Visual metaphor analysis: a relevance theory approach

Аналіз візуальної метафори: підхід теорії релевантності

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Abstract

The article proposes a method for analyzing visual metaphors using Relevance Theory tools, including ad hoc concepts, emergent properties, and meta-representations. It identifies the specific features of visual metaphor meaning inference as a multi-component structure based on the interplay of explicature, contextual assumptions, and implicatures from ad hoc properties of visually encoded source and target concepts. The study demonstrates that implicatures from the source domain concept's ad hoc properties, adapted to the target, form primary and secondary mappings between domains, checked for relevance against contextual constraints and meta-representations. A hypothesis is proposed and tested regarding the influence of domain visualization methods and processing focus on cognitive effort and achieving an optimal balance between effort and cognitive effects.

Анотація

У статті пропонується метод аналізу візуальних метафор за допомогою інструментів теорії релевантності, включаючи ад хок (спеціальні) концепти, емерджентні властивості та мета-репрезентації. Визначаються особливості інференції смислу візуальної метафори як багатокомпонентної структури, що є результатом взаємодії експлікатури, контекстуальних припущень та імплікатур із ад хок властивостей візуально закодованих вихідних і цільових концептів. Дослідження демонструє, що імплікатури на основі ад хок властивостей концепту джерела, адаптовані до цілі, утворюють первинні та вторинні відображення між доменами, що перевіряються на релевантність щодо контекстних обмежень і мета-репрезентацій. Запропоновано та перевірено гіпотезу щодо впливу способів візуалізації домену та фокусу

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обробки на кількість зусиль з когнітивної обробки та досягнення оптимального балансу між витраченими зусиллями та позитивними когнітивними ефектами.

Introduction

This article proposes a method for analyzing visual metaphor from the perspective of the relevance-theoretic approach, utilizing categories such as ad hoc concepts, emergent properties, and meta-representations. The problem of metaphor analysis remains one of the most debated within Relevance Theory (hereafter referred to as RT), whose founders interpret metaphor similar to other loose uses (Sperber & Wilson, 1986;1995, p. 233-237), which are not metaphorical.

Recently, some modifications of this approach have been proposed that take into account the specificity of creative "category-crossing" metaphors, introducing new explanatory tools such as emergent properties and metarepresentations. However, these innovations are still in the form of separate ideas and hypotheses and require further development. This defines *the relevance* of this article as a specific contribution to the study of visual metaphor as a cognitive-pragmatic phenomenon. *The novelty* of the article lies in the fact that, as far as we know, visual metaphor is being analyzed from the perspective of the relevance-theoretic approach for the first time.

Literature Review

The theoretical foundation of the article includes the principles of the relevance-theoretic approach to metaphor analysis, as well as the theory of visual metaphor, particularly regarding their classification and processing focus.

Relevance Theory provides an explanation of how people understand and interpret information based on the principles of optimal relevance, which aims to achieve the best balance between processing effort and positive cognitive effects (Carston, 2010; Kravchenko, & Zhykharieva, 2023; Romeo & Soria, 2014; Sperber & Wilson, 2015; Wilson, 2011).

Research contributing to the theoretical framework of the article according to the postulates of Relevance Theory can be conventionally divided into three groups: studies associated with general methods for testing interpretational hypotheses in the inference of meaning, both non-metaphorical and metaphorical expressions; research related to classical tools for metaphor analysis in Relevance Theory; and works dedicated to innovative tools for analyzing complex metaphors.

The verification of interpretational hypotheses proceeds based on their availability until the interpretation aligns with current expectations of relevance, depending on the context, communicators' goals and intentions, their previous experience and knowledge, as well as expectations linked to the structure and format of information. Relevance Theory (Romeo & Soria, 2014; Rubio-Fernández, 2008; Sperber & Wilson, 2008) identifies stages of hypothesis testing such as: (a) Disambiguations – resolving ambiguities in the meaning of words or phrases (in the case of visual metaphor – in visually encoded images) that can have multiple interpretations depending on the context; (b) Reference Assignment – determining what or who the referential reference in the text pertains to (in visual metaphor – identifying visual domains through referring visual details); (c) Enrichments – adding or clarifying initial information to make it more understandable or complete; (d) Loosening – expanding or weakening the meaning during interpretation; (e) deriving strong and weak Implicatures, and so on (Romeo & Soria, 2014; Rubio-Fernández, 2008; Sperber & Wilson, 2008).

Our article relies on these stages of hypothesis testing, applying them to the analysis of visual metaphors, which has not yet been done in the academic literature, thus addressing this gap. In particular, disambiguation, reference assignment, and enrichment are applied in the article at the explicature derivation

stage, allowing for the identification of visualized domains. The derivation of implicatures – implicit meanings inferred beyond the literal/visualized content – is carried out at the stage of adapting the source domain to the target. Cognitive processing of visual metaphor is completed when the derived meaning satisfies the optimal balance between the processing effort and positive cognitive effects – benefits that arise from the processing and interpretation of information. Such effects include understanding and meaningfulness of the information; alignment with interpreters' expectations and resulting intuitive or emotional satisfaction; cognitive relief; and the development of new connections and ideas as a result of enriching the cognitive structure.

The next group of studies concerns traditional tools for metaphor analysis in Relevance Theory – ad hoc concepts (Carston, 2002, 2010; Sperber & Wilson, 2008; Stöver, 2010; Wilson, 2000, 2011; Wilson & Carston, 2006, 2008; Wilson & Sperber, 2012). These special concepts are understood as temporary constructs pragmatically created by recipients during communication to satisfy the requirements of the principle of relevance "in response to specific expectations of relevance raised in specific contexts" (Carston, 2002, p. 322). In terms of metaphorical understanding, ad hoc concepts are activated to link different domains, adapting elements of the source to the target.

When constructing an ad hoc concept, the listener/viewer/reader selects from the encyclopedic entry of the source concept a core or non-core property that can be metaphorically adapted to the target (Sperber & Wilson, 1986/1995, p. 86; Rubio-Fernández, 2008, p. 381-382). In this process, the scope of the verbally or visually encoded concept is either expanded or narrowed. For example, in a visual metaphor depicting a joyful shark in a pasta restaurant advertisement, where frightened surfers are flying into the shark's mouth from the sky, the visualized concept of the source domain Shark cannot be directly applied to the restaurant's pasta lover. The possibility of a direct correlation is limited by the encyclopedic context, since the connection between Shark and Restaurant Customer forces parallels to be drawn between other structural elements of the source and target domains - in particular, between surfers and pasta, which contradicts the logic of "common sense". Accordingly, in order to apply the visualized source to the target, the interpreter must radically adapt the encoded source concept. For this, a non-core, contextually dependent ad hoc property such as "Emotion of Delight" is selected from the source's encyclopedic entry. This property is supported by the local verbal context of the advertisement—the slogan "That's how you feel." Here, the inference of the ad hoc concept SHARK* (Emotion of Delight) is constructed by expanding the meaning of the visually encoded source to encompass emotion—a property applicable to a range of other referents. The constructed ad hoc concept is metaphorically applicable to the target – the restaurant customer – promising them the emotion of delight from the pasta.

Research dedicated to innovative tools for analyzing complex metaphors focuses on the emergent properties of metaphors and on the least explored issue in Relevance Theory: metarepresentations. Emergent properties of a metaphor refer to new aspects of meaning that arise from the interaction of elements from different domains, which individually do not possess these properties. Emergent meanings occur during the inference of meaning in "category crossing" metaphors, where the literal interpretation of the subject (target) and the predicate (source) is incompatible (Wilson & Carston, 2008, p. 14). In such cases, researchers propose an inferential process as a transition from the encoded concept to the communicated concept and from the communicated concept to implicatures (op. cit., p. 19).

The example given above can illustrate an emergent property of the metaphor. Here, the inferential transition from the encoded concept "Shark" to the communicated concept occurs with the ad hoc property "Emotion of Delight" as a hypothesis about the implicit content, triggered by the verbal anchor. When adapting the ad hoc concept to the target, an implicature is drawn—promising the restaurant customer the emotion of delight from Spoleto's pasta. The implicature results from the interaction of explicit (visualized) content, the hypothesis about implicit content, and local-contextual assumptions based on the verbal caption, combined with the encyclopedic context of "common sense," which imposes constraints on the direct correlation between "Shark" and "Restaurant Customer."

In contemporary research on Relevance Theory, scholars propose that complex metaphors can be derived through dual processing that combines propositional and metarepresentational levels (Carston, 2010). We believe that a significant portion of visual metaphors falls into this category, since it is often difficult to establish comparable domains in them, and the numerous visual details contained in such metaphors can encode sub-metaphors in the overall metaphorical image.

In studies on TD, developing the problem of metarepresentations, the idea was expressed that metarepresentations include two types of structures (Stöver, 2010) – categorization-based structures (general-level conceptual metaphors) and undifferentiated representations based on sensorimotor experience, primarily emotions and feelings. Such structures can be used to test inferences of propositional format (conceptual metaphors) or exist in parallel with the representational level (sensory-based structures).

In the analyzed metaphor, both types of structures are discovered: categorization-based conceptual metaphors, which are "held" to test inferential hypotheses: "SUBJECT is EMOTION" and "DESIRES ARE FORCES BETWEEN THE DESIRED AND THE DESIRER" (these metaphors are available in Lakoff's list of metaphors – Lakoff, Espenson & Goldberg, 1991) (surfers in the advertisement are metaphorically pulled towards the shark against their will), and sensory-based metarepresentation – delight in tasty food based on the sensory experience of the advertisement's recipients.

It is important to note that the relevance-theoretical approach has been applied in individual studies of visual metaphor (Kravchenko & Yudenko, 2021; 2023; Kravchenko, & Zhykharieva, 2023), but without addressing research tools such as ad hoc concepts, emergent properties of metaphor, and metarepresentations. This article aims to address this gap.

The second theoretical premise of the article involves certain aspects of the theory of visual metaphors, primarily related to their classifications based on the method of domain visualization and the focus of cognitive processing. We will use the now-traditional classification of visual metaphors introduced by Forceville (1994), which includes:

Pictorial Simile (or juxtaposition in other terminology, Phillips & McQuarrie, 2004) – metaphors in which both the source and target domains are visualized.

Hybrid Metaphor or Fusion – metaphors where the target and source objects merge into a single semantically related visual element or gestalt. In this type, the target object completes the form of the object visualizing the source, or vice versa.

Context Metaphor or Replacement – metaphors where one of the domains is omitted. In Peterson's extended classification (2019), this type of metaphor is referred to as Identification, where one domain is pictorial, and the other is textual.

Based on the mentioned classification, the article puts forward the hypothesis that for analyzing visual metaphors through the lens of Relevance Theory, the specifics of domain visualization are crucial, as this affects the cognitive effort required for processing. The article also incorporates the concept of cognitive processing focus into the analysis, attempting to demonstrate that such a focus influences the balance between cognitive effort and expected effects. Contemporary research distinguishes three main focuses of cognitive processing (Phillips & McQuarrie, 2004, p. 119):

Comparison for Similarity: Applied by the viewer when the source and target domains of the visual metaphor have certain similarities, allowing inferences about their other shared features.

Comparison for Opposition: Used by the viewer when the source and target domains have specific differences, enabling conclusions about their other differences.

Comparison for Connection (Associative Connection): Employed when there is an associative link between elements of the target and source, revealing other associative connections between them.

The visual metaphor analyzed above is classified as a context metaphor (or replacement) based on the method and level of domain visualization, since the target domain is not visually represented in it and is reconstructed on the basis of the verbal code, and the source concept is derived inferentially, not coinciding with the visualized source. In terms of cognitive processing the metaphor follows the comparison for connection focus.

Despite the fact that a significant number of interdisciplinary studies examine the cognitive aspects of visualization in bimodal and multimodal contexts (Cohn, 2021; Dimara, & Perin, 2020; Kravchenko, &

Shanaieva-Tsymbal, 2023; Padilla et al., 2018; Schlosset al., 2018), visual metaphor is examined for the first time from a cognitive-pragmatic perspective, using the tools of Relevance Theory.

The aim of the article is to propose a method for analyzing visual metaphors from the perspective of Relevance Theory. This aim involves addressing the following tasks:

a) Identifying the research tools of Relevance Theory suitable for the analysis of visual metaphors;
b) Analyzing visual metaphors using these tools;
c) Determining the relationship between the type of metaphor, the focus of processing, and the amount of cognitive effort expended to infer the optimally relevant meaning of the metaphor;
d) Proposing a Relevance Theory-based algorithm for analyzing visual metaphors.

Methodology

The primary research method of the article is the analysis of metaphors from the perspective of Relevance Theory, employing explanatory tools such as ad hoc concepts, ad hoc properties, metarepresentations, and emergent properties. Additional methods include: (a) Analysis within the framework of Conceptual Metaphor Theory to establish categorization-based general-level structures used for testing propositional format inferences; (в) A method for analyzing the focus of cognitive processing of visual metaphors to identify how different types of processing affect cognitive effort.

The analysis algorithm consists of nine stages:

1. Determine the type of metaphor based on the method of visualizing the source and target domains.
2. Identify the cognitive processing focus used in interpreting the visual metaphor.
3. Infer the Explicature: Establish the connection between the target and source domains by developing the visually encoded propositional content through reference assignment, disambiguations, enrichments, and other inferences related to constructing a hypothesis about the explicit content of the metaphor.
4. Infer the Ad Hoc Concept: Based on the choice of ad hoc property from the encyclopedic entry of the source concept, adapt the ad hoc concept to the target. Infer the first-order available implicatures for processing.
5. Check Implicatures for Relevance: Verify the implicatures against contextual constraints and metarepresentations, including general-level conceptual metaphors.
6. Address Discrepancies: If implicatures do not align with contextual constraints, continue processing by inferring additional ad hoc properties from the source concept and, if necessary, constructing an ad hoc concept for the visually encoded target concept. Adjust the source to the target with the inference of second-order implicatures/mappings and verify against contextual constraints and metarepresentations.
7. Determine emergent properties of the metaphor that are not encoded by either the source or target and result and are the result of the coordination of non-nuclear ad hoc properties of the source or target.
8. Infer the meaning of the metaphor as a mutual agreement between the explicature, contextual assumptions, and the set of implicatures from ad hoc concepts, including implicatures, which create the emergent properties of metaphor.
9. Assess the metaphor in terms of visual factors affecting the complexity of cognitive processing.

Results and Discussion

Let us analyze the visual metaphor in accordance with the proposed analysis algorithm.

Picture 1. Visual metaphor: "Animals are not clowns"
Image Source: Inyminy (n/d)

In terms of domain visualization, the metaphor falls under pictorial simile or juxtaposition, as the visual details—the grid and the makeup—clearly refer to two comparable domains: the Circus (Target) and the Prison (Source). The metaphor's cognitive processing focus is comparison for similarity, as the metaphorical elements of the source and target domains share certain similarities (animals in a circus are kept in cages, similar to cells in a prison), which allows for inferring additional correlations between the domains during metaphor processing.

The nearest accessible processing step involves formulating a hypothesis about the explicature that links the target and source into a single proposition. Decoding the explicature requires minimal procedural effort due to the configuration of the visual domains as a juxtaposition and the processing focus as comparison for similarity.

The first set of interpretative hypotheses accessible during cognitive processing of the metaphor involves Reference Assignment – associating visual details with their corresponding visual domains, and Disambiguations – detailing the scope of domains. In this vein, the development of the visually encoded logical form, with the inference of the explicature, is carried out by: (a) Reference Assigning the grid to the prison (source), allowing the identification of the source domain, and assigning the makeup on the animals' faces to the circus (target) domain; (b) Enrichment: Narrowing the concept of Prison to specify that it refers to a prison for animals, thereby clarifying the target.

The inferential process of interpretation, guided by the Principle of Relevance, continues with the adaptation of the source to the target. For this purpose, an ad hoc concept of Prison* is inferred, selecting a core ad hoc characteristic from the encyclopedic entry of the source concept, such as "deprivation of freedom." In this case, the inference is executed as loosening, as the meaning of the communicated concept is expanded by removing parts of its logical record – for example, elements like "criminals" or "punishment for crimes."

The ad hoc concept of Prison* is relevant to the target, enabling the identification of contextual implicatures that correlate with the mappings between the domains, such as: Animals are understood as prisoners; Trainers are perceived as guards.

However, loosening alone is insufficient for a full understanding of the metaphor's meaning, given all contextual assumptions—the filter for interpretation through the lens of what is already known or assumed to be true. Since encyclopedic knowledge doesn't usually cover the idea of animals being in prisons, additional contextual assumptions need to be considered. The principle of relevance requires continued cognitive processing, as a literal interpretation of the predicate is incompatible here "with a literal interpretation of the subject" (Wilson & Carston, 2008, p. 14). Consequently, the inferential process continues as loosening inside loosening, which involves extending the concept of "Prison" to include broader ad hoc properties, such as "any enclosed space" and "not only for humans." These ad hoc properties, when adapted to the target, create weak implicatures: Prison* – any enclosed space; Prison* – not only for humans, which are reinforced by visual details—like animals in cages that resemble prison bars—thus bridging the gap between the metaphor's literal and intended meanings.

Additional meanings of the metaphor are inferred as emergent properties. The first emergent property relates to the integration of new information that resolves the ambiguity of the contextual assumption associated with the background knowledge of the concept of prison, which includes the component "guilt and punishment"—serving a sentence for committed crimes. To align the source with the target, the ad hoc concept Circus Animal* is inferred by selecting a non-core, contextually dependent ad hoc property, such as being imprisoned without guilt. Adapting the source to this ad hoc property allows the interpreter to map an additional aspect of the metaphor's meaning, its emergent property: animals in a circus—serving a prison sentence without guilt.

Another emergent property of the metaphor, "compulsion to unnatural work for animals," is triggered by the visual detail of makeup on the animals' faces. On the one hand, the element "compulsion to work" aligns with the source domain of Prison based on the contextual assumption that prisoners in prison must perform certain tasks, which is a natural part of prison life. On the other hand, the limitations on a direct correlation between animal performances in the circus and the work of prisoners are imposed by the local-visual context of the metaphor—the visual detail of makeup on the animals' faces. This detail allows for the inference of the ad hoc concept of the target domain Circus*, based on the selection from the encyclopedic entry of the concept of a non-core ad hoc property, Clown, metonymically associated with Makeup. From this ad hoc property, a weak implicature "Animals are Clowns" is inferred, which conflicts with the cognitive context of the advertisement viewer. Expectations of relevance lead to processing the ambiguous contextual assumption as an implicature about the unnaturalness of work for animals in the circus, creating the second emergent property of the metaphor.

Ultimately, the meaning of the metaphor is derived as an inferential transition from (a) the explicature Circus – Prison for Animals, to (b) the set of strong and weak implicatures from the ad hoc concepts Prison* and Circus*, taking into account (c) contextual assumptions. The meaning is inferred as a multi-component structure that integrates a set of mappings, adapting ad hoc properties of the source domain concept to the target, including to non-core ad hoc properties from the encyclopedic entry of the target concep: animals are prisoners, depriving animals of their natural environment is imprisonment, trainers are wardens, animals performing tricks is coercion to unnatural work, exploitation of animals is imprisonment, the enclosed space of the Circus is a Prison for Animals, and animals in a circus—serving a prison sentence without guilt. The mappings unfolding into the meaning of the metaphor are checked for relevance against categorization-based conceptual metaphors as part of the interpreter's cognitive context in their working memory: ANIMALS ARE PEOPLE; STATES ARE LOCATIONS; EXISTENCE IS A LOCATION; HARM IS BEING IN A HARMFUL LOCATION; SOCIAL ROLES (exploitation as circus performers) ARE PHYSICAL LOCATIONS (imprisonment). These are based on the part/whole image schemas, the link schema, and the container schema as recurring dynamic patterns of perceptual interactions and motor programs that provide coherence to human experience.

Mappings checked for their relevance by categorization-based structures and satisfying contextual constraints allow for obtaining enough positive cognitive effects proportional to the devoted processing effort, in accordance with the presumption of optimal relevance.

The possibility of connecting the principle of relevance with mapping is confirmed by findings that metaphorical restructuring of a concept is guided by relevance, such that the restructured target domain becomes the context of interpretation. "The mapping is shaped guided by the search of the properties that will enable the hearer to obtain as many cognitive effects as possible following a path of least processing effort." The unusual conceptualization of some propositional constituents depends on a mapping that modifies the cognitive environment by downplaying, adding, or strengthening certain properties of the target concept in an analogical way (Romeo, & Soria, 2014, p. 502).

Although the inferential process of the analyzed metaphor is multistage, involving the construction of ad hoc concepts, the derivation of strong and weak implicatures, and emergent properties, the metaphor still appears relatively simple for cognitive processing. This simplification is influenced by visual factors such as the characteristics of visual blending in Juxtaposition with a clear visualization of the target and source domains, and the focus on comparison for similarity. It can be hypothesized that in context metaphors with a focus on comparison for association, the viewer will expend significantly more effort in cognitive processing of the message. This hypothesis, suggested by the analysis of one metaphor, needs further confirmation through applying the proposed method to a corpus of metaphors with varying domain

visualization methods and processing focuses. Testing this hypothesis across a range of metaphors will help validate the findings and refine the proposed method.

Metaphor processing can be represented in the following stages:

1) Identification of the metaphor type as Juxtaposition, where both source and target domains are visualized distinctly.
2) Identification of the cognitive processing focus as Comparison for Similarity, with common elements of target and source structure obvious to the viewer.
3) Decoding the image at the level of explicature "Circus is a Prison for Animals" through reference assignment and disambiguations.
4) Inference of the ad hoc concept Prison* by selecting from the encyclopedic input of the source concept the core ad hoc characteristic "deprivation of liberty." Adaptation of the ad hoc property to the target, inferring implicatures that are immediately accessible for processing.
5) Verification of matching between the source and target domains against relevance via metarepresentation, such as the conceptual metaphor ANIMALS ARE PEOPLE.
6) Addressing any inconsistencies with contextual constraints by deriving additional ad hoc properties for the concepts Prison* and Circus*. Checking new matchings between source and target for their relevant compliance with contextual constraints and general-level conceptual structures like STATES ARE LOCATIONS, EXISTENCE IS A LOCATION, HARM IS BEING IN A HARMFUL LOCATION, and "SOCIAL ROLES ARE PHYSICAL LOCATIONS.
7) Identification of emergent properties of the metaphor that arise from integrating additional ad hoc properties.
8) Inference of the metaphor's meaning as an inferential transition from the explicature, contextual assumptions, and the set of strong and weak implicatures from ad hoc concepts, including implicatures that generate emergent properties.
9) Evaluation of the metaphor's complexity: assessment of the metaphor as relatively simple in terms of cognitive processing effort, establishing correlations between processing complexity, the type of visual domain representation, and the focus of processing.

Conclusions

The article attempts to analyze visual metaphors from the perspective of a cognitive-pragmatic approach, using research tools from Relevance Theory such as ad hoc concepts, ad hoc properties, emergent properties, and meta-representations.

The proposed and tested analysis algorithm includes stages such as determining the type of visual metaphor based on the method of visualizing the source and target domains; identifying the processing focus; decoding the explicature that establishes the propositional connection between domains; inferring the ad hoc concept of the visually encoded concept from the source domain and adapting the ad hoc concept to the target through implicatures from ad hoc properties; checking the first group of matches between the source and target for relevance to contextual constraints and metarepresentations; deriving additional ad hoc properties of the source concept and, if necessary, the target concept, that satisfy the constraints of local and encyclopedic contexts; checking new matches between the source and target for relevance to context and metarepresentations; inferring the emergent features of the metaphor as implicatures from non-core ad hoc properties of domain concepts; extracting the multi-component meaning of the metaphor; and assessing the complexity of cognitive processing based on the focus of visual processing and the method of domain visualization.

Future research prospects include testing the hypothesis about the impact of domain visualization methods and processing focus on the amount of effort required for cognitive processing and achieving an optimal balance between expended effort and positive cognitive effects.

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