QUALITY OF PROCESSING AND TRANSMITTING WRITTEN INFORMATION CONTAINING VERBAL ILLUSIONS IN YOUTH AGE

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Abstract

There are some different standards for quality of processing and transmitting of information. This study compared three quality standards of transmission of verbal written information. One quality standard is keeping initial meaning with giving necessary and sufficient information, according to Peterson, 1996. Another quality standard is meeting some expectations and norms in the society, according to Gasser, Cortesi, Malik and Lee, 2012. The third quality standard is signalling what is important, according to Sanford and Sturt, 2002. 123 Bulgarian youth participants produced 984 sentences trying to rephrase 8 verbal illusions per participant. These verbal illusions were presented as verbal written information in the form of several independent sentences non-related meaningfully in a paragraph. The participants processed and transmitted information from these sentences significantly more incorrectly (4/5th from them) than correctly – 1/5th from them. Processing and transmitting correctly information was not related with its perception as supported by the most people in society. The results indicated that signalling what is important, as well as meeting some expectations and norms in the society were presented in the answers of the respondents, but these standards did not contribute significantly to the correct processing and transmitting verbal written illusions in youth age. However, they prevailed over the quality standard of giving necessary and sufficient information.
Key words: *information processing, information quality, verbal illusions.*

Introduction

It is undoubted that people, even young persons, are able to process and transform correctly information – otherwise, the science would not develop, the everyday life would be very complicated.

Transmitting information involves such things as parsing/ interpreting by the receiver, ability to make use of shared knowledge in encoding or decoding messages (Peterson, 1996, p.137).

Focus in the complicated sentence through the main clause and the perspective of one character (the main character, or a narrator) represents a way of signalling what is important and it plays a role in determining depth of processing (Sanford & Sturt, 2002).

Reproduction of the elements is not necessarily improved by additional information. It is important to reach the equilibrium between necessary and sufficient information (Peterson, 1996, p.147).

There are different standards for information quality. The ethnographic perspective defines information quality as making information seekers choose one piece of information over another. The adult-normative perspective defines information quality in terms of meeting some expectations and norms in the society. The systematic perspective defines information

quality through abstract reflection rather than empirical investigation. The prescriptive perspective defines information quality by how much the datum improves the lives of users (Gasser et al., 2012, p.7).

There are some brain regions that are engaged in information processing. The left inferior frontal gyrus is involved in syntactic processing of information. Reanalysis and reconstruction of information increase activation in such brain areas as left inferior frontal gyrus, Broca's area, left premotor cortex, and left posterior middle/superior temporal gyrus (Christensen, 2010). The basic unit for communication consists of two neurons and their entire field of interacting dendritic and synaptic connections. Each neuron transmits information in the form of temporal electrophysiological action potentials or spikes (S) operating on a millisecond timescale that, along with pauses (P) between spikes generate meaningful frequency-encoded signals (Baslow, 2009).

The so called verbal illusions create difficulties in understanding and reproducing the meaning of a text. They are of different types.

The verbal illusion supposes two opposite interpretations of the same sentence. The sentence is actually nonsensical. The complex ambiguity can cause difficulty in processing and semantically interpretation of information. Verbal illusions are ambiguous, with two possible (and opposite) interpretations. Their interpretations depend on semantic (such as the lexical semantic properties of the verb participating in the construction) and pragmatic factors. Lexical properties can be successful in resolving an ambiguity (Cook & Stevenson, 2010). The pragmatic sentences are paraphrased more accurately than the non-pragmatic sentences (Wason & Reich, 1979).

The sentence in verbal illusion is systematically misconstrued, anomalous in two ways. It is semantically anomalous because of the opposition between the adjective and the verb. It is pragmatically anomalous because the relation between the noun and the verb expresses an injunction which is inconsistent with commonly held beliefs (Wason & Reich, 1979).

The verbal transformation effect is an auditory illusion in which listeners report hearing illusory utterances after listening to a word repeat over and over at a rapid rate (Pitt & Shoaf, 2001). Continuous repetition of a word causes listeners to hear the word transformed into other utterances (Shoaf & Pitt, 2002). The verbal transformation effect consists of presenting a word repeatedly that eventually leads to a switch of the percept to an alternative potential organization of the sound segments. The percept then continues to switch between these two interpretations. There are four types of perceptual changes: "(1) reorganization of the same speech sounds to produce different words; (2) change in vowel or consonant sounds; (3) hearing a speech sound which is actually absent; and (4) not hearing or suppressing a speech sound actually present" (Warren & Gregory, 1958, p. 613). Perceptual regrouping and segmental satiation (fatigue of segmental representations, which leads to a slight shift in phoneme identity) are two causes of the verbal transformation effect (Pitt & Shoaf, 2001).

There are also some research findings about the ways in which some gender and age groups process information.

Women are more concerned with uncertainty, while men assign more importance to the analysis of the information and to the purposes of the decision. Men and women both carefully process the information, retrieve the relevant decision-related data, categorize the data if they are very diverse, and think logically about the alternatives. Youths are more strongly influenced from emotional and social aspects in information when taking decisions, then the adults and the retired persons (Sanz de Acedo Lizárraga, Sanz de Acedo Baquedano & Cardelle-Elawar, 2007, p.388). Communicating information about age verbally and/or abstractly through words and numbers arouses little feeling and has little effect on the way the students evaluate a person. Communicating information about age non-verbally and/or concretely through facial photographs arouses more feelings and has a greater impact on evaluation of this person among the students (Stolte, 1996).

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The hypothesis of the study was that verbal written information in the form of several independent complicated sentences would be processed and transmitted correctly (by means of handwriting) in youth age, especially when this information was considered as supported by the most people in society.

In computer writing, the sentence replaced the paragraph as a unit of meaning, compared to handwriting (Lyman, 1984). This was one of the reasons for choosing some computer-typed independent sentences to be rephrased instead of a paragraph unifying in meaning several sentences.

Methodology of Research

General Background of Research

32 sentences that were used in the experiments 1 (such as "No war is too trivial to be ignored"; "No head injury is too unimportant to be overlooked", etc.), 2a (such as "The more trivial a war is, the less one should ignore it", etc.), 2c (such as "The more trivial a war is, the more one should ignore It", etc.), and 3 (such as "No missile is too small to be banned"; "No government is too secure to be overthrown", etc.) by Natsopoulos (1985) were translated from English to Bulgarian. These sentences were chosen because they represented some verbal illusions - their meaning was difficult to be interpreted due to a negative part of the sentence, the opposed adjectives, and non pragmatic information expressed by the sentence.

Sample Selection

The subjects were purposefully selected as being in youth age, well educated people who should understand the meaning of every word in the sentences-stimuli and who had some experience from school years in transforming short verbal information to keep its meaning using own words. They participated voluntarily in the study. The total number of Bulgarian students in Bachelor degree for 2013/2014 academic year was 176 344 (National Statistical Institute of Republic of Bulgaria, 2014). The needed sample size for a representative study for students in Bachelor degree was 96 (confidence interval 10; confidence level 95%) that was computed by means of an online sample size calculator (Creative Research Systems, 2012).

The participants in the study were 123 Bulgarians from the South-Western and Central part of the country. They were between 18 and 25 years old, i.e. youth age (Nikolov, Georgiev & Madolev, 2007, p.90). Their mean age was 21 years old, SD=2 years. The females (N=77; 62.6%) were twice more than males (N=46; 37.4%). The participants were university students in their 1st, 2nd, and 3rd year of study from two universities in Bulgaria – respectively 52 (42.3%), 52 (42.3%) and 19 (15.4%) students from each year of study.

Instrument and Procedures

12 experts, all native speakers of the language, including one philologist, one teacher and one journalist, estimated if some rules were observed in translation of the sentences from English to Bulgarian. The rules were keeping the negations in the sentences from experiments 1 and 3 (Natsopoulos, 1985) and the comparisons more/less and more/more from experiments 2a and 2c (Natsopoulos, 1985).

32 sentences were given to 123 participants in the study (native speakers) asking to re-phrase them as exact as possible in Bulgarian, as well as to indicate on a scale from 0 (no beliefs held at all) to 6 (extreme beliefs held) in what degree they thought people believed in them. Each participant rephrased 8 sentences from a total number of 32 sentences (random choice of sentences). 984 sentences were produced as rephrasing of the original 32 sentences. The participants read the sentences, and looked at the original sentence during the whole

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process of rephrasing. There was not any time limit for rephrasing. The mean time needed for rephrasing of 8 sentences by every participant was about 15 minutes.

Then three persons evaluated each rephrased sentence if it presented correctly the information in the original sentence. A missing answer for any sentence was estimated as incorrect transmission of information.

Data Analysis

The methods for statistical processing of data were descriptive statistics, chi-square analysis, and t-test. SPSS statistical software was used.

Results of the Study

The participants in the study rephrased incorrectly 770 times the sentences (78.3%) and they produced in total 214 correctly rephrased sentences (21.7%). They processed and transmitted information from the sentences significantly more incorrectly (4/5th from them) than correctly – 1/5th from them ($\chi^2_{|1|}$=314,163; p<.001).
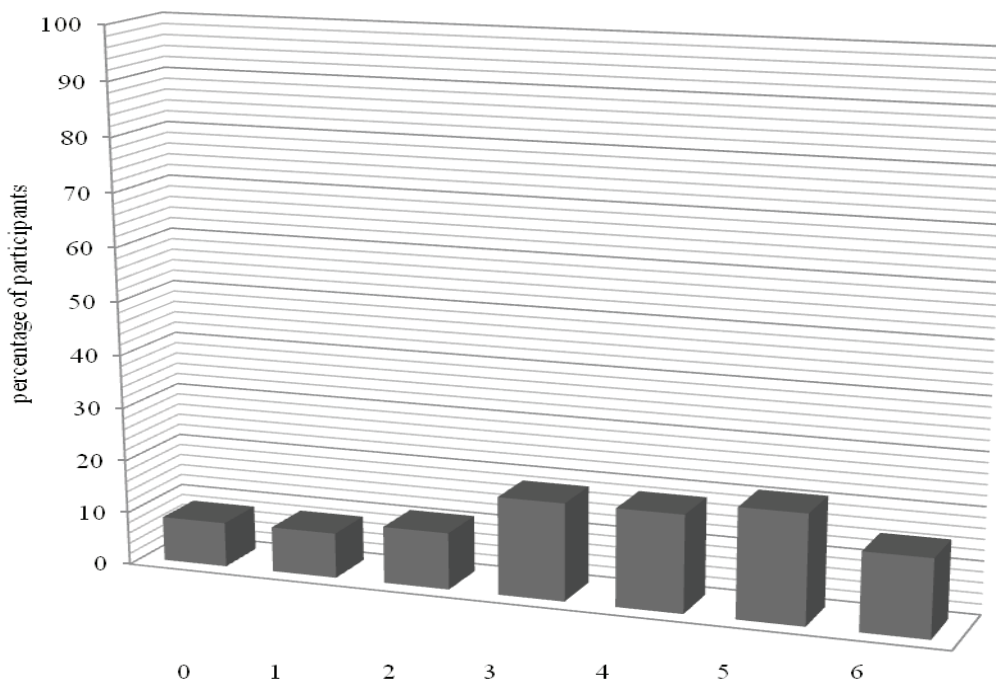

Figure 1: Percentage distribution of strength of beliefs that the rephrased sentences were supported by people in the society.

Note: on the axes X, 0 means no beliefs held at all to 6 - extreme beliefs held

The participants in the study expressed mainly the opinions that the rephrased sentences were supported in a medium degree by people in the society – *M*=3.5; *SD*=1.8 (see Figure 1).

There was no significant difference between the mean beliefs in the spread of the correctly and incorrectly rephrased sentences in the society (see Table 1).

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Table 1. Results from t-test for the significant difference between the mean beliefs in the spread of the correctly and incorrectly rephrased sentences in the society.

	Sentence	N	M	SD	T	df	p
Means of strength of beliefs that the re-phrased sentences were supported by people in the society	Incorrect rephrasing	770	3.49	1.848	0.646	982	.519
	Correct rephrasing	214	3.58	1.695			

The genders did not differ significantly in their mean beliefs in the spread of the correctly and incorrectly rephrased sentences in the society (*Mmen*=3.6; *SDmen*=1.7; *Mwomen*=3.46; *SDwomen*=1.8; $t_{|982|}$=1.167; *p*=.244).

Table 2. Gender differences in correct rephrasing of the sentences.

$\chi^2_{|1|}$=6.556; p=.01		Sentence	
		Incorrect rephrasing	Correct rephrasing
Gender	Men % within males	82.6	17.4
	Women % within females	75.6	24.4

More females than males rephrased the sentences correctly (see Table 2). The students in 1st, 2nd and 3rd year of study did not differ significantly in their correct rephrasing of the sentences ($\chi^2_{|2|}$=5.558; p=.062).

Discussion

The hypothesis of the study was not supported by the results. The participants processed and transmitted information from the written sentences containing verbal illusions significantly more incorrectly (4/5th from them) than correctly – 1/5th from them. A big deal of the youth participants did not process and transmit correctly information in the sentences, neither when it was considered as supported by the most people in society. Processing and transmitting correctly information was not related with its perception as supported by the most people in society. These findings indicate the difficulty in processing information from verbal illusions.

The youth participants often expressed their attitudes towards the information in the sentences- stimuli by means of writing "Exact, I think in this way" instead of re-phrasing the sentences. This finding points out again the importance of emotional meaning of information for young participants (Sanz de Acedo Lizárraga, Sanz de Acedo Baquedano & Cardelle-Elawar, 2007, p.388). Emotions and estimation of information prevail when trying to transmit some facts.

Another part of the respondents did not write any attempt of rephrasing the sentences striving to avoid any mistake that illustrated a preference for evaluating information as typical or not in the society than to interpreting and transmitting its content. Emotional and social meaning of information was perceived as more important for the participants than its linguistic content, because of the few missing answers (about 10) regarding the support of such beliefs (sentences) in society compared to more missing answers regarding rephrasing the sentences (they were coded as incorrect re-phrasing). Statistical analysis indicated that correct or incorrect re-phrasing of information was not related to the beliefs in its spread and support in the society.

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Incorrect rephrasing of information could be explained with personal meaning of information – more important information could be transmitted more correctly. The subjects in this study (presented as a psycholinguistic study to the participants) did an unusual task– unusual in comparison to the typical psychological studies requiring answers to a questionnaire. Perception of the study as a psycholinguistic one and the stereotypes and expectations related to a psychological study could also be a reason for giving some answers as agreement or not with the sentences instead of just transmitting information in them. Additionally, estimation of other people's beliefs in the information presented in the sentences increased the appeal to evaluate instead of transmit. Besides, if the respondents disagreed with the information in the sentences they could have some resistance to transmit their exact meaning.

The difficulties in understanding of verbal illusions were revealed among the youth indicating that quality of processing of verbal information even among native speakers of language depended on self-regulation of emotional states, concentration on the required task (not replacing it with own interests) and social categorization.

The female participants coped better with re-phrasing the verbal illusions than males in correspondence with the findings that women were more concerned with uncertainty (Sanz de Acedo Lizárraga, Sanz de Acedo Baquedano & Cardelle-Elawar, 2007, p.388).

There are some limitations of the study related to the need for a bigger sample representative for the youth in the whole country, and to the criteria for assessment of correct/ incorrect rephrasing. For example, a very small number of participants (about 4) just repeated one sentence instead of rephrasing it and this was indicated as a wrong answer.

Conclusions

Three quality standards of transmission of information were compared - keeping initial meaning with giving necessary and sufficient information (Peterson, 1996); meeting some expectations and norms in the society (Gasser et al., 2012); and signalling what is important (Sanford & Sturt, 2002). Signalling what is important, as well as meeting some expectations and norms in the society were presented in the answers of the respondents, but these standards did not contribute significantly to the correct processing and transmitting verbal written illusions in youth age. However, they prevailed over the quality standard of giving necessary and sufficient information.

This study of quality of processing and transmitting information has revealed that such quality is expected, but in reality it is difficult to be achieved even for small pieces of information. A further study of quality of processing and transmitting bigger information units is necessary to indicate if summarizing information reflects accurately its content or just simplifies it and transmits mainly the personal meanings given to information, as in smaller information units like sentences presenting verbal illusions. Transmitting written information containing verbal illusions could be compared with transmitting orally verbal illusions that should be expected to be done with more mistakes because of memory difficulties. Transmitting short sentences that does not contain verbal illusions could be also compared to the quality of processing information containing verbal illusions. Some different age groups could also be studied, including students in school who often retell stories as a part of school education. If they improve their abilities for transmitting unambiguous information, keep them or worsen them later in life, it is important to be studied for understanding better human communications.

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