The social nature of ANGER
Multivariate corpus evidence for context effects upon conceptual structure

Dylan Glynn
University of Bielsko-Biała

1. Introduction

Both traditional linguistics and psychology offer a rage of approaches to conceptual structure. Social psychology and corpus linguistics are, in various ways, attempting to extend these research traditions to include the social dimension of the structuring of concepts. The role of social context is believed to be crucial to the study of emotion concepts since it is interpersonal interaction that represents the stimulus of most emotional responses. This study employs multivariate usage-feature analysis in an attempt to identify the conceptual structure of ANGER, sensitive to social context.

The use of lexical semantic analysis as an indirect method for determining conceptual structure has an established tradition (Wierzbicka 1985, Lakoff 1987). This tradition relies on introspective methodology. This approach is excellent for identifying subtle fine-grained structures within and between languages / cultures. However, despite the important inroads made in this tradition, the results offer little information on the role of social variation in conceptual structure. In response to this, corpus methods for conceptual study have been developed (Bednarek 2008, Dziwirek & Lewandowska-Tomaszczyk 2011). To date, the corpus methodology as been restricted to formal analysis. In other words, collocation patterns have been identified as indirect evidence for conceptual structure. Although successful, the subjective nature of the interpretation of the collocation results means that only coarse grain patterns can be identified. In order to overcome this limitation, this study applies Multivariate Usage-Feature Analysis (Glynn 2007, 2010a, 2012a), also called Behavioural Profile Analysis (Gries 2006, 2010, Gries & Divjak 2009). This method combines close

qualitative analysis of large numbers of contextualized usage events with multivariate statistics. The sample size is smaller than collocation-based analysis of corpus data, but the analysis is much more fine-grained. This study demonstrates the feasibility of applying the method for the description of socially contextualized emotion concepts

2. Method, Data and Analysis

2.1 Method: Multifactorial Usage-Feature Analysis

Onomasiological structures identified through lexical semantic analysis have long been employed as an indirect tool for conceptual description (Wierzbicka 1985, Kövecses 1986, Lakoff 1987, Vorkachev 2007; Bartmiński 2009 *inter alia*) and this analytical assumption is accepted here. However, the method differs to previous research in that it is the contextualized *use* of the items, rather than their 'meaning', that forms the basis of the study. In simple terms, the multivariate usage-feature method consists of the repeated analysis of a range of semantic, pragmatic, and social characteristics of speech events. A large sample of a given phenomenon, here emotion concept key words, are extracted form a corpus with their context. These occurrences are annotated for whatever usage dimensions are hypothesised to be indicative of conceptual structure. The results of this analysis provide a behavioural profile of the linguistic form. Due to its complexity, this profile needs to be interpreted with the aid of multivariate statistics, which permits the identification usage-patterns across the data. If sufficient data is available, the statistics can also be used to determine the descriptive accuracy of the analysis by testing its predictive power.

The method has been successfully applied to a range of linguistic phenomena including (near) synonymy (Divjak 2006, 2010; Glynn 2007, 2010; Janda & Solovyev 2009; Klavan 2012), (vague) polysemy (Gries 2006; Glynn 2009, 2010b, 2012b, Fabiszak *et al.* 2012) and constructional semantics (Gries 1999, 2003; Heylen 2005; Wulff 2006; Shank *et al.* 2012; Levshina 2012). Extending the method to more abstract concepts, typical of emotion studies, represents an important next step in the development and application of the methodology (cf. Krawczak & Glynn 2012, Glynn & Krawczak (in press) and Krawczak (this volume).

2.2 Data: Personal diaries

The data consist of instances of people discussing ANGER in personal online diaries (blogs) extracted from the *LiveJournal Corpus* (Speelman & Glynn 2005). The kind of language found in this genre particularly apt for the study in question because (i) emotions are frequently discussed at a personal - experiential level and (ii) the language is often narrative in structure, maximising the probability of descriptive usage. The sample consists of 500 examples in total, made up of 80 examples of *angry*, *annoyed*, *pissed off* in British English and 80 examples of *angry*, *annoyed*, *mad* in American English. The choice of lexemes was determined by frequency: for each dialect, the three most frequent items denoting ANGER. Note that for both dialects it was adjectives not nouns that were the most frequent and the first two lexemes are the same. For the third lexeme we have onomasiological variation. Although the American *mad* is usually considered a near-synonymy of the British *cross*, the latter item was relatively rare in the corpus. It is likely that this lexeme is being lost in British English and that *pissed off* has, to some extent, replaced it. Despite the semantic difference between the two lexemes, *pissed off* was clearly the third most common ANGER lexeme in the British component of the corpus. Note also that the corpus is made up of highly informal language and that the authors are likely to be young people, although this is impossible to verify. From the text, it is apparent that most are studying either at secondary school or university and there appears to be more female authors than male. It is not possible to estimate the socio-economics or ethnicity of the authors.

2.3 Analysis: Form, Meaning, and Context

The analysis is, in part, inspired by the work in social psychology (Soriano *et al.* in press) and in part by previous work in multivariate usage-feature analysis of emotion concepts (Glynn 2007). The basis for the analysis is the ANGER event-frame. Four possible arguments or participants are identified. These are termed the Cause, the Emoter, the Receiver and the Responsible. Terms with a more established tradition are avoided because they have led to ambiguity due to variation in uses in different theoretical paradigms and disciplines. The Cause is typically an event or situation and needs to be distinguished from the Responsible, who is typically an animate argument associated with the Cause. There is always a Cause, but the Responsible is optional. In an example such as the *pen made me angry*, there is no clear Responsible in the event. However, it is worth noting that in the diaries, it is not uncommon to find exampels where the author overtly discusses the

fact he or she is angry because of given event or thing, but actually the anger is 'really' due to something else. In these instances, the Cause and Responsible in the event are ascribed accordingly.

Another distinction, which may not be immediately obvious, is between Responsible and Receiver. Although in an 'idealised' or 'prototypical' scenario the two roles overlap, in the data, numerous exampels are found where two roles are distinct and often overtly referred to as such. The term Emoter is used for the subject of the ANGER expression. Example (1) is artificial but clearly identifies the event roles. Identifying the roles, in the natural data, is often difficult and requires large amounts of context.

(1) ANGER Event Frame

I'm	angry	with Sam	because Jamie	smashed the pot!
Emoter	ANGER	Receiver	Responsible	Cause

The semantic features that make up the analysis concern the different participants in the event. The instances are, in fact, analysed for a much wider range of features. For sake of brevity, only the features considered in the results, section 3, are presented. Also for practical reasons, it is not possible to exemplify the categories. Some exampels are given when presenting the results in section 3.

Emoter

Engagement:	Engagement with Responsible
Aggression:	Degree that the Emoter expresses aggression
Control:	Does the Emoter have ability to change the cause?
Behaviour:	Self Depreciation; Change Cause; Verbal Violence, Physical Violence; Verbal Complaint; Non-Verbal Non-Violent Social Expression, No expression

Cause

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

Responsible

Type:	Specified Known Person; Specified Unknown Person; Unspecified Person; Family; Friend; Self; State of Affairs; Inanimate Object

It also noteworthy that the gender of the Emoter, the Responsible and the Receiver was annotated yet produced no significant differences relative to any of the behaviour patterns identified. In other words, there was no evidence that certain behaviour types are more typical of men and women. However, in many instances the gender information was unknown, resulting a small sample size. A larger sample would be needed to know with any certainty that difference gender does not, in fact, interact with the behavioural patterns of ANGER.

Other than the semantic features, several formal features were also annotated. The most of important of these were lexical class of predicative and attributive adjectives and the grammatical construction licensed by the lexeme. Typical constructions include [Pred. Adj. *about* NP]; [Pred. Adj. *at*]; and [Pred. Adj. because]. However, dividing up the predictive forms in this way produces a type-token ratio that made quantitative analysis impossible. Future research must either work with a larger sample of control for this variable in the sampling. Variation that might be associated with the constructional variation is not accounted for in the analysis.

3. Results

The results are presented in two parts. Firstly, we consider the onomasiological structure identified across the lexemes. The aim here is simply to map the semantic variation of the near-synonymy of the four lexemes. This descriptive step follows established methods in lexical semantic research. Secondly, we consider the results without the structuring dimension of the lexemes. This step is novel in lexical based conceptual analysis and is inspired by the research in social psychology, which attempts to identify the conceptual structure of emotion concepts with detailed elicitation tasks (cf. Soriano *et al*. in press).

3.1 Lexical field and near-synonymy of ANGER

The onomasiological analysis is straightforward. Focusing on the interaction of the Cause and the lexeme, a clear and stable picture of the near-synonymy relations emerges. Table 1, below, presents the numerical output of a multiple correspondence analysis (Cf. Glynn 2012b for explanation of the technique). The analysis was performed using Greenacre's 'adjusted' multiple correspondence analysis, which permits the interpretation of inertia values (Greenacre 2007). The scree plot indicates how much of the vari-

ation in the data is accurately represented in the first two dimensions, that is, axes *x* and *y* in the plot presented below in Figure 1. The figure of 83.9% explained variance (or inertia) in these first two dimensions represents an extremely stable result. Below the scree plot, we have a column breakdown for the representative quality of each data point and its contribution to explaining the structure of the data. As a rule of thumb, any 'quality' score of 500 indicates a reliable representation of the relations in the data (Greenacre 2007). Having established the reliability of the visualisation, we can consider the results of the analyses, presented in Figure 1.

Table 1. Multiple correspondence analysis, numerical summary
Lexeme, Norm Violation, Perceived Injustice, Cause Predictability

```
Explained Variation
 dim    value     %     cum%  scree plot
 1      0.124122  64.8  64.8  ************************
 2      0.036569  19.1  83.9  *******
 3      0.001084   0.6  84.5
        -------- -----

Columns, visualisation quality and contribution scores:
                            name  quality   Dim. 1    Dim. 2
                                           contrib.  contrib.
1  |               Lexeme ANGRY |     100      114         5 |
2  |             Lexeme ANNOYED |     987       49        28 |
3  |                 Lexeme MAD |     839       49         0 |
4  |          Lexeme PISSED OFF |     869        4       120 |
5  |          NORM No Violation |     836      131         9 |
6  |        NORM Non Applicable |     786      218        62 |
7  |             NORM Violation |     858        7       197 |
8  |        INJUSTICE Injustice |     774        1       294 |
9  |   INJUSTICE Non Applicable |     771      201        92 |
10 |    INJUSTICE Non-Injustice |     808      167        22 |
11 | PREDICTABILITY Non-Predict |    1000        0        75 |
12 |     PREDICTABILITY Predict |    1063       19        92 |
13 |     PREDICTABILITY Unknown |    1012       30         5 |
```

In figure 1, three reasonably clear clusters of associations are apparent. In the bottom right quadrant, the lexeme *angry* is distinctly and highly associated with unknown event predictability, non-applicable norm violation and injustice. This set of Cause features suggests a conceptually general or under-specified profile of ANGER. Example 2 is typical of the kind of use this cluster of feature represents.

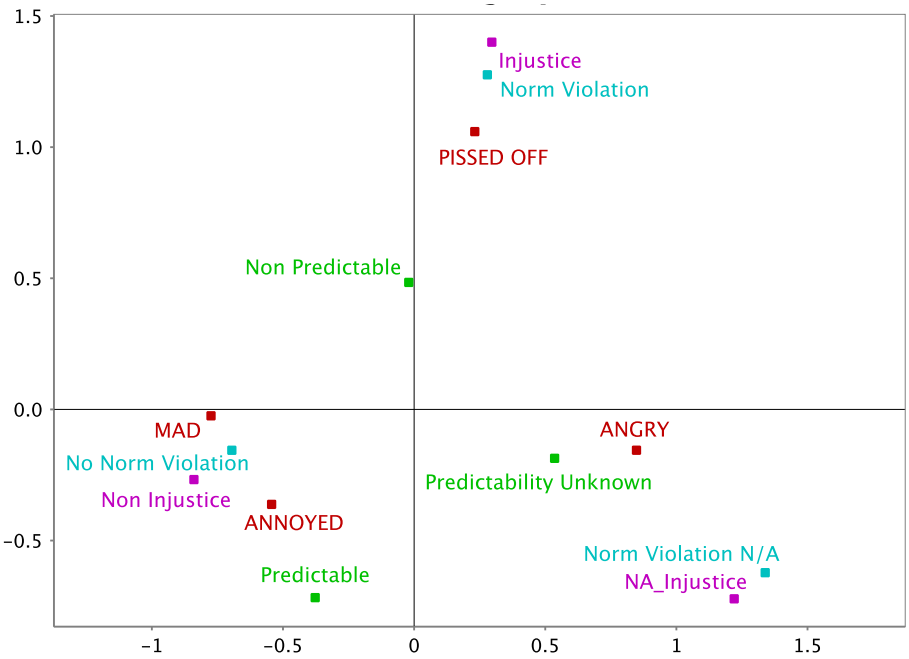

Figure 1. Multiple correspondence analysis, biplot Lexeme, Norm Violation, Perceived Injustice, Cause Predictability, explained inertia (83.9%)

(2) I've been angry cause the whole being sick thing has totally cut into my Christmas spirit. And damn it, I want some Christmas spirit!

The lexeme *pissed off* is also distinct, being characterised by norm violation and injustice. The feature of non-predictability is also characteristic of *pissed off*, although not distinctly so, it also being characteristic of *mad*, placed below on the plot. Example (3) is representative of the usage.

(3) It woke me up. They just stayed there chatting, with the loud diesel engine of the humongous car running, right outside our bedroom window. After 25 minutes I got pissed off enough that I went outside in my PJs and asked them to turn the engine off.

The lexemes *mad* and *annoyed* appear to be closely related. Conceptually associated with predictable Causes, that is things the Emoter knows will make him or her angry. There is no norm violation or injustice, it is simply something 'disliked'. *Mad* is distinguished from *annoyed* by being more associated with unpredictable Causes. Consider examples (4) and (5):

(4) i ran through heathrow like a mad woman and got really mad at this customs official who wouldn't stop searching my bag.

(5) I have already got another notice from Dish Network. I am getting annoyed. I plan on paying it today, but no matter what number I dial, I can not manage to find a real person to speak with.

3.2 Event based evidence of conceptual structure

The next step is to attempt to identify conceptual structure without using the lexical dimension to structure the data. In other words, to run multivariate analysis on the feature annotation, but not relative to the lexemes. This will result in a description of the concept of ANGER that is determined by the use of the lexemes in question, but not structure by them. Figure 2 presents the results of the analysis which consists of Emoter Control, Emoter Behaviour, Cause Type, and Responsible Type.

Due to the practical limitations, a detailed discussion and exemplification of the results is not possible. The biplot is interpreted in the same manner as that presented in Figure 1 save that in this instance, the contribution of the different data points is indicated by the relative size of the data point on the plot. Moreover, features with a very low contribution are omitted.

Three clusters of features that arguably represent conceptual structures are visible. The top left quadrant is structure around 'inanimate' Causes and, interestingly, the Cause of 'illness', which appeared quite frequently in the sample. Similarly, other Causes of inconvenience, such as 'missing something' and 'work' are associated with this cluster. The data point of 'self' as the Responsible represents a very low degree of contribution and could possibly be omitted. The other important feature in this cluster is the Emoter's response of 'complain'. Unlike the highly specific response of 'violence' and the general response of 'social expression', 'complain' was annotated when the Emoter expressed dissatisfaction over an event but with no intent to change the Cause of the ANGER.

Figure 2. Multiple correspondence analysis, biplot with contributions Emoter Control, Emoter Behaviour, Cause Type, Responsible Type (explained inertia 76%)

Distinctly displayed in the top right quadrant, lies a cluster structured by the Cause of 'immoral behaviour' and 'violent' response on the part of the Emoter. Also important to the cluster is the fact that the Cause constitutes a 'norm violation' and that the Emoter seeks 'control' in order to change the Cause. Another distinctive Response feature is 'self depreciation'. Here, the Emoter responds to the event and anger in self-criticism. Indeed, the presence of self-hatred, often in quite violent terms, was not uncommon in the data. The Cause events themselves are 'non-predictable' and the Responsible is 'non-specified'. However, the positioning of 'non-predictable' suggests that this feature is also characteristic of the structure clustered in the left-hand quadrant.

Moving to the bottom of the plot, we see another relatively tight-knit cluster. None of the individual features appears to dominate this structure in terms of contribution and the features form an intuitively coherent picture of a 'type' of ANGER. The Responsible of the event is a 'friend', a 'family'

member of the Emoter's or another 'specified known person' and the Cause is the 'behaviour' of this person. The 'predictability' of this behaviour is unknown, which means this dimension of the event is maximally backgrounded in the diary description. Perhaps the most important feature here is the response of the Emoter, which is 'social expression'. This feature is indicative of people talking, without violence, about their ANGER. Another interesting aspect of this cluster is the feature that lies between it and the 'complain' type ANGER. The positioning of 'non control' over the event with respect to the Emoter suggests this is common to both the 'complain' - 'thing / events' cluster and the 'social expression' - 'friends / family' cluster. This similarity between the two types of ANGER results in a dichotomy between these 'non control' ANGER structures and the 'violent' - 'control' ANGER clustered in the top right quadrant.

The overall picture present a coherent structuring of the concept of anger: violent response type of anger associated with norm violations and immoral behaviour; a complaining or irritated kind of anger associated with inanimate objects inconveniences such as being ill; and more inter personal anger, associated with the behaviour of people you know which results in the social engagement of the problem without violence.

4. Discussion

The results have shown that multivariate usage-feature analysis can be used to describe conceptual structure of emotion concepts. More importantly, it was shown how the method is able to offer a socially sensitive event-based description of the emotion and one that is not structured by the lexemes, but rather the events the lexemes are used to describe. This latter point has yet to be demonstrated using such methods. A second step, which is straightforward to apply but remains beyond the purview of this study, is the application of *k*-means cluster analysis to determine if, indeed, the interpretation of the biplots is accurate and the behaviour of the data can be best described as representing three underlying ANGER structures.

To conclude, it must be stressed that these results remain exploratory. In order to test the results with confirmatory modelling, a larger sample would be needed. To these ends, these exploratory results have identified which usage-feature appear important to the structuring of the concept. By limiting the number of features warranting manual annotation, larger numbers of occurrences can be analysed making confirmatory modelling pos-

sible. The next essential step is to demonstrate the feasibility of such modelling to this kind of data.

References

Bartmiński, Jerzy (2009). *Aspects of Cognitive Ethnolinguistics*. London: Equinox.

Bednarek, Monika (2008). *Emotion Talk Across Corpora*. London: Macmillan.

Divjak, Dagmar (2006). "Ways of intending: A corpus-based cognitive linguistic approach to near-synonyms in Russian", in: Stefan Th. Gries and A. Stefanowitsch (eds.): *Corpora in Cognitive Linguistics. Corpus-based approaches to syntax and lexis*. Berlin: Mouton de Gruyter, 19–56.

Divjak, Dagmar (2010). *Structuring the Lexicon: A clustered model for near-synonymy*. Berlin: Mouton de Gruyter.

Dziwirek, Katarzyna and Lewandowska-Tomaszczyk, Barbara (2011). *Complex Emotions and Grammatical Mismatches A Contrastive Corpus-Based Study*. Berlin: Mouton de Gruyter.

Fabiszak, Małgorzata, Hebda, Anna, Kokorniak, Iwona and Krawczak, Karolina (2012). "The interaction of prefix and patient semantics in the Polish verb *to think*", in: Dylan Glynn and Justyna Robinson (eds.): *Polysemy and Synonymy. Corpus methods and applications in Cognitive Linguistics*. Amsterdam: John Benjamins.

Glynn, Dylan (2007). Mapping Meaning. Toward a usage-based Cognitive Semantics. PhD dissert.: University of Leuven.

Glynn, Dylan (2009). "Polysemy, syntax, and variation. A usage-based method for Cognitive Semantics", in: Vyvyan Evans and Stephanie Pourcel (eds.): *New Directions in Cognitive Linguistics*. Amsterdam: John Benjamins, 77–104.

Glynn, Dylan (2010a). "Lexical fields, grammatical constructions and synonymy. A study in usage-based Cognitive Semantics", in: Hans-Jörg Schmid & Suzanne Handl (eds.): *Cognitive Foundations of Linguistic Usage-Patterns*. *Empirical studies*. Mouton: Berlin: Mouton de Gruyter, 89-118.

Glynn, Dylan (2010b). "Testing the Hypothesis. Objectivity and verification in usage-based Cognitive Semantics", in: Dylan Glynn and Kers-

tin Fischer (eds.): *Quantitative Cognitive Semantics. Corpus-driven approaches*. Berlin: Mouton de Gruyter, 239-270.

Glynn, Dylan (2010c) Corpus-driven Cognitive Semantics. Introduction to the field", in: Dylan Glynn and Kerstin Fischer (eds.): *Quantitative Cognitive Semantics. Corpus-driven approaches*. Berlin: Mouton de Gruyter, 1-42.

Glynn, Dylan (2012a). "The many uses of *run.* Corpus methods and cognitive socio-semantics", in: Dylan Glynn and Justyna Robinson (eds.): *Polysemy and Synonymy. Corpus methods and applications in Cognitive Linguistics*. Amsterdam: John Benjamins.

Glynn, Dylan (2012b). "Correspondence Analysis. An exploratory technique for identifying usage patterns", in: Dylan Glynn and Justyna Robinson (eds.): *Polysemy and Synonymy. Corpus methods and applications in Cognitive Linguistics*. Amsterdam: John Benjamins.

Glynn, Dylan (2012c). "Polysemy and synonymy. Corpus method and cognitive theory"", in: Dylan Glynn and Justyna Robinson (eds.): *Polysemy and Synonymy. Corpus methods and applications in Cognitive Linguistics*. Amsterdam: John Benjamins.

Glynn, Dylan and Krawczak, Karolina (in press). "Social cognition, Cognitive Grammar and corpora. A multifactorial approach to epistemic modality", *Cognitive Linguistics*.

Greenacre, Michael (2007). *Correspondence Analysis in Practice.* London: Chapman & Hall.

Gries, Stefan Th. (1999). Particle movement: A cognitive and functional approach. *Cognitive Linguistics* 10: 105-145.

Gries, Stefan Th. (2003). *Multifactorial Analysis in Corpus Linguistics: A study of particle placement.* Continuum: London.

Gries, Stefan Th. (2006). Corpus-based methods and cognitive semantics: the many meanings of *to run*", in: Stefan Th. Gries and A. Stefanowitsch (eds.): *Corpora in cognitive linguistics: corpus-based approaches to syntax and lexis*, Berlin: Mouton de Gruyter, 57-99.

Gries, Stefan Th. (2010). "Behavioral Profiles: A fine-grained and quantitative approach in corpus-based lexical semantics", *Mental Lexicon* 5, 323-346.

Gries, Stefan Th. and Dagmar S. Divjak (2009). "Behavioral profiles: A corpus-based approach towards cognitive semantic analysis", in: Vyvyan Evans and Stephanie Pourcel (eds.): *New Directions in Cognitive Linguistics*, Amsterdam: John Benjamins, 57-75.

Janda, Laura and Solovyev, Valery (2009). "What constructional profiles reveal about synonymy: A case study of the Russian words for SADNESS and HAPPINESS", *Cognitive Linguistics* 20, 367-393.

Klavan, Jane (2012). A multifactorial analysis of grammatical synonymy. The Estonian adessive and adposition *peal* 'on'", in: Dylan Glynn and Justyna Robinson (eds.): *Polysemy and Synonymy. Corpus methods and applications in Cognitive Linguistics*. Amsterdam: John Benjamins.

Krawczak, Karolina & Glynn, Dylan (2011). Context and cognition. A corpus-driven approach to parenthetical uses of mental predicates", in: Krzysztof Kosecki and Janusz Badio (eds.): *Cognitive Processes in Language*, Frankfurt/Main: Peter Lang, 87-99.

Krawczak, Karolina (this volume). "Shame and its near synonyms in English: A multivariate corpus-driven approach to social emotions".

Kövecses, Zoltán (1986). *Metaphors of Anger, Pride, and Love*. *A lexical approach to the structure of concepts*. Amsterdam: John Benjamins.

Levshina, Natalia (2012). Comparing constructicons: A usage-based analysis of the causative construction with *doen* in Netherlandic and Belgian Dutch. *Constructions and Frames* 4, 76-101.

Shank, Cristopher, Plevoet, Koen and Cuyckens, Hubert (2012). "A diachronic corpus-based multivariate analysis of "I think *that*" vs. "I think zero"", in: Dylan Glynn and Justyna Robinson (eds.): *Polysemy and Synonymy. Corpus methods and applications in Cognitive Linguistics*. Amsterdam: John Benjamins.

Soriano, C., Fontaine, J., Ogarkova, A., Mejia, C., Volkova, Y., Ionova, S. and V. Shakhovskyy (in press). "Semantic types of anger in Spanish and Russian", in: J. Fontaine *et al.* (eds.): *Components of Emotional Meaning*. Oxford: Oxford University Press.

Speelman, Dirk and Glynn, Dylan (2005). LiveJournal Corpus of British and American online personal diaries. University of Leuven.

Vorkachev, Sergei (2007). *Любовь как лингвокультурный концепт*. Moscow: Gnozis

Wierzbicka, Anna. 1985. *Lexicography and Conceptual Analysis*. Ann Arbor: Karoma.

Wulff, Stefanie (2006). "*Go*-V vs. *go-and*-V in English: A case of constructional synonymy?", in: Stefan Th. Gries and Anatol Stefanowitsch (eds.): *Corpora in Cognitive Linguistics. Corpus-based approaches to syntax and lexis*, Berlin: Mouton de Gruyter, 101-126.

Abstract
Developing empirical methods for the description of emotion concepts that are sensitive social variation represents an important goal in both linguistics and psychology. This study demonstrates the feasibility of using Multivariate Usage-Feature analysis (also termed Profile-Based Analysis) as a means for mapping such social-conceptual structure. The case study examines ANGER in American and British English with data from personal on-line diaries. Three underlying conceptual structures are identified, each determined relative to types of causes and responses associated with the ANGER event. The study employs multiple correspondence analysis to identify these patterns.

Résumé
Le développement des méthodes empiriques pour la description des concepts d'émotion qui sont sensitives à la variation sociale reste un objectif important pour la linguistique et la psychologie. Cette étude démontre la faisabilité de l'application de l'analyse componentielle et multivariée de traits linguistiques d'usage (*usage-feature analysis* ou *profile-based analysis*) pour la description de telle structure socio-conceptuelle. L'étude de cas examine le concept de ANGER (COLERE) en anglais britannique et américain et est basée sur les extraits des journaux intimes électroniques. Trois structures sous-jacentes sont identifiées, chaque structure déterminée par variations dans les causes et les réponses de l'événement de colère. L'étude emploi l'analyse des correspondances multiples pour identifier ces tendances quantitatives (*patterns*).