

Observations on Antonyms in the Field of Thermodynamics

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Abstract. Antonyms are different words with opposite meaning, belonging to the same part of speech, from the same semantic field, often coupled together and usually used together; their meanings is opposite and carry opposing ideas. Their study also relates to an issue of methodological character[1], defined in the differentiation of words in opposites, which serves to observe the semantic side, of the polysemy, which should always be taken into consideration for the right definition of the antonym as a linguistic phenomenon. Antonymy being a key feature in everyday life is present everywhere and occupies a place in society. In terminologies of various fields of knowledge there are presentations of antonyms, depending on the terminology of the field being studied. In the field of thermodynamics we also come across a number of antonym terms, which will be processed in this paper.

Keywords: Anonyms, Mechanical Engineering, Thermodynamics.

1. Introduction

Like all other lexica-semantic relationships such as the synonym, polysemy or the hyponym; the antonym alike was treated long ago by philosophers, psychologists, anthropologists, linguists, lexicographers and terminologists. These lexica-semantic connections have one thing in common: All have a single quality, the semantic dimension found in all languages and which are taught more easily through examples rather than through theoretical explanations, such as *hot-cold* (Alb. *i nxeht ë-i ftoht ë*), *old-young* (Alb. *i vjet ë-i ri*), *good-bad* (Alb. *i mir ë-i keq*), *top-down* (Alb. *lart ë-posht ë*) etc.

Among other phenomena like synonymy, polysemy appears with distinction in terminology, in antonymy they appear as an integral phenomenon. In Albanian linguistics antonyms are relatively well studied. It's enough to mention here researchers, like H. Pasho [2] for economic terminology, M. Samara [3], J. Thomaj [4], R. Memushaj [5], Xh. Lloshi [6], I. Goç [7] for Albanian Language. M. Samara [1] explains that antonymy is a lexica-semantic opposite, whereas opposite is a broader concept and expresses rapports between words or other language units that are not antonyms. With this definition we understand that an antonym connection between words is conditioned by their lexical meaning. Thus, for example in the pair *pour in-pour out*, we are dealing with opposite meanings associated with actions that are performed in opposite directions.

2. Lexical Features of Antonyms

It is evident not that antonymy is a universal phenomenon, but with different features in different languages. Some defend the thesis of the existence of extremities or polarity between components of antonymous pairs. M. Samara [1] in his monograph states that besides the aforementioned features, it is the attribute or the ability that the parts of an antonymic pair possesses to connect on a semantic and grammatical term, and that from a lexica-grammatical point of view they should be homogeneous; e.g. words *sell* (Alb. *shitje*) and *buy* (Alb. *blej*) do not belong to the same grammatical category and therefore are not antonyms.

Antonyms in Albanian language may be words:

- phonetically different like *good-bad* (Alb. *i mir ë i keq*); *left-right* (Alb. *majtas-djathtas*),

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- completely opposite in their setting like *up/down* (Alb. *lart/posht ë*),
- expressed with prefixes like *important-unimportant* (Alb. *i past ër- i pa past ër*), *careful-careless* (Alb. *i shterur- i pa shterur*), *possible-impossible* (Alb. *e mundur-e pa mundur*),
- phraseological units like *with gloves-without gloves* (Alb. *me dor ëza-pador ëza*) etc.

The distinctive feature of this antonymic group is that opposites name qualities that are compared, meaning, qualities that can be perceived as "more or less", therefore the dimension or the extent to which the pair is coupled has a neutral and medium measuring point, which Samara [1] calls norm. Thus, for example, if we compare the meanings of the word *hot* and *cold*, which mark the two extreme ends of temperature, we always start from the normal condition that it can have, e.g. water, and can say: *Water is hotter than needed. It's fairly cold outside. It's very cold.* When the water is neither cold nor hot, then we say that it is *tepid (warm)* (Alb. *i vak ë*) etc.

Between two extremes of the opposites lies a middle point of the temperature character, which can be expressed with adjectives *warm* and *cool* when something is neither hot nor cold. This example clearly shows that the dimension of temperature is more lexicalized to the fact that the temperature intervals are expressed with other words.

3. Semantic Features of Antonyms

The lexical features of the term antonymy are not sufficient to classify it without mentioning the semantic features, which occupies a special place. The semantic analysis of antonyms guarantees the opportunity to highlight the features of the antonymic pair, as well as the degree of contradistinction of its components. This can be achieved by making a semantic analysis of antonymic words and their relation to other words. Antonyms link with various forms with other linguistic elements. Exactly, these links make the antonyms take a different meaning through context. M. Samara [1] extends his opinion when he says, that certain semantic components define the antonymic connections between different words, called *seme* or minimal *semantic unit*. Memushaj [5] states that joint *seme* constitute the semantic core that connects the two components of the antonymic pair. Therefore, according to R. Memushaj [5] in regards that joint *semas* appear; explains why antonymic words imply each other. E.g. the word *table* (Alb. *tavolin ë*) and *book* (Alb. *lib ër*) are not antonyms, since their meanings have no common *seme*; whereas words *cold/hot* (Alb. *i ftoht ëi ngroht ë*) are antonyms, as they belonging to the same semantic field, that of temperature, and they enter in an antonymic rapport, according to the feature $\pm hot$ (Alb. $\pm i nxeht ë$).

4. The Task of the Antonym Researcher

Antonymy is one of the phenomena that prove the systemic character of the vocabulary; antonyms create in the consciousness of the speaker conceptual association by contrast. Thus, the word *high* (Alb. *e lart ë*) (*high temperature*-Alb. *temperatur ë e lart ë*) enters an antonymous relationship with the word *low* (Alb. *e ul ë*) (*low temperature*-Alb. *temperatur ë e ul ë*). The study of antonymy is closely related with the study of polysemy, synonymy and homonymy.

The first task that should be taken into account in determining antonyms in Albanian, it is not the privative/negative, but the opposite character of the meanings of the words and sustainable compound words, i.e. the ability of the words to oppose each other in their predicative meaning; this predicative element is also seen in antonym words with privative/negative prefixes (e.g. Alb. *e lar ë-e* *par ë* in *en ë e lar ë-en ë e par ë* Eng. *washed and-unwashed*, in *washed-unwashed dishes*).

The second task is semantic connection that ties or unites words or two limbs of an antonymous pair with one another. E.g. words, Alb: *e bardh ë-e zez ë i ngroht ë-i ftoht ë i holl ë-i trash ë i gjat ë i shkurt ër, i majt ë-i djatht ë i zi – i bardh ë* Eng: *white-black, hot-cold, thin-thick, long-short, left-right, black - white*). Positive - negative words connect antonymically by meaning, since both mark opposite electrical poles.

The third task for the definition of antonyms is the possibility of comparison between them by meaning/context; the possibility enters antonyms in a relationship of oppositions. In this case we have a greater clarity, for adjective and adverb antonyms.

4.1. Adjective Antonyms

aj ërngroh ës/e-aj ërftoh ës (*airwarmer-aircooler*), *i avulluesh/ën;me-i paavullush ën, asimetri-simetri* (*asymmetry-symmetry*), *i ashp ër-i but ë* (*harsh-mild*) *ball ëgj ër ë-ball ëngusht ë* (*wide forehead-narrow forehead*), *i bardh ë-i zi* (*white-black*), *i bymyesh ën-i tkurrsh ën* (*expandable-shrinkable*), *i çelur-i mbyllur* (*open-closed*), *i djatht ë-i majt ë* (*right-left*), *i ekuilibruar-i çekuilibruar* (*balanced-unbalanced*), *i fort ë-i dob ë* (*strong-weak*), *i ftoht ë-i ngroht ë* (*cold-warm*), *i lag ë-*

i that ë (wet-dry), i lëng ë-i ngurt ë (liquid-solid), i madh-i vog ë (small-big), i ngusht ë i gjër ë (wide-narrow), i pambrojtur- i mbrojtur (protected-unprotected), i papast ë- i past ë (unclean-clean), i sip ërm- i posht ën (upper-lower), i vog ë- i madh (small-big) etc.

4.2. Adverb Antonyms:

Asnjëher ëkurdoher ë (never-always), brendazi-jashtazi (internally-externally), drejtpërdrejt-t ërthorazi (direct-indirect), ftoht ëngroht ë (cold-warm), lag ë-that ë (wet-dry), p ërbrenda-p ërjashta (inside-outside), shtremb ër-drejt (curved-straight), vertikalisht-horizontalisht (vertically-horizontally), zhdrejtas-drejtas (not straight-straight) etc.

Antonymy, different from multi meanings and the synonymy characterize the terminology for the systematic connection of notions and for an advanced terminology in the system:

1) *Antonymic pairs that name action:*

Hapje-mbyllje (e valvol ë) (opening-closing (of the valve), pak ësim-shtim (i temperatur ë) (decrease-increase (of temperature)), bllokim-zhblokim (i rrjedhjes s ëajrit) (blocking-unblocking (of air currents)).

2) *Antonymic pairs that label quality:*

E brendshme-e jashtme (temperatur ë) (internal-external (temperature)), maksimum-minimum (i nivelit t ë ujit) (maximum-minimum (of water level)), aktive-pasive (rrrot ë) (active-passive (wheel)), me pakic ëme shumic ë (l ënd ë djeg ë) (retail-wholesale (fuel)), i mir ë i keq (kalitje e mire-kalitje e keqe) (bad hardening-good hardening), i madh- i vog ë ((big assembly-small assembly), i fort ë-i but ë (strong body-soft body).

3) *Antonymic pairs that name manifestation:*

Ekulib ër-desekulib ër (pajisje) (balance device-misbalance device (equipment)), i bymyesh ën-i tkurrsh ën (trup i bymyesh ën- trup i tkurrsh ën (expandable body-contractible body), barazi-pabarazi (equality-inequality), batic ë zbatic ë (ebb-flow).

4) *Antonymic pairs that name condition:*

Q ëndrueshm ëri-paq ëndrueshm ëri (e nxeht ësis ë) (stability of heat-instability of heat), i ftoht ë-i nxeht ë (aj ër) (cold air-hot air).

5) *Antonymic pairs that name notions of thermo-technics:*

Makrostruktur ëmikrostruktur ë (e materialit) (macrostructure of material –microstructure of material), mbitruysni-n ëntrysni (e avullit) (over pressure of steam-under pressure of steam), dend ësi-jodend ësi (e ajrit) (density of air-non density of air), bymim-tkurrje (i(e) ujit) (expansion of water-contraction of water).

5. Antonyms with Prefixes

During the study of antonyms with prefixes, some problems do arise: if the opposition of lexical meanings that express antonym words with prefixes are justified from a semantic and structural aspect, in what level does this opposition appear, complete or incomplete? The Prefix as a word-forming element is attached to the subject in question [4] by forming a new word that has the opposite meaning to that word without the prefix.

Antonyms formed with prefixes of opposite meaning:

Anti-: *th ërmij ëantith ërmij ë (particle-antiparticle), adiabatik-antiadiabatik (adiabatic-antiadiabatic).*

Ç-(meaning ‘i-’ or ‘dis’): *i rregullt-i çrregullt (Engl. regular - irregular)*

Akordoj-çakordoj (Engl. accord-disaccord), ndemje-çndemje (Engl. stress-unstress), ekuilibroj-çekuilibroj (balance-disbalance), rregullim-çrregullim (Engl. regular-irregular).

Jo-: (meaning ‘un-’, ‘non-’, ‘in-’, ‘i’ and ‘ab’): *aft ësi-joaft ësi (Engl. skill-unskilled), ciklik-jociklik (Engl. cyclic - noncyclic), ekonomik-joekonomik (Engl. economical-uneconomical), fitimprur ë-jofitimprur ë (Engl. profitable-unprofitable), industrial-joindustrial (Engl. industrial -nonindustrial), kalimtar-jokalimtar (Engl. transitional-intransitive), natyror-jonatyror (Engl. natural -unnatural), origjinal-joorigjinal (Engl. original-unoriginal), p ërdorues-jop ërdorues (Engl. usable-unusable), praktik-jopraktik (Engl. practical-unpractical), paralel ësi-jo paralel ësi (Engl. parallelism-unparallelism).*

Pa-: (meaning ‘without’, ‘-less’ and ‘un-’): *i besuesh ën-i pabesuesh ën (Engl. reliable - unreliable), i caktuar- i pacaktuar (Engl. set/defined-undefined), i d ënsh ën- i pad ënsh ën (Engl. harmful-harmless), i dobish ën- i padobish ën (Engl. useful-useless), fuqi-pafuqi (Engl. strength-without strength (impotent)), i fuqish ën- i pafuqish ën (Engl.*

powerfull-powerless), *i harxhuar- i paharxhuar* (Engl. *consumed - unconsumed*), *i k ënbyesh ën - i pak ënbyesh ën* (Engl. *exchangeable - unexchangeable*), *i konsumuar - i pakonsumuar* (Engl. *consumated - unconsumated*), *i kontestuesh ën - i pakontestuesh ën* (Engl. *contested - uncontested*), *i kontrolluar- i pakontrolluar* (Engl. *controlled - uncontrolled*), *i q ëndruesh ën - i paq ëndruesh ën* (Engl. *stable - unstable*);

S- sakt ësi-pasakt ësi (Engl. *accuracy-unaccuracy*).

Sh-fuqizoj-shfuqizoj (*empower-disempower*).

Zh- (meaning 'to undo smth.' using 'un-' or 'de-'): *bllokim - zhbllokim* (Engl. *block - unblock*), *d ëntim - zhd ëntim* (eng. *injury/damage - compensation*), *vler ësim - zhvler ësim* (Engl. *evaluation/devaluation*).

6. Conclusion

It is noticed that antonyms are general vocabulary words, but which enter into the composition of the thermo-technical vocabulary and form terms, as: *i rregullut-i q rregullt* (impiant i rregullt-impiant i q rregullt), *i drejt- i shtremb ër* (*aj ërngroh ës i drejt ë-aj ërngroh ës i shtremb ër*), *i vog ël-i madh* (presion i vog ël-presion i madh) etc. Engl: *regular-irregular* (*regular-irregular plant*), *straight-curved/skewered* (*straight air warmer-curved/skewered air warmer*), *small-big* (*low pressure-high pressure*) etc.

In the view of breadth, the phenomenon of the antonymy occurs more in words that express notions of feature, notions of time, space and quantity, thus, antonyms in thermodynamics are mainly found in adverbs and adjectives.

From the view of the thermodynamics terminology in this aspect, in the occurrence of semantic phenomena; it results that these lexic-semantic processes, also affect the terminological lexicon. The systemic vocabularies with definitions have to rest on the basis of the creation of the terminological banks by using computerized methods. We, like in Albania as well as in Kosovo and Macedonia don't see the reason of inventing and opening new paths in this field. For this reason the utilization of the foreign experience turns out useful, which will help us to immerse in the International net of terminology. On this basis we will be solving enough problems of the terminology, and first of all the problem of standardization, the attitude towards foreign terms, the construction of a harmonized terminology with the terminology of the languages with advanced technology, like with the English, German, Italian, Spanish, Russian languages etc.

The Study of the terminology on the basis of the systemic connections, especially by leaning on the relations of *gender/type*, *part/whole* and on the *functional relationships* [8], has to be one of the most effective paths for the uncovering of the distinctiveness of every terminology, like on the level of the form, as well as that of the composition one, as well as to find ways for the resolving of the systemizing problems, the standardization and their Albanization.

The Terminology, as part of the language of science and technology, of the one which today is called *Language for Special Purposes* (Gjuh ë e specializuar), hides deep within itself enough problems, like on the level of the form (its structure), as well as the composition (semantic manifestations). Therefore it can become an object of versatile treatments, of the studies of all levels, of student's diploma's, master's and doctorate's etc. It has enough strength for this; it only demands work which is organized and planned that will attract today all those masses of post graduates who search to get involved with studies for the language of special fields of knowledge, as a specialized language.

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