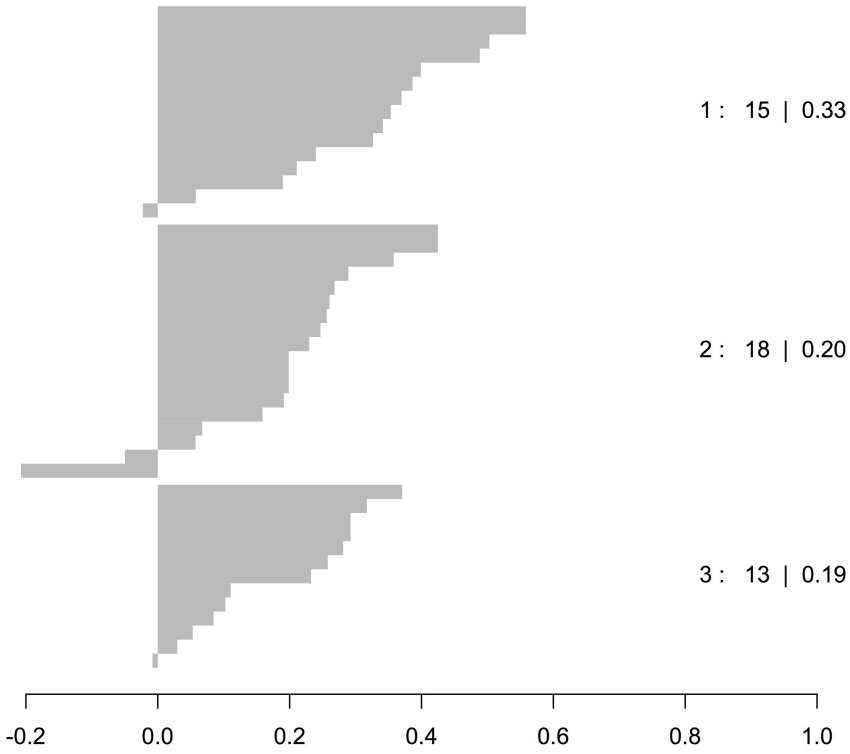


2.2 Results. Emotion Universals: Underlying structure and Comparing Results with GRID

k= 3, k-medoid cluster, distance matrix Manhattan, 500 iterations



Cluster plot (inertia 2%)



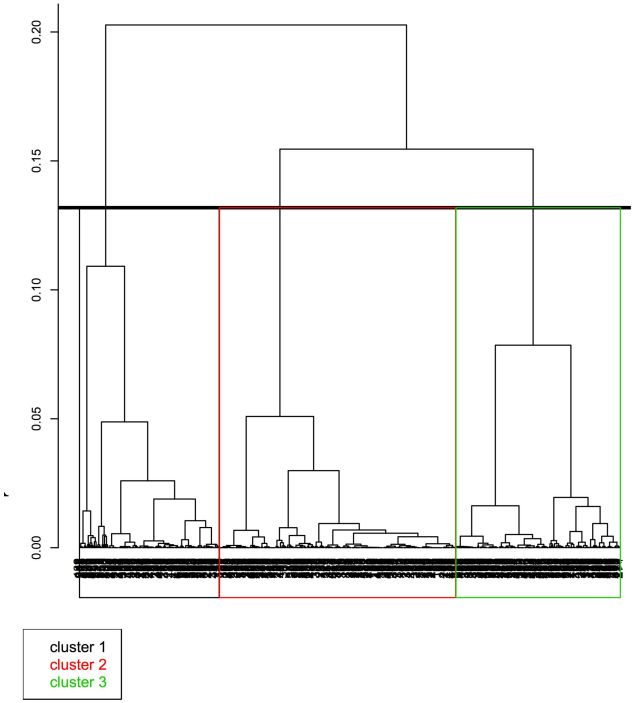
Silhouette plot (average silhouette width 0.24)

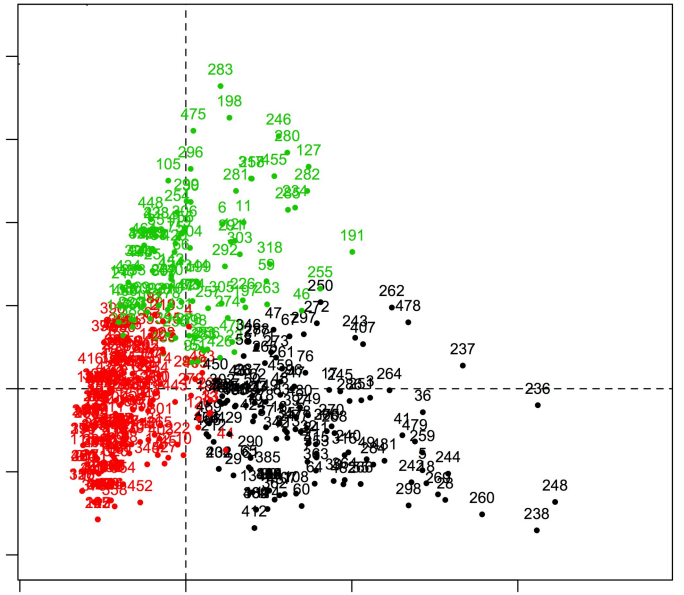
HCA - An obvious choice, but one that does not work...

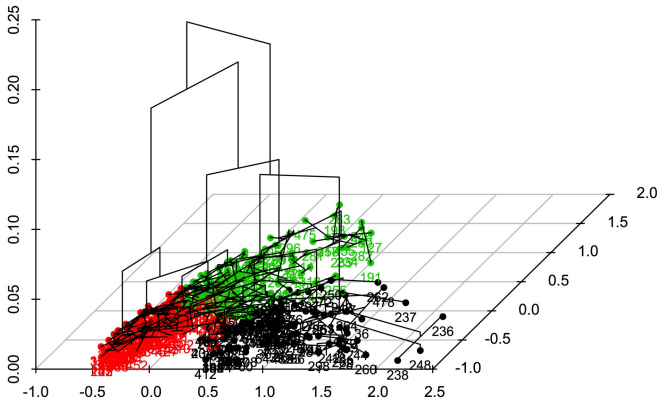
2.2 Results. Emotion Universals: Underlying structure and Comparing Results with GRID

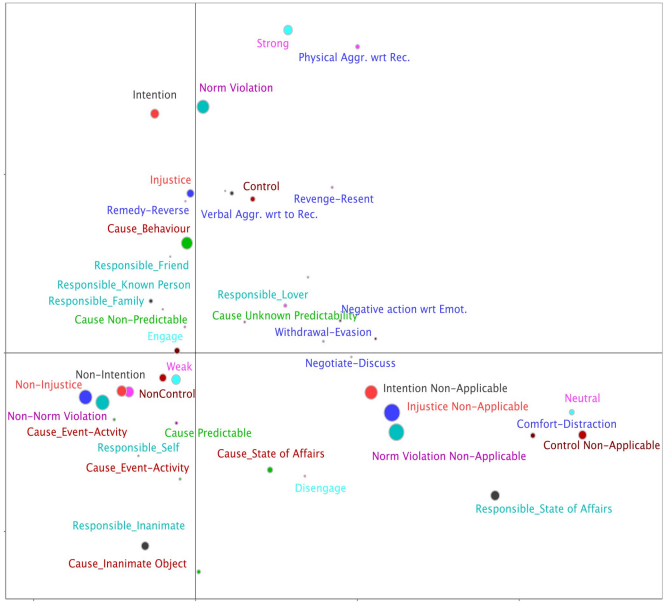
3-way structuring of results
is clear

Step 1. HCA of MCA
Step 2. Factor Analysis of MCA
Step 3. Compare
with original MCA









2.2 Results. Contrasting Cultures

Having shown, how we can now produce results directly compatible with research in psychology, which seeks to look for cross-cultural generalisations.

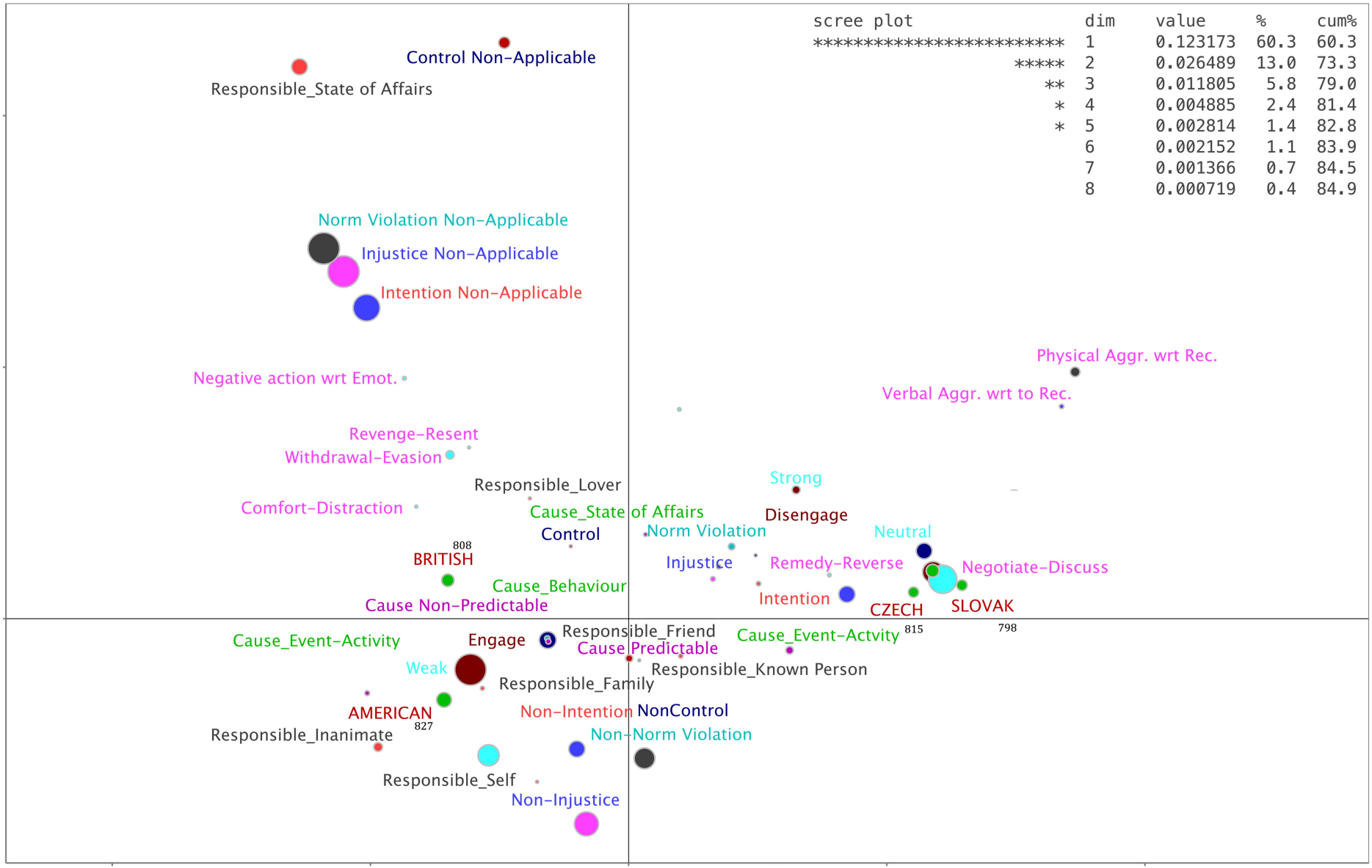
Can we use this same approach to contrast cultures, to see how different cultures conceptualise / understand abstract concepts, ICMs like anger.

Can we produce empirical, repeatable and even predictive descriptions that are comparable to the traditional keyword and metaphor research of Wierzbicka (1985,1997), Kövecses (1995, 2000, 2005), or even applied research like Littlemore (2003)

Remember, a lexical / constructional based contrast is methodological trivial and has been achieved many times

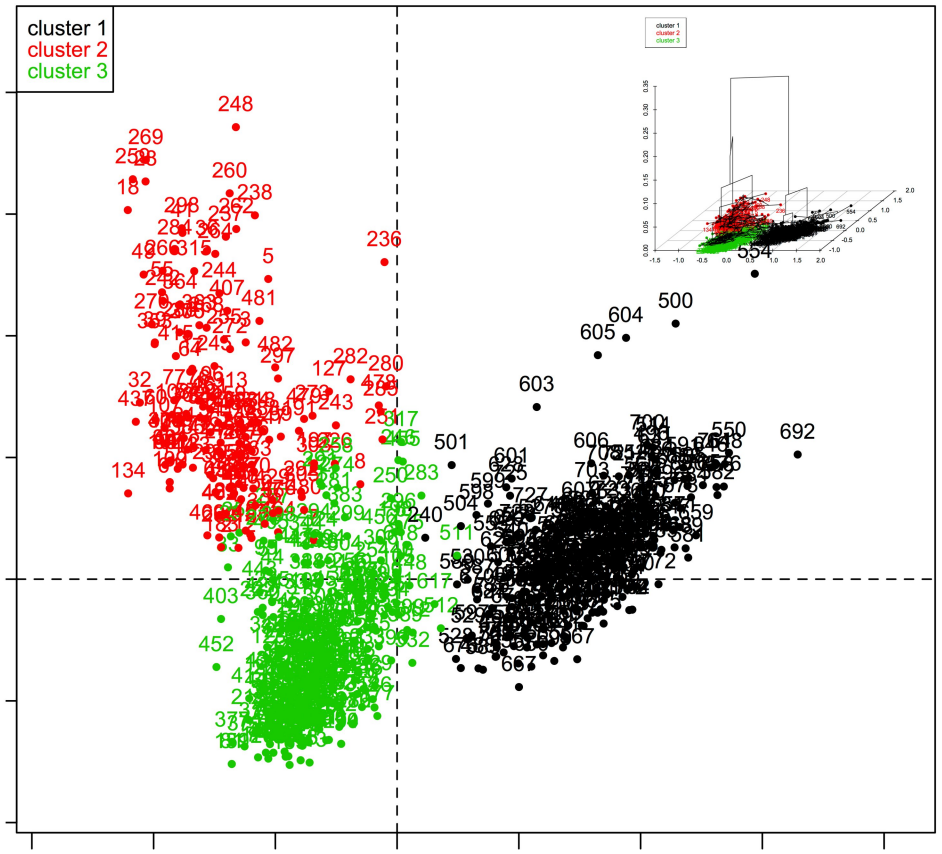
Can we contrast the concept itself (ICM), identify the conceptual structure of a culture (as it is expressed in language) and compare it across languages?

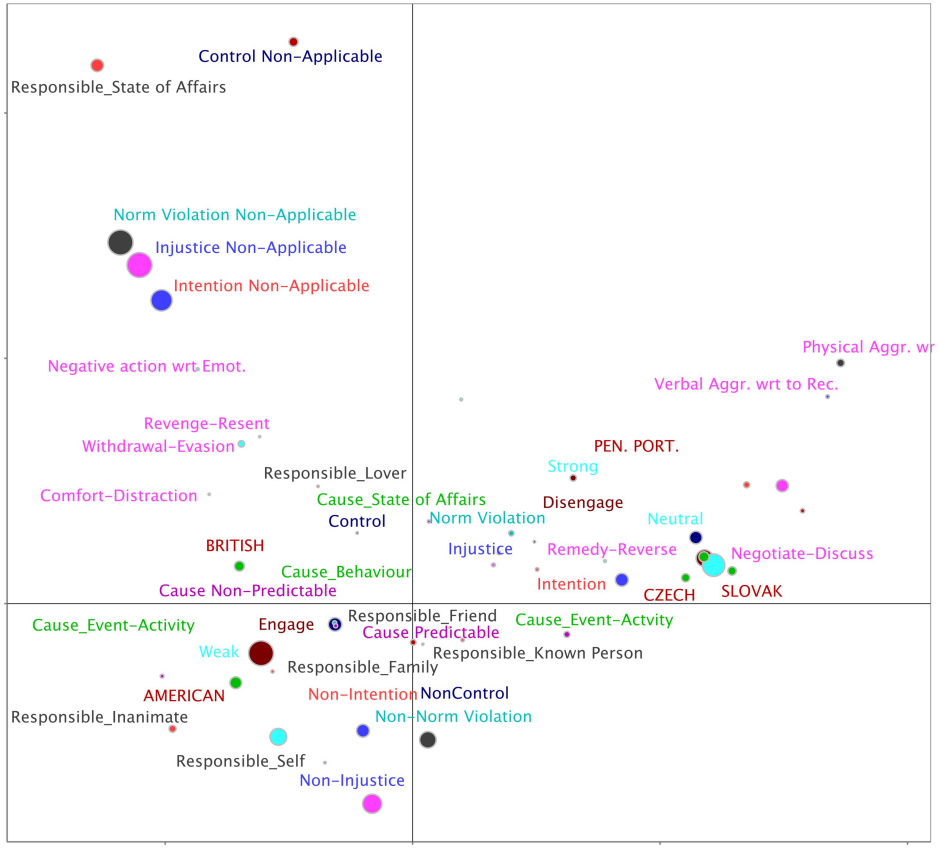
2.2 Results. Contrasting Cultures: Multidimensional Associations between Actor Features + Language



2.2 Results. Contrasting Cultures: Multidimensional Associations between Actor Features + Language

Hierarchical Clustering of MCA: A clear picture, with three distinct clusters – American, British, and Czech-Slovak





2.2 Results. Contrasting Cultures: Predictive Modelling of Language ~ Factors + Features

Fixed-Effects Multinomial Logistic Regression

Language - Feature Correlations	**Effect Size**	**Sig.**
AMERICAN: Responsible - Family	-0.10897	*
AMERICAN: Responsible - Friend	-0.19272	*
AMERICAN: Responsible - Non-Intention	+0.80529	*
AMERICAN: Emoter - Non-Injustice	+0.15148	*
AMERICAN: Emoter - Injustice Non-Applicable	+0.91958	*
AMERICAN: Emoter - NonControl	-0.62028	*
BRITISH: Emoter - Control - NonControl	+0.062028	*
BRITISH: Emoter - Injustice Non-Applicable	-0.091958	*
BRITISH: Emoter - Non-Injustice	-0.015148	***
BRITISH: Responsible - Non-Intention	-0.080529	*
BRITISH: Responsible - Friend	+0.019272	*
BRITISH: Responsible - Self	+0.010897	*
CZECH: Emoter - Non-Injustice	+0.178550	**
CZECH: Responsible - Non-Intention	+0.012627	**
CZECH: Cause - Norm Violation	+0.232850	***
SLOVAK: Emoter - Non-Injustice	-0.278341	**
SLOVAK: Responsible - Intention	-0.226450	**

Predicting AMERICAN
Sommers Dxy: 0.743580
C: 0.8717904

Predicting BRITISH
Sommers Dxy: 0.3365414
C: 0.6682707

Predicting CZECH
Sommers Dxy: 0.5833913
C: 0.7916956

Predicting SLOVAK
Sommers Dxy: 0.3402959
C: 0.6701479

McFadden Pseudo R2: 0.54127
Likelihood ratio test: chisq = 911.34 (p.value = < 2.22e-16)

2.3 Behavioural Profiles of ANGER Metaphors in English and Russian

conducted with Irina Matusevich

Masaryk University, Brno (Czechia EU)

Aim

Produce empirical (repetable and predictive) descriptions of what conceptual metaphors exist in a language and how they differ in use between languages and cultures

2.3 Data and Tokenisation - Identifying Metaphors

Corpus: LiveJournal Corpus (Speelman & Glynn 2006, 2012)

Highly Comparable Corpus

Keyword Operationalisation of target concept

The 3 most frequent lexemes demoting anger in UK English, US English and Russian

Percentage of tokens that are were associated with metaphoric uses

UK English

angry = 2%

pissed off = 0%

anger = 52%

US English

angry = 1%

mad = 1%

anger = 44%

Russian

гнев (gnev) ‘anger’ = 55%

бесит (besit) ‘piss off’ = 14%

злой (zloy) ‘angry’ = 16%

2.3 Analysis. Behavioural Profiles of ANGER Metaphors

Multifactorial feature analysis on 164 Russian, 123 American, and 70 British examples

Factor 1: Source Concept

Step 1. The collocate indicating the metaphoric use was identified

Step 2. Categories of semantically similar collocates established, based on previous research / semantic similarity

Step 3. Collocates given labels

e.g., FLUID, FIRE, OPPONENT etc. etc.

190/193 in English and 164/164 Russian examples were categorised metaphorically

for 13 conceptual metaphors 354/357 examples

Factor 2: Emotion Intensity (Arousal)

Step 1. Subjective analysis of the degree of intensity of emotion on 9-point Likert scale

Step 2. Secondary subjective analysis of intensity of emotion on 9-point Likert scale

Step 3. Reduction of granularity of scale from 9-point to 5 or 3, determined by Kappa

2.3 Analysis. Behavioural Profiles of ANGER Metaphors

Factor 3: Responsible

Known Specific Person (family and friends), Unknown Specific Person (people in daily life)

Unknown Unspecified Persons (people out there with no name or face), Self-Speaker

Factor 4: Cause

State-of-Affairs, Relationship-Love, Injustice, Violence, Jealousy, Fear, Guilt, Sadness-Disappointment, Other

2.3 Results. Descriptive Power, Attesting Metaphors Proposed by Introspective Research

Kövecses (1986, 2000), Lakoff (1987), Geeraerts & Grondelaers (1995), Esenova (2011)

Qualitatively, we were surprised at the richness of the metaphoric language!

ANGER is FLUID/LIQUID
ANGER is CONTAINER
ANGER is HEAT/FIRE
} ANGER is HEATED FLUID IN A CONTAINER (ENG: 115 /193, RUS: 60 /164)

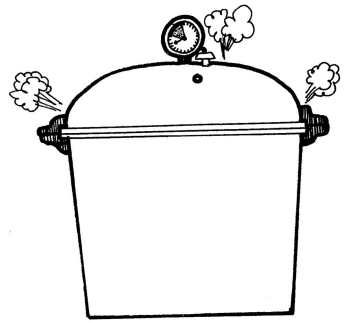
ANGER is an OPPONENT ENG: 15/193, RUS: 5/164

ex.: she did not give in to her anger / **как бороться с гневом** (how to fight anger)

but relatively few

ANGER is INSANITY ENG: 0/193; RUS: 5/164

ex.: **приступ гнева** (fit of anger)



2.3 Results. Descriptive Adequacy of Metaphors Proposed by Introspective Research

ANGER is a PLANT ENG: 4/193, RUS: 1/164

ex.: anger sprouted and took over his words

ANGER is a HORSE ENG: 1/193, RUS: 2/164

ex.: **оседлать войну гнева** (to saddle the war of anger)

ANGER is a NATURAL FORCE ENG: 2/193, RUS: 9/164

ex.: **в порыве гнева** (in the gust of anger)

ANGER is a MACHINE ENG: 3/193, RUS: 3/164

ex.: **генерить гнев** (generate anger)

ANGER is a BURDEN ENG: 1/193, RUS: 5/164

ex.: **освободить от гнева** (free from anger), **жить под гневом** (live under anger)

ANGER is a DANGEROUS ANIMAL ENG: 1/193, RUS: 8/164

ex.: **исходить пеной от гнева** (frothing at the mouth with anger)

2.3 Results. Descriptive Adequacy of Metaphors Proposed by Introspective Research

Although sample, figurative examples suggesting previously unidentified Conceptual Mappings

? WEAPON ENG: 4/193; RUS: 3/164 (part of OPPONENT?)

ex.: misdirected anger, redirect anger, sharp edge of anger, blunt anger;

ex.: **убивают не гневом**, **но смехом** (they kill not with anger but with laughter),

? SUPERNATURAL FORCE ENG 4/193; RUS: 14/164

ex.: spirit of anger, turn anger into X;

ex.: **превращалась в гнев** (turned into anger), **нашлите гнев** (cast the anger),

? PLACE ENG: 21/193; RUS: 2/164 (part of CONTAINER + *ad hoc* metaphors?)

ex.: uncharted anger, leads to anger, in place of anger, turn toward anger;

ex.: **на другом конце гнева** (at the other end of anger),

? PERSONIFICATION ENG: 8/193; RUS: 19/164

ex.: anger management, ask the anger to go;

ex.: **управление гневом** (anger management), **справляться с гневом** (manage the anger),

? MANIPULABLE OBJECT ENG: 15/193; RUS 15/164

ex.: hold anger, take anger, put aside anger, exchange anger, let go of anger;

ex.: **использовать гнев** (use the anger), **получить гнев** (get anger)

2.3 Results

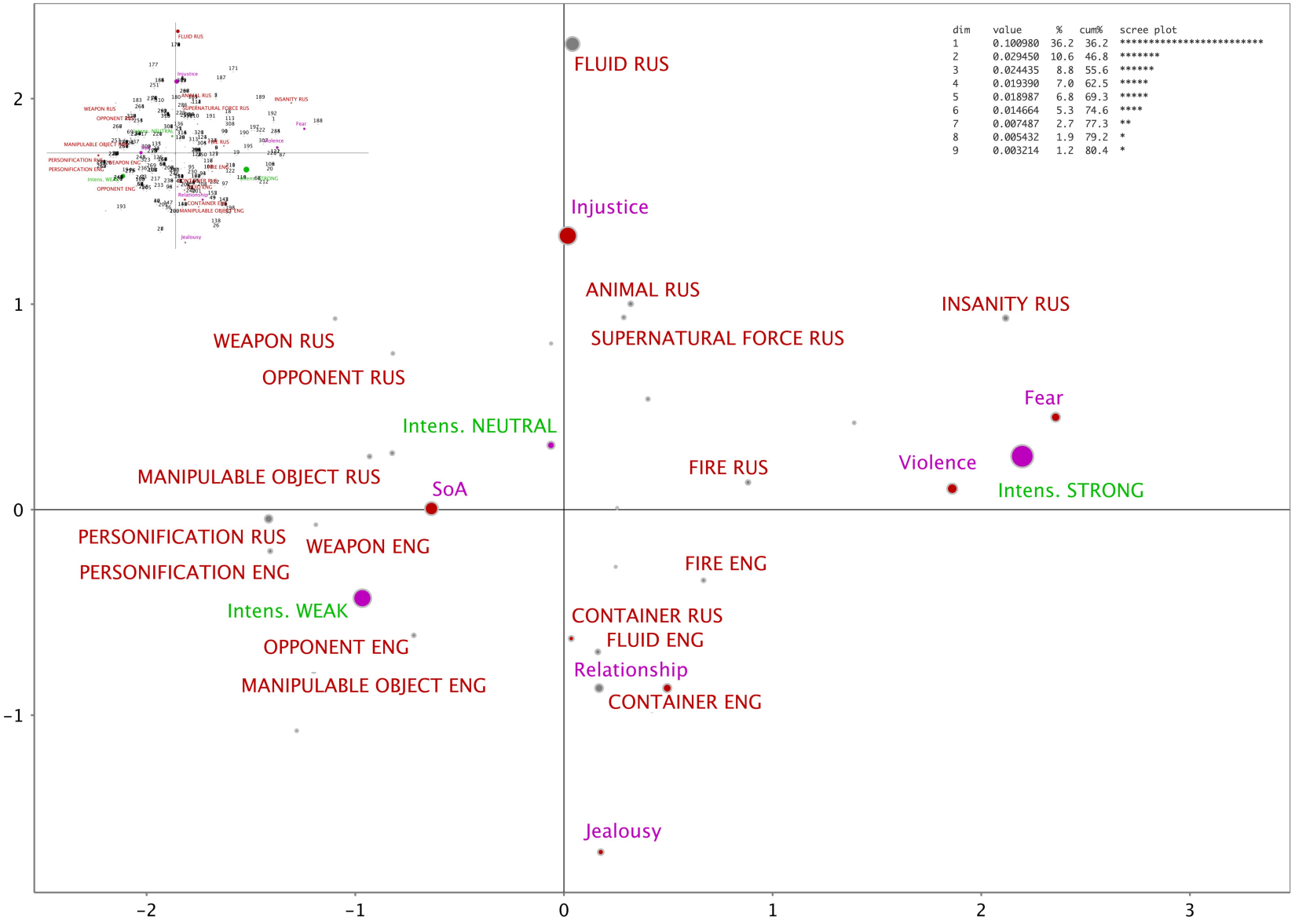
Can we now look at the profiles of how those metaphors are used in the two languages?

We can see that some metaphors are more common in Russian then in English and vice versa.

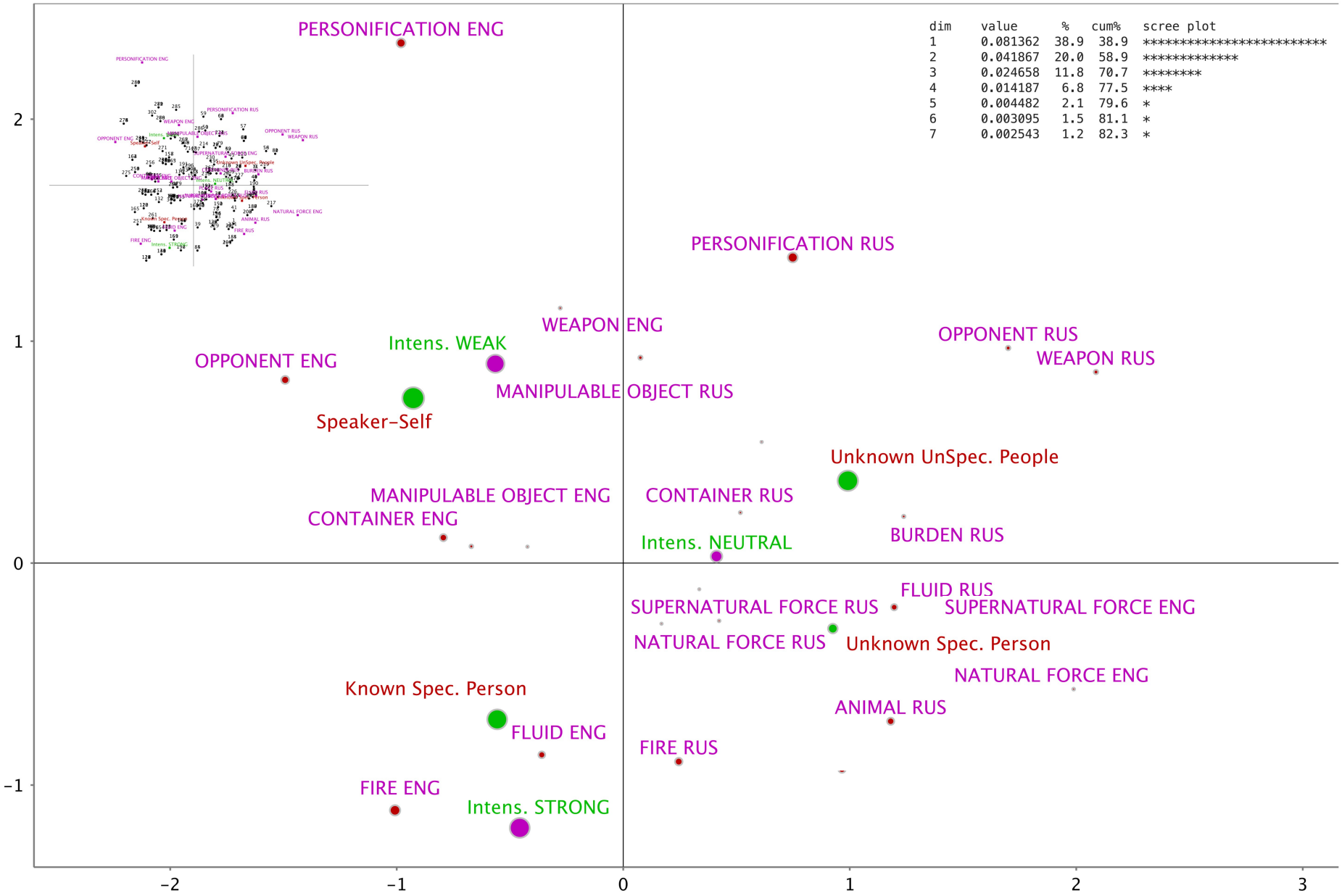
This is interesting and probably indicative of cultural and linguistic differences

But, can we also see if the metaphors are used in the same way?
Are there cultural differences in the use of the metaphors?

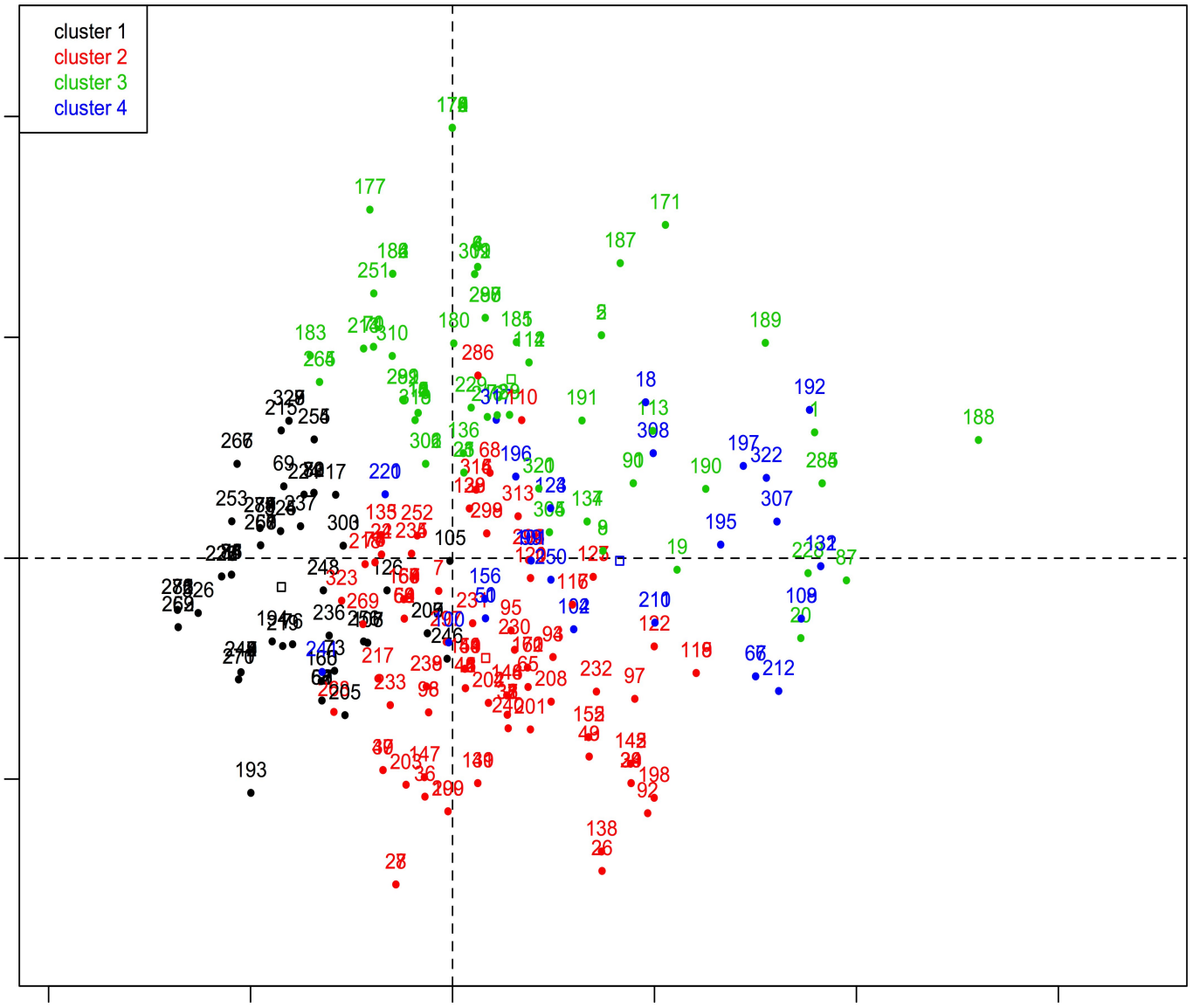
2.3 Results. Metaphoric Behavioural Profile: Metaphor-Language * Intensity * Cause

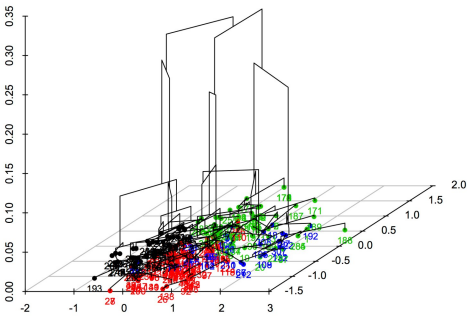


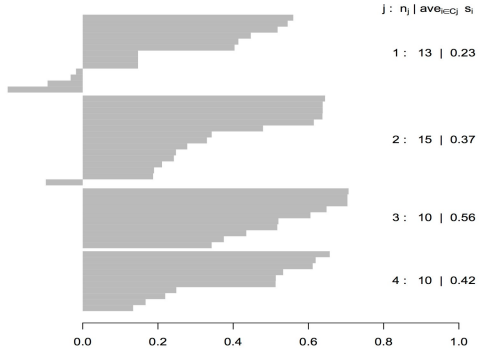
2.3 Results. Metaphoric Behavioural Profile: Metaphor-Language * Intensity * Responsible

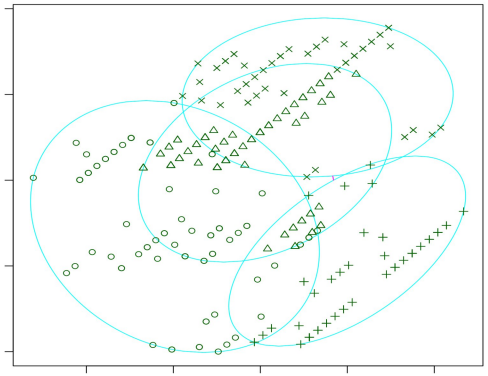


2.3 Results. Behavioural Structure Contrastively (Language * Intensity * Cause)









2.3 Results. Confirmatory Modelling of Cross-Linguistic Metaphoric Usage Profiles

But, importantly, when modelled predictively, although significant, there is not a big difference between how the cultures use the metaphors

Predicting Language with Profile features: Intensity, Cause and Responsible

Responsible:	Effect	P	Correlation
People General	0.36703	***	ENG
Person Unknown	1.61401	***	RUS
Cause * Responsible			
SoA * People General	1.21119	*	ENG

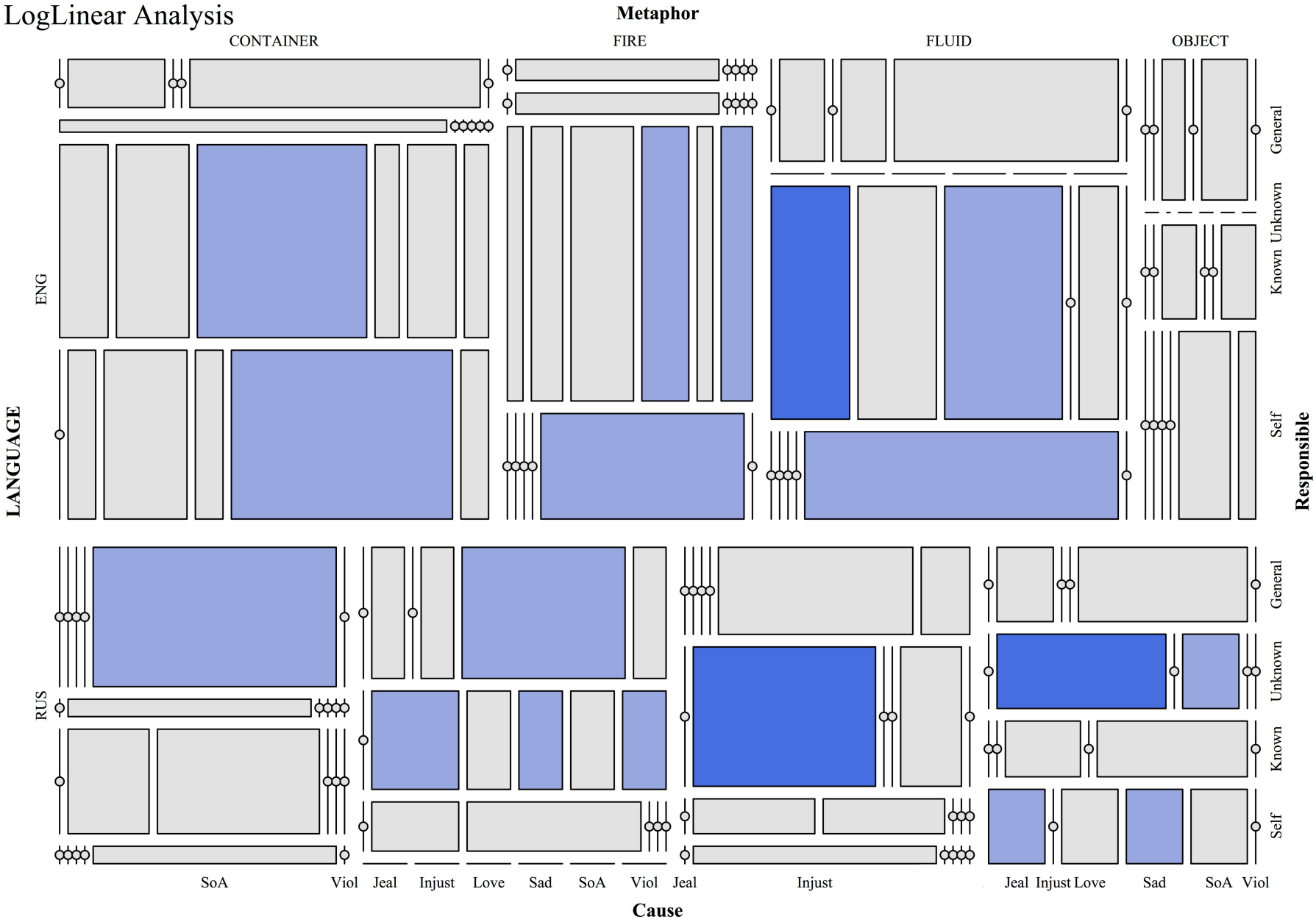
But there is a big difference between the languages in which metaphors they use

Predicting Language with only metaphor,

Language ~ Metaphor + (Cause | Responsible)

Metaphor:	Effect	Pr.	Correlation		
CONTAINER	2.56276	***	ENG	Max VIF:	4.280
FIRE	2.21196	**	ENG	Fit (Randomised MCMC n= 1000)	
OBJECT	3.16965	**	RUS	Nagelkerke R^2:	0.565
NATRUAL FORCE	4.14668	***	RUS	C:	0.893

2.3 Results. Modelling of Cross-Linguistic Metaphoric Usage Profiles



2. Problem

Since the object of study, an extra-linguistic concept, is poorly defined / lacks a rigorous definition,
It is difficult to apply confirmatory statistics to determine accuracy / descriptive value of results.

3. Grammatical Semantics - Application of behavioural analysis to Construction Grammar

3.1 Grammatical Constructions and Construction Grammar

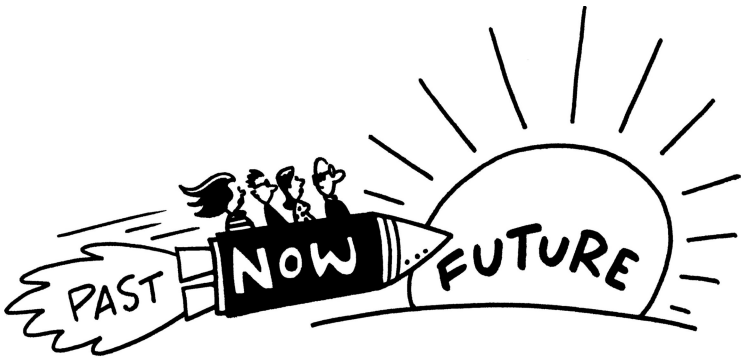
Some basics

3.2 Text book example of grammatical alternation

We know how to predict speaker choice

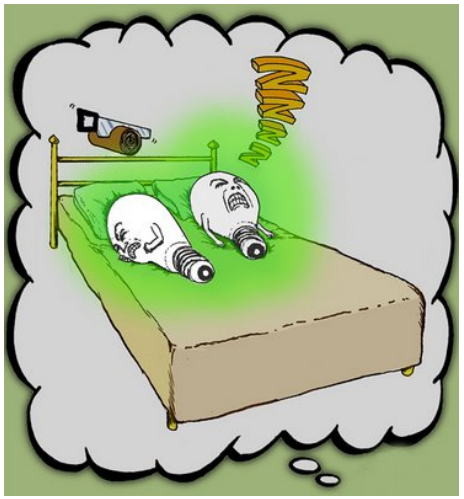
3.3 Parsimony vs. complexity: Fundamental problems for Construction Grammar

Or do we? what are speakers choosing between….



3.1 Grammatical Semantics – Construction Grammar and Constructional Alternations

Functional and Cognitive Linguistics holds that syntactic patterns are learnt form-meaning pairs
(just like lexemes and morphemes)



Therefore, the utterance

Green colourless ideas sleep furiously (Chomsky 1957)

is grammatically *acceptable* because its grammatical semantics are acceptable,
it is lexically *unacceptable* because its lexical semantics are not…

simple

Essentially, this approach to grammar means that speakers have a list of syntactic form-meaning pairs that they learn
and choose between them to communicate (just like lexemes and morphemes)

3.1. Grammar – Construction Grammar and Constructional Alternations

Construction Grammar (Fillmore 1968, Lakoff 1987, Fillmore *et al.* 1988, Goldberg 1995) is a family of approaches that seeks to develop a way of explaining grammar in these terms

"Usage-Based Syntax"

Double Object Construction

Agent	GIVE	Beneficiary	Theme
Joan	handed	Noam	a present

Prepositional Dative Construction

Agent	GIVE	Theme	*to* Beneficiary
Joan	handed	a present	to Noam

Going back to at the late 1990s (Gries 1999, Grondelaers 1999) and especially since the early 2000s (Grondelaers *et al.* 2002, Gries 2003, Bresnan et al. 2005, Stefanowitsch 2003, Szmrecsanyi 2003, Helyen 2005 *et alia*)

Quantitatively modelling the descriptive and predictive accuracy of descriptions grammatical choices using corpora has been a mainstay of usage-based cognitive and functional linguistics

3.2 Text book example of grammatical alternation – Future Constructions

Much of this work is part of a PhD project by **Olaf Mikkelsen**

His webpage and references are presented at the end

He is looking at constructions of future reference in English, Norwegian, French and Spanish

3.2 Modelling grammatical language choice

For this “text book example”, we will restrict ourselves to

Two future constructions in English

Cx 1: [*will* + VERB]

She will eat her supper

Cx 2: [BE *going to* VERB]

She is going to eat her supper

3.2 Patterns: Collocations, Colligations and Formal Profiles of Use

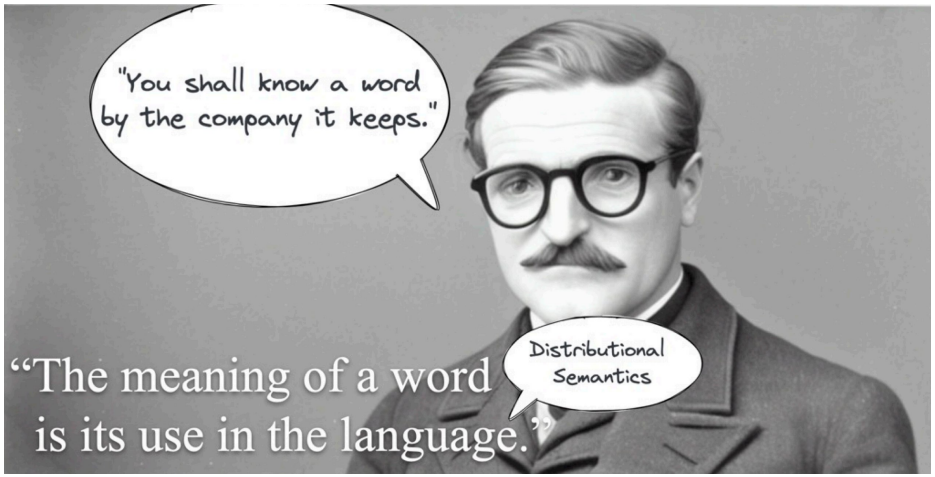
Firth (1957) “you shall know a word by the company it keeps”

This was and remains the underlying principle of mainstream corpus linguistics methodology

For a given linguistic phenomenon (for us that would be a grammatical construction),
look at what it combines with and what it does not combine with to get a profile of its use.

These profiles (or usage-patterns),
are an index of how the linguistic form is used, which,
for a Cognitive or Functional linguist,
is an index of what the form means
that is - its grammar

simple…



Firth meme by Harald Sack

3.2 Patterns: Collostructional Analysis [*will* VERB] vs. [BE *going to*]

Colligational analysis (frequency-based association between lexemes and morpho-syntactic patterns) dates to Firth (1957).

But the potential for looking at grammatical semantics (as opposed to lexical semantics) was developed in Cognitive Linguistics by Stefanowitsch & Gries (2003, 2005), Gries & Stefanowitsch (2004a, 2004b, cf. also Hilpert 2006, 2014, Wiechmann 2008, Gries 2019 *inter alia*).

Distinctive Co-Lexeme Analysis

Distinctiveness ranked by Pearson residuals

From Mikkelsen (forthcoming)

WILL	Distinctiveness	GOING TO	Distinctiveness
be	40.41	go	33.29
know	16.75	do	25.77
post	7.37	happen	19.02
understand	6.4	miss	10.61
remember	5.93	kill	9.42
add	5.56	get	8.36
remain	5.22	sleep	7.64
come	4.28	try	6.62
allow	3.95	start	6.57
admit	3.76	buy	5.41
return	3.59	rain	4.9
remind	3.28	waste	4.62
update	3.21	attempt	4.61
forget	2.92	lose	4.6
excuse	2.8	visit	4.5
receive	2.8	say	3.99
accept	2.78	fuck	3.92
continue	2.64	pretend	3.64
wait	2.56	die	3.61
respond	2.55	put	3.56

But….

despite being able to gather very large amounts of data

and being able to objectively and automatically extracting it

If you believe that grammar is functionally motivated,

this is a very noisy and indirect index of the meaning,

and therefore the “grammar’, motivating those choices.

3.2 Sample - Data extraction and Constructional Alternation

What constitutes an alternation is an important question but one we will not address today.

In these instances, the verb is the same and it is not obvious which is better nor what the difference in meaning would be.

(1) I'm going to / I'll learn brewing this year

(2) Today calls for a bubble bath and a glass of wine, otherwise I'm going to / I'll be a complete bitch tomorrow

(3) This is going to / This'll happen fast – if we're lucky, we've got a year or two to prepare for it

(4) Did realise I'm going to / I'll miss Hellboy 2, The Mummy 3, loads a book releases and general musical theatre news in the 6 months I am off

In each of these instances, both forms are possible and their difference in meaning is subtle
In the sample, all instances were checked for interchangeability

3.2 Annotation – Usage-Feature Analysis and Previous Hypotheses

Usage-Features – Observable and semi-observable colligational features

Variable	Features
Grammatical person	1st Person, 2nd Person, 3rd Person
Grammatical number	Singular, Plural
Grammatical polarity	Affirmative, Negative
Verb semantic class	action, change of possession, change of state, communication, existence, motion, obligation, perception, psych, social interaction

Usage-Features – Non-observable semantic features (based on previous introspection research)

Variable	Features
Temporal proximity to moment of utterance	5-point Likert scale
Link to moment of utterance	attached, detached
Contingency on situation of utterance	dependent, independent
Speaker certainty	3-point Likert scale (reduced from 5-point)
Speaker agency	intent, non-intent

3.2 Behavioural Profiles – Combinations of usage-features predicting choice

Data analysed by students from class exercises on corpora they compiled from copyright free British literature

Due to time limitations, we will not look at the tables of combinatorial possibilities in terms of raw frequency

Cx 1: [*will* + VERB] vs. Cx 2: [BE *going to* VERB] – Purely formal features

Predictor	Effect Size	*p*
Person: 2nd	0.2720	**
Person: 3rd	0.3755	***
Number: Singular	0.1393	.
Polarity: Negative	1.4319	***

C = 0.618 (bootstrapped C = 0.616, n = 1000), Observations = 12222

Red indicates feature is associated with [BE *going to*] and blue is associated with [*will* + VERB]

A “simple” frequentist fixed-effects multiple binary logistic regression analysis finds both grammatical person and grammatical polarity to significantly contribute towards predicting the choice between the two constructions. Grammatical number is borderline significant.

The model is significant, but not predictively powerful

3.2 Behavioural Profiles – Combinations of usage-features predicting choice

Again, using student data, but this time on a small sample manually annotated for semantic features

The variables of Speaker Certainty and Contingency on the situation of utterance are not significant.

Cx 1: [*will* + VERB] vs. Cx 2: [BE *going to* VERB] – Purely grammatical semantic features

Predictor		Effect Size	*p*
Temporal proximity:	Imminent	2.5039	***
Link to moment of utterance:	Detached	0.9858	**
Speaker agency:	Intent	1.0241	**

C = 0.826 (bootstrapped C = 0.813, n = 100), Observations = 200, highest VIF: 3.34

Cx 1: [*will* + VERB] vs. Cx 2: [BE *going to* VERB] – Grammatical and lexical semantic features

Predictor		Effect Size	*p*
Temporal proximity:	Imminent	2.5881	***
Link to moment of utterance:	Detached	0.8463	.
Speaker agency:	Intent	1.6796	**
Verb Class:	Existence	2.1910	***
Verb Class:	Obligation	2.3897	**

C = 0.891 (bootstrapped C = 0.872, n = 100), Observations = 200, highest VIF: 2.93

3. Behavioural Profiles – Usage-based functional grammar

So,

combinations of usage-features

can predict speaker choice between grammatical constructions

our grammars are descriptively and predictively adequate, to use Chomsky's terminology

But,

what about the grammar?

what is in the speaker's mind?

what does his or her competence consist of?

What about explanatory adequacy, to use Chomsky's terminology

The fundamental theoretical question that Construction Grammar faces is

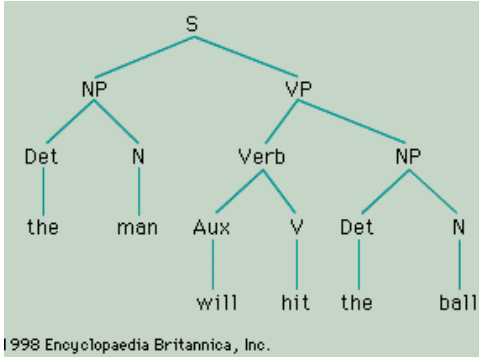
What is a construction? What is stored in a speaker's mind and used to produce (generate) language?

3.3 But what is a construction really? – Models for explaining grammatical competence

The data and results in this section are published in Glynn & Mikkelsen (2024)

Concretely, Construction Grammar needs to be able to answer the question

What is a construction – what is the knowledge stored in a speaker's mind



There are two sides to that question - the form and the function

This supposed that we have two constructions and based on their functional characteristics, we chose between them

Cx 1: [*will* + VERB] vs. Cx 2: [BE *going to* VERB]

But is that how it works? is it that simple?

3.3 Composite Forms and Complex Functions

For today's purposes, we can summarise four broad approaches to what constitutes a construction:

Function

What meaning should be included in the description of a construction

a. Lexico-Modular - Should lexical / argument structure meaning be included?
b. Socio-Modular - Should "social" / "pragmatic" meaning be included?

Form

What form should be included in the description of a construction

a. Networks - Should a construction be understood as a network of distinct, yet related "alloconstructions"
b. Clusters - Should a construction be an analytical construct clustering non-distinct chunks

3.3 Semantic Modules – Lexical Semantics and Sociolinguistic Dimensions

Relationship between lexical and grammatical semantics

We know that the lexemes significantly associated with constructions are strong predictors of the use of those constructions.

a. Should this lexical dimension be understood to be part of the meaning of a construction?

or

b. Should constructions be accounted for entirely independently from lexical semantics?

Relationship between sociolinguistics and semantics

Structuralist accounts of meaning seek to identify meaning independent of its use and instantiation.
Cognitive Linguistics and Systemic Linguistics reject entirely this idea.

The impact of stylistic, register, genre and or other context effects on choice is held to be part of the choice and therefore part of their “semantics”

We will simply control for this variable to today.

3.3 Formal Variation - A network of related constructions

In a speaker's grammar, what is the relationship between

I am going to eat soon	[SUBJ + BE-emphatic *going to*]
I'm going to eat soon	[SUBJ + BE-reduced *going to*]
I'm gonna eat soon	[SUBJ + BE-reduced *gonna*]
Gonna eat soon	[*gonna*]

Are these stored as four related constructions in a network or is there are a more schematic

[BE GOING TO] construction that as different phonological realisations?

This is similar to the question of the cognitive status of phonemes and allophones.

a. Bottom-Up: If it is a cluster of chunks, then this is a "rabbit hole" and at what level granularity are constructions actually stored in the mind.

b. Top-Down: If there is a single schematic construction with different phonological instantiations, how do we account for systematic differences in use between these forms.

3.3 Formal Variation - A cluster of constructional chunks

A more radical proposal is that a construction is actually a cluster of semantically similar and formally similar instances of language.

Instead of a form-meaning pair, a construction is an emergent phenomenon, made of many-to-many pairings of semantic features and formal features

(1) a. *I'll submit the paper by the 15th*

b. *I'm gonna submit the paper by the 15th*

(2) a. *The paper'll be submitted by the 15th*

b. *The paper's gonna be submitted by the 15th*

(3) a. *They'll get the paper by the 15th*

b. *They're gonna have the paper by the 15th*

Such an understanding would have features of the meaning Futurity and features of the forms for Future reference

Such an approach would have massive colligational complexity with chunks of not only lexical semantics but grammatical semantics potentially playing a role. So, for instance, the 1st person *will* could be a different construction to the 3rd person *will*

3.3. Modelling Future Constructions: Sample

400 occurrences, LiveJournal Corpus (Speelman & Glynn 2006)

Cx 1: [*will* + VERB] vs. Cx 2: [BE *going to* VERB]

Formal Variation controlled for

All reduced forms were excluded

All negation form were excluded

All interrogative forms were excluded

Lectal Variation controlled for

All examples for UK English

All examples from personal online diaries

All examples from between 2006 and 2012

3.3 Modelling Future Constructions: Annotation

During annotation, the construction was hidden from the annotator

Variable	Features
Grammatical person	1st Person, 2nd Person, 3rd Person
Grammatical number	Singular, Plural
Grammatical polarity	Affirmative, Negative
Verb semantic class	action, change of possession, change of state, communication, existence, motion, obligation, perception, psych, social interaction
Temporal proximity to moment of utterance	5-point Likert scale
Link to moment of utterance	attached, detached
Contingency on situation of utterance	dependent, independent
Speaker certainty	3-point Likert scale (reduced from 5-point)
Speaker agency	intent, non-intent

3.3 Results for Modular Model: Grammatical Semantics of High-level Construction

Construction ~ Temporal proximity + Link to t_0 + Intention + Certainty + Contingency | Grammatical person | Verb class

Predictors	Effect size (all nominal)	Effect size (nominal and ordered)
Temporal proximity: 5 levels (ordered)	–	0.8993**
Temporal proximity: distal (nominal)	1.0843*	–
Intention: subject	1.6161**	1.5146*
Contingency: independent	−0.7085	ns
Speaker certainty: moderate certainty	1.1775**	–
Link to t_0: detached	1.0993***	1.3264***
Concordance statistic	0.7603	0.7395

***p < 0.001. **p < 0.01. *p < 0.05. A full stop indicates p < 0.1.

3.3 Results for Network Model: A family of formally related constructions

Construction * Person ~ Temporal proximity + Link to t_0 + Intention | Verb class)

W-1st baseline	Effect size (nominal)	Effect size (nominal and ordered)	W-3rd baseline	Effect size (nominal)	Effect size (nominal and ordered)
GT-1st + temporal proximity: 4 levels ordered	–	−0.9583	GT-1st + temporal proximity: 4 levels ordered	–	−1.6105**
GT-1st + temporal proximity: neutral	−1.515	–	GT-1st + temporal proximity: neutral	−2.7933**	–
GT-1st + temporal proximity: distal	−1.160	–	GT-1st + temporal proximity: distal	−1.3052	–
GT-1st + link to t_0: detached	−1.471***	−1.495***	GT-1st + intention: speaker	1.8478***	1.8457***
GT-3rd + intention: speaker	−3.802***	−3.850***	GT-3rd + link to t_0: detached	−1.4186***	−1.4186***
GT-3rd + link to t_0: detached	−2.219***	−2.239***	GT-3rd + intention: speaker	−1.6965**	−1.6904**
			GT-3rd + intention: subject	−1.3279*	−1.3574*
			W-1st + link to t_0: detached	0.8144	0.8131
			W-1st + intention: speaker	2.125***	2.156***
Concordance statistic	0.7409	0.7415	Concordance statistic	0.7416	0.7371

GT-3rd baseline	Effect size (nominal)	Effect size (nominal and ordered)
GT-1st + temporal proximity: 4 levels ordered	–	−1.1492*
GT-1st + temporal proximity: neutral	−2.772**	–
GT-1st + intention: speaker	3.477***	3.5070***
Concordance statistic	0.7156	0.7163

***$p < 0.001$. **$p < 0.01$. *$p < 0.05$. A full stop indicates $p < 0.1$.

3.3 Results for Cluster Model: An emergent set of form-meaning chunks

Construction * Person ~ Verb class + Temporal proximity + Link to t_0 + Intention

W-1st baseline	Effect size (nominal)	Effect size (nominal and ordered)	W-3rd baseline	Effect size (nominal)	Effect size (nominal and ordered)
GT-1st + speaker certainty: moderate certainty	−1.1651*	–	GT-1st + temporal proximity: 4 levels ordered	–	−1.524**
GT-1st + link to t_0: detached	−1.5411***	−1.5411***	GT-1st + temporal proximity: neutral	−2.6674**	–
GT-1st + verb class: obligation	1.9015*	1.9015*	GT-1st + speaker certainty: moderate certainty	−0.9438	–
GT-3rd + intention: speaker	−3.8384***	−3.8384***	GT-1st + intention: speaker	2.0639***	2.064***
GT-3rd + link to t_0: detached	−2.2099***	−2.2099***	GT-1st + verb class: existence	−2.4813***	−2.481***
GT-3rd + speaker certainty: moderate certainty	−1.5151*	–	GT-1st + verb class: obligation	2.2865*	2.2865*
GT-3rd + temporal proximity: neutral	1.7716	–	GT-1st + verb class: perception	−2.3725	−2.3725*
GT-3rd + verb class: existence	2.0432*	2.0432*	GT-3rd + intention: speaker	−1.6823**	−1.6823**
W-3rd + intention: speaker	−2.1561***	−2.1561***	GT-3rd + intention: subject	−1.5944*	−1.5944*
W-3rd + link to t_0: detached	0.8912	0.8912	GT-3rd + link to t_0: detached	−1.3186**	−1.3186**
W-3rd + verb class: existence	2.0530**	2.0530**	GT-3rd + speaker certainty: moderate certainty	−1.2939*	–
Concordance statistic	0.7411	0.7411	Concordance statistic	0.7164	0.7164

GT-3rd baseline	Effect size (nominal)	Effect size (nominal and ordered)
GT-1st + temporal proximity: 4 levels ordered	–	−1.2668**
GT-1st + temporal proximity: neutral	−2.9772**	_
GT-1st + intention: speaker	3.7462***	3.7462***
GT-1st + verb class: existence	−2.4715**	−2.4715**
Concordance statistic	0.7164	0.7164

***$p < 0.001$. **$p < 0.01$. *$p < 0.05$. A full stop indicates $p < 0.1$.

3 The problem

One cannot compare the predictive power of models of different complexities – both complexity of the predictors and the complexity of the outcome, massively impact those scores

How can we then determine which level of schematicity is best for accounting for speaker choice.

Maximally schematic constructions with families of related constructions or more specific chunks

Summary

Despite quantitative modelling, theoretical rigour is still the bugbear of functional linguistics

Using Behavioural Profiles to describe extra-linguistic concepts

It works but does not solve the inherent problem:

Inherent lack of rigour over what constitutes the object of study, makes confirmatory modelling difficult.

Using Behavioural Profiles to describe grammatical semantics

It works but cannot solve the fundamental problem:

Explanatory adequacy of what constitutes a construction cannot be tested

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https://sites.google.com/view/dylan-glynn/

https://transcrit.univ-paris8.fr/-Cognition-Societe-et-Langage-

thank you...