

# Application of D-Script Model to Emotional Dialogue Simulation

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**Abstract.** In the present issue we discuss a rule-based model for emotional dialogue simulation. The model has been originally developed for description of affective (emotional) processing of mass media texts and also applies to several other types of emotional communication including conflict, complaint and speech aggression. In the proposed model we distinguish rules for “rational” inference (r-scripts) and rules for “emotional” processing of meaning (d-scripts). We consider that “affective” semantic components in text meaning are recognized by d-scripts and cause their activation, thus simulating speech influence. On the other side, d-scripts define “affective” semantic shifts in texts, which are produced in an emotional state or aimed to affect the listener.

## 1. Introduction

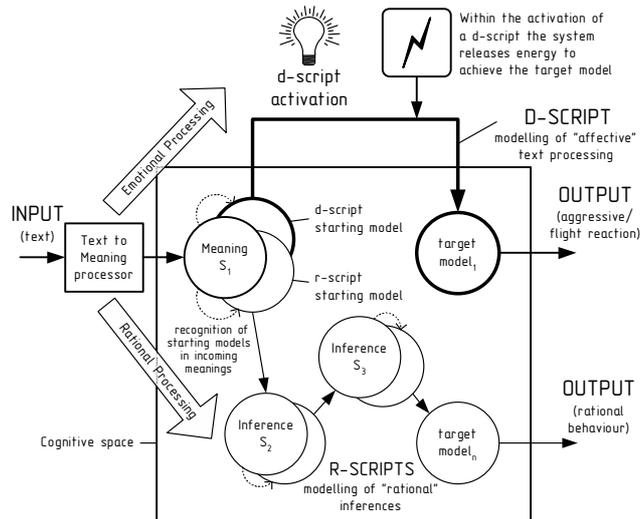
The interest to functional interpretation of emotional communication is recently growing in several areas of linguistics and computer studies. Linguistic studies of this area are explained not only by the desire to describe new material, but also by the requests from applied areas: above all, theory of advertising and practice of juridical linguistic expertise. Our interest in studies of affective text processing was initiated by requests from state and public institutions to work out a procedure of juridical linguistic text expertise for court examination on honour protection cases. As we expect the same theoretical model could be used to construct artificial agents, experiencing speech influence and producing induced utterances.

In our studies of natural text influence we have proposed a theoretical model with distinguished procedures for “emotional” and “rational” processing of text. The theory was intended to provide a theoretical base for a work of an expert during a text expertise on honour protection cases, information disputes or where it can be supposed, that a certain text is aimed to affect the audience of mass media.

In the proposed model the speech influence of mass media texts is described in a unified way with some other types of emotional communication, in particular – with some types of conflict, complaint, and speech aggression (varying in distribution of actants). In all these cases the model simulates speech influence and generates texts with the help of d-scripts – units for emotional meaning processing, which are opposed to r-scripts – units for rational text processing.

## 2. General Architecture of the Model

The model accepts text on input and constructs semantic representation with the help of Text-to-Meaning processor [6]. The model contains a number of rules – *scripts* – which can be activated by the constructed meaning. A script is activated by a meaning, which corresponds (though not always exactly) to the *starting model* of this script. Rational inferences from the meaning of incoming text are simulated by *rational scripts* - *r-scripts*. The other group of scripts is intended to simulate emotional processing of incoming texts. Following [3] we consider, that such units, responsible for simple, emotional reactions dominate during information processing, and they are designated as *dominant scripts* or *d-scripts*. The model reacts on utterances like (1) *The government is lying to you!* and (2) *The mayor thinks only about himself* – this reaction is described as an activation of specific d-scripts: phrase (1) activates d-script DECEPT (“Deception”) and phrase (2) activates d-script SUBJV (“Subjectivity”). Following our studies of mass media texts, we have selected a list of 13 d-scripts, quite sufficient to cover most of the negative propaganda in mass media.<sup>1</sup>



**Fig. 1.** General structure of the model for description of affective text processing

In addition to the behavioural output the model provides speech output from its internal components. In particular, the starting and target models of a d-script serve as meaning sources for the generation of emotional text.

The proposed architecture with the distinction of “rational” and “emotional” processing of meanings corresponds to the H-CogAff model discussed in [3, 4]. In particular, the mechanism of d-scripts is quite similar to *alarm system* in CogAff architecture and the concept of *protospecialists* in [2, p. 163-172]. D-scripts in the same way detect “critical” meanings in incoming texts (or in the results of inference, constructed during rational processing) and initiate affective reactions.

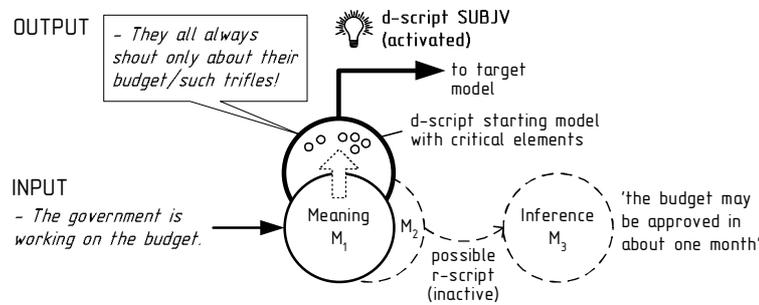
<sup>1</sup> See: <http://www.harpia.ru/d-scripts-en.html>

### 3. Example of a D-Script: SUBJV

We will become angry, if a person, who is our neighbour or relative, thinks only about himself or about some useless matter. The same corresponds to subjective actions of our boss or government. In this way we can be affected by utterances such as (3) *Your farther thinks only about his football* or (4) *The government is concerned only about it's salary*. The influence of such texts is simulated by the activation of one of the d-scripts: SUBJV (Subjectivity). The starting model of this script describes the situation of ‘subjectivity’ and includes slots AGGR – for the person or entity, whose actions seem to be subjective, and VICT – for the person, who is affected:

SUBJV(AGGR, VICT [, M<sub>1</sub>/P<sub>AGGR</sub>] [, M<sub>2</sub><sup>goal</sup>] [, M<sub>R</sub><sup>stimulus</sup>]):  
 AGGR doesn't consider relevant factors of the situation and is effecting or is going to effect [all the possible] actions P<sub>AGGR</sub> [upon discovering of situation M<sub>R</sub> or to achieve a goal M<sub>2</sub>]; AGGR and VICT are linked with a relation R<sub>AGGR-VICT</sub>.

Starting model of a d-script contains a list of *critical elements* – semantic markers, which describe preferable semantic shifts in emotional texts. For example one of the critical elements detects (and also produces) increased intensity of the main verb, which can mark implicit aggression of the speaker: *Why do you speak?* – neutral, vs. *Why do you shout?* – emotional [5]. A dialog-oriented realisation of the model could accept a phrase on input, activate a d-script, which is closer to it's meaning (suppressing alternative r-scripts), shift the meaning following the list of critical elements defined for the d-script and provide the text with shifted meaning on output.



**Fig. 2.** Activation of SUBJV d-script by a “neutral” text and feedback, experiencing several semantic shifts, as defined by the critical elements of SUBJV

We consider that examples with explication of critical elements are better recognised by d-scripts during text perception and can be easily constructed in an emotional state (following the activation of the respective d-script).

The same mechanism is used in several types of emotional communication, varying in the distribution of AGGR and VICT slots between the communicants. On one hand the proposed model activates d-scripts when receiving texts like (5) *Your mother doesn't tell you the truth* (it will consider itself as a victim - VICT, while 3<sup>rd</sup> person ‘mother’ – as an aggressor, AGGR) on the other hand, it can produce texts like

(6) *The government is always lying to you!* (when trying to affect the opponent and make him believe, he is a victim of some other aggressor) or (7) *You are always lying to me!* (in conflict communication, where the addressee is believed to be the aggressor). Different types of AGGR/VICT distribution are represented in Table 1.

**Table 1.** Expectations of addresser on the distribution of AGGR and VICT slots between the participants of communication

	Addresser	Addressee	3 <sup>rd</sup> party	Thesis of addresser
1.	VICT	AGGR	–	<b>Conflict.</b> <i>You are concerned only about your football! You, politicians, are only concerned how to speak well!</i>
2.	VICT	–	AGGR	<b>Complaint.</b> <i>My husband speaks only about his football!</i>
3.	VICT	VICT	AGGR	<b>“Communication of victims”</b> . <sup>2</sup> <i>Modern youth think only about dances!</i>
4.	–	VICT	AGGR	<b>Influence.</b> <i>The Government thinks only about their taxes!</i>
5.	AGGR	VICT	–	<b>Aggression.</b> <i>I’m going to kill you!</i> (for d-script DANGER)

In the present issue we have briefly represented the general architecture of a model for the processing of affective texts. We have defined, that affective processing is performed by specific components of the model – d-scripts. D-scripts apply to different types of emotional communication and define meaning shifts and selection of semantic components to appear in the text and, in some cases, to start a listener’s d-script. As we expect, the proposed model can be implemented in computer agents, simulating speech influence (activating d-scripts while processing “emotional” texts) or supporting “communication of victims” and conflict communication on the predefined object fields.

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<sup>2</sup> Communication of victims corresponds to game “Ain't It Awful”, described by E. Berne [1].