

The Role of Metonymy in The Formation of English and Uzbek Scientific and Technical Terms: A Comparative Study

Hamroqulova Ruxshona

Samarkand State institute of Foreign languages

Student of English philology and translation faculty

ABSTRACT. *Metonymy as a cognitive and semantic mechanism plays an important role in the emergence of new meanings and their association with certain concepts in a specific field of knowledge. The role of metonymy in the formation and development of scientific and technical terms requires further clarification in a comparative context.*

This paper aims to investigate the role of metonymy in the etymology of English and Uzbek scientific and technical terms, analyze the connections that underlie them, and compare the means used in languages to express these connections. The proposed approach is based on a qualitative comparative analysis and supported by quantitative descriptions of authentic data. Metonymically motivated terminology is differentiated from homonymy, contextual reference, ordinary polysemy, and metaphor, and special attention is paid to the analysis of part-whole connections, as well as the connections between tool-function, material-object, place-institution, and others, if any. This article aims to contribute to cognitive terminology by determining the cognitive mechanisms through which metonymy can motivate the terminology of a particular field of knowledge and by comparing these mechanisms for the two languages under study. The findings are expected to be based on verified examples and supported by a description of the context and definitions.

KEYWORDS: *metonymy, term formation, scientific terminology, technical terminology, cognitive linguistics, English, Uzbek, comparative analysis.*

ANNOTATSIYA. *Kognitiv va semantik mexanizm sifatida metonimiya yangi ma'nolar paydo bo'lishida hamda ularning muayyan bilim sohasidagi ayrim tushunchalar bilan bog'lanishida muhim rol o'ynaydi. Ilmiy-texnik atamalarining shakllanishi va rivojlanishida metonimiyaning tutgan o'rni qiyosiy nuqtai nazardan chuqurroq o'rganishni talab qiladi.*

Ushbu maqola ingliz va o'zbek tillaridagi ilmiy-texnik atamalar etimologiyasida metonimiyaning o'rnini o'rganish, ularning negizida yotgan aloqalarni tahlil qilish hamda ushbu aloqalarni ifodalashda tillarda qo'llaniladigan vositalarni qiyoslashni maqsad qiladi. Taklif etilayotgan yondashuv sifat jihatidan qiyosiy tahlilga asoslanadi va haqiqiy (autentik) ma'lumotlarning miqdoriy tavsiflari bilan boyitiladi. Metonimiya asosida shakllangan terminologiya omonimiya, kontekstual ishora, oddiy polisemiya va metaforadan farqlanadi; bunda "qism-butun" aloqalari, shuningdek, "qurol-funksiya", "material-obyekt", "joy-muassasa" va boshqa shu kabi aloqalar tahliliga alohida e'tibor qaratiladi. Maqola muayyan bilim sohasi terminologiyasini metonimiya orqali shakllantiruvchi kognitiv mexanizmlarni aniqlash hamda o'rganilayotgan ikki til misolida ushbu mexanizmlarni qiyoslash orqali kognitiv terminologiya sohasiga o'z hissasini qo'shishni ko'zlaydi. Tadqiqot natijalari

tasdiqlangan misollarga asoslanishi hamda kontekst va ta'riflar tavsifi bilan asoslab berilishi kutilmoqda.

KALIT SO'ZLAR:metonimiya, termin yaratish, ilmiy terminologiya, texnik terminologiya, kognitiv lingvistika, ingliz tili, o'zbek tili, qiyosiy tahlil.

АННОТАЦИЯ. Метонимия как когнитивный и семантический механизм играет важную роль в возникновении новых значений и их ассоциации с определенными понятиями в рамках той или иной области знания. Роль метонимии в формировании и развитии научно-технической терминологии требует дальнейшего изучения в сравнительном аспекте. Целью данной статьи является изучение роли метонимии в этимологии английских и узбекских научно-технических терминов, а также анализ связей, лежащих в их основе, и сравнение способов их выражения в двух языках. Данный аспект исследования базируется на качественном анализе и подкреплён количественными описаниями эмпирических данных. Метонимически мотивированные термины дифференцируются от гомонимии, контекстуального референса, простой полисемии и метафоры; особое внимание уделено анализу связей в системе части-целое, инструмент-функция, материал-объект и другие, если они имеются. Автор статьи надеется внести вклад в когнитивную терминологию, чтобы определить когнитивные механизмы, лежащие в основе мотивации терминов в рамках той или иной области знания, и сравнить их для английского и узбекского языков. Полученные результаты будут подтверждены примерами из эмпирического материала и описаны с учетом контекста и определений.

КЛЮЧЕВЫЕ СЛОВА: метонимия, терминообразование, научная терминология, техническая терминология, когнитивная лингвистика, английский язык, узбекский язык, сравнительный анализ.

1. Introduction

Scientific and technical terminology plays a crucial role in the formation and development of a particular sphere of knowledge. Terms enable professionals and researchers to identify concepts, describe their characteristics, classify objects, and communicate the results of their studies. Existing linguistic material can acquire a specialized meaning during the development of a particular field; at the same time, new terms can appear through various linguistic and semantic mechanisms. Terminology reflects different conceptualizations appropriate to the particular field of knowledge.

Traditional terminology studies have typically focused on problems of conceptualization, the principles of building specialized vocabularies, and their linguistic features: word formation, phraseology, and semantics. Cognitive linguistics has allowed taking a look at terminology from a new perspective, highlighting how conceptual associations shape the ways of term formation and representation of concepts in language. Metonymy is considered to be one of the mechanisms by which people cognitively associate one conceptual entity with another entity on the basis of domain-specific associations. The role of metonymy in linguistic

studies has been extensively explored in the literature, as it is regarded as a basic cognitive process enabling people to access conceptual domains.

The relationship between metonymy and term formation has been a subject of debate. Terminological nominations may be motivated by metonymy in terms of conceptual associations. At the lexical level, metonymy is often differentiated from metaphor as a basis for the analysis of word formation in a comparative-historical context. Metonymy has also received much attention in recent studies devoted to metaphor and metonymy in linguistic discourse. The mechanisms of metaphor and metonymy were identified, and their patterns were analyzed in various linguistic structures in the context of language development.

However, there are still questions regarding the relationship between term formation and conceptual associations in two languages: Uzbek and English. On the one hand, existing words may be conventionally used in a specialized way to refer to a particular entity, for example, through associations on the basis of domain-specific links between components of a system. On the other hand, terms may be formed from existing linguistic material through semantic changes motivated by associations within conceptual structures. Determining the difference between term formation, specialization of a term, and conventionalized use is essential for analyzing specialized vocabulary. The comparative study aims to identify conceptual and linguistic patterns of metonymically motivated terminology in the English and Uzbek languages.

This paper attempts to provide an overview of linguistic and terminological research on the basis of conceptual associations to identify the mechanisms by which the metonymy contributes to term formation and determine the similarities and differences of metonymically motivated terminology for two languages. The research questions guiding this study are the following:

What associations form the basis of metonymically motivated terminology for English and Uzbek language?

What similarities and differences can be found in the usage of metonymy to express concepts in two languages?

What is the contribution of metonymic mechanisms to the development of scientific and technical terminology?

How do the patterns found correlate for the languages under study, and what conclusions can be drawn about similarities and differences based on linguistic and terminological data?

2. Literature Review

2.1. Metonymy As A Cognitive And Semantic Mechanism

The phenomenon of metonymy has been explored from different perspectives in theoretical and applied linguistics. However, many questions remain open for debate. Metonymy has been examined in cognitive linguistics, lexical semantics, pragmatics, and the theory of reference. The cognitive approach views it as a process of accessing one conceptual entity by another associated conceptual entity. From this perspective, metaphor and metonymy are different cognitive operations in that a metaphor is grounded in a conceptual structure

common to both domains, and metonymy relies on domain-specific conceptual associations. According to Barcelona, metonymy is a fundamental cognitive mechanism shaping meaning construction, which was highlighted in cognitive linguistic research. He goes on to note that the cognitive basis and multidimensionality of this phenomenon complicate the work of classification. This is particularly evident in the analysis of terminology since conceptual associations shaping the semantics of terms may not always be obvious.

An essential aspect of such analysis is the differentiation of conceptual structures underlying the semantics of a term from associations at the level of language. When analyzing the language resource, it is vital to take into consideration the source of conceptualization, and actualize those conceptual associations that determine the specialized meaning of the word. The motivation of specialized terms must be examined with reference to particular languages; otherwise, the identification of conceptual associations is complicated by the ambiguity of translation. In this regard, it is relevant for terminology studies to consider semantic motivation in the context of linguistic means and language-specific features.

The analysis of metonymy as a cognitive mechanism has produced many valuable results, bearing both theoretical and applied significance. However, further study is needed to identify patterns in terminology to determine how to analyze metonymically motivated terms. In particular, there is a need for research to differentiate the concepts of homonymy, polysemy, contextual reference, and metonymy. Another important area for investigation is related to the application of metonymy to word formation, both in translation and within one language.

2.2. Metonymy And Word Formation

The relationship between word-formation and conceptual associations has been a subject of debate for years. Word-formation studies have sought to identify patterns in the construction of the linguistic material. The findings of cognitive linguistics shed new light on the analysis of word-formation, which has led to the identification of semantic patterns associated with metonymy. Janda's study highlights the relationship between metonymic relations and word-formation, which is essential for both theoretical and applied terminological studies. According to Janda, metonymic relationships provide a cognitive basis for the motivation of word-formation patterns. She provides an overview of research data that demonstrate the relationship between word-formation and metonymy within the structural and semantic structures of the Russian, Czech, and Norwegian languages. Her findings suggest that similar word-formation patterns may be related to specific associations within conceptual structures.

At the same time, she points out that the interpretation of metonymy is controversial. Some researchers argue that metonymy does not have a linguistic manifestation, so it must be differentiated from metaphor at both the conceptual and textual levels. The word-formation process should therefore rely only on conceptual associations. The analysis of word-formation by Janda focuses on the structure of meaningful units, their morphological structure, and the contribution of context to their interpretation. Kos and Gutierrez Rubio's recent study further examines theoretical issues related to the scope of metonymy's influence in word-formation.

The review of studies shows that there is a need for further investigation to identify the patterns of metonymy in word-formation. The phenomenon's role in terminology studies is beyond question since terms can be motivated by conceptual associations. Further research efforts are needed to explore terminology in different languages to identify possible patterns. At the same time, this problem is linked to the differentiation of concepts, including metaphor, homonymy, and other semantic relationships.

2.3. Metonymy In Scientific And Technical Terminology

Conceptual associations are often the basis for the formation of terms in scientific and technical terminology. Technical concepts are typically organized into systems on the basis of conceptual associations. The analysis of terminology highlights many examples of terms referring to objects in terms of their components, materials, functions, and locations. Metonymy plays a key role in the semantic structure of technical terms since it is based on domain-specific associations. In the context of terms, it is essential to consider the relationship between language and conceptual structure. Language structures may express conceptual associations partially or not at all; therefore, terminology differs significantly in each language and discipline.

The study of metonymy in technical terminology requires further clarification of some theoretical issues related to the analysis of conceptual structures. At the same time, this problem is linked to the practical need to analyze the semantics of terms within linguistic structures, examine the differences between homonymy and polysemy, determine what constitutes a term, and differentiate between concepts of metonymy and metaphor.

Many recent studies highlight the significance of discourse analysis in theoretical and applied linguistics. In terms of discourse analysis, metonymy plays a crucial role in the creation of new meanings and shaping the linguistic structures of specialized discourse communities. In particular, the paper entitled "The Role of Metonymy and Polysemy in Academic and Popular Science Literature" discusses the contribution of polysemy and metonymy to the interpretation of academic texts published in science journals. This research focuses on the discourse structures characteristic of technical language; however, the concepts of metonymy and metaphor need to be further differentiated.

A study of the discourse of academic speech helps to determine the conceptual structures that underlie terminology. Analysis of linguistic structures highlights the differences in terminology for different languages. For example, the discourse structures peculiar to telecommunication jargon reflect some characteristics of the linguisticization of the concepts of this sphere.

This brief overview of linguistic research highlights the importance of the study of metonymy in terminology. In particular, this study will explore the ways in which conceptual associations affect term formation, which will facilitate a better understanding of the semantics of technical terms. The next step is an empirical analysis to determine whether similar patterns can be found in the English and Uzbek languages.

2.4. Research Gap

The influence of conceptual associations on terminology has long attracted the attention of researchers. The relationship between metonymy and term formation has played a prominent role in both theoretical and applied linguistic studies. The linguistic resource for analyzing specialized discourse has been extensively explored in the literature. Metonymy, as a phenomenon that influences the semantics of terms, has been discussed within the frameworks of both theoretical and applied terminology studies. At the same time, the analysis of metonymy in technical terminology remains a controversial issue, which raises questions about the validity of categorizing conceptual associations as metonymic.

The goal of this study is to examine the role of metonymy in the formation of scientific and technical terms in the English and Uzbek languages. The key challenge is differentiating metonymy from homonymy, contextual reference, ordinary polysemy, and metaphor. This empirical study aims to contribute to terminology research from the perspectives of cognitive linguistics and comparative analysis by analyzing the conceptual associations shaping the semantics of terms in the two languages. The main idea is to identify the linguistic patterns that determine the motivation of terms in English and Uzbek.

3. Research Methodology

3.1. Research Design

This paper employs a contrastive qualitative research design with descriptive quantitative components to explore metonymically motivated terms. The primary goal of the study is to conduct a semantic analysis of English and Uzbek terminological units in order to determine whether they are based on metonymy. The qualitative approach will be used to identify the relationships between the source concepts and the target concepts. A descriptive quantitative analysis component will be employed to describe this data set.

3.2. Data Collection

The data set will be formed by compiling lists of English scientific and technical terms and their verified Uzbek counterparts. The candidate terms will be selected on the basis of reliable technical dictionaries, glossaries, and reference books, as well as the corresponding corpora of scientific or technical texts. Each candidate term will be added to the database on the basis of the following criteria: the term's field of application; the definitions in English and Uzbek; the source of the definitions; and examples of the contexts of use, if available.

The size of the data set will depend on the number of candidates' sources and terms that meet the selection criteria. The final list will contain the terms for which reliable definitions and supporting information will be found. Particular care must be taken to determine whether two terms in the Uzbek and English languages actually refer to the same concept. If a direct correlate is not found, this should be noted rather than attempting to force a match.

3.3. Identification Criteria

The candidate terms will be sorted into terminologically motivated expressions and non-terminologically motivated expressions.

The items that will be analyzed are terms that possess documented scientific or technical meanings. A distinction will be made between terms that denote the same concept and those

that refer to different entities. The identification of metonymically motivated terms will be based on conceptual associations within linguistic structures. Each term will be examined with reference to definitions, context, and supporting linguistic evidence. Special attention will be paid to distinguishing metonymically motivated expressions from homonyms, metaphorical mappings, and simple contextual reference.

3.4. Analytical Categories

The analysis will initially focus on the identification of several common patterns of metonymy. The following conceptual associations will be examined:

Part-whole: A term used to denote a whole is associated with a phrase referring to one of its parts, and vice versa.

Instrument for function/activity: an instrument and the function/activity associated with it.

Material for object: A term denoting material is associated with an object made of this material.

Place for institution: A location is associated with an institution situated at this location.

Producer for product: A term associated with the producer is linked with the product.

These patterns reflect some of the most common examples of metonymic associations found in terminological data. However, this list should not be considered exhaustive, and terms associated with other types of conceptual links will also be examined. Each category will be included in the analysis only if there is reliable terminology-related evidence.

3.5. Contrastive Analysis

The analysis will examine conceptual, semantic, and cross-linguistic levels of the correlation between source and target concepts for each category. Particular attention will be paid to interlingual differences, especially to cases in which no correlation can be detected for either English or Uzbek. Differences in word formation, translation practices, and terminology development will be taken into account when examining divergent patterns.

3.6. Quantitative Analysis And Reliability

After compiling the data set, the number of examples for each category will also be counted for English and Uzbek. The analysis may focus on comparing the number of positive and negative matches. However, this data can only illustrate the characteristics of the corpus rather than the general tendencies for the languages as a whole. A sufficiently large corpus is required to determine general distribution tendencies for terms. The reliability of the results will be supported by written justification for each item and additional evidence, if available. Cases identified as uncertain will be excluded from the final quantitative results until additional data can be collected. If possible, this analysis can be reviewed by an expert in terminology or cognitive linguistics in order to verify certain results. This relationship may generate a potential environment for part-whole metonymy. One may use a component name to refer to a complete system or use a system name in a specialized context to refer to a particular component.

The central analytical question is whether it represents an established terminological meaning or only a contextual reference. For instance, a component may be used informally

to refer to a complete device, but that does not automatically make it a recognized technical term.

The English and Uzbek data will therefore be examined for documented part-whole relationships, taking account of definitions, contexts, and differences in lexical convention. The analysis will determine whether comparable relationships are realized through equivalent terms in both languages.

4. Analysis and Discussion: Proposed Analytical Framework

The empirical analysis will be organized around the conceptual relationships identified in the verified dataset. The following subsections define the questions that will guide the analysis, but do not present unverified examples as research findings.

4.1. Part – Whole Relationships in Technical Terminology

Technical systems often consist of components that participate in the functioning of a larger entity. This relationship creates a potential environment for part-whole metonymy. A component name may be used to refer to a complete system, or a system name may be used to refer to a particular component in a specialized context.

The central analytical question is whether the expression represents an established terminological meaning or only a contextual reference. For instance, a component may be used informally to refer to a complete device, but this does not automatically make that usage a recognized technical term.

The English and Uzbek data will therefore be examined for documented part-whole relationships, taking account of definitions, contexts, and differences in lexical convention. The analysis will determine whether comparable relationships are realized through equivalent terms in both languages.

4.2. Instrument–Function Relationships

An instrument is conceptually associated with the activity it performs and the result it produces. Such associations may contribute to the development of specialized meanings, especially in fields involving measurement, engineering, computing, and industrial processes.

However, an instrument's name and the name of its function may be linked through different semantic mechanisms. A term may refer to a tool, an operation, a result, or a system that performs a particular task. The analysis must establish whether the relevant relationship is metonymic and whether it contributes to a conventionalized technical meaning.

The English and Uzbek examples will be examined to determine whether comparable instrument–function relationships are documented and whether they result in equivalent or language-specific terminological patterns.

4.3. Material–Object Relationships

The relationship between a material and an object made from that material may provide another potential source of metonymically motivated terminology. In specialized discourse, a material name may be used to designate a manufactured object, a component, or a category of products.

Nevertheless, material names frequently occur as ordinary modifiers in compound terms. A compound such as a material-plus-object construction cannot be classified as metonymic solely because the material is mentioned. The analysis must determine whether the material expression itself designates the object or whether it simply specifies the object's composition.

The comparison will therefore distinguish compositional naming from cases in which a material name has acquired a conventionalized object-denoting meaning.

4.4. Place–Institution Relationships

A geographical location may be associated with an organization, laboratory, industrial facility, or other institution. In some contexts, the place name may be used to refer to the institution itself or to the activities associated with it.

This relationship is a recognized type of referential metonymy, but its relevance to technical term formation must be demonstrated separately. A place name used to identify an institution in a news report, for example, may represent contextual reference rather than a specialized technical term.

The study will include such cases only when the expression has a defensible terminological status and the relationship contributes to the specialized meaning under investigation.

4.5. Producer–Product Relationships

The name of a producer may become associated with a product, device, or technology. This association may result in a conventionalized designation in particular technical communities.

However, commercial brand names, product names, and generic technical terms are not interchangeable categories. A proprietary name does not automatically constitute a generic scientific or technical term. The analysis will therefore distinguish brand-based reference from established terminological usage and include a case only when its status is supported by relevant evidence.

4.6. Cross-Linguistic Correspondence

The final stage of the analysis will compare the metonymic relationships documented in English and Uzbek. The comparison will consider three possible outcomes.

The first is conceptual correspondence, in which both languages exhibit a comparable relationship between source and target concepts. The second is partial correspondence, in which a similar conceptual relationship exists but differs in lexical realization or terminological convention. The third is non-correspondence, in which the pattern is documented in one language but is not established in the available data for the other.

Non-correspondence in the dataset should not automatically be interpreted as proof that a language lacks the relevant pattern. It may reflect limitations in source coverage, differences in terminology, or the restricted scope of the sample.

The discussion will therefore interpret similarities and differences in relation to the evidence available and avoid generalizations that extend beyond the dataset.

5. Conclusion

Metonymy offers a potentially productive perspective for examining the relationship between conceptual organization and specialized vocabulary. Its relevance to terminology lies

not merely in the existence of figurative or context-dependent expressions, but in the possibility that systematic conceptual associations may motivate the naming and interpretation of scientific and technical concepts.

This study proposes a contrastive framework for investigating metonymically motivated terminology in English and Uzbek. By combining cognitive-semantic analysis, terminological verification, and contextual evidence, it seeks to distinguish established terminological meanings from ordinary polysemy, metaphorical transfer, and temporary contextual reference.

The proposed analysis focuses on part-whole, instrument-function, material-object, place-institution, and producer-product relationships. These categories will be evaluated against verified terminological data rather than treated as predetermined findings. The comparison will examine the extent to which the identified patterns correspond across the two languages and whether differences can be explained by linguistic structure, lexicalization, or terminological convention.

At the current stage, the article establishes the theoretical orientation, research questions, and analytical procedures of the investigation. Definitive conclusions about the frequency, productivity, and cross-linguistic distribution of metonymic patterns must await the completion of the dataset and its systematic analysis. The resulting evidence will determine the study's final contribution to cognitive terminology and contrastive linguistics.

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