# An Annotated Bibliography of Affective Natural Language Generation*

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## Contents



## 1 Introduction

This annotated bibliography is an attempt to present an overview of papers which are directly dealing with *affective natural language generation* (affective NLG) and, additionally, studies into *affect in language* from empirical, descriptive, philosophical and linguistic perspectives. There is a variety of views on how affective NLG and more generally affect in language should be defined. We have collected a number of these definitions. We included all studies which we encountered and which matched at least one of the definitions. In other words, we cast our net fairly widely when collecting papers for this bibliography. Nevertheless, it is impossible to claim completeness: whereas we believe that a substantial part of the studies on affective NLG is included, this cannot be said for studies into the wider field of affect in language. Here, there is such a wealth of papers by psychologists, linguists, sociolinguists and others that we had to content ourselves with a limited survey of the field. It also has to be stressed that we have excluded studies which focus on how affect can be expressed in speech by means of, for instance, pitch, intensity and duration. Roughly speaking, our concern is with how affect influences content selection, grammatical realization and lexical choice.

When one is looking for the definition of a word, an obvious place to start is the dictionary. In the Electronic New Shorter Oxford English Dictionary the, for our purposes, relevant sense of the adjective 'affective' is defined in terms of the noun 'affection':

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> **affective** ... **2.** Of or pertaining to the affections; emotions. ...
> **affection** ... **I** Of the mind. **1.** A mental state; an emotion, a feeling. ...

The core notion here is that of *emotion*. This is reflected in the definition of de Rosis and Grasso (2000) of Affective Natural Language Generation:

> NLG that relates to, arises from or deliberately influences emotions or other non-strictly rational aspects of the Hearer.

De Rosis and Grasso consider 'personality traits, emotions and highly-place values' to be non-strictly rational aspects of the Hearer. According to them 'Attitudes' is the appropriate generic term.

Whereas in the definition of de Rosis and Grasso the hearer is central, Hovy (1988) takes the speaker and her or his opinions as his starting point. According to him affect is concerned with techniques which allow the speaker to *slant* a text in her or his favour, i.e., to introduce a certain *bias* into the text. To do this properly the speaker will have to '[...] distinguish between what the hearer is likely to find sympathetic, what he or she is likely to dislike, and what he or she is likely not to care about much' (Hovy, 1988:58). According to Hovy, only three values are needed for this purpose: good, bad and neutral.

In linguistics, a notion closely related to that of affect has gained some currency. The notion in question is that of *stance*. The term 'stance' is defined from the speaker's perspective:

> In addition to communicating propositional content, speakers and writers commonly express personal feelings, attitudes, value judgements, or assessments; that is, they express a 'stance'. (Biber et al., 1999:966)

This characterization of stance in terms of personal feelings, attitudes, etc. is strongly related to the notion of affect.

The strict separation between stance and propositional content which is suggested by this definition is, however, misleading. Some of the examples which Biber et al. themselves put forward illustrate that this separation cannot be maintained. Sometimes the propositional content and the stance which is expressed by an utterance are the same, as in:

> I'm not happy. (Biber et al., 1999:969)

Here the proposition is expressed *that the speaker is not happy*. This proposition coincides with the communicated stance of the speaker.

In Hunston and Thompson (2000), the term evaluation is used. This edited volume consists of a number of papers on the topic. It starts with a very illuminating introduction by the editors. In this introduction, three functions of evaluation are discerned: (1) to express an opinion, (2) to construct and maintain relations and (3) to organize discourse. Examples of evaluation which illustrate these three functions are provided. All chapters of the book are preceded by a short introduction by the editors.

We have seen that various terms have been used instead of the word 'affective'. In particular, the following terms are closely related to the term 'affect': appraisal, attitude/attitudinal meaning, bias, connotation, evaluation, opinion, slanting and stance.

The few definitions of affect and related terms which we have discussed give a rough impression of the scope of this bibliography. The bibliography is, however, somewhat more focussed than these definitions might suggest. In particular, the primary concern of this bibliography are studies which can be used to inform the construction of NLG *algorithms* which take affect into account. As background reading, Reiter & Dale (2000) provides a good overview of NLG from an engineering perspective. Readers who are interested in psycholinguistic investigations into NLG are referred to Levelt (1995).

A less strong bias of this bibliography is towards affective NLG for communicating *agents*, in particular, agents which communicate in a *dialogue* setting. Bradshaw (1997) contains a collection

of papers on software agents. More recently a volume has appeared on Embodied Conversational Agents edited by Cassell et al. (2000). A special issue of Applied Artificial Intelligence on 'Animated Interface Agents' appeared in 1999 (André, 1999). Gratch et al. (2002) reports on a workshop on Virtual Humans at the University of Southern California. Picard (1997) addresses the wider issue of 'Affective Computing'. She discusses '[...] what it might mean for computers to recognize, express, and "have"emotions, as part of efforts to make them more intelligent, friendly, and capable'. (Picard 1997:85)

**References**


André, E. (ed.) (1999). *Applied Artificial Intelligence Journal, Special Double Issue on Animated Interface Agents*. 1999, Vol. 13, No. 4-5.

Biber, D. S. Johansson, G. Leech, S. Conrad and E. Finegan (1999). *Longman Grammar of Spoken and Written English*, Harlow: Longman.

Bradshaw, J.M. (1997). *Software Agents*. AAAI Press/The MIT Press, Menlo Park, California.

Cassell, J., J. Sullivan, S. Prevost and E. Churchill (2000). *Embodied Conversational Agents*, MIT Press, 220–255.

Gratch, J., J. Rickel, E. André, J. Cassell, E. Petajan, N. Badler (2002). 'Creating Interactive Virtual Humans: Some Assembly Required'. *IEEE Intelligent Systems*, July/August 2002, 54–63. (see also: http://www.ict.usc.edu/∼vhumans/)

Levelt, W. (1995), *Speaking: From Intention to Articulation*. MIT Press, Cambridge, Massachusetts.

Picard, R.W. (1997). *Affective Computing*. The MIT Press, Cambridge, Massachusetts.

Reiter & Dale (2000). *Building natural language generation systems*. Cambridge University Press, Cambridge.


# 2 Affective NLG: Systems and Computational Theories


Allbeck, J. & N. Badler (2002). 'Toward Representing Agent Behaviors Modified by Personality and Emotion'. In: *Proc. of AAMAS Workshop 'Embodied Conversational Agents: Let's Specify and Compare Them!'*, Bologna, Italy, July 2002.

André, E., T. Rist, S. van Mulken, M. Klesen & S. Baldes (2000). 'The Automated Design of Believable Dialogues for Animated Presentation Teams', In: J. Cassell, J. Sullivan, S. Prevost and E. Churchill: *Embodied Conversational Agents*, MIT Press, 220–255.

Describes two systems which can generate dialogues between presentational agents. The first system uses a top-down planner to generate a complete script for the dialogue, which is then executed by means of the Microsoft Agents Player technology. The second system allows for two agents to provide real-time soccer commentaries (for the RoboCup league).

Ball, G. & J. Breeze (1998). 'Emotion and Personality in a Conversational Character'. In: *Proceedings of the Workshop on Embodied Conversational Characters*, Lake Tahoe, CA, 1998, 83–86.

De Carolis, B., V. Carofiglio, C. Pelachaud & I. Poggi (2001). 'Interactive Information Presentation by an Embodied Animated Agent'. In: *Proceedings of the International Workshop on Information Presentation and Natural Multimodal Dialogue*, Verona, Italy, 14–15 December 2001, 19–23.

Describes the architecture of a multimodal believable agent. The agent has a personality and a social role. The paper contains some examples of the Affective Presentation Markup Language (APML).

De Carolis, B., V. Carofiglio, M. Bilvi & C. Pelachaud (2002). 'APML, a Mark-up Language for Believable Behavior Generation'. In: *Proc. of AAMAS Workshop 'Embodied Conversational Agents: Let's Specify and Compare Them!'*, Bologna, Italy, July 2002.

Describes the Affective Presentation Markup Language (APML).

Devillers, L., I. Vasilescu & L. Lamel (2002). 'Annotation and Detection of Emotion in a Task-oriented Human-Human Dialog Corpus'. In: *Proc. of ISLE Workshop 'Dialogue Tagging for Multi-Modal Human Computer Interaction'*, Edinburgh, Scottland, December 2002.

Fabri, M., D. Moore and D. Hobbs (2002). 'Expressive Agents: Non-verbal Communication in Collaborative Virtual Environments'. In: *Proc. of AAMAS Workshop 'Embodied Conversational Agents: Let's Specify and Compare Them!'*, Bologna, Italy, July 2002.

Includes description of a controlled experiment to study user ability to interpret faces of avatars pre-prepared to express specific emotions.

Fleischman, M & E. Hovy (2002). 'Towards Emotional Variation in Speech-Based Natural Language Generation', In: *Proceedings of the Second International Natural Language Generation Conference (INLG02)*, 1–3 July, Arden Conference Center, Harriman, NY, USA, 57–64.

Describes a generation algorithm which takes as its input a case frame and the speaker's emotional attitudes (an integer in [-5,5]) towards the events and objects which are to be described. The underlying emotion model is based on appraisal theories (e.g., Ortony et. al, 1988; Lazarus, 1991). Firstly, object descriptions are generated. The algorithm selects the description whose default emotional shade (these shades are stored in the lexicon) is closest to that of the speaker's emotional attitude towards the object. Secondly, the main verb is selected. Verbs are associated with an overall emotional connotation of the verb itself, and with the emotional shades that the verb conveys about each of its arguments. Given the input, semantically adequate verbs are assigned an emotional score by summing the distances between on the one hand the speaker's emotions about the event and the objects involved, and on the other hand the corresponding emotional connotations associated with the verb and its arguments. The total score associated with a verb (or more precisely, verb group, since also passives are included) is based on the emotional score and the informational score. The informational score is the number of slots from the input frame that are realized by the verb. The precise formula is: Total Score(x) = $\alpha$ Info(x) − (1 − $\alpha$) EmotScore(x). The verb with the highest score is selected (retaining information from the input is rewarded, whereas a high emotional score, that is a big distance between input and realization emotions, is penalized. $\alpha$ determines the weight of these two factors; it is hypothesized to correspond with the speaker's personality). The paper contains some evaluation which yielded a statistically significant correlation between human judgements of the emotion of generated expressions and the speaker attitudes used for generation. The research is being carried out in the context of the Mission Rehearsal Exercise (MRE) virtual training environment (see, e.g., Rickel et al., 2002).

Grasso, F., A. Cawsey & R. Jones (in press). 'Dialectical argumentation to solve conflicts in advice giving: a case study in the promotion of healthy nutrition', *International Journal of Human Computer Studies*.

Provides a formalization of a theory of informal argumentation (Perelman & Olbrechts-Tyteca, 1969). In a plan-based language a number of argumentative patterns are encoded. The dialogues which are studied involve advice giving in order to change behaviour (in particular, on healthy

nutrition). Conflict situations are considered which arises from differences in opinion between the interlocutors.

Höök, K. (2002). 'Evaluation of Affective Interfaces'. In: *Proc. of AAMAS Workshop 'Embodied Conversational Agents: Let's Specify and Compare Them!'*, Bologna, Italy, July 2002.

Discusses four studies into affective interfaces. In particular, a number of problems which one encounters when carrying out such studies are highlighted.

Hovy, E. H. (1988). *Generating Natural Language Under Pragmatic Constraints*. Lawrence Erlbaum, Hillsdale, New Jersey.

Contains a detailed description of the PAULINE (Planning And Uttering Language In Natural Environments) system. The general question which Hovy addresses is how to generate a text from a knowledge base given a certain set of situational factors, such as the interlocutors' factual knowledge, opinions, emotional states, etc. Hovy argues that an intermediate level of rhetorical goals is required. Situational factors cannot be related directly and in a transparent manner to generator production decisions. Hovy discerns rhetorical goals of opinion and rhetorical goals of style. He also stresses that some of these goals are different in nature from the goals that are common in the AI planning literature. The rhetorical goals are never fully satisfied and removed. Rather, during the generation process the extent to which they are being satisfied is continuously monitored (see pp. 136–139).

Jameson, A. (1989). 'But what will the listener think? Belief ascription and image maintenance in dialog systems'. In: A. Kobsa & W. Wahlster (Eds.), *User models in dialog systems*. Berlin: Springer Verlag. 255–312.

Describes a model of how speakers go about influencing the image that the listener has of their dialog motivation and their model of the listener. An implementation of the model which simulates everyday dialog in a restricted domain was used to carry out the study.

Jameson, A., R. Schäfer, J. Simons & T. Weis (1995). 'Adaptive Provision of Evaluation-Oriented Information: Tasks and Techniques'. In: *Proceedings of the 14th International Joint Conference on Artificial Intelligence*, Montreal, August, 1995.

Paper on the PRACMA dialogue system.

Kantrowitz, M. (1990), 'GLINDA: Natural Language Text Generation in the Oz Interactive Fiction Project'. *Technical Report CMU-CS-90-158*, School of Computer Science, Carnegie Mellon University, Pittsburgh, PA, July 1990.

Reports on work which has been carried out in the context of the Oz project at CMU. See also Loyall & Bates (1997) and Reilly (1996). Situational information is propagated during natural language generation by means of features. Features can license various types of rules (information structure, syntax, lexicon, etc). These rules can change features, block them and introduce new ones.

Lester, J.C., J.L. Voerman, S.G. Towns, C.B. Callaway (1999). 'Deictic Believability: Coordinated Gesture, Locomotion, and Speech in Lifelike Pedagogical Agents'. In: E. André (ed.): *Applied Artificial Intelligence Journal, Special Double Issue on Animated Interface Agents*. 1999, Vol. 13, No. 4-5, 383–414.

Loyall, A.B. (1997). 'Believable Agents: Building Interactive Personalities'. Ph. D. thesis, CMU, Tech report CMU-CS-97-123,

Loyall, A.B. & J. Bates (1997). 'Personality-Rich Believable Agents That Use Language'. In: *Proceedings of the first International Conference on Autonomous Agents*, Marina Beach Marriott Hotel, Marina del Rey, California, February 5-8, 1997.

Describes the Hap behaviour based architecture which was developped in the Oz project at CMU. The Hap architecture is intended for agents that "perform actions and use natural language in interactive, animated real-time worlds".

Moffat, D. (1997). 'Personality parameters and programs'. In: R. Trapl & P. Petta (eds.): *Creating Personalities for Synthetic Actors*. Springer Verlag. 120–165.

Nakanishi, H., S. Nakazawa, T. Ishida & K. Takanashi(2002). 'Using Balance Theory to Understand Social Agents'. In: *Proc. of AAMAS Workshop 'Embodied Conversational Agents: Let's Specify and Compare Them!'*, Bologna, Italy, July 2002.

Includes description of an experiment to study the interaction between human-human relations and agent-human relations.

Nitta, K., O. Hasegawa, T. Akiba, T. Kamishima, T. Kurita, S. Hayamizu, K. Itoh, M. Ishizuka, H. Dohi, and M. Okamura (1997). 'An Experimental Multimodal Disputation System'. In: *Proc. of the IJCAI-97 Workshop on Intelligent Multimodal Systems*, Nagoya, 1997.

This paper discusses an experimental multimodal disputation system called Mr. Bengo. The system presents three agents to the user: a judge, a prosecutor and a defense attorney. The defense attorney can be controlled by the user (The user can determine which disputation moves it should make). Each agent's face is displayed and facial expressions are used to convey the agent's perception of the dispute (i.e., whether the dispute is going in a direction which yields a favourable or unfavourable conclusion from the agent's point of view).

Piwek, P. & K. van Deemter (2002). 'Towards Automated Generation of Scripted Dialogue: Some Time-honoured Strategies'. In: *Proceedings of EDILOG (6th Workshop on the Semantics and Pragmatics of Dialogue)*, Bos, J. & C. Matheson (eds), Edinburgh, September 4–6, 2002.

Scripted dialogue is defined as a dialogue which is performed by two or more agents on the basis of a description of that dialogue. This script specifies the actions which are performed in the course of the dialogue and their temporal ordering. On the basis of example dialogues, three categories of strategies for influencing the audience of a scripted dialogue are discerned: strategies of information distribution, association and emphasis. The research is carried out in the context of the NECA project (see http://www.ai.univie.ac.at/NECA/).

Piwek, P., B. Krenn, M. Schröder, M. Grice, S. Baumann & H. Pirker (2002). 'RRL: Rich Representation Language for the Description of Agent Behaviour in NECA'. In: *Proc. of AAMAS Workshop 'Embodied Conversational Agents: Let's Specify and Compare Them!'*, Bologna, Italy, July 2002.

Proposes a representation language for various types and levels of information, including emotion, for specifying agent behaviour.

Piwek, P. (2003) 'A Flexible Pragmatics-driven Language Generator for Animated Agents'. In: *Proceedings of EACL03 (Research Notes)*, Budapest.

Describes the multimodal natural language generation (MNLG) platform of the NECA project. The generator allows for variation of the generated language and gestures based on a number of situational parameters, including emotion.

Prendinger, H. & M. Ishizuka (2001). 'Agents That Talk Back (Sometimes): Filter Programs for Affective Communication'. Contribution to: *Second Workshop on Attitude, Personality and*

*Emotions in User-adapted Interaction* (in conjunction with User Modeling 2001), Sonthofen, Germany, July 13, 2001.

Build on top of the microsoft agents player technology. Involves a scenario in a virtual coffee shop. The user interacts with an animated agent portraying a waiter. They use Moulin and Rousseau's (2000) approach to modelling conversation. Furthermore, for their model of emotions they draw on Ortony, Clore and Collins (1988). They use Moffat's (1997) model of personality to bias an agent's emotion expression. The personality model takes into account extraversion and agreeableness. Additionally they take into account the social relations between the speaker and the hearer. Some of the ideas are taken from work by Walker et al. (1997). To combine all this information they use so-called filter rules. The paper does not go into the details of natural language realization of the aforementioned information.

Reilly, W. Scott Neil (1996). *Believable Social and Emotional Agents*. PhD. Thesis, Carnegie Mellon University, Pittsburgh.

Includes models for negotation behaviour in dialogues. Reports on work which has been carried out in the context of the Oz project at CMU. See also Kantrowitz (1990) and Loyall & Bates (1997).

Rickel, J., S. Marsella, J. Gratch, R. Hill, D. Traum & W. Swartout (2002). 'Toward a New Generation of Virtual Humans for Interactive Experiences'. *IEEE Intelligent Systems*, July/August 2002, 32–38.

Describes the Mission Rehearsal Exercise project. The aim is to build a training platform for the US Army. It involves a human user interacting with three autonomous virtual humans in a virtual environment. Further virtual humans are scripted characters. It incorporates the work reported in Fleischman & Hovy (2002) on emotional natural language generation.

de Rosis, F. & F. Grasso (2000). 'Affective Natural Language Generation'. In: A.M. Paiva (Ed.), *Affective Interactions*, Springer Lecture Notes in AI 1814, 204–218.

Highlights issues in Affective NLG by discussing explanation texts in the domain of drug prescription. They warn for uncritical use of Grice's maxims and, for instance, aggregation. They raise the issue that sometimes a speaker might not want to aggregate, in order to emphasize some piece of information.

Velásquez, J. (1997). 'Modeling Emotions and Other Motivations in Synthetic Agents.' In: *Proceedings of the Fourteenth National Conference on Artificial Intelligence (AAAI-97)*. Providence, RI: MIT/AAAI Press.

Walker, M.A., J.E. Cahn & S.J. Whittaker (1996). 'Linguistic Style Improvisation for Lifelike Computer Characters'. In: *Proceedings of the AAAI Workshop on AI, ALife and Entertainment*, Portland.

Presents a detailed computational theory (following Brown & Levinson, 1987) for choosing the linguistic form of a speech act (in particular, the level of indirectness) on the basis of the threat of a speech act (computed on the basis of the social distance, the power that the hearer has over the speaker and the ranking of imposition of the speech act).

# 3 Affect in Language: Linguistic, Descriptive and Empirical Work

Biber, D. S. Johansson, G. Leech, S. Conrad and E. Finegan (1999). *Longman Grammar of Spoken and Written English*, Harlow: Longman.

Chapter 12 is about 'The grammatical marking of stance.' (See the introduction of this bibliography for Biber et al.'s definition of stance).

Brown, P., & S.C. Levinson (1987). *Politeness: Some Universals in Language Usage*. Cambridge University Press, Cambridge.

Bruce, R. and J. Wiebe (2000). 'Recognizing subjectivity: A case study of manual tagging', *Natural Language Engineering*, **6**(2).

Burton, D. (1980). *Dialogue and discourse: A sociolinguistic approach to modern drama dialogue and naturally occurring conversation*. Routledge, London.

Burton, D. (1982). 'Conversation Pieces'. In: R. Carter & D. Burton (eds.): Literary Text and Language Study, Edward Arnold, London, 86–111.

Contains a dialogue analysis of a fragment of a play by Harold Pinter called 'The Dumb Waiter'. It provides a nice illustration of how social relations are established/reflected by dialogue acts.

Culpeper, J. (1998). '(Im)politeness in dramatic dialogue'. In: *Exploring the language of drama*, J. Culpeper, M. Short and P. Verdonk (Eds.), Routledge, London, 83–95.

Edmonds, P. & G. Hirst (2000). 'Reconciling fine-grained lexical knowledge and coarse-grained ontologies in the representation of near-synonyms'. In: *Proceedings of the workshop on Semantic Approximation, Granularity and Vagueness (associated with KR-2000)*, Breckenridge, Colorado, 12–22.

The paper presents a model for representing fine-grained lexical knowledge.

Furnham, A. (1990). 'Language and Personality'. In: H. Giles & W.P. Robinson (eds.): *Handbook of Language and Social Psychology*, John Wiley & Sons, Chichester, UK, 73–95.

Gill, A. and Oberlander, J. (2002). 'Taking care of the linguistic features of extraversion'. In: *Proceedings of the 24th Annual Conference of the Cognitive Science Society*, Fairfax VA, August 2002, 363–368.

Contains a study on the influence of extraversion/introversion on language production. The basis is a corpus of email texts from persons for whom a categorization on the basis of Eysenk's personality test was available.

Hatzivassiloglou, V. and J. Wiebe (2000). 'Effects of Adjective Orientation and Gradability on Sentence Subjectivity'. In: *Proc. of COLING-2000*, Saarbrücken.

Herman, V. (1995) . *Dramatic Discourse. Dialogue as Interaction in Plays*. Routledge, London.

Hickey, L. (1990). *The Pragmatics of Style*. Routledge, London and New York.

Chapter 6: 'Speech styles in conversation as an interactive achievement' by M. Selting (pp. 106–132). Discusses the dynamics of the social relation between interlocutors. Examples are taken from a conversation at the dept. of social services. In particular, the choice between standard language and dialect/informal language is linked to the distance between speaker and hearer. Chapter 7: 'Discourse control in confrontational interaction' by J. Thomas (pp. 133–156). Describes how interlocutors can use specific devices (e.g., discourse markers) to signal the relation between them.

Hunston, S. & G. Thompson (2000). *Evaluation in Text: Authorial Stance and the Construction of Discourse*, Oxford University Press, Oxford.

Table of Contents:

1. Evaluation: An Introduction (G. Thompson & S. Hunston)
2. Persuasive Rhetoric in Linguistics: A Stylistic Study of Some Features of the Language of Noam Chomsky (M. Hoey)
3. Corpus-Based Analyis of Evaluative Lexis (J. Channell)
4. Adverbial Marking of Stance in Speech and Writing (S. Conrad & D. Biber)
5. A Local Grammar of Evaluation (S. Hunston & J. Sinclair)
6. Evaluating Evaluation in Narrative (M. Cortazzi & L. Jin)
7. Evaluation and Organization in Text: The Structuring Role of Evaluative Disjuncts (G. Thompson & J. Zhou)
8. Beyond exchange: APPRAISAL Systems in English (J. Martin)
9. Evaluation and the Planes of Discourse: Status and Value in Persuasive Texts (S. Hunston)

Kuno, S. & E. Kaburaki (1977). 'Empathy and Syntax'. *Linguistic Inquiry, Volume 8, Number 4*, 627–672.

Kuno & Kaburaki aim to show that empathy has important influences on syntax. Empathy 'is the speaker's identification, *with varying degrees* (ranging from 0 to 1), with a person who participates in the event that he describes in a sentence'. (p. 628)

Lazarus, R.S. (1991). *Emotion and Adaptation*. Oxford University Press.

Leech, G. (1983). *Principles of Pragmatics*. Longman, London.

In chapter 5 Leech discusses "The Tact Maxim". Chapter 6 provides "A survey of Interpersonal Rhetoric".

Moulin, B. & D. Rousseau (2000). 'An Approach for modeling and simulating conversations'. In: Vanderveken, D. &. S. Kubo (eds.): *Essays in Speech Act Theory*. John Benjamins.

Oatley, K. & P. Johnson-Laird (1998). 'The Communicative Theory of Emotions'. In: J.M. Jenkins, K. Oatley & N.L. Stein (Eds.), *Human Emotions. A Reader*, Blackwell, Oxford, 84–97.

Ortony, A., G. Clore & A. Collins (1988). *The Cognitive Structure of Emotions*. Cambridge University Press, Cambridge, MA.

A theory of emotions which has inspired various implementations.

Pang, B., L. Lee, and S. Vaithyanathan (2002). 'Thumbs up? Sentiment Classification using Machine Learning Techniques.' in: *Proceedings of EMNLP 2002*, University of Pennsylvania, Philadelphia, PA, USA. July 6-7, 2002

They apply machine-learning techniques for determining whether given movie reviews are positive or negative.

Perelman, C. & L. Olbrechts-Tyteca (1969). *The New Rhetoric: a treatise on argumentation*. University of Notre Dame Press, Notre Dame, Indiana.

Precht, K. (2000). *Patterns of Stance in English*. PhD. Thesis, Northern Arizona University.

'The study of stance examines the expression of emotion, attitude, certainty and doubt in language. Although there have been many studies on stance in recent years, there is no comprehensive study of individual stance markers across a large, multi-register corpus. This study uses a multi-dimensional approach to identify 1) identifying the main patterns of stance use in English, and 2) interpreting these stance patterns. The corpus for the study is the Longman Corpus of Spoken and Written English [...]' (Source: Linguist List Dissertation Abstract)

Walton, D. (1999). *One-Sided Arguments: A Dialectical Analysis of Bias*, SUNY, Albany.

Provides a wealth of examples of bias in various contexts: political, courtroom, scientific, sales, etc. Of particular interest are chapters 4 and 5. Chapter 4 deals with 'Indicators of bias in argumentation'. Chapter 5 is entitled 'Biased language'. Walton argues that the use of slanted language is not necessarily bad. A negative judgement is only warranted if the slanting was inappropriate in the context of a specific type of dialogue.

Wiebe, J., Bruce, R., Bell, M., Martin, M., & Wilson, T. (2001). 'A Corpus Study of Evaluative and Speculative Language'. In: *Proc. 2nd ACL SIGdial Workshop on Discourse and Dialogue*. Aalborg, Denmark, September, 2001.

Wiebe, J., Wilson, T., Bruce, R., Bell, M., & Martin, M. (2002). 'Learning subjective language'. (Extended version of a paper in submission to a journal.) *Department of Computer Science Technical Report TR-02-100* , University of Pittsburgh, Pittsburgh, PA.

Wierzbicka, A. (1999). *Emotions across languages and cultures: Diversity and Universals*. Cambridge University Press, Cambridge, MA.