

**COMPARATIVE CHARACTERISTICS OF THE CONSTRUCTIONS
“CAN/COULD + INFINITIVE” AND “MAY/MIGHT + INFINITIVE”
(ON THE MATERIAL OF SCIENTIFIC DISCOURSE TEXTS)**

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The article considers the grammatical, lexical-semantic and statistical characteristics of the modal constructions with “may/might + infinitive” and “can/could + infinitive” for their further comparison. The material for the work was the text corpora of the technical specialties “Heat Engineering”, “Electrical Engineering” and “Automotive Industry”. They have been compiled on the basis of scientific journal articles referred to the relevant fields of knowledge published in the UK and USA. The total volume was 300 thousand tokens. The most frequent constructions with the verbs ‘may/might’ were the models with the second constituent in the infinitive in the active voice – ‘may V’ which in total frequency represents more than half of all constructions with the active infinitive in the second constituent. The verbs ‘can/could’ – the highest priority is possessed by the verb constructions which have the forms of the passive infinitive. The most frequent is the model ‘can be Ven’ which also covers more than half the total frequency of all ‘can/could’ models. So along with completely different grammatical characteristics in the constructions with ‘may/might’ and ‘can/could’ they (constructions) possess statistical coincidences, besides there are lexical and stylistic coincidences in the second constituents of modal constructions – they (constituents) belong to the same lexical layers – common and general scientific. In the constructions that are in the second place in terms of frequency of usage one can also observe certain coincidences. The second

as to the frequency usage in the texts in constructions with the modal verb ‘may/might’ are the models in which the second constituent is used in the passive voice (33% of the total frequency of all models with this verb), and the most high-frequency construction is the model ‘may be Ven’. In the modal constructions with ‘can/could’ on the second place appears the ones where the infinitive occurs in the active voice and again with 33% of the total frequency of all the models with this verb. Thus the set of grammatical patterns with both modal verbs is absolutely identical. In the less frequent constructions the second constituents for the most part also belong to the common and general scientific layers. A detailed review of the examples has showed that the basic meaning for both verbs is “ability to do something”. The coincidence of all of the above characteristics in constructions with the modal verbs ‘may/might’ and ‘can/could’ allows to come to the conclusions that the verbs ‘can’ and ‘may’ in them can be functional substitutes and be used in the text corpora of scientific discourse in the same function.

**ПОРІВНЯЛЬНІ ХАРАКТЕРИСТИКИ КОНСТРУКЦІЙ
«CAN/COULD + INFINITIVE» ТА «MAY/MIGHT + INFINITIVE»
(НА МАТЕРІАЛІ ТЕКСТІВ НАУКОВОГО ДИСКУРСУ)**

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Ключові слова: частота вживання, лексичний шар, модель, збіг, функціональний замінник, модальне значення.

У статті розглядаються граматичні, лексико-семантичні та статистичні характеристики модальних конструкцій із “may/might + infinitive” й “can/could + infinitive” для їх подальшого порівняння. Матеріалом для роботи послуговували текстові корпуси технічних спеціальностей «теплотехніка», «електротехніка» й «автомобільна промисловість». Вони складені на основі статей із наукових журналів у відповідних галузях знань, опублікованих у Великобританії та США. Загальний обсяг

становив 300 тис. слововживань. Найбільш частими конструкціями з дієсловами *may/might* були моделі з другим складником в інфінітиві в дійсній заставі – *may V*, яка в загальній частоті представляє більше ніж половина всіх конструкцій з активним інфінітивом у другому складнику. Дієслова *can/could* – у них пріоритет мають дієслівні конструкції, які використовуються у формі пасивного інфінітиву. Найбільш частою є модель *can be Ven*, яка також охоплює більше ніж половину загальної частоти всіх моделей із *can/could*. Отже, поряд із абсолютно різними граматичними характеристиками в конструкціях із *may/might* і *can/could* вони (конструкції) мають статистичні збіги, крім того, є лексичні та стилістичні збіги в других складниках модальних конструкцій: вони (складники) належать до тих самих лексичних шар – загальноживаної та загальнонаукової. У конструкціях, що посідають друге місце за частотою використання, також можна спостерігати певні збіги. У конструкціях, що посідають друге місце за частотою використання, також можна спостерігати певні збіги. На другому місці за частотою використання в текстах у конструкціях із модальним дієсловом *may/might* знаходяться моделі, у яких другий складник використовується в пасивному заставі (33% від загальної частоти всіх моделей із цим дієсловом), і найбільш високочастотною конструкцією є модель *may be Ven*. У модальних конструкціях із *can/could* на другому місці з'являються ті, де інфінітив зустрічається в дійсному заставі, і знову 33% від загальної частоти всіх моделей із цим дієсловом. Отже, набір граматичних зразків з обома модальними дієсловами абсолютно однаковий. У менш частих конструкціях другі складники здебільшого також належать до загального й загальнонаукового шарів. Детальний огляд прикладів показав, що основним значенням обох дієслів є «здатність щось робити». Збіг усіх вищезазначених характеристик у конструкціях із модальними дієсловами *may/might* і *can/could* дає змогу дійти висновку, що дієслова *may* й *can* у них можуть бути функціональними заміниками й використовуватися в текстових корпусах наукового дискурсу з тією самою функцією.

Problem statement. The problems of functional styles and, in particular, the analysis of the text units features in various types of discourse, have long been considered as something outdated, a passed stage in the research activities of linguists-theorists and practitioners. Even the inclusion of these problems in the general content of corpus linguistics as one of the sections did not make this area of linguistics more popular and did not contribute to its further development. They were replaced by other scientific tasks – corpus linguistics as a comparative analysis of texts [1], cognitive linguistics, which describes cognitive structures and processes in the human mind [2; 3; 4; 5].

A small number of works devoted to the analysis of units of text corpora, and in particular to modal verb constructions, which can be found in available literature and which can be called examples is the study by S.F. Belyaeva [6], describing modal constructions in the texts of scientific and technical communication, and another one by M.B. Umatova [7], which is a comparative analysis of modal verbs in languages with different language systems.

However, it seems that the scientific potential of the problems associated with the study of functional styles, as well as the units included in sampling (text

corpora) of a particular type of style (discourse), is far from being over and requires further consideration.

This article demonstrates the results of the analysis carried out on the material of several text corpora that relate to scientific and technical discourse.

The goal and tasks of the article. The purpose of the article is to consider and describe the comparative characteristics of the most frequent modal verb constructions ‘can/could + infinitive’ and ‘may/might + infinitive’ functioning in the text corpora of scientific discourse, and also to determine how the features of the meanings of each modal verb affect the similarity or difference in the complex of characteristics possessed by each of them.

The article is aimed at the fulfillment of the following tasks:

- to select as a material the text corpora that can guarantee the representativeness of the research results;
- to pick up from the selected text corpora modal verbs ‘can/could’ and ‘may/might’ forming a common modal construction with the second constituents attached to them;
- to determine the statistical, grammatical, lexical-semantic and stylistic features of the constructions with these modal verbs for their further comparison.

The “Heat Engineering”, “Electrical Engineering” and “Automotive” text corpora were used as a material. It was formed on the basis of scientific articles of the relevant fields of knowledge published in the journals in the United Kingdom and the United States: IEEE Transactions on Power Apparatus and Systems; Power Engineering; Power; Automotive News; Combustion; Control and Optimization; Machine Design; Machinery and Production Engineering; Automotive Engineer. The text corpus of each specialty has 100 thousand tokens, and the total volume, thus, amounted to 300 thousand tokens.

The base material of the research. First of all, let us represent the semantic structure of both modal verbs. In Hornby's standard dictionary [8] the semantic structure of the verb ‘may/might’ is presented in the following way: 1) to indicate a possibility or probability; 2) to indicate a permission or a request for a permission; 3) to express desires and hopes (may), to express requests (might).

The content of the modal verb ‘can’ and its internal form are precisely analyzed in Oxford Advanced Learner's Dictionary by A. Hornby [9], which represents the verb can as a token, which has the following set of “modal meanings”: 1) ability or opportunity; 2) “permission” in everyday conversational style; 3) probability and possibility of what is happening; 4) in the interrogative sentences it gives the shadow of the meaning directed on revealing of surprise, absence of attention; 5) indicates what someone or something is considered possible for the existence or implementation; 6) indicates what is considered to be typical.

Thus in both of the presented complexes of definitions it is possible to note a certain coincidence in the meanings, i.e. 1), 2) and 3) definitions of the verbs ‘may’ and ‘can’ which makes it possible to compare these modal verbs and their structures, which have, albeit not completely coinciding semantic structures, but also not entirely different in terms of the set of values.

1. Let us consider the statistics of these modal verbs usage in various models in the text corpora of the technical specialties. The total number of models with ‘may/ might’ is 56 units, the frequency of their occurring in the texts is 540. The number of models for the verb ‘can/could’ is 28 units, the frequency of their usage is 1100. That is, although the variety of models with ‘may/might’ is twice as high, the frequency of their usage is also almost half as high as in ‘can/could’ constructions.

In the constructions with the verbs ‘may/might’ the most frequent are the ones with the second constituent in the infinitive in the active voice. The number of such units is 37, the total frequency of usage of these constructions is 348, and the ‘may V’ model in terms of the total frequency represents more than half of all models with an active infinitive. The category of modality expressed by this formula appears in

reproducible syntactic unities only in one of the possible meanings – “the ability to perform an action” in various production situations, which are reflected in the meanings of the lexical component combined with the verb ‘may’, e.g. *resonance may influence, overvoltages may exist, excitation may result, voltage may occur*, etc.

Speaking about the verbs ‘can/could’ the highest priority is possessed by the verb constructions which have the forms of the passive infinitive. There appeared to be only 8 of them, but their total frequency (594 usages) covered more than a half (54%) of all models with this verb. They showed almost all methods of variation of constituents in syntagmatic text corpora. The highest total absolute frequency is possessed by ‘can be Ven’ (F * = 481) construction, it accounts for 88% of all models of modal constructions with the passive infinitive, e.g. *center can be located, the devices can be interconnected, console cannot be mounted; error cannot be found*.

Thus both modal verbs have practically the same statistical distribution pattern: firstly, only one grammatical form is distinguished, which also occupies more than half of all presented forms of the modal verbs ‘may/might’ and ‘can/could’: in ‘may/might’ constructions it is ‘may V’, in ‘can/could’ constructions – ‘can be Ven’; secondly, both grammatical models ‘may/might’ and ‘can/could’ occupy a dominant position among all forms with the same value (more than half of all available forms).

2. It can be noted that being completely different grammatically, the constructions with the verbs ‘may/might’ and ‘can/could’ possess certain lexical and stylistic coincidence in the second constituent of modal constructions: they both (constituents) belong to two lexical layers – the common layer (*find, exist, result, occur*) and general scientific layer (*mount, interconnected, located, influence*). Moreover, it can be seen from the examples that there are more general scientific units in constructions with the verb ‘can/could’ than with the verb ‘may/might’ where units of common vocabulary prevail.

All syntactic structures of the ‘may V’ type demonstrate consistency in correlating their meanings with the extra linguistic situation. So, according to this model two types of modal verb constructions are represented in the meaning: 1) the “ability” of an inanimate object to do something with another object (70% of all analyzed modal phrases of this type), e.g. *may cause; may increase; may mix; may effect; may hit; may achieve*, etc. 2) the “ability” of the subject to do something with the object, e.g. *may debate, may wonder; may write, may suggest, may use, may explain*, etc.

3. The second place in terms of frequency of usage of the constructions with the modal verb ‘may/might’ is occupied by the models in which the second constituent is used in the passive voice. Such mod-

els are found in the text corpora with the frequency 180 units, which is 33%, and, of course, it is a much lower indicator than in the constructions with active infinitive. This phenomenon can be explained by the fact that, as it has already been indicated above, the action on the object, which is characteristic to the passive voice, can also be performed in the presence of an active infinitive, the meaning of which can be modified by an adverb (D), e.g. *may considerably exceed; may legitimately inquire; may well prove to be 'just make, etc. ; might ultimately facilitate; might eventually change; might also require; may begin as soon as; might prove difficult; may become more closely scrutinized; might open only once.*

The analysis data show that the most consistently reproducible high-frequency construction is 'may be Ven' combination.

The analyzed verb constructions with a passive infinitive function in the text corpora with the meaning "presumption", when the structures are built according to the 'might be Ven' model, e.g. *might be (thought, expected, assumed, considered)*. It should be noted that the passive infinitive in this structure is formed with the verbs expressing mental activity. This creates a kind of semantic enhancer effect, as the meaning "may be", "probably" is in the combination of the first two elements of the model 'might be' but the attached participle II varies the semantics of the entire utterance. Such constructions can be considered as typical since the 'modal verb + passive infinitive' form is noted by many linguists. However, due to their semantics (uncertainty, improbability, unreality of performing an action) they are used in the text corpora with a very low frequency. To describe and explain the realities of this subject area other linguistic means are used, mostly devoid of emotional assessments.

Modal constructions with 'can/could', where the infinitive occurs in the active voice, occupies the second place in terms of their usage frequency 361, which is 33% of total frequency of all models with this verb, e.g. *motor can run; turbine can generate; council could take into account, computer could control; carburetor could not include; brake could not work, etc.* The data show that these aspectual-temporal forms of the infinitive are diversified enough in this type of the voice.

And here among the less frequent grammatical units with both described modal verbs we can observe almost the same picture of the statistical distribution of forms with the same usage frequency in the text corpora, which makes 33%. Moreover, in the constructions of both modal verbs with active and passive infinitive as well, grammatical forms turned out to be the same: in the constructions with 'may/ might' – models 'may V' and 'may be Ven'; in the constructions with 'can/could' – 'can be Ven' and 'can V'.

4. A detailed analysis of all above examples allows us to assert that the model 'may/might + active infinitive' (with different determinants) expresses one modal meaning, namely, "ability to do something", and can be considered as the basic meaning for the structures of this type in the scientific discourse texts. The frequency characteristics of these structures demonstrate the implementation of the paradigm of the verb 'may' meanings in an incomplete volume in the text corpora "Heat engineering", "Electrical engineering", "Automotive industry" where the structures are represented in a selective way.

The results of the contextual analysis of the text corpora "Power Engineering", "Electrical Engineering" and "Automotive", which fragments are presented in the examples, show that the verb 'can/could' implements the only modal meaning of "physical ability to do something".

We can also conclude that the variation of the morphological characteristics of constituents in these constructions does not influence the implementation of the modal meaning of the entire phrase, and the main modal meaning "physical ability" is just clarified in time (compare: *can be designed – could be designed; can be measured – could be measured, etc.*), focuses on the possibility or impossibility of the action taken by the subject (*can be checked – cannot be checked; can be estimated – cannot be estimated*), and not any additional semantic (connotative) features are added to the modal meaning of the mentioned above construction types.

The similar situation has been observed in the modal constructions with the verb 'may/might'.

5. As for the lexical characteristics of both types of modal constructions 'may/ might + passive infinitive' and 'can/could + active infinitive', the following statements can be given here. The construction 'may/ might be Ven' turned out to be characteristic to the texts of only two corpora – "Heat Engineering" and "Electrical Engineering", if we take into account the frequency indicators of these construction usage. As for the "Automotive industry" text corpora, the combination of the verb 'may/might + passive infinitive' is not typical for them (only 20 cases of use in texts with a length of 100 thousand tokens).

This phenomenon can be explained by the fact that when describing the realities of the subject area "Automotive" the authors of the texts pay great attention to explaining the operation of various units and mechanisms of already well-tuned systems (engine, body, chassis, operating materials). Different language means are used for their designation which are not the lexemes that express and reproduce the modal meanings "probably" and "possibly".

For models with 'can/could, in which the second constituent is an active infinitive, the distribution over the text corpora occurs more evenly, i.e. in the texts

of all technical specialties presented above the constructions ‘can/could + active infinitive’ are found in almost equal proportions.

6. If we try to determine the relevance of the lexical meanings of the second constituents to a particular stratification layer in the constructions that are in the second place in terms of usage frequency, then both models with the modal verb ‘may/might’ and the verb ‘can/could’ have the second constituents which in their majority belong to the common and general scientific layer. This can be seen in the examples given.

7. Since, according to M.V. Vdovina [9] the methods of constructing models like ‘can V’ and ‘may V’ are quite identical, the verbs ‘can’ and ‘may’ can be functional substitutes in them, but, as the study of constructions shows, only in case if they are used with the same verb or with lexemes that are interchangeable in meaning. For example, in the article about the ‘engine’, the following synonymous constructions are implemented: *can run – may work, can work – may run*. If the situation is described on the topic “Operation of machines”, then the ‘*can run*’ construction is semantically equivalent to ‘may go’ (can pass ...), i.e. the attitude of the author of the article to the described realities is verbally expressed, in the designation of which syntagmatic unity is used with an increment of thematic shade, the subject-relatedness of the statement, which acquires an additional specialized shade due to the variability of the combined lexemes.

Consequently, constructions with different lexical content built according to the same model can have the same content plan, reproduce the same modal meaning.

Conclusions. The analysis of the real text corpora shows that in order to express the category of modality in the meaning “ability to perform an action on something” the syntactic constructions not only with the verb ‘can/could’ but also with ‘may/might’ are used in the text corpora “Heat engineering”, “Electrical engineering” and “Automotive”. However, based on the data of contextual analysis, the usage frequency of these modal verb constructions is rather low, almost two times less than, for example, in the corresponding constructions with the verb ‘can/could’, which has practically identical modal meaning – “the possibility of performing an action over something”. This gives reason to call ‘may/might’ a semantic equivalent, semantically variable speech unit that preserve the same plan of expression, mostly in the form of the ‘can/may + passive/active infinitive’ model. As already noted, they are reproduced in scientific and technical texts in order to avoid repetition of linguistic units, in which the **can / could** + verb is still preferred.

The possibility of mutual exchange of ‘may/might’ and ‘can/could’ models, in addition to identical modal meanings, is also confirmed by their statistical and lexical-semantic characteristics, which are almost identical in the studied text corpora.

Further research is supposed to be carried out on the basis of the same text corpora of scientific discourse. The constructions ‘may/might + name’ and ‘can/could + name’ will be selected as objects for this study.

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