

Linguistic Structure, Narrative Structure and Emotional Intensity

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Structure of the Presentation

- Structural analogy between emotion experiences and narrative structure
- Corpus
- Automated analysis
- Empirical study

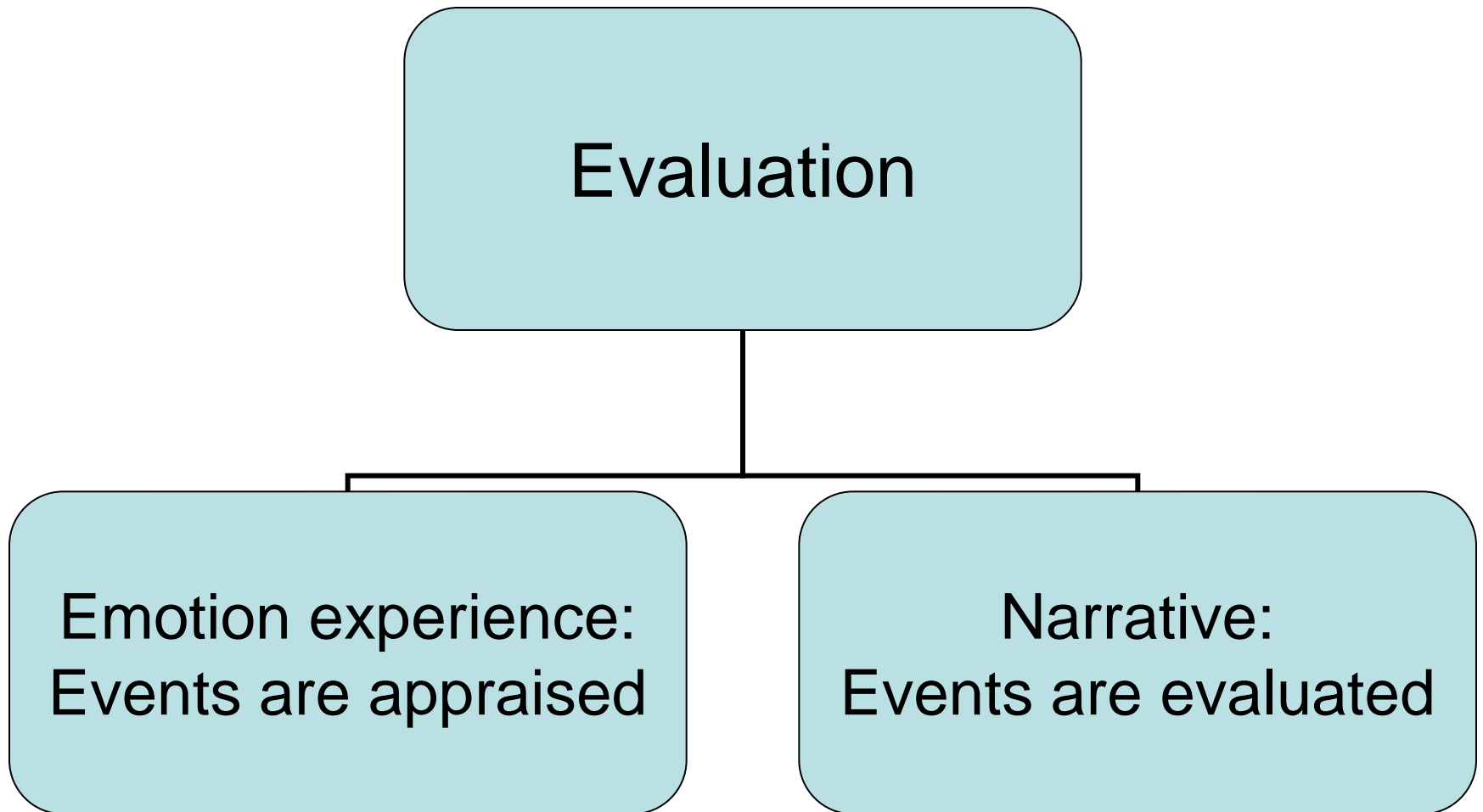
Role of Narratives in Emotion Research

- Narratives provide definition for emotions
 - Hogan (2004): e.g. „X feels sad = X feels as one does when one thinks that what one has desired to happen has not happened and will not happen”
- Narratives describe emotional responses
 - E.g. Stein, Trabasso, Folkman, Richards (1997)
- Narratives generate emotions in readers
 - Oatley (1999): stories simulate emotions
- Narratives are tools for reliving and sharing emotional experiences

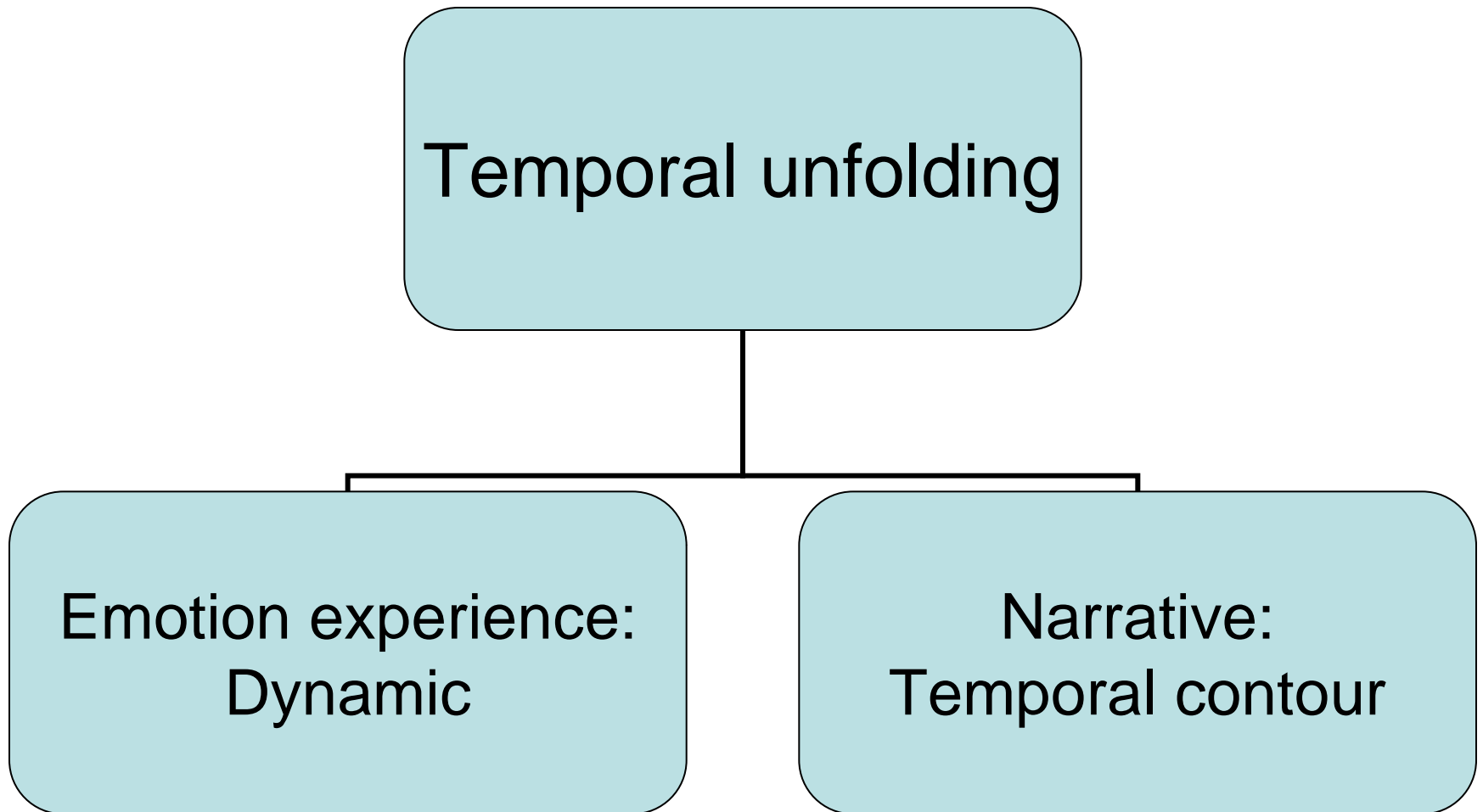
Structural Analogy

- Emotion experiences and narratives have analog structure:
 - Evaluation
 - Temporal unfolding
 - Consciousness

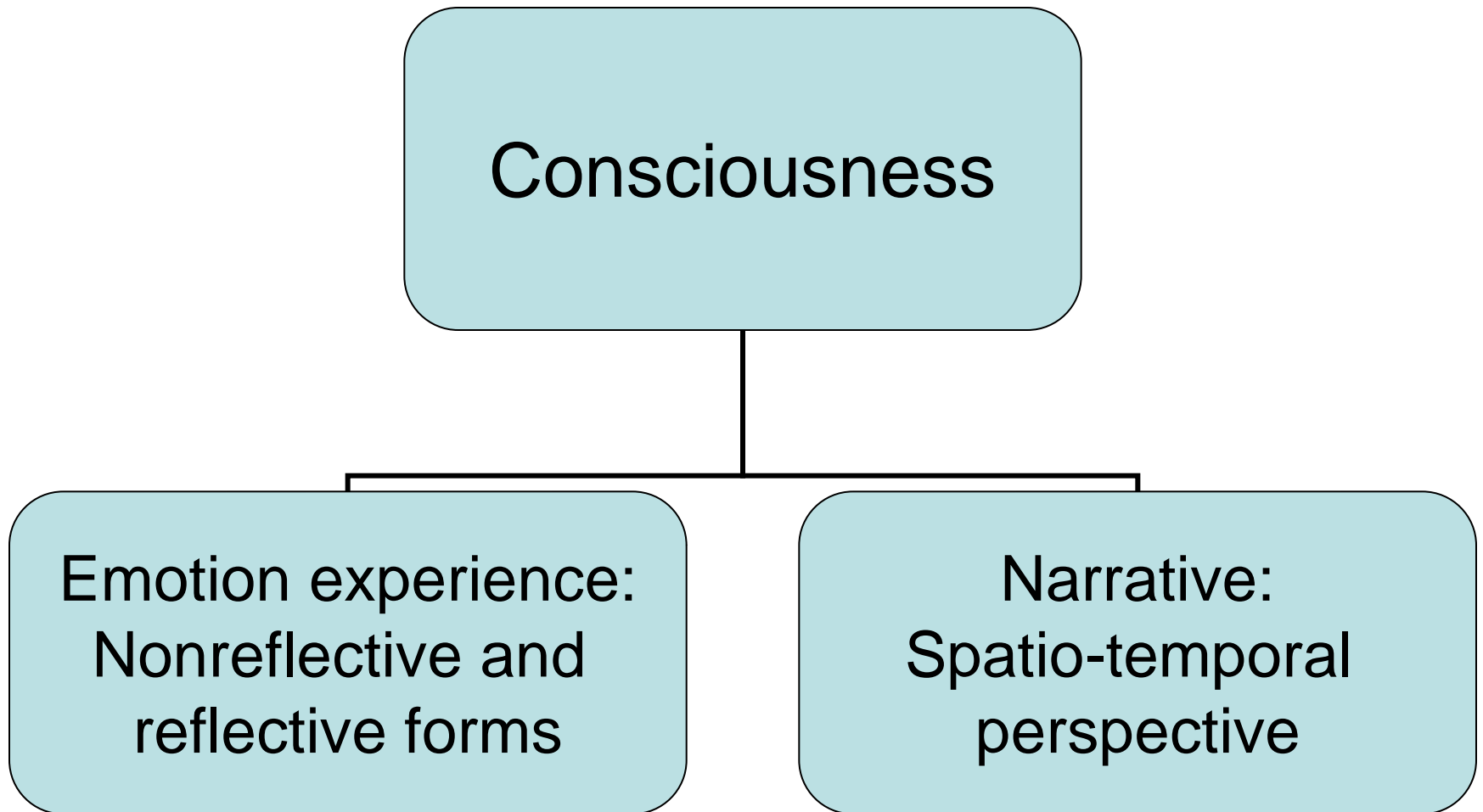
Structural Analogy 1.



Structural Analogy 2.



Structural Analogy 3.

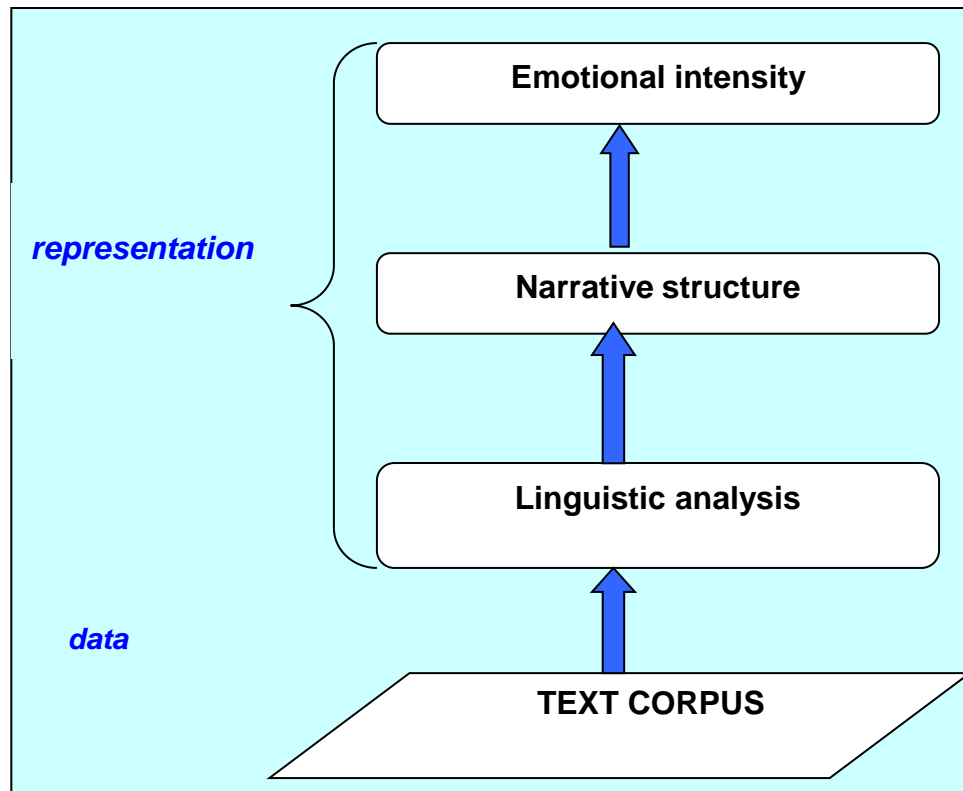


Linguistic Analysis

Automated identification of relevant facets of narrative structure → quantitative analysis

Creation of a corpus annotated on these 3 levels + tools to perform automatic analysis

Annotation



Corpus

- recorded Hungarian speech data
- written transcription: 36.000 words
- 60 healthy adult people aged between 18 and 45 years (M=29.2 SD=6.3)
- psychophysiological channels: Blood Volume Pulse, Abdominal Respiration and Skin Conductance
- a cue word paradigm was used to elicitate autobiographical memories regarding emotional episodes
- cue words: pride, relief, sadness and fear
- 7.000 words subcorpus manually annotated for narrative structure

Different Methods for Text Analysis

- Several tools for (psychological) content analysis (e.g. LIWC)
- They usually perform word-level analysis: lemmatize, compare frequencies, output lists of keywords etc.
- We use deeper linguistic analysis: constituent parsing, CF grammars, structured lexicons

Corpus Annotation Tool

- NooJ - functions
 - corpus annotation (automatic or semi-automatic)
 - query, concordances
 - grammar development
 - linguistic processing
- FS basis: fast and robust
- XML compliant
- user-friendly interface: easy to handle, develop, share and re-use grammars

Corpus Annotation Tool

- Linguistic aspects
 - FS basis → enhanced with additional functions:
 - variables
 - lexical constraints → feature unification
 - embedded grammars
 - Grammars represented as graphs, edited via the graphical interface
 - Philosophy: to produce highly lexicalized linguistic descriptions
 - Lexicon plays a central role, morphosyntactic and semantic features combined

Linguistic Preprocessing I.

- Hungarian linguistic resources for NooJ (Váradi, Gábor, 2004):
- Hungarian tool chain
 - tokenization (built-in NooJ module)
 - sentence splitting
 - lemmatization, morphology (Vajda et al., 2006): inflectional dictionary for 60.000 lemmata + lookup: frequent word forms from the HNC
 - to achieve better coverage, the output of the NooJ-internal morphology was completed with the Humor morphological analyzer (Prószéky, 1995)
- rule-based syntactic parser included in the Hungarian NooJ module Váradi (2003), (Gábor, 2007).

Linguistic Preprocessing II.

- Syntactic analysis:
 - Phrase chunker (NPs, APs, AdvPs)
 - 1) Basic chunks
 - 2) Top-level constituents (recursive NPs)
 - 3) Coordinated phrases
 - 4) Feature percolation: case, morphology, semantics
 - handle agreement phenomena
 - Dependency annotator (aux+V, prefix+V)
 - Segmentation into clauses

Mapping between narrative structure and linguistic structure

We are not looking for keywords but for syntactic structures to delimit the scope of each category

E.g. embedding of evaluation:

- É11 de akkor éreztem először,
But then I felt for the first time
- É11 hogy fú,
that wow!
- É11 én most tényleg büszke vagyok magamra,
now I am actually proud of myself
- É11 és hogy megérdemelten lehetek büszke.
and that I have a reason to be proud.

Mapping between narrative structure and linguistic structure

- Creating grammars in NooJ to recognize relevant narrative structural units
 - Find *markers* associated to narrative structural categories
 - Examine the linguistic behavior of markers
 - Create grammars to delimit the scope of units

Markers

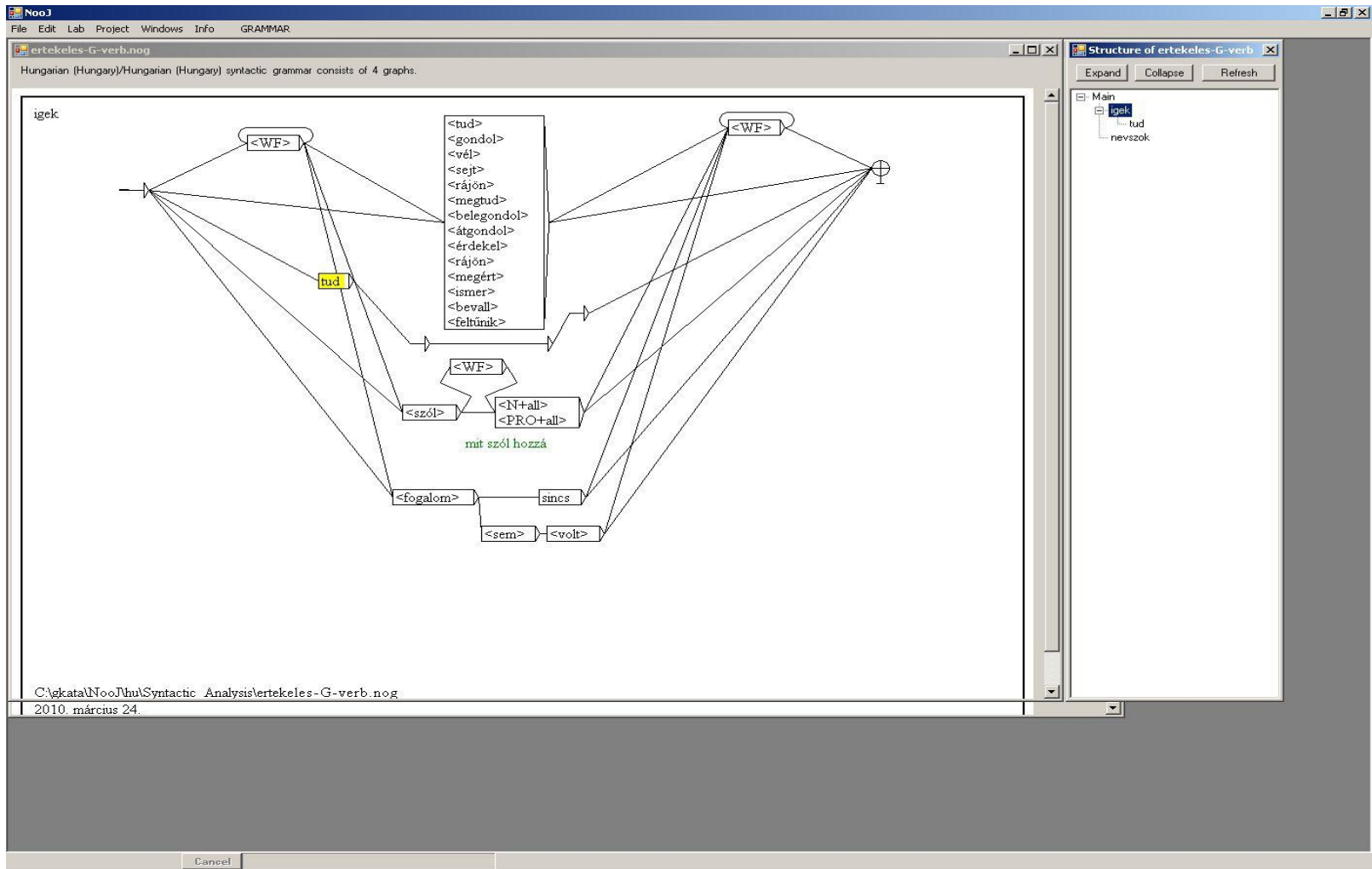
- Retrieve category-specific keywords by tf-idf scores:
- Embedded evaluation – perception

5.62509431	érez	0.0177304	0.003152
3.85553339	büszke	0.0082742	0.002146
3.97990543	félelem	0.0082742	0.002079
4.77351753	érzés	0.0076832	0.001609
3.30474290	fél	0.0070921	0.0021460
4.40632387	szomorú	0.0070921	0.0016095
3.46211161	szomorúság	0.006501	0.00187780
2.75395242	megkönnyebbülés	0.005910	0.002146
7.83346467	örül	0.004728	0.00060358

→ markers: *feel, proud, fear, feeling, sad, sadness, relief, be-happy ...*

~ 50 markers for each (sub)category

Grammars

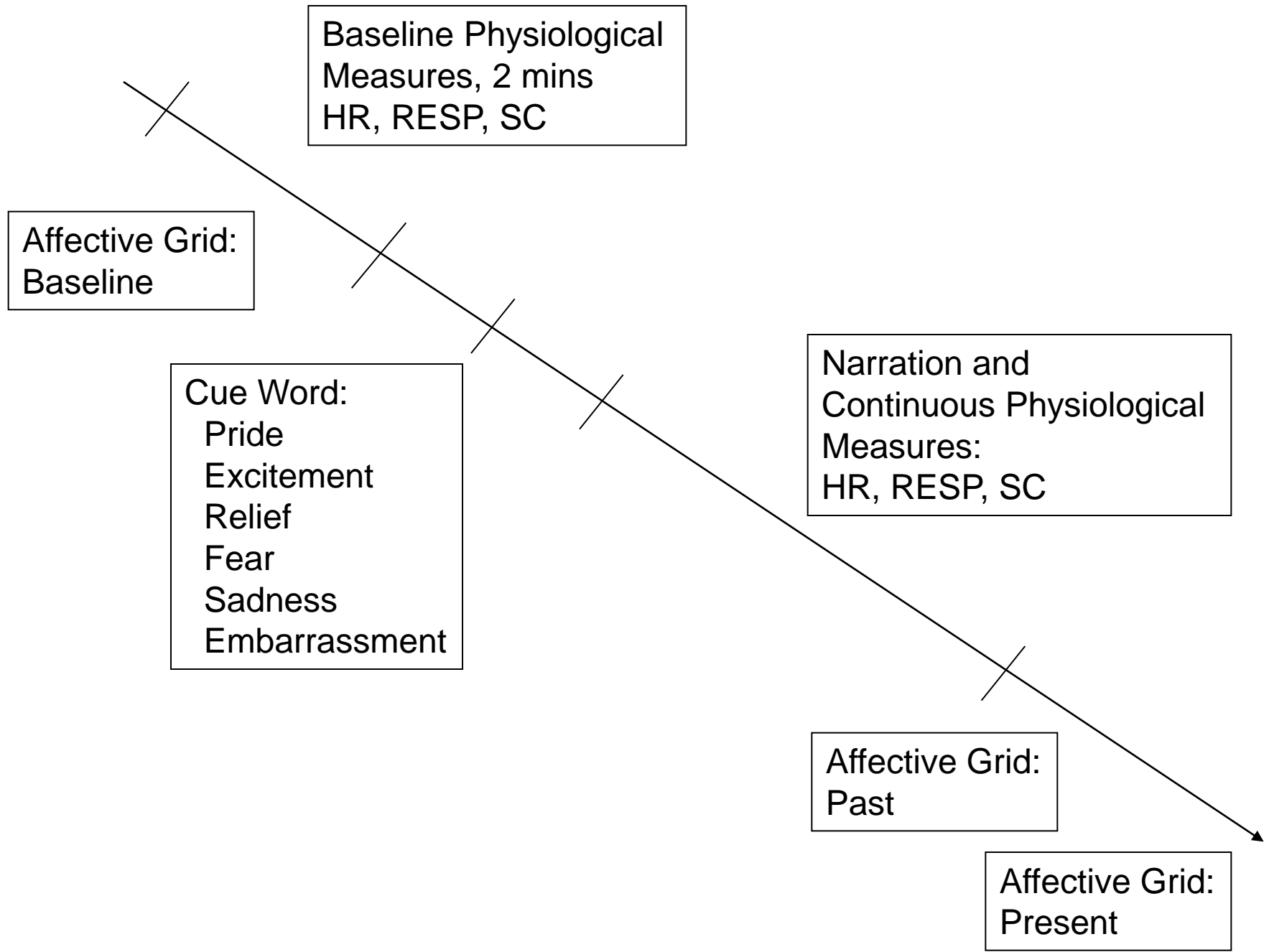


Empirical Study

- Hypothesis
 - If a story has an elaborated narrative structure the intensity of an emotional experience during narration is higher than the story has a default narrative structure
- 108 narratives from 18 participants

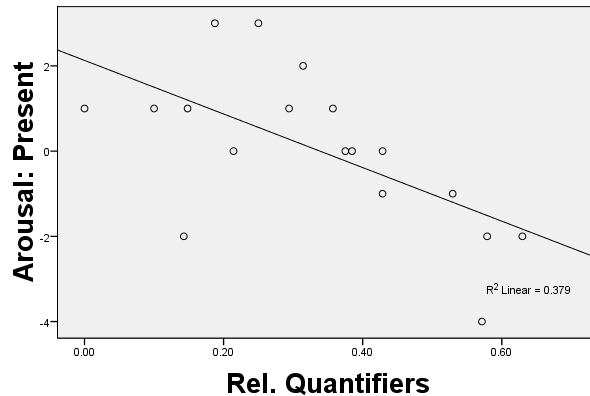
Automatically Analysed Structural Features

- Narrative Evaluation
 - (Core narrative clauses)
 - Quantifiers
 - Qualifications
 - Negated events
- Temporal Contour
 - Perfect verb aspect
 - Continuous verb aspect
 - Specific temporal adverbs
- Spatio-temporal Perspective Forms
 - Retrospective
 - Experiencing
 - Metanarrative

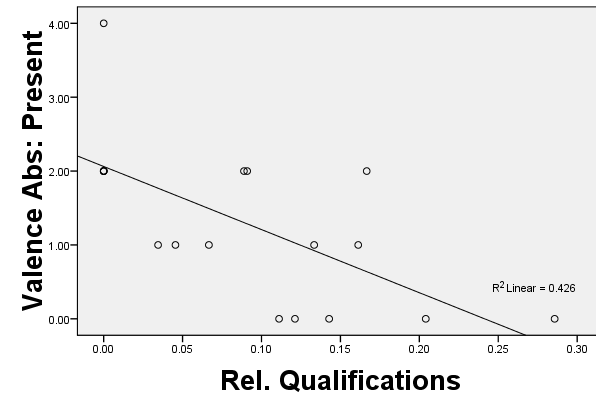


Narrative Structure and Affective Grid

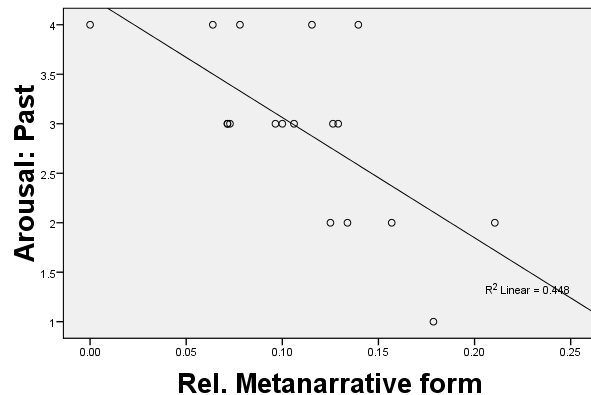
Pride stories



Fear stories



Excitement stories



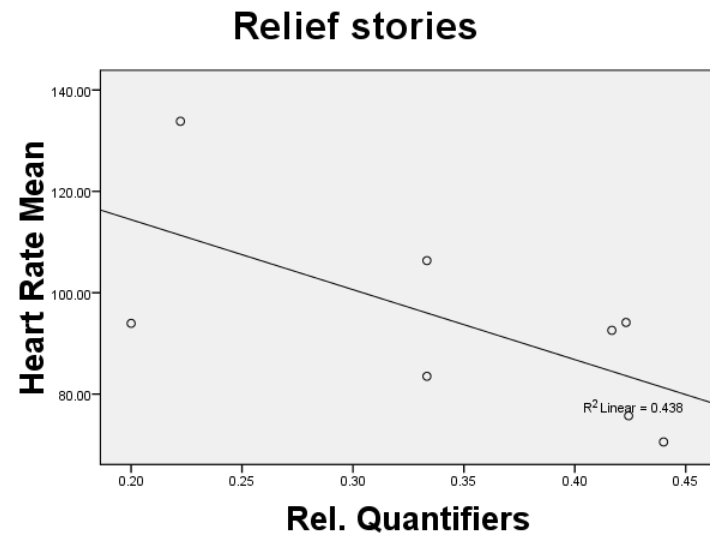
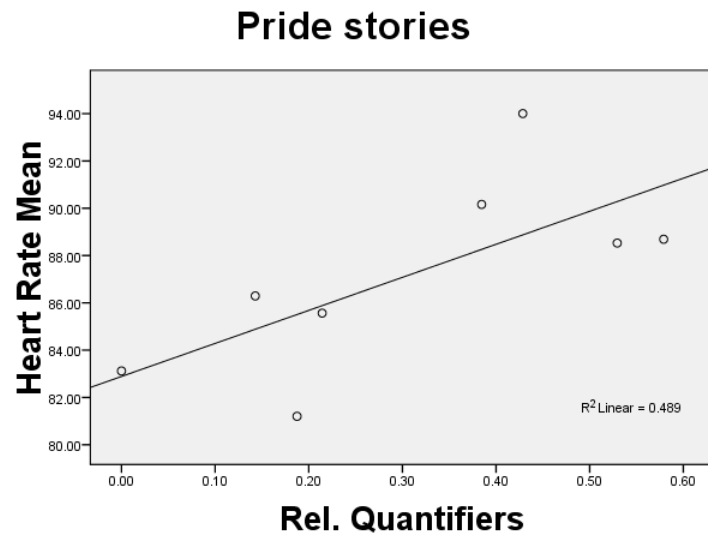
Strong negative correlations

$$r_{\text{Pride}} = -0.62 \quad p < 0.01$$

$$r_{\text{Fear}} = -0.65 \quad p < 0.01$$

$$r_{\text{Excitement}} = -0.67 \quad p < 0.01$$

Narrative Evaluation and Physiological Measures



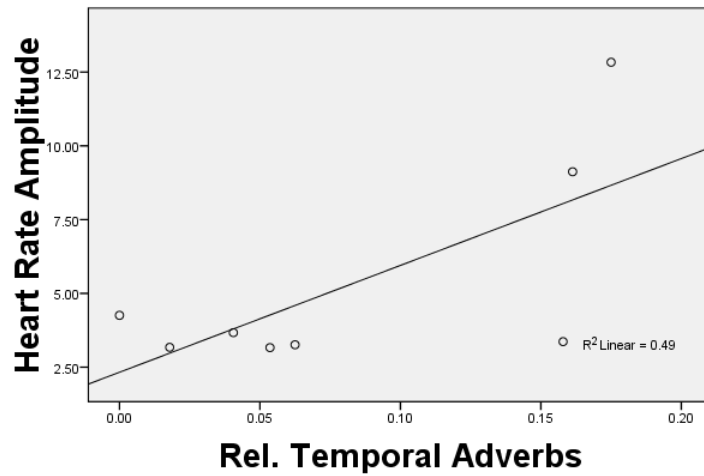
Strong, but reverse correlations

$$r_{\text{Proud}} = 0.70 \quad p < 0.01$$

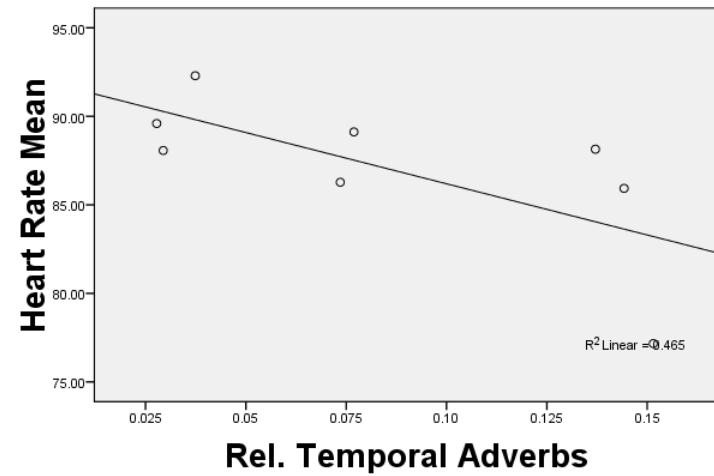
$$r_{\text{Fear}} = -0.66 \quad p < 0.01$$

Temporal Contour and Physiological Measures

Pride stories



Excitement stories



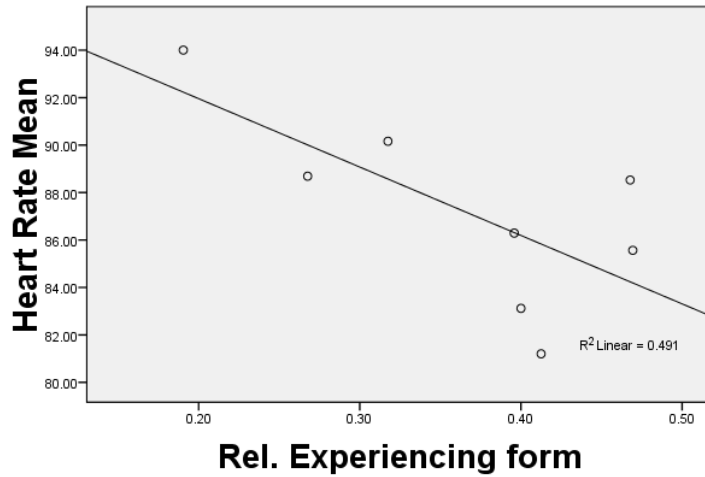
Strong, but reverse correlations

$$r_{\text{Excitement}} = 0.70 \quad p < 0.01$$

$$r_{\text{Fear}} = -0.68 \quad p < 0.01$$

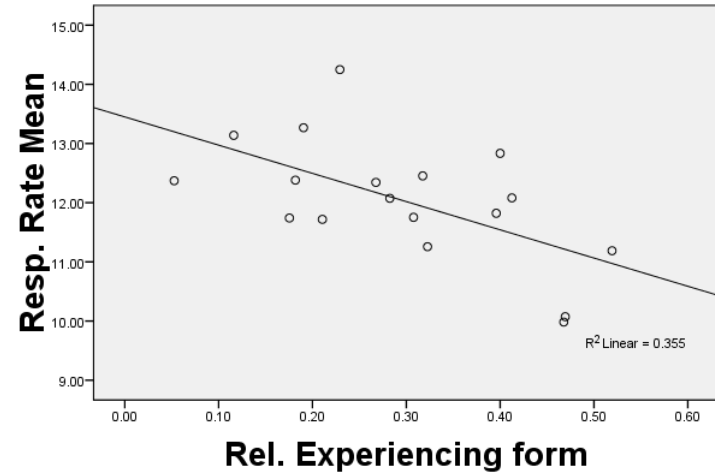
Perspective and Physiological Measures

Pride stories



$r = -0.70$ $p < 0.01$

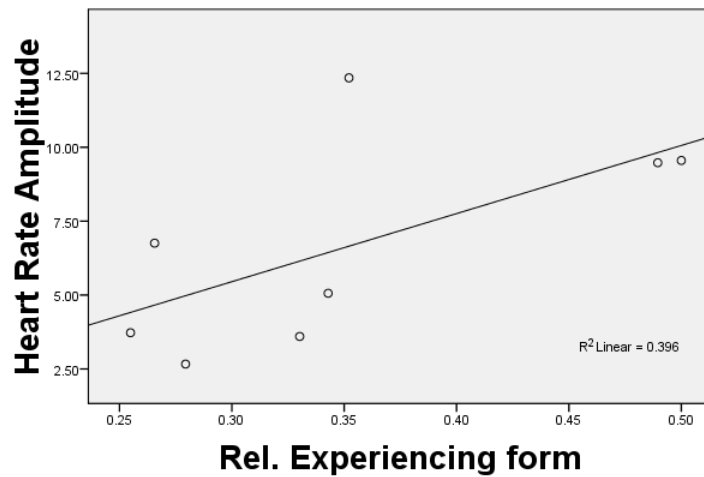
Pride stories



$r = -0.60$ $p < 0.01$

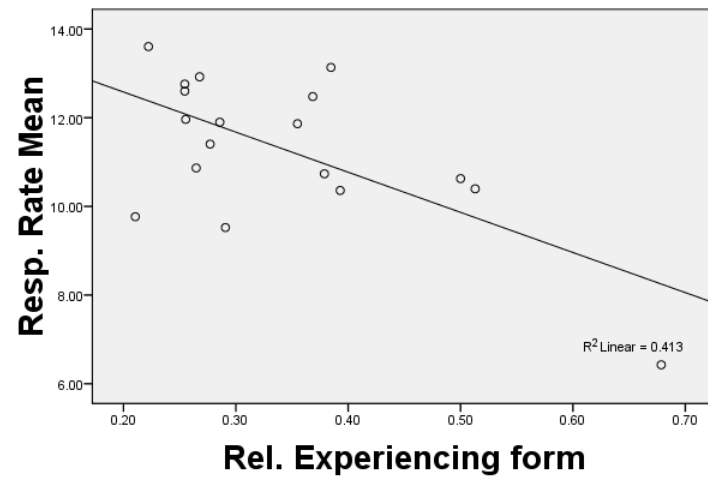
Perspective and Physiological Measures

Embarrassment stories



$r=0.63$ $p<0.01$

Excitement stories



$r=-0.64$ $p<0.01$

Conclusions

- It is the default narrative structure which indicates higher emotional intensity, mainly in terms of valence
- There is a structural analogy between emotion experiences and narratives
- Narratives are proper tools for reliving and sharing emotion experiences
- A new and a non-invasive way for studying rather elusive emotion experiences
- It is promising to use deep linguistic description to analyse narrative structure

Further work

- Analysis of
 - A whole Corpus
 - More linguistic markers
 - Patterns of narrative structure, not simply relative frequencies
- English corpus

Thank you!

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