

VERBAL ASSOCIATIONS OF BULGARIAN TEENAGERS FOR 'NATURE'

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Abstract

This paper presents a part of a survey aimed at studying the content of the concept of 'Nature' in the linguistic mind of Bulgarian children and adolescents.

The issue under study is: "Are there significant differences in the group associative fields of the word nature in the minds of Bulgarian teenagers depending on the differentiating factor of gender?"

The method of study used is a chain associative experiment carried out following the S (stimulus) – R_i (reactions) pattern. Each participant is required to write down the first words that come to their mind when the word nature is pronounced. 1000 reactions are used to reconstruct the associative fields objectifying the conscious and unconscious layers of the cultural concept of 'Nature' in the linguistic mind of the participants (100 girls and 100 boys).

The results of the paper can be commented upon along three aspects: 1) psychological – according to the type of reaction; 2) psycho-linguistic – a) according to the verbal reactions in the minds of the participants, b) according to the lexical and grammatical meaning of the words-reactions through which the associations have been expressed; 3) didactic – according to the degree of correspondence between the thesaurus that can be drawn (a system of knowledge about the world expressed through language) and the thesaurus of the concepts set in the syllabus of the natural sciences subjects.

Key words: associative experiment, gender, concept of 'Nature'.

Introduction

Knowledge about Nature and the value relationships connected to it are key components of the cultural concept of 'Nature'. The content of this concept in the individual mind is formed in the process of socialization and changes throughout the conscious life of a person depending on various factors. It is then logical to expect that one of the main factors in the childhood and adolescent period is education, especially natural sciences education.

Other important factors include gender, nationality and the specific conditions of the surrounding environment.

Bulgarian specialized literature lacks any research as to what reflection key concepts from the general educational minimum connected to the concept of 'Nature' have in the linguistic

mind of Bulgarian students. No research has been carried out as to whether there are gender differences between students when learning basic concepts from the natural sciences syllabus.

The purpose of this article is to present some of the results from our survey on the question whether there are significant differences in the content of the cultural concept of 'Nature' in the minds of Bulgarian boys and girls at the initial stage of studying natural sciences.

An unconventional means for access to reliable information, which leads us to an answer to this question, is the associative field of the word *nature* which is reconstructed through interpretation of the verbal associations of students from the 6th and 7th grades.

Methodology of Research

In the introductory part we stick to the ideas of the Russian scholar Yurii Karaulov concerning the linguistic personality and to the notions of Moscow Psycholinguistic School for a linguistic mind (E. F. Tarasov, N. F. Ufimtseva, G. A. Cherkasova, etc.), for the verbal associations through which this mind can be studied and through which conclusions significant to the theory and practice of various subjects teaching can be drawn.

Yurii Karaulov introduces the concept of a linguistic person. According to him (Карaulов, 1987), the structure of this concept could be described on three distinct levels: *the first level* is the verbal-semantic level which includes all linguistic means at the individual's disposal; *the second* is the linguistic-cognitive level, or, the thesaurus of the person, which includes the system of knowledge about the world that is expressed through language; *the third level* is the pragmatic-communicative level (pragmatikon), or the system of attitudes toward the world expressed through language.

The pragmatikon reflects the action and communicative needs, the system of goals, incentives, the attitudes and the intentions, the evaluations of the person (individual), that is why it can be defined as a motivational level in the structure of the linguistic person (Карaulов, 1987). It is closely connected to the *thesaurus*, or the linguistic-cognitive level in the structure of the linguistic person, i.e., to the system of knowledge about the world.

Following Yurii Karaulov's notion, we could look at the student as a linguistic person. Both the student's pragmatikon and thesaurus are built upon the *lexicon*, generally seen as a verbal-semantic level. This is a zero level for the structure of the linguistic person since the linguistic means for expression available to the carriers of the language, including the student, are common to all, and the differences in the choice of these means are realized in a linguistic-cognitive and motivational aspect, i.e. they depend on the person (Ангелова, 2005).

Contemporary education puts the student in the center of attention, giving the student certain autonomy in the process of pedagogical interaction, thus attaching importance to the personal characteristics of the student.

For the purposes of research we discuss with great detail the thesaurus in which the concept of 'Nature' has a key place in the linguistic mind of the students who took part in the survey.

The object of the survey is the linguistic mind of Bulgarian teenagers – 200 thirteen-year-old students from 25 classes in the 6th and 7th grade at five Bulgarian schools (in the towns of Plovdiv, Kazanlak and Sevlievo).

The subject of the survey is the verbal associations of the participants.

The purpose of the survey is to reconstruct an associative field of the word *nature* in the linguistic mind of a group of thirteen-year-old students. The choice of students in the 6th and 7th grade is determined by the fact that the systematic studying of basic ideas and concepts related to the knowledge of Nature is being introduced in Bulgarian schools at this age.

Empirical hypothesis: There are significant differences in the group associative fields of the word *nature* in the linguistic mind of teenagers depending on the differentiating factor of gender.

The method of survey is a chain associative experiment which allows for reconstructing the associative fields which objectify the unconscious and conscious layers of the cultural concept of 'Nature' in the linguistic mind of the participants.

Description of the Survey

A chain associative experiment with 590 students in the 6th and 7th grade (students at the age of 12 to 14) was carried out in May 2008. The experiment was carried out following the S (stimulus) → R_i (reactions) pattern: each student is asked to write down the first nine words that come to their mind when the word *nature* is pronounced. The students are required to react spontaneously and quickly without giving much thought to what is to be written down.

After the survey was carried out, we took the answers only of the thirteen-year-old students from all 25 classes. A survey sample was made using a default feature; we took 4 work sheets filled in by girls and 4 work sheets filled in by boys. We took only the first five words-reactions from each work sheet in the survey sample. The choice only of the first five words allows only for the data from the words with a stimulus *Nature*, which are most closely related to the core of the associative-verbal field, to be taken out and processed. In this way we got data from the reactions of 100 girls and 100 boys. The total number of reactions is 1000, and the number of words that express them – 169.

A frequency glossary of the words from the two groups is drawn using a computer program. Then, both glossaries are put together (see appendix). The words are coded on the basis of various features. A comparative table is then drawn so as to take account of the frequency of the reactions in question (table 1).

So as to compare two relative frequencies in the study of two independent survey samples the following statistics is used (Гласс и Стэнли, 1976, 295):

$$z = \frac{p_1 - p_2}{\sqrt{\frac{f_1 + f_2}{n_1 + n_2} \left(1 - \frac{f_1 + f_2}{n_1 + n_2}\right) \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

where:

n_1, n_2 – is the volume of the reactions studied (n_1 – of the girls; n_2 – of the boys);

f_1, f_2 – is the absolute frequency of the reactions;

p_1, p_2 – is the relative frequency of the reactions;

$$p_1 = \frac{f_1}{n_1}; \quad p_2 = \frac{f_2}{n_2}.$$

The empirical hypothesis is redefined for the purposes of the statistical analysis into statistical hypotheses.

Hypothesis H_0 : there is no difference between the reactions in the two survey samples.

Hypothesis H_1 : the reactions in the two survey samples differ.

The calculated value of the quantity z is compared to the critical value for the chosen level of truthfulness (α) which is taken from statistical tables. If the value of z is smaller than the negative and greater than the positive critical value for the chosen level of truthfulness, H_0 is denied, and an alternative hypothesis H_1 is accepted. Otherwise, H_0 is accepted. For $\alpha = 0.05$, the critical values of the quantity are $z = \pm 1.96$.

Results of Research

The results have been systematized in the following table.

Table 1. Results from the associative experiment.

Aspects of studying and comparison features	Frequency of the reactions		Criterion for Differentiation <i>z</i>	Frequency of the different reactions		Criterion for Differentiation <i>z</i>
	<i>f</i> ₁	<i>f</i> ₂		<i>f</i> ₁	<i>f</i> ₂	
1. Psychological aspect						
• standard reactions	409	411	$z = -0,17 > -1,96$ <i>H</i> ₀ is accepted	40	32	$z = 0,54 < 1,96$ <i>H</i> ₀ is accepted
• reactions in diads	28	34	$z = -0,8 > -1,96$ <i>H</i> ₀ is accepted	14	17	$z = -0,93 > -1,96$ <i>H</i> ₀ is accepted
• individual reactions	63	55	$z = 0,8 < 1,96$ <i>H</i> ₀ is accepted	63	55	$z = 0,13 < 1,96$ <i>H</i> ₀ is accepted
<i>Total number of reactions:</i>	500	500		117	104	
2. Psycho-linguistic aspect						
• core of the linguistic mind	203	220	$z = -1,1 > -1,96$ <i>H</i> ₀ is accepted	8	8	
• periphery of the linguistic mind	297	280	$z = 1,1 < 1,96$ <i>H</i> ₀ is accepted	109	96	$z = 0,26 < 1,96$ <i>H</i> ₀ is accepted
<i>Total number of reaction:</i>	500	500		117	104	
• concepts expressed through nouns(a)	407	460	$z = -5,05 < -1,96$ <i>H</i> ₀ is denied	82	83	$z = -1,69 > -1,96$ <i>H</i> ₀ is accepted
• features expressed through adjectives(b)	93	40	$z = 5,05 > 1,96$ <i>H</i> ₀ is denied	35	21	$z = 1,67 < 1,96$ <i>H</i> ₀ is accepted
<i>Total number of reactions:</i>	500	500		117	104	
3. Didactical aspect						
• terms – names of organisms and groups of organisms (c)	153	209	$z = -3,73 < -1,96$ <i>H</i> ₀ is denied	12	23	$z = -2,43 < -1,96$ <i>H</i> ₀ is denied
• terms meaning <i>life environment, biotop</i> or <i>ecosystem</i> (d)	66	95	$z = -2,52 < -1,96$ <i>H</i> ₀ is denied	9	13	$z = -1,20 > -1,96$ <i>H</i> ₀ is accepted
• terms related to other objects, processes and phenomena in Nature (e)	61	85	$z = -2,18 < -1,96$ <i>H</i> ₀ is denied	21	22	$z = -0,60 > -1,96$ <i>H</i> ₀ is accepted
• other words	220	111		75	46	
<i>Total number of reactions:</i>	500	500		117	104	

Discussion

The results of the survey can be discussed in three aspects: psychological, psycho-linguistic, and didactical.

From the point of view of psychology the reactions of the word-stimulus in the conditions of an associative experiment can be classified according to various features. We choose the *level of originating of the answers* feature since an accurate enough comparison can be made between the structures of the group associative fields of the word nature. According to Gennadiy Martinovich

(Мартинович, 1993) the reactions are *standard* (with frequency greater than 2) and *individual* (with frequency 1), and the words with frequency 2 make up a middle layer within the associative field (in table 1 we have marked them as *reactions in diads*).

The statistical analysis shows that the group associative fields do not differ greatly according to the level of originating of the answers. There are similarities in the frequency of the three types of common reactions, as well as in the frequency of the three types of different reactions in both groups that have been studied. This determines the similarities in the structures of the two associative fields – a great number of reactions are concentrated in their cores, and their peripheries are made of a small number of individual reactions.

The real number of individual reactions in the compiled survey sample is 90 (i.e. 9% of all 1000 reactions) which shows a rather small share of verbal reactions related to the unique perception of nature by the participants in the survey.

We would like to specifically note that in both the associative fields the word *tree*, -s has greatest frequency 92 (37 + 55); the word *wood*, -s is relatively frequent: 22 (10 + 12), and a few individual reactions also refer to the image of tree like a hyperonym or a similar term – *pine* 1 (0 + 1), *groves* 1 (1 + 0), *jungle* 1 (0 + 1), *oak* 1 (0 + 1). More precisely, 48% of the girls and 70% of the boys associate the word *nature* with tree or a group of trees. According to psychologists, the image of the tree is an inseparable part of the image of the world, both of the ancient and the contemporary man, and it symbolically reflects a person's individual and typological characteristics. That is why we would be interested to find out whether the tree would be present in a non-verbal presentation of the image of Nature. When using the interpretations of some psychological projective methods (for example, *The House-Tree-Person* test), conclusions can be drawn not only for the attitude of the participants in the survey to Nature, but also for some of their personal characteristics.

From the point of view of psycholinguistics, what is notable is that eight words are among the most frequent reactions: *tree*, -s 92 (37 + 55), *animal*, -s 72 (30 + 42), *beauty* 56 (38 + 18), *grass* 48 (23 + 25), *plant*, -s 45 (21 + 24), *flower*, -s 45 (23 + 22), *air* 35 (17 + 18), *mountain*, -s 33 (15 + 18). These words can be related to the core of the linguistic mind on statistical grounds. [For more details as far as the methodology of study is concerned, see *Bulgarian Associative Dictionary* (Капулов, Е. и др., 2003, 10)]. The statistical analysis confirms that the words from the core have similar frequencies of originating during the associative experiment. For the students in both groups the concept of 'Nature' has associations with a positive connotation as related to the image of the tree as a symbol of life, to the beauty of Nature, to the world of the plants and animals, etc.

Most of the words in the periphery expressing an emotional attitude to Nature are predominantly positive. As it becomes clear from the appendix, 35 from a total of 43 adjectives illustrate a positive evaluative attitude, for example: *beautiful* 25 (19 + 8), *clean* 12 (6 + 6), *green* 9 (8 + 1), *fresh* 8 (6 + 2) and so on. Comparatively low in number (5) and with a low frequency (13) are adjectives related to negative evaluations: *dirty* 6 (3 + 3), *polluted* 4 (4 + 0), *missing* 1 (1 + 0), *not-taken-care-of* 1 (1 + 0), *ugly* 1 (1 + 0). It is difficult to give an explanation to these facts without additional information from conversations with the students, from the texts they've written or from other sources. We could only assume that the students have more often perceived beautiful natural sights or perhaps follow certain clichés for the beauty of Nature; it is possible for the students to have as a leading image their subjective aesthetic image of Nature and it is also possible that they are not fully aware of the acuteness of the problems connected to its preservation from pollution and destruction.

While the total number of reactions is 1000, the actual number of words corresponding to these reactions is 169. From these words only 58 words (i.e. 34%) have been used by representatives of both genders. That is why we could claim that the two group associative fields that have been studied are actually different. The statistical analysis points out that the two groups differ in the total frequency of originating of nouns and adjectives but are similar in the frequency of the differing reactions. It is important to note that concrete nouns are predominant in the linguistic mind of the boys, and the abstract nouns are predominant in the linguistic mind of the girls. For example, *tree*, -s 92 (37 + 55), *beauty* 56 (38 + 18), *water* 27 (9 + 18), *cleanliness* 21 (12 + 9), *freshness* 13 (11 + 2), *bush*, -es 17 (4 + 13) and so on. If the number of participants in both groups is increased we could more accurately define whether there is a difference between the cognitive and evaluative orientation of the girls and boys at that age.

It is also interesting to compare the frequency of appearance of lexical units with the same root. For example: *beauty* 56 (38 + 18) – *beautiful* 25 (19 + 8), *cleanliness* 21 (12 + 9) – *clean* 12 (6 + 6), *freshness* 13 (11 + 2) – *fresh* 8 (6 + 2) etc. If the number of the participants in the survey and correspondingly the number of reactions in both groups is greater, we could more accurately define whether at this age boys and girls prefer to name features of Nature using abstract nouns. If these results are confirmed, we could be looking for an explanation not only on the basis of a psycholinguistic aspect.

There is still no research carried out for the Bulgarian language related to the building up of a so called associative grammar (for example, Караулов, 1999). Such research would provide us with a hypothetical answer as to whether teenagers have gender-determined preferences to syntagmatic or paradigmatic reactions. In specialized literature, the factor of age is usually taken into consideration, not the factor of gender (children tend to give syntagmatic reactions, i.e. S and R make a combination of words, and adults tend to have paradigmatic reactions, i.e., S and R belong to one and the same part of speech).

On the basis of the associations preferred in the groups, we could make a general judgment about the ratio between the empirical and theoretical knowledge about Nature verbalized in the conditions of the associative experiment. If we follow the psychological understanding of the periods of the intellectual development of the individual, then our observation for the gradual transition from concrete-sensory towards abstract-conceptual knowledge, which takes place at the of the participants in the survey, wouldn't be surprising. At this stage of school education, there is an exchange of some of the worldly (most often prototypical) concepts with logical (scientific) ones. That is why it is interesting to trace whether there is a difference in the two associative fields in a didactical aspect, i.e. with respect to the use of terms from the general educational minimum included in the syllabus for natural sciences subjects. This information might also give us a clue about the productivity of the concepts related to the knowledge of Nature.

In order to achieve a greater accuracy in the comparison, in the focus of our attention are the terms included the syllabi for the following school subjects: Man and Nature; Geography and Economics; Biology and Health Education; Physics and Astronomy; Chemistry and Environmental Preservation.

The statistical analysis shows that in the didactical aspect the group associative fields differ significantly with respect to the common reactions. It is notable that boys more often present their associations about Nature using terms from the natural sciences subjects they have studied. It would be of interest to check these findings through a content analysis of texts about Nature written by the teenagers themselves.

It is also important to note that in both associative fields the verbal associations reflecting updated perceptions and notions of Nature are less than 50%, and the greater part of the associations could be considered a response to a stimulus realized as a well thought-of complex system of knowledge about Nature. This means that in the conditions of the associative experiment teenagers from both groups have overcome the given stimulus-reaction pattern for verbalization of the concept of 'Nature' and have passed the boundary of the subject-event perception and description of the material world. It is then natural to relate this fact to the positive influence that natural sciences education has on the development of the reflective thinking of teenagers.

Instead of a conclusion

The verbal associations and group associative fields of words outline the empirical and cultural experience of the carriers of the language in question. Since the concept of 'Nature' exists in the linguistic mind of each person and since it is nationally and culturally specific, the carrying out of associative experiments (similar to this one) in other countries might give an answer of two interdisciplinary questions:

Are the group associative fields of the teenagers, carriers of different languages and representatives of different cultures and subcultures, different or comparable? Is there an invariant core of the associative field of the word *nature* independent of the biological and cultural factors?

The answers to these questions could suggest solutions for optimization of first, second and third language teaching as well as of natural sciences teaching.

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APPENDIX

A frequency glossary of the verbal associations related to the word *nature*

Notes: The participants in the survey have given their answers in Bulgarian. That is why the words from the glossary has been translated into English. The reactions of the girls have been given first within the round brackets, then, after the “+” sign – the reactions of the boys have been listed. Within the square brackets, there are letters corresponding to features listed in row 1, table 1.

Tree, -s 92 (37+55) [a, c]; animal, -s 72 (30+42) [a, c]; beauty 56 (38+18) [a]; grass 48 (23+25) [a, c]; flower, -s 45 (23+22) [a, c]; plant, -s 45 (21+24) [a, c]; air 35 (17+18) [a, d]; mountain, -s 33 (15+18) [a, e]; river, -s 29 (12+17) [a, d]; verdure 29 (16+13) [a]; water 27 (9+18) [a, d]; beautiful 25 (19+8) [b,]; wood, -s 22 (10+12) [a, d]; cleanliness 21 (12+9) [a]; bush, -bushes 17 (4+13) [a, c]; birds 15 (7+8) [a, c]; life 14 (7+7) [a, e]; freshness 13 (11+2) [a]; lake, -s 13 (6+7) [a, d]; sky 13 (4+9) [a, e]; clean 12 (6+6) [b]; soil, -s 12 (5+7) [a, d]; sun 11 (8+3) [a, e]; green 9 (8+1) [b]; fresh 8 (6+2) [b]; meadow, -s 8 (2+6) [a, d]; sea, -s 8 (4+4) [a, d]; waterfall, -s 8 (3+5) [a, e]; people 7 (0+7) [a]; pollution 7 (1+6) [a, e]; cliffs 6 (2+4) [a, e]; dirty 6 (3+3) [b]; earth 6 (1+5) [a, e]; human 6, (4+2) [a, c]; leaf, leaves 6 (1+5) [a, e]; animate (nature) 5 (3+2) [b]; birdies 5 (2+3) [a]; rock, -s 5 (3+2) [a]; varied 5 (3+2) [b]; variety 5 (4+1) [a, e]; graceful 4 (4+0) [b]; inanimate (nature) 4 (2+2) [b]; rest 4 (4+0) [a]; magnificent 4 (3+1) [b]; perfect 4 (4+0) [b]; polluted 4 (4+0) [b]; tranquility 4 (4+0) [a]; Balkan Mountain Range (a mountain in Bulgaria) 3 (2+1) [a]; butterfly 3 (1+2) [a, c]; colored 3 (2+1) [b]; enchanting 3 (1+2) [b]; energy 3 (3+0) [a, e]; interesting 3 (2+1) [b]; pleasant 3 (1+2) [b]; abundant 2 (2+0) [b]; biology 2 (1+1) [a]; colorful 2 (2+0) [b]; colorfulness 2 (1+1) [a]; colored 2 (2+0) [a]; clouds 2 (0+2) [a, e]; development 2 (2+0) [a, e]; dirt 2 (1+1) [a]; environment 2 (0+2) [a, d]; exquisiteness 2 (1+1) [a]; field, -s 2 (1+1) [a, e]; fungi 2 (0+2) [a, c]; gracefulness 2 (1+1) [a]; hare 2 (0+2) [a, c]; health 2 (2+0) [a, e]; hind, -s 2 (1+1) [a, c]; mother 2 (2+0) [a]; ocean 2 (1+1) [a, d]; perfection 2 (0+2) [a]; phenomena 2 (0+2) [a, e]; preservation 2 (1+1) [a, e]; relaxation 2 (2+0) [a]; sand 2 (0+2) [a]; stump 2 (0+2) [a]; vegetation 2 (1+1) [a, e]; adventures 1 (1+0) [a]; agronomy 1 (1+0) [a]; amazing 1 (1+0) [b]; bear 1 (0+1) [a, c]; bottle 1 (1+0) [a]; breed 1 (0+1) [a, c]; bright 1 (0+1) [b,]; calmly 1 (1+0) [b]; cells 1 (0+1) [a, e]; chalet 1 (0+1) [a]; charming 1 (1+0) [b]; cheetah 1 (0+1) [a, c]; chemistry 1 (1+0) [b]; children 1 (0+1) [a]; climate 1 (0+1) [a, e]; colors 1 (1+0) [a]; cycle 1 (0+1) [a, e]; deer 1 (0+1) [a, c]; desert 1 (0+1) [a, d]; destruction 1 (1+0) [a]; edelweiss 1 (1+0) [a, c]; ecology 1 (1+0) [a]; fascinating 1 (0+1) [b]; fauna 1 (0+1) [a, c]; fertile 1 (0+1) [b]; flora 1 (0+1) [a, c]; fruit 1 (1+0) [a, e]; groves 1 (1+0) [a]; gullies 1 (0+1) [a]; home 1 (1+0) [a]; important 1 (1+0) [b]; infatuated 1 (0+1) [b]; innocent 1 (0+1) [b]; insects 1 (0+1) [a, c]; insolence 1 (1+0) [a]; irresponsibility 1(0+1) [a]; joy 1 (1+0) [a]; jungle 1 (0+1) [a, d]; lagoon 1 (0+1) [b, d]; landscape 1 (0+1) [a,]; lily 1 (1+0) [a, c]; love 1 (1+0)

[a]; majestic 1 (0+1) [b]; mammal 1 (0+1) [a, c]; might 1 (1+0) [a]; missing 1 (1+0) [b]; mosquito 1 (0+1) [a, c]; motherland 1 (1+0) [a]; mud 1 (1+0) [b]; natural 1 (1+0) [b]; necessary 1 (1+0) [b]; necessity 1 (1+0) [a]; noble 1 (1+0) [b]; not-taken-care-of 1 (1+0) [b]; oak 1 (0+1) [a, c]; oxides 1 (1+0) [a, e]; oxygen 1 (1+0) [a, e]; ozone 1 (1+0) [a, e]; physics 1 (1+0) [b]; picnic 1 (1+0) [a]; pine 1 (0+1) [a, c]; protected 1 (0+1) [b]; protection 1 (0+1) [a]; quietly 1 (1+0) [b]; rain 1 (1+0) [a, e]; raspberries 1 (0+1) [a, c]; relaxing 1 (1+0) [b]; reproduction 1 (0+1) [a, e]; roots 1 (0+1) [a, e]; rubbish 1 (0+1) [a]; sensitivity 1 (1+0) [a]; silence 1 (0+1) [a]; spring 1 (1+0) [a, e]; stars 1 (1+0) [a, e]; strange 1 (1+0); style 1 (1+0) [a]; substances 1 (0+1) [a, e]; summer 1 (0+1) [a, e]; surroundings 1 (0+1) [a]; tender 1 (1+0) [b]; tenderness 1 (1+0) [a]; the art of painting 1 (1+0) [a]; ugly 1 (1+0) [b]; unique 1 (1+0) [b]; vast 1 (1+0) [b]; village 1 (1+0) [a]; warming 1 (0+1) [a, e]; waters 1 (0+1) [a]; wonderful 1 (0+1) [b]; zoo world 1 (1+0) [a].

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