

# The Quantum of Language: A Metaphorical View of Mind Dimension

Svetlana Machova and Jana Kleckova

University of West Bohemia,  
Department of Computer Science and Engineering, Univerzitni 8,  
306 14, Plzen, Czech Republic  
{smachova, kleckova}@kiv.zcu.cz

**Abstract.** In this article, we are focusing on metaphor of mental states examining hidden dimension of the human mind and its interaction with a world. Our natural language research methodology were included constructing a database of metaphorical stimuli, randomly presenting these to participants, and tabulating FAE responses both by participant and by the stimulus, analyzed by frequency of semantic type. The project aimed to produce a new model of knowledge representation. Acquired data suggest that mind's metaphoric self-reflection semantics closely correlate with entangled quantum particles and light binding phenomena. Created semantic network gave us a unique opportunity to visualize the probabilistic picture of mind itself within an interdisciplinary approach of cognitive and computational networking studies.

**Keywords:** Semantics, NLP, Free Associations, Quantum linguistics, Mind.

## 1 Introduction

This paper proposed a new method representing a cognitive dimension of mind based on the psychoanalytic methodology of Free Association Test and Lakoff's cognitive metaphor theories. Common sense view of mind self-perception is an important tool representing a general approach specifying default reasoning.

There are several models describing how the mind works in the realm of ideas. The first is a W.Humboldt's theory describing human speech ability as a spirit of language. The second is an A. Nalimov's probabilistic idea of the semantic fields. The next is implemented reasoning model called ATT Meta "performs a type of metaphor based reasoning" developed at Birmingham University. [2, 3, 12]. J. Barnden is arguing that metaphor is a particularly significant field in mind studying as its most of the times the only way how a mind can describe itself. [2, 3, 4].

According to J. Barnden, fully/fledged science can describe a mind as it describes itself in natural language [7, 12, 13]. English based metaphoric concepts such as MIND PARTS AS PERSONS eg. "One part of Mike knows that Sally has left for good" or MIND AS PHYSICAL SPACES eg. "inner/outer Self", "Emptiness was killing herL, were as well present in Czech data. Eg. "Citil se rozpolceny, roztrzity", "Jeho pohled byl prazdny, okna do duse nevyjadrovali zhola nic, jako by odesel."

In our latter researches [10, 11] was shown that metaphors of mind significantly correlate with Cartesian view of mind / body duality. Both theories, claiming unity duality of mind and body nature, can be true (see out of body metaphor Fig.1). It is two sides of a problem, - two major states of mind: consciousness presence – transcendent unity and MIND WANDERING (non-presence) duality. [13].

The Quantum Mind Project (QMP) is knowledge representation research that uses Free Associations Test data to create a semantic network of Mind from associations to a unique list of cognitive metaphor stimuli. QMP is a fundamentally new resource of deep semantic knowledge, a platform for mind study and optimizing the human communication process with electronic resource.

According to K. Ahrens [1] there is a need for cognitive models reflecting the relationship of the Mind within and out of the physical world. As W. James noticed we are divided into “spiritual me, social me and material me“[1, 12]. Conceptual Metaphor Theory rejects the notion that metaphor is a decorative device and suggest that metaphor structure thinking and knowledge [7, 8, 9].

## 2 Methods

In contrast with already existing WordNets or MindNET Microsoft research [17] based on collocations or existing corpuses processing, these algorithms work on immediate authentic respondent answers for given text stimuli. To create and visualize association semantic network, we used a set of web application tools. A database was generated in SQL by an original algorithm in on-line mode. Semantic dependency data were loaded from the CSV file and visualized with Gephi dynamic graph. We also examined which stimuli-response pairs occurred more frequently, which responses occurred more often, were there any unexpected connections between certain words? [12]

A list of 400 stimuli for Free association Test in the Czech language has been created. In the database, we have collected 12,673 word responses from 200 participants. Most of the participants were university students, mostly in humanities field such as history or philosophy. The stimuli appeared to each respondent in a random order, and she/he had the opportunity to write 0-3 responses (association) to each stimulus. Respondents had to write the first word or phrase which immediately came into their mind. [10, 11, 12].

## 3 Experimental Findings

Stimuli -association strings from the database were sorted into several main semantic spaces according to associations:

1. *emotions* (negative/ positive, love, excitement, friendship, feelings, emptiness). According to Picard “people have skills for detecting when someone is annoyed or frustrated and for adapting to such affective cues. Three factors are especially important: perceiving the situation, perceiving affective expression, and knowing how interrupting at such a time was received in the past. The ultimate

strategy involves more than affect perception, but affect perception is critical.” [14]. The conceptual metaphor for emotion - HAPPINESS IS LIGHT, writes Kovecses [1, 12] such as “To shine with happiness”, “His face became dark when he realized that”-, “Let shining your truth colors,” “Her personality is shining through” supports the idea of inner Self as something, which is “enlightened” by personality (eg. *bright Mind*) and colored by emotions.

2. *mind’s puzzling* (distraction, dispersion/concentration, torn into pieces, mind behaving as an aeter or dissolving gas. ( see examples and Fig. 1 below)

3. *mind’s in- and out of body* experience (being out of self, to be spaced out, to be taken, being not myself (Divided person metaphor [3] ), feeling strange, alienation, flying, being beside myself with smth. The other important concept is a MIND AS A SPACE [2, 4] or MIND WANDERING metaphor, such as “I was beside myself with anger”, I am not myself today” [8], “I have got you under my skin” were occurred in a participants responses the most frequently.

4. *mind’s interaction* (empathy, interest, openness, clearness). It is obviously not only in English that cognitive realm representing its states mentioning: “fringes of consciousness,” about “ideas surfacing at the mind”, that we can see mental things “clearly” or “obscurely” [1].

**Mind -ontology of interaction.**

**Table 1.** Metaphoric examples of Mind as a Quantum phenomen

Czech	Russian	English	Literal English translation
Se-tkání	Vstrecá	Meeting	Co-spinning, co – binding
Pařit	Zavisat	Get high,	Hanging in the air
Bavit se	Baldet, rastvoritsja v tolpe	To talk, having fun	Mixing, dissolve in a crowd
Roz-loučit se	Razluka	Say good buy	Divide light rays
Vy-točit nekoho (slang)	Zakolebat kogo-to (slang)	Get angry	To spin out (of the body), make someone waving
Souznit, byt naladen	Garmonija	Harmony	Stay tuned
Vytvorit pouto, zaplest se	Svjazatsja,	Attachment	To create bond, tie
Vytvorit spojeni	Prisojedinitjsja	Connection	Get involved , mixed up

Unique phenomena are described by metaphor of mind’s communication networks: it emphasizes *unity, creating of atmosphere, network*, and how the mind *in-flu-ence* another behaving as an enlighten fluid/stream of consciousness. According to mind’s self-reflection it is also able to “*mix*” (with each other), to *build bonds, to interfere waves* [6] as it were explained in [12, 15], and “*attach*” strings to each other. All those phenomena are universal in all languages we have studied so far.

As we mentioned in previous studies [10, 11], the concept of *influence* on a deep semantic level suggests a functional similarity with *inspiration*. Moreover, the in-fluence root “flu”, in Russian *vlijanie*, in Czech *.vliv*, metaphorically depicts a certain kind of consciousness stream “*in-spiring*” influenced person. The research seems to confirm the Cartesian dualistic theory about mind possessing, leaving or transcending the body. These associations seem to represent conceptual metaphors of Lakoff’s CONTAINER conceptual metaphor [7] *being out of body, inner self as a light, fluid, gas, life as a spinning*.

We have classified our data from different points of view; we were after all interested in the qualitative findings. Unique associations produce another cognitive metaphor in connection with these stimuli. Primarily, we were interested in creating a semantic network from obtained data. The example of the network describing a concentrated/distracted state of mind we can see from the Fig 1 below. Emphasized arrows mean s semantic dependency. [See also 10, 11,12]

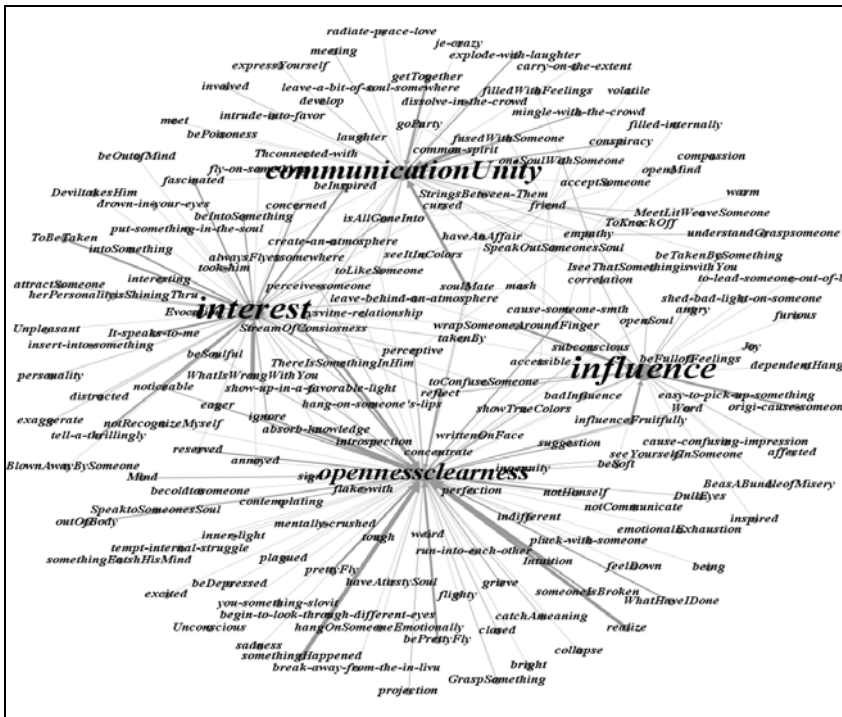


Fig. 1. Ontology of Mind,s interaction. Semantic network.

As we can see from the Tab. 1.metaphorical view suggests that our Self (Mind) somehow, on a quantum level, physically *entangled into* a communication network with others. See also [15, 16]. The *communication unity, interest, influence, openness and “clearness” of mind* are the main concepts providing an ontological view of Mind’s interaction and to create *common spirit or atmosphere* and to be able to communicate we literally need to open our Mind. Eg. “*I always accepted (let in) him as a person.*”

## 4 Conclusion

Empirical findings about the phenomenology of mind gained from Associative Experiment, has opened a new dimension of artificial intelligence and quantum linguistics research, allowing us to create a link between a collective unconscious level and a conscious Mind. In this study we attempted to explore and visualize the mind and its interaction. Examining of metaphorical reasoning concepts is extremely important not only for creating algorithms implemented in artificial intelligent agents, but also to explain well-known psychoanalysis and psychiatry phenomena, such distraction, multiple personality states of mind or some neurogenic speech disorders.

Understanding of the metaphoric self-reflection might be guided by understanding how the quantum like entanglement influence socializes and structures our natures, how it shapes our mental life's architectures in Czech and other languages. We realize that every language is a complementary puzzle of this latent semantic information, which can be possible discovered. As a validation of our research we aim to extend this experiment on English and Russian languages and compare the metaphoric view of mental states with original data. As research suggests, literal meaning of metaphor is a huge field of research discovering hidden structures of the mind helping computational intelligence to achieve a natural human - like reasoning.

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