

Ambient Scripts in Humor and Beyond

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Abstract. The paper explores the mechanism of following scripts in inferring and reasoning, both in humor and, generally, in natural language, as a way of creating a base for acquisition and use of scripts in the computer.

Keywords: Humor · Formal humor theory · Script detection · Script computation

1 Introduction

Like [1] and several earlier papers, this article continues to deal with the notion of script, central to the dominant linguistic theories of humor [2–4]. We will capitalize again on the doctor/lover joke, which is well familiar to the humor research audience and, at the same time, is suitable to introduce the first-time or casual reader to this aspect of humor research. We will subject the text to the most detailed analysis at the script level trying to reconstruct completely the human reasoning in “getting” the joke in order to pave the way for the computer simulation of the same process. Contrary to the current, hopefully moribund trend in natural language processing, we will make no attempt to cheat out of the account for the full semantic process and by replacing it with machine learning statistical simulation of knowledge. We know it cannot work, and it is not our responsibility here to explain again to semantically naïve statisticians that we are in a different business that requires different tools—namely, access to the meaning of natural text.

2 Informal Analysis of the Joke

Here is the canonical form of the Doctor/Lover joke that we picked up from a rank-and-file American joke book of the 1930s:

“Is the doctor in?” the patient asked in his bronchial whisper. “No,” the doctor’s young and pretty wife whispered back, “Come right in!”

Let us talk through how an ordinary reader/hearer understands the joke. A man identified as a patient shows up at the door of a doctor’s residence and asks his wife whether the doctor is in. The wife says that he is not, and then invites him in. This definitely does not make sense, so the normal understanding process is defeated. Then it occurs to the reader/hearer that the wife was described as young and pretty and that she invited a man other than her husband to come in while the husband is away. This introduces a different situation, and the patient is reconceived as a (potential) lover.

As a not so remote a thought, a potential understanding with whisper may reveal itself here: the patient whispers because he has lost his voice but the wife may misinterpret it as a request for secrecy, which is typical for adultery.

Much of the material that forms part of the human understanding is missing from the short text. We can only guess that the conversation is happening at the door, probably after the patient knocked or rang the bell. We don't really care if the door is opened by the doctor's wife or they communicate through a home phone or over a crack between the chained door and the frame. It is even possible, in a rustic environment, that on a bright summer day, the wife is sitting on the veranda while the patient approaches. What somewhat complicates the perception of the joke in the late 20th and early 21st century is the association of the wife with the doctor's office because doctors do not typically see their patients in their homes with their wives serving as their assistants or nurses.

That SSTH turned out to be the sensation it was at the 2nd International Congress on Humor Research in Los Angeles back in 1979 [5] was easy to explain: most people congregated there were not researchers at all—the South Californian shrinks, comedians, and journalists had never heard of a theory in their lives. The small minority of humor researchers had heard or read about theories of aggression, liberation, and incongruity, and the content of the theory was “humor is (like) aggression/liberation/incongruity,” with perhaps another sentence thrown in to elaborate. The theory was an image, a metaphor, a comparison. It was one unknown thing “explained” in terms of another, probably not even less unknown thing. Those theories were like the “theory of benign violation.” SSTH imported the theoretical power of the then young Chomskian Linguistics, founded by a logician, and presented to the humor research “softies” by another logician. And it was empirically tested in 1991 [6].

It was presented as part and parcel of a formal semantic procedure of text representation developed outside of humor research and applied to humor research in strict accordance with the rules of linguistic application with an addition of one special resource, the list of typical script oppositions. Like all well-developed theories, it had a list of disclaimers, and this list of oppositions was one of them. The list was outlined in [2] and then re-compiled in [7]. It consisted of three mega-types of actual/non-actual, normal/abnormal, and plausible/implausible situations, and a list of under 20 typical oppositions related to those mega-types in unexplored ways. Sex/no-sex, good/bad, money/no-money were popular examples. The oppositions have since been addressed by various scholars in mostly atheoretical contexts, and the main challenge to SSTH was the hunt for the red counterexample: find a joke that has no script opposition.

Practically undetected was a much more major disclaimer, made explicitly in [2] but largely escaping notice. The theory was based on a fully developed formal meaning representation base that was not yet available, even though clearly in progress. As it was read and perceived the theory was the ham in the old cowboy joke about how they would, if they had only had ham, have made themselves ham and eggs, provided they had had eggs—eggs being the access to semantics. A couple of generations later, namely now, the eggs are in place: they are called the Ontological Semantic Technology [8–10], and ham is called the Ontological Semantic Theory of Humor (OSTH—[4]). So it seems to be the right time for the ham and eggs.

2.1 Script-Based Semantic Theory of Humor

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2.2 Scripts in Humor

We reviewed the early history of scripts [11–13] on multiple occasions, including [1], and since that paper ended long before getting to a real analysis of scripts, we will now quote a large chunk from it here, before bothering to paraphrase so as to escape capture by the plagiarism software (always, a highly humorous occasion!) before going boldly elsewhere.

The naïve and most obvious way of handling a script in SSTH was to present it as a set of sentences, each describing an individual part of a script. This is how it went for the Doctor/Lover joke: “a doctor was an adult human, who spent a considerable time at

a medical school in the past and now sees patients, diagnoses them, and prescribes medication. A lover was an adult person, who has had sex at least once to a person of the (then) opposite sex, to whom he or she was not married. A bit more formally, something like the sequence of events in Figs. 1 and 2 must take place to establish X as a doctor and Y as a lover.

X is a doctor if and only if:

1. X went to an accredited medical school and graduated from it.
2. X passed an extended internship
3. X was licensed as a physician
4. X has opened or joined a medical practice or a hospital
5. X treats patients on a regular basis by examining or listening to them, diagnosing their condition and sending them to tests or specialists and/or prescribing them medication

Fig. 1. “Script” for doctor

Y is a lover if and only if:

1. Y is a teenager or older
2. There is a Z of the opposite sex who is a teenager or older
3. Y and Z are not married to each other
4. Y and Z have had sex at least once

Fig. 2. “Script” for lover.

It was then, when considering the actual content of the scripts, that I discovered the powerful *but* operator: *Bob is a doctor but he never went to medical school*. But here indicates that going to a medical school is indeed a part of the script for doctor unlike having been to Africa: *Bob is a doctor but he never went to Africa* is not at all inappropriate and could easily tolerate the replacement of *but* by *and*. All the components of the scripts above were indeed *but*-tested.

We have now reached the stage when a humor researcher’s expertise is made salient for the rest of the paper and a novice reader has been introduced to what a humor researcher standardly knows about scripts. The rest of the paper deals with a close textual analysis in order to detect and identify scripts and to model this human capacity in the computers.

3 Scripts Beyond

To continue the quote from [1] for the last brief time, “Fig. 3 shows an abortive attempt [14] to incorporate scripts into pre-OST Ontological Semantics that OST has not yet picked up and incorporated. The *if/then*, *and*, and *or* logical operators had not, however, been actually incorporated into the system, even though semi-tacitly allowed in.

APPROACH-BANKRUPTCY

If	Or	company has cash problems company can't meet payroll company misses loan payment company seeks loan
Then		company may near bankruptcy

DECLARE-BANKRUPTCY

If	company declares bankruptcy
	And company files for Chapter 11
	Or court appoints receiver for company
Then	And company officers lose control company operates under receiver
	Or company stops operating company liquidates assets creditors get partial payment

Fig. 3. Two bankruptcy scripts

The scripts were developed for use in an application that would crawl the web and inform the officers of a company about the state of financial health of their partner companies, both suppliers and buyers. To my knowledge, such an application has not yet been implemented, and an expensive horde of human analysts continues to provide an imperfect service. Obviously, an Ontological Semantic implementation would process the phrases and sentences into its text-meaning representations (TMRs) and develop a TMR-manipulating calculus for using scripts for inferencing and, more broadly, for reasoning. This is what we are proceeding to investigate on the material of the Doctor/Lover joke.

3.1 Script Analysis

Pre-script Ontological Semantic Technology processes every sentence of the text and, proceeding linearly, identifies every word in the language-specific lexicon that has a footprint in the language-independent ontology, notes their links, and combines these words into a TMR on the basis of syntactic and, mostly, semantic links—see Fig. 4 for the overall architecture of OST, for humor in this picture, with its resources and processors:

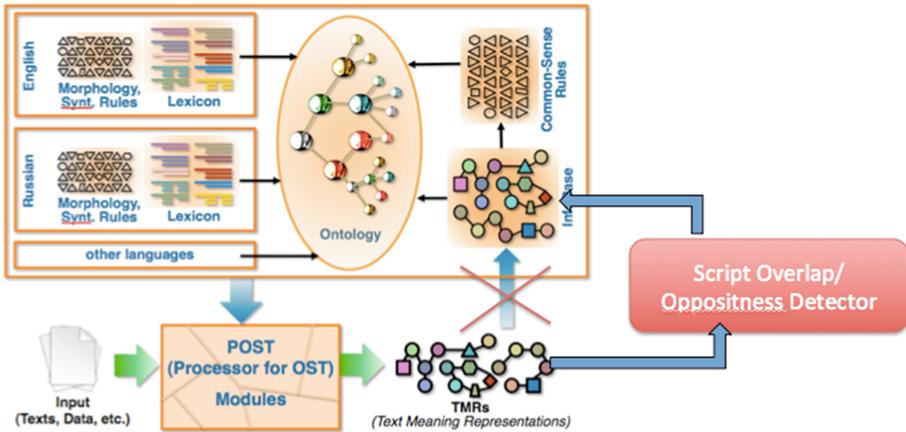


Fig. 4. OST architecture

The very first sentence of the joke contains the English words doctor and patient which are easily TMR-ed together on their ontological connection as per doctor seeing patient with a health condition, which is, incidentally, erroneously represented as bronchitis while, in fact, it must be pharyngitis for the voice to be lost. For a human understander of the text, the whole script is evoked that goes far beyond the ones on Figs. 1 and 2. Let us try and reconstruct it simplistically in Fig. 5:

This script is a very sketchy representation of a common human routine. It ignores appointments, ambulances, emergency house calls, helicopter rides, and many other additions and aberrations but it is a very commonly noun routine, a part of our knowledge of the world. Note that the joke barely covers the bold-faced part of the routine. Natural language always underdetermines reality [15, 16] but this short text leaves out an awful lot. It also violates the grain size [17]: we know nothing about the patient except for his gender but we learn more about the woman who opens the door, and in a common script, she could even be replaced by a buzz. We somehow know or assume that she is the doctor’s wife, which seems to follow from another script that spouses live together and the patient tries to see the doctor in his home office. And we find out that the woman is young and pretty. Young and pretty women are part of another script, that of sexual desirability for me (we are in the 1930s, remember?).

We are drowning in scripts, and this is why they are really ambient. Every word is a part of many different scripts, and every script may be split up in many more in response to a possible question. How young is the woman? How is she pretty? How is she dressed, or is she? Doctor’s wives, female aids, or female nurses are also part of stereotypes, which are not contingent or factually reliable scripts, probably a hundred years or so ago, they saw other men alone, often seeing them undressed and asking them for personal details.

Speaking of adultery, where is the husband and how possible it is to return while the pair is having sex. Is the patient interested, potent, married? What is his name, her name? Are there pets in the house? Children? Hired help? Is his car conspicuous on the parking lot. The joke is cleverly crafted, but any text in natural language maintains a

- Human discovers a health problem/symptom
- Human may try to handle it on his/her own by
 - Waiting and hoping for it to blow over
 - Trying homemade remedies
- When unsuccessful, human decides to seek medical help
- Human goes to see doctor
- **Human requests entrance to doctor's premises**
 - **Another human enables entrance**
 - **First human requests information about doctor's availability**
 - **Human obtains that information from the other human**
- If positive, human enters doctor's premises
- If negative, human seeks alternative(s) by
 - Waiting
 - Rescheduling
 - Seeking another doctor
- Human sees doctor tells him/her what the problem is
- Doctor examines human
- Doctor prescribes medication
- Human gets better

Fig. 5. Script for seeking medical help

certain relevant grain size, providing all the necessary information and refraining from unnecessary details. In the British sketch show of the 1970s, "The Two Ronnies," casting Ronnie Barker and Ronnie Corbett, the "Big Ronnie" and the "Little Ronnie," the latter had a middle-of-the-show recurring sketch, sitting in front of a fireplace in an oversized chair, attempting to tell a joke. The joke was hackneyed and easily recognizable but he never finished the delivery because he kept being distracted by small details. It was, actually, a gross exaggeration of a speech disorder that some people may develop in senility, so it is probably forbidden humor now, and one has not seen anything like that for decades. The point is that, "normally," competent speakers maintain the grain size of the information, and they stick to it in evoking the script as well.

It is clear that script evocation is part of understanding any natural language text. Humans are equipped with an incredibly rich inventory of scripts, all stored in the non-contingent part of our world knowledge. We also have an experience, first- or second-hand as well as based on literature, education, reading, films, etc., about various implementations of scripts and their interactions.

So how does it work in the joke? Pursuing the doctor script, we get to the point of attempting to see the doctor. The patient requests information about the doctor's availability, and he is ready for the positive and negative kind. What he gets, however, is a clear violation of the script: the doctor's wife invites him, and rather urgently so, while denying the doctor's availability. The patient must be puzzled but never more so

than the reader/hearer who is also operating on the Doctor script. We are dealing here with a typical inferencing/reasoning failure, so let us talk about that, never yet discussed in OST.

4 Inferencing and Reasoning in OST

Inferencing and reasoning have never really been adequately addressed in and around linguistics, which remains pretty much the science of the sentence. Correspondingly, classical Ontological Semantics [18] focused on the sentence-based seminar, assuming implicitly that, somehow, they will all blend together. Ontological Semantic Technology [8–10], again) has until now followed suit. Yet, all the NLP applications of any intellectual value require reasoning to summarize, update, and even recognize pertinent information.

There has been a lot of research into inferencing, and emulating it computationally in the computer, first, led to an exponential explosion, and second, was not based on real semantics. In description logic, it is also based on first-order logic, something natural language is unable to follow, as the failure of formal semantics clearly indicates.

Following the scripted routines provides access to the more obvious and common forms of reasoning, so identifying and storing as many scripts as possible should lead to at least an important part of reasoning if the computer can inference to the next phase of a script. Again, the ability not to regress infinitely into tiny details and rise to a coarser level, as humans routinely do, is important also. What is next in order, then, for OST is to develop the techniques of script detection and recording for computer use as well as the mechanisms for using their information effectively in a TMR. The already existing resources in OST pave much of the way there.

5 How to Get the Computer to Get the Joke

We have always maintained that humor is a very effective testing ground for other disciplines. For linguistic semantics, jokes provide a semi-structured, mostly short text with known components, such as two scripts and the mechanism of triggering the change. In the Doctor/Lover joke, this is how human reasoning works.

Stumped in the middle of the Doctor script on Fig. 5, we reject the script as inappropriate. Peter Derks' 1991 demonstration of the MRI of his brain processing an unfamiliar joke, shows a moment of total collapse of the cognitive attempt to process the text, followed by a very short pause, followed by the second successful cognitive attempt. This second attempt is the search of an alternative script.

It is reasonable to assume that second attempt is the search of a script that has the new situation, puzzling for the first script, as a natural sequential stage, as indeed for two people of the opposite sex, not married to each other, to use an opportunity for sex when their spouses are not around. The search for the alternative script is greatly facilitated by a reasonably small list of common script oppositions covering an enormous number of different jokes, and the sex/no-sex opposition invites itself into humor reasoning pervasively.

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