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A COMPUTATIONAL APPROACH TO THE SEMANTIC CHANGE OF THE ANCIENT GREEK ADVERB ὁμῶς TO ὅμως

ABSTRACT

This article provides a novel insight into how the Ancient Greek ὁμῶς may have evolved into ὅμως. It shows that the contrasting meaning of ὅμως can be traced via similes that were expressed by the equational structure “Entity A is like Entity B”. When a new syntactic analysis was applied to the equational structure, the two entities being compared were represented by two clauses, thus leading to the appearance of the new form ὅμως driven by the mechanism of analogy. The analogical relationships that were drawn between the “source” comparison and the “target” comparison led to the extension of the structure “Entity A is like Entity B” to “Entity A is not like Entity B”. This extension resulted in the emergence of a novel meaning of the form ὅμως, followed by a shift in the accent from the second syllable to the first.

Keywords:

semantic change, Ancient Greek, ὁμῶς and ὅμως, natural language processing, reanalysis, analogy

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1. INTRODUCTION

This study examines the semantic changes of the ancient Greek adverb ὁμῶς ‘likewise’ to ὅμως ‘however’ as this has not yet been investigated in any level of depth.¹ The only reference made in dictionaries regarding the etymology of ὅμως is that it derived from ὁμῶς with a changed accent (see the entry for ὅμως

¹ The data underlying this article are available in the Open Science Framework repository, at https://osf.io/vsbzn/?view_only=d13c89f5fa5444049d13c2dd43d4815f ED 1 Oct, 2023.

in *The Online Liddell-Scott-Jones Greek-English Lexicon*). Further, only Veloudis (2001) has attempted to explain these changes by claiming that the situations presented are the same as the use of the adverb *ὄμῳς*, which stands in contrast to the human experience that involves the anticipation of an exception. That is, there is at least one situation that displays dissimilarities to all others. This exceptional case, Veloudis (2001) explains, then served as the trigger to the genesis of the contrasting meaning of *ὄμῳς*.

The present study aims to provide a more detailed account of the evolution of *ὄμῳς*, as well as provide more insights into the changes of a concrete “source” comparison (see Section 4.1 below) to a less tangible “target” comparison (Section 4.2 below) that is then “hard to characterise purely semantically” (Traugott 1980: 46). The content of this article is divided into three main sections – Data, Methodology and procedures, and Results – followed by Conclusions.

2. DATA

2.1. DATA COLLECTION

The samples of *ὄμῳς* and *ὄμῳς* were retrieved from the *Thesaurus Linguae Graecae*® (2014) corpus. The exclusion of any duplicate cases, as well as any fragmented lines that contain *ὄμῳς* or *ὄμῳς*, resulted in a list of 55 cases for our sample of *ὄμῳς* and 65 cases for our sample of *ὄμῳς*. The *ὄμῳς* sample was gathered from three time periods: (a) 8th and 7th century BC (Stage I), (b) 6th century BC (Stage II), and (c) 5th century BC (Stage III). Further, the *ὄμῳς* sample was gathered from two time periods: (a) 6th century BC (Stage II) and (b) 5th century BC (Stage III).

The *ὄμῳς* sample was retrieved from the works of Homer (*Ilias*, *Odyssea*), Hesiodus (*Theogonia*, *Opera et Dies*), Tyrtaeus (*Elegiae*), Mimnermus (*Elegiae*), Solon, Semonides from Samos (*Elegiae* and *Iambi*), Theognis (*Elegiae*), Simonides from Kea (*Lyrical*), Pindar (*Olympian*, *Isthmian*, *Nemean*, and *Pythian*), Aeschylus (*Eumenides* and *Prometheus Vincetus*), Sophocles (*Ajax*), Euripides (*Electra*), and Aristophanes (*Equites*). The *ὄμῳς* sample was retrieved from the works of Theognis (*Elegiae*), Pindar (*Olympian*, *Isthmian*, *Nemean*, and *Pythian*), Euripides (*Alcestis*, *Medea*, *Heraclidae*, *Hippolytus*, *Andromache*, *Hecuba*, *Supplices*, *Electra*, *Hercules*, and *Troiades*), and Aristophanes (*Acharnenses*, *Plutus*, *Nubes*, *Vespae*, *Pax*, *Aves*, *Lysistrata*, *Thesmophoriazusae*, *Ranae*, and *Ecclesiazusae*).

2.2. DATA ANNOTATION

The unit of analysis in this study consisted of two entities joined by the adverbs *ὁμῶς* and *ὅμως*. The two entities were represented by either two nouns or two clauses. In the cases in which the two entities were represented by two clauses, these were annotated in terms of their attributes: time, speaker's or writer's perspective of the narrative, and semantic connotation.

Time tags (i.e. past, present, or future) were given to each clause after considering the fact that in the early stages of the Greek language, there were many instances in which the tense of the verb did not correspond to the time scale to which it referred. For instance, in example (1), the verb *παρμέμβλωκεν* 'protects' might carry the markers of present perfect (i.e. reduplication *παρ-μέμβλω-κεν*); however, it actually refers to a present situation (Μπαχαράκης 2001):

- (1) . . . μήτηρ παρμέμβλωκεν ὁμῶς νύκτας τε καὶ ἡμέρας.
 . . . the mother (Thetis) protects (Achilleus) all night- and day-long, likewise.
 (Homer, *Ilias*, 24.74)

Furthermore, the speaker's or writer's perspective of the narrative for the given situation was annotated such tags as "assertion", "probability", "hypothesis", and "uncertainty" in order to represent the degree of certainty regarding the truth of a given situation. Other tags, such as "wish", "desire", "prompt", "order", "warning", "obligation", were used to represent the degree of necessity expressed by the speaker or the writer in terms of whether the action or a situation has to happen (Clairis & Babiniotis 2011). In (2), for example, with the use of the verb *δεῖ* 'must', the speaker emphasises that Andromache's death is imperative and, thus, the tag "obligation" was assigned to it:

- (2) σοφὴ σοφὴ σὺ· κατθανεῖν δ' ὅμως σε δεῖ.
 You are wise, but you must die.
 (Euripides, *Andromache*, 246)

Positive tags were given to the representation of situations with positive connotations and negative tags to those with negative connotations. The statement of clause 2 (*κατθανεῖν δ' ὅμως σε δεῖ*) in (2), for example, was assigned a negative tag. When a situation has neither positive nor negative connotations, such as the verb *εὔδει* 'sleeps' (Aristophanes, *Aves* 81), a neutral tag was given to it.

3. METHODOLOGY AND PROCEDURES

The study measured the cosine similarity between two TF-IDF (Term Frequency-Inverse Document Frequency) vectors, Vector A and Vector B. Vector

A (d1) consists of the TF-IDF values of the attributes (terms, t) of clause 1, while Vector B (d2) consists of the TF-IDF values of the attributes (terms, t) of clause 2. The TF-IDF, as well as the cosine similarity values, were measured using Scikit-Learn library on Python (cf. Pedregosa et al. 2011).

The TF-IDF method was used to define how important an attribute (term, t) is within a given document (d) by considering the number of times that the former occurs in the latter, as well as its relation to the number of times the same attribute occurs in the overall corpus ($D = d_1, d_2$).

TF-IDF is the product of two weights, the Term Frequency (TF) and the Inverse Document Frequency (IDF). In the Scikit-Learn library, the resulting TF-IDF vectors are normalised by the Euclidean norm:

$$\text{tfidf}(t, d) = \text{tf}(t, d) * \text{idf}(t, D)$$

TF is the proportion of the occurrences of a specific attribute (term, t) to the total number of attributes in the document, either d1 or d2.

$$\begin{aligned} \vec{vd1} &= (\text{tf}(t_1, d_1), \text{tf}(t_2, d_1), \text{tf}(t_3, d_1), \dots, \text{tf}(t_n, d_1)) \\ \vec{vd2} &= (\text{tf}(t_1, d_2), \text{tf}(t_2, d_2), \text{tf}(t_3, d_2), \dots, \text{tf}(t_n, d_2)) \end{aligned}$$

Further, IDF measures how important a specific attribute (term, t) is in the corpus ($D = d_1, d_2$) and is computed as the logarithm of the number of documents in the corpus divided by the number of documents containing the terms, that is, document frequency $\text{df}(t)$.

$$\text{idf}(t) = \log\left[\frac{(1+n)}{(1 + \text{df}(t))}\right] + 1$$

The cosine similarity was then calculated as the cosine of the angle theta (θ) between the two TF-IDF vectors (A, B) as projected in a multi-dimensional space, in which the dimensions represent the attributes of the clauses. The cosine of the angle theta (θ) between the two vectors is equal to the sum of the products of the individual components of the two number sequences (i.e. two vectors), divided by the product of the magnitude of the two vectors.

The cosine similarity metric between two vectors A and B is computed as:

$$\cos(A, B) = \frac{A \cdot B}{\|A\| \cdot \|B\|} = \frac{\sum_i A_i B_i}{\sqrt{\sum_i A_i^2} \sqrt{\sum_i B_i^2}}$$

The numerator represents the dot product (inner product) of the vectors $\vec{vd1}$ and $\vec{vd2}$, while the denominator is the magnitude of each vector.

The cosine values range from 0 to 1. A value closer to 1 means that Vectors A and B have the same orientation, meaning that they are highly similar to each other.

4. RESULTS

4.1. “SOURCE” COMPARISON

An equation between two entities is fundamental to humans and is rooted in the physical experience of comparing two physical objects, e.g. in measuring their length or weighing them with the use of the human body (Tomasello 2003). In Stage I of the semantic change of *ὁμῶς* to *ὅμως*, this ability of comparing two objects in terms of their similarity was expressed, by linguistic means, with the adverb *ὁμῶς*. This is attested in similes in which Entity A is described as similar to Entity B. For example, in (3), any person who thinks one thing and then says something else (*κεῖνος ὅς χ' ἕτερον μὲν κεύθη ἐνὶ φρεσίν, ἄλλο δὲ εἶπη*) is compared to the gates of Hades (*Ἄϊδαο πύλησιν*) because they are both seen as being hateful to the speaker:

- (3) . . . ἐχθρὸς γάρ μοι κεῖνος ὁμῶς Ἄϊδαο πύλησιν
 . . . ὅς χ' ἕτερον μὲν κεύθη ἐνὶ φρεσίν, ἄλλο δὲ εἶπη.
 . . . because he is hateful to me as the gates of Hades,
 . . . whoever hides one thing in the mind and says another thing.
 (Homer, *Ilias*, 9.313)

The adverb *ὁμῶς* is also used to compare two entities in terms of their shared role, as in example (4), in which the horses (*ἵππων*) and the crammed shield-bearers (*ἀνδρῶν ἀσπιστάων εἰλομένων*) fulfil the same role (i.e. that of filling the entire battlefield):

- (4) τῶν δ' ὅσον ἐκ νηῶν ἀπὸ πύργου τάφρος ἔεργε
 πλῆθεν ὁμῶς ἵππων τε καὶ ἀνδρῶν ἀσπιστάων εἰλομένων.
 and the whole place, as far as the wall was closed by the pit towards the ships,
 was similarly filled with horses and multitudes of crammed shield-bearers;
 (Homer, *Ilias*, 8.215)

In Stage I, there are also cases in which the two entities share a common relation, such as in the description in (5), where Pergasides (*Περγασίδην*) is respected by Trojans to the same degree as are Priam's children (*Πριάμοιο τέκεσσι*):

- (5) βάλει δὲ πρόμον ἄνδρα Αἰνεΐω ἕταρον μεγαθύμου Δηϊκόωντα Περγασίδην,
 ὃν Τρῶες ὁμῶς Πριάμοιο τέκεσσι τίον. . .

He smote . . . Deicoon Pergasidin. . .
 whom Trojans were respecting as Priam's children. . .
 (Homer, *Ilias*, 5.536)

In Stage I, the use of the adverb *ὁμῶς* was contingent on the equational structure “Entity A is like Entity B”, which involves a relationship of comparison between two entities in response to a shared quality, role, or relation (Figure 1). This comparison then allowed language users to align Entity A with Entity B and to recognise the fact that two unlike entities can still be associated with each other (Gentner & Markman 1997; Markman & Gentner 1993, 1994, 1996).

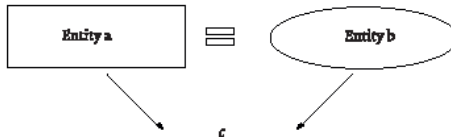


Figure 1. Association (c) between two unlike entities: Entity A (noun) and Entity B (noun)

However, the adverb *ὁμῶς* was not consistently used to compare two entities in those early stages. It was rarely used to compare more than two entities (*μύθους μὲν ὑπερφιάλους ἀλέασθε πάντες ὁμῶς* ‘stop the superfluous words all without an exception’, Homer, *Odyssea*, 4) or, along with the conjunction *καὶ* ‘and’, it was used to emphasise that the two properties added via *καὶ* are similar to each other (*ὄτ’ αἰσχρὸν ὁμῶς καὶ κακὸν ἄνδρα τιθεῖ* ‘The old age turns the man shameful and, likewise, evil’, Mimnermus, fragment 1, 7).

Finally, in Stage I, there are a few cases in which the adverb *ὁμῶς* has a different syntactic role (e.g. that of linking two clauses instead of two nouns). Each of these two clauses represented a different semantic situation. Nevertheless, the two situations were never exact opposites of each other as there was a conceptual thematic link between them (cf. Lakoff 1971). These two situations were never identical, either, as they only resembled one another, either to a high or a low degree, in terms of their attributes, including time, speaker’s or writer’s perspective, and semantic connotation (Figure 2).

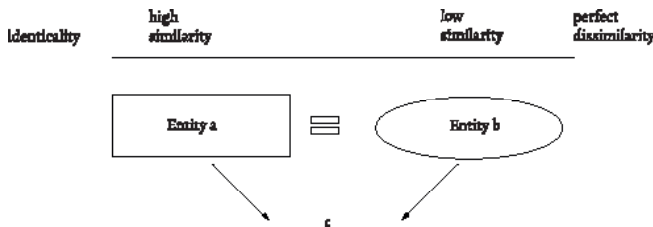


Figure 2. Thematic link (c) between Entity A (clause 1) and Entity B (clause 2) that exhibit either high or low similarity between them

For example, in (6) the adverb links two clauses that represent, on the one hand, two different semantic situations, and, on the other hand, two situations which share a common thematic link. The shepherd guards the animals (clause 1) and also has kind feelings (clause 2). Additionally, the two situations resemble each other to a high degree as they are represented in

the present tense and have a positive meaning expressed with assertion on the speaker's behalf:

(6) . . . ὄς τοι ὑῶν ἐπίουρος ἐστίν, ὁμῶς δέ τοι ἦπια οἶδε. . .

. . . who guards the animals (the shepherd) and likewise has kind feelings. . .

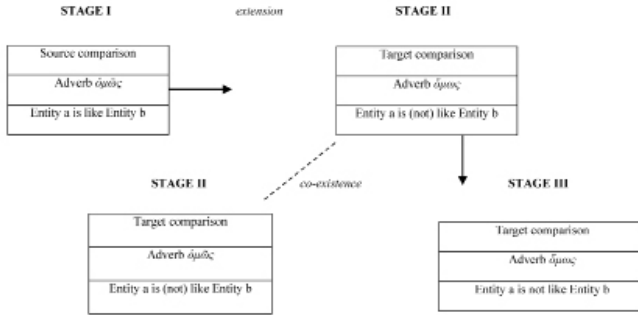
(Homer, *Odyssea*, 13.406)

4.2. "TARGET" COMPARISON

So far we have seen that in Stage I the adverb ὁμῶς was used to compare two entities that then allowed language users to map the attributes of Entity A to those of Entity B. Speakers associated one entity with the other because of their shared quality, role, or their relation, while also identifying their different attributes.

We also saw that a new syntactic analysis was given to the equational structure "Entity A is like Entity B" when ὁμῶς started linking two clauses instead of two nouns. Therefore, the appearance of the new form ὁμῶς in Stage II should have been the outcome of reanalysis (De Smet 2009; Traugott 2011; Hopper & Traugott 2003) driven by the mechanism of analogy (Behrens 2017). According to the principles of ostensive-inferential communication (Smith 2012), the speaker used the form ὁμῶς with the intention to compare two entities and align their similar attributes. Because the two entities were never identical and had dissimilar attributes, in the course of the alignment the hearer inferred that the two entities were compared not only in terms of their similarities but also in terms of their differences. This difference between the speaker's intention (ostensive act) in aligning the similar attributes between the two entities with the use of the form ὁμῶς and the hearer's inference (inferential act) that the former's intention was also to align the differences resulted in a new analysis being given to the surface equational structure of ὁμῶς (Hoefler & Smith 2008; Smith 2011). Furthermore, the mapping of similar attributes shed an "analogical insight" (Pritchard 2019: 594) onto the mapping of the dissimilar ones and, therefore, analogical relations were drawn between the comparison of two similar attributes (source) and the comparison of two dissimilar attributes (target). The inferred dissimilarity driven by the mechanism of analogy (Behrens 2017; Gentner & Colhoun 2010; Gentner & Smith 2012, 2013; Heine, Claudi & Hünemeyer 1991) led to the extension of the equational structure "Entity A is like Entity B" to the structure "Entity A is not like Entity B" and eventually to the novel meaning of the form ὁμῶς that was followed by a shift of the accent from the second syllable to the first (Figure 3).

Figure 3.
The evolution of
ὁμῶς



This new syntactic and semantic analysis resulted in the coexistence of two surface structures, represented by ὁμῶς and ὁμῶς (Figure 4).

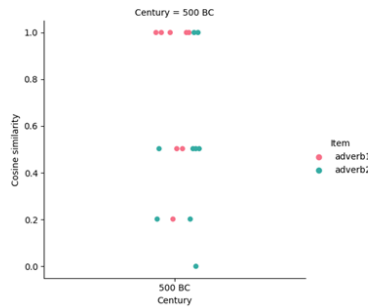


Figure 4.
Co-existence
of two surface
structures repre-
sented by ὁμῶς
(adverb 1) and
ὁμῶς (adverb 2)

These two structures were, on the one hand, identical at the surface level, and, on the other hand, semantically different. That is, they varied in the degrees of resemblance between the two clauses. In both interpretations, two clauses were compared that resembled one another to either a high or a low degree in terms of their attributes. Those two interpretations could be inferred from either of the two surface structures because they both had the same referent, that is, the equational structure (Detges & Waltreit 2002).

For example, in (7), clauses 1 and 2 hold an adversative relation. Clause 1 triggers the expectation that Aristomenes' action in attacking his four enemies with evil intentions would cause negative reactions. However, in clause 2, this expectation is denied because the people who were attacked were not allowed to return to Pythias (cf. Lakoff 1971; Oversteegen 1997; Spooen 1989). Here, the adversative relations between clauses 1 and 2 would be more appropriately expressed with the use of ὁμῶς, while ὁμῶς is used instead:

(7) . . . τέτρασι δ' ἔμπετες ὑψόθεν σωματέσσι κακὰ φρονέων,
 . . . τοῖς οὔτε νόστος ὁμῶς ἐπαλπνος ἐν Πυθιάδι κρίθη. . .
 . . . upon four enemies you fell mercilessly off the top,

. . . nor was their return to Pythias judged as pleasant likewise. . .

(Pindar, *Pythian*, 8.84)

Likewise, in example (8), the use of ὁμῶς would be more appropriate because clause 1 is not semantically opposite to clause 2. The speaker in both clauses makes two negative statements about a deceitful person:

(8) ἀδύνατα δ' ἔπος ἐκβαλεῖν κραταῖον ἐν ἀγαθοῖς δόλιον ἀστόν.
ὁμῶς μὰν σαίνων ποτὶ πάντας ἄταν πάγχυ διαπλέκει.

It is impossible for a deceitful citizen to say a word that would have impact on the good people; however, by deceiving everyone, he always devises frauds.

(Pindar, *Pythian*, 2.82)

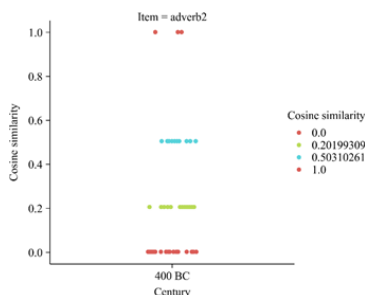
This co-existence of the two surface structures continues in Stage III, around the 4th century BC. However, the more frequent use of the new form-meaning mapping led to the displacement of the surface structure represented by ὁμῶς and to the conventionalisation of the structure represented by ὁμῶς in Stage III. In this stage, the two clauses represent two situations that hold an adversative relation (Lakoff 1971) indicated by a shift from one situation to the other (Segal, Duchan & Scott 1991) in terms of time, the speaker's/writer's perspective, or semantic connotation. For example, in (9), the speaker expresses her desire to speak up (clause 2) regardless of the guilty feelings that she has about this particular action (clause 1):

(9) Ἡλ. αἰσχύνομαι μὲν, βούλομαι δ' εἰπεῖν ὁμῶς.
I feel ashamed, however I want to speak up.

(Euripides, *Electra*, 901)

The degree of low similarity between the representation of these clauses, joined by ὁμῶς, is indicated by the low values of cosine similarity between clause 1 (vector A) and clause 2 (vector B), as shown in Figure 5.

Figure 5.
Low degrees of cosine similarity between clause 1 (Vector A) and clause 2 (Vector B) linked by ὁμῶς in Stage III



The dissimilarity between the attributes of clauses 1 and 2, as linked by $\delta\mu\omega\varsigma$, increased from Stage II to Stage III, this increase being apparent in the values of the cosine similarity between the attributes of clause 1 (vector A) and clause 2 (vector B) in Figure 6. In Stage II, the cosine similarity between the two vectors is 0.84 (cosine distance: $1 - 0.84 = 0.16$), which then decreased to 0.76 (cosine distance: $1 - 0.76 = 0.24$) in Stage III (Figure 6).

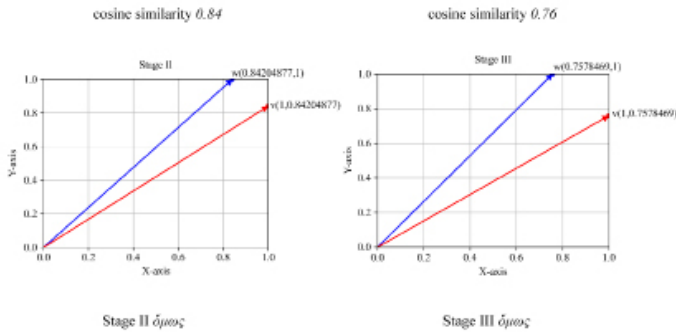


Figure 6. Cosine similarity between clause 1 and clause 2, as linked by $\delta\mu\omega\varsigma$, in Stage II and Stage III

Overall, the source location of the semantic change should have been the human experience of equating two physical objects that was linguistically expressed with similes via the use of $\delta\mu\omega\varsigma$. This high degree of similarity between two entities, entailed by this use of similes, progressively decreased along with the semantic changes of the adverb $\delta\mu\omega\varsigma$ until it reached the target, which was a high degree of dissimilarity.

5. CONCLUSION

The evolution of an adversative relation between two clauses linked by $\delta\mu\omega\varsigma$ was traced back to similes in the early stages of the Greek language. This evolution seems to have been the result of ostensive-inferential communication on a synchronic usage level, as well as having occurred via the process of reanalysis by means of the cognitive mechanism of analogy that, in turn, resulted in the extension of the equational structure: “Entity A is like Entity B” to the structure “Entity A is not like Entity B”.

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OBLICZENIOWE PODEJŚCIE DO ZMIANY SEMANTYCZNEJ STAROGRECKIEGO PRZYSŁÓWKA ὀμῶς DO ὀμως

Praca prezentuje nowatorskie ujęcie zmiany semantycznej starogreckiego ὀμῶς do ὀμως. Rozwój znaczenia ὀμως można prześledzić uwzględniając konstrukcję wyrażającą porównanie "A jest jak B". Kiedy konstrukcji tej przypisano nową strukturę składniową, dwie podlegające porównaniu jednostki zaczęły reprezentować dwa odrębne zdania składowe, co na skutek działania analogii doprowadziło do powstania nowej formy ὀμως. Relacje analogiczne między porównaniem „źródłowym” a „docelowym” doprowadziły do rozszerzenia konstrukcji „A jest jak B” do „A nie jest jak B”. W konsekwencji powstało nowe znaczenie słowa ὀμως, po którym nastąpiło przesunięcie akcentu z drugiej sylaby na pierwszą.

Słowa

kluczowe:

zmiana semantyczna, język starogrecki, ὀμῶς i ὀμως, naturalne przetwarzanie języka, reinterpretacja, analogia