Kaunas University of Technology

Faculty of Social Sciences, Arts and Humanities

Inversion in Popular Science Texts: Functioning and Translation

Master's Final Degree Project

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Translation and Post-editing of Technical Texts (6211NX031)

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Summary

This study combines the elements of translation studies and contrastive linguistics in order to analyze inversion as a type of translation procedure. Inversion is a multi-faceted word order change: it can be the result of applying the well-known basic grammar rules, or the implicit rules obvious only to native speakers but not so much to language learners; or, on the contrary, it can be completely optional and used to highlight specific sentence elements and arrange theme and rheme. Thus, the topic of inverted word order in translation presents valuable research opportunities.

So far, while dealing with translation procedures in English to Ukrainian translation, the researchers have mostly focused their attention on the literary texts. This project aims to fit in this gap by examining the new area: popular science.

The object of the master thesis is inversion in the context of English-Ukrainian translations of popular science texts. The purpose is to investigate how translators use inversion while translating texts from English to Ukrainian (popular science in particular). To achieve this, the pilot English-Ukrainian parallel corpus of popular science texts was compiled, which helped to identify approximately 200 instances of obligatory and non-obligatory inversion employed there. Inversion cases were examined through comparative translation analysis, with accompanying patterns and trends identified and categorized.

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Santrauka

Šiame tyrime derinami vertimo studijų ir kontrastinės lingvistikos elementai, siekiant analizuoti inversiją kaip vieną iš vertimo procedūrų tipų. Inversija yra daugialypis žodžių tvarkos pokytis: ji gali būti gerai žinomų pagrindinių gramatikos taisyklių taikymo rezultatas arba numanomų taisyklių, kurios akivaizdžios gimtakalbiams, tačiau ne visuomet suprantamos kalbos besimokantiesiems; kita vertus, ji gali būti visiškai pasirenkama ir vartojama tam tikriems sakinio elementams išryškinti bei temai ir remai išdėstyti. Todėl inversinės žodžių tvarkos tema vertime suteikia vertingų tyrimo galimybių.

Iki šiol, nagrinėdami vertimo procedūras verčiant iš anglų kalbos į ukrainiečių, tyrėjai daugiausia dėmesio skyrė grožiniams tekstams. Šiuo darbu siekiama užpildyti šią spragą, tiriant naują sritį – mokslo populiarinimo tekstus.

Magistro darbo objektas – inversija anglų–ukrainiečių mokslo populiarinamųjų tekstų vertimų kontekste. Tyrimo tikslas – ištirti, kaip vertėjai taiko inversiją versdami tekstus iš anglų kalbos į ukrainiečių, ypač mokslo populiarinamuosiuose tekstuose. Šiam tikslui pasiekti buvo sudarytas bandomasis anglų-ukrainiečių lygiagretusis mokslo populiarinamųjų tekstų tekstynas, padėjęs nustatyti apie 200 privalomosios ir neprivalomosios inversijos atvejų. Inversijos atvejai buvo nagrinėjami taikant lyginamąją vertimo analizę, o nustatyti lydintieji dėsningumai ir tendencijos buvo identifikuoti bei suskirstyti į kategorijas.

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Introduction

When we think about inversion, it is usually one of the two types – stylistic or grammatical – that comes to mind. However, inversion can also appear in other contexts; for instance, inversion as a word order change occurring during translation was addressed under different names by some of the most influential figures in the history of translation studies (like Jean-Paul Vinay and Jean Darbelnet (1958/1995), Eugene Nida (1964), etc.) although sometimes it was overlooked or taken for granted.

This master thesis project combines the elements of translation studies and contrastive linguistics that historically used to be deeply connected, but later became more and more separated. From an institutional point of view, translation studies is a young discipline, and contrastive linguistics was at the foundation of it. But as translation studies scholars made their field of study progressively independent, other disciplines' influence was also limited. However, combining the methods and achievements of translation studies and contrastive linguistics together offers very promising research opportunities nowadays too, just like it used to be in the last century.

Another question relevant to this work is the use of translation procedures in texts of different language registers. When handling texts that belong to different registers, translators give preference to different types of translation procedures, therefore it would be appropriate to conduct a research with the purpose to identify the procedures that are most often used and characteristic of a certain language register (Loshchenova & Nikishyna, 2014).

So far, when it comes to the topic of grammatical translation procedures in English to Ukrainian translations, the researchers are mostly focusing their attention on the translations of literary texts (Krasulia & Myklashchuk, 2020; Shemuda, 2013; Shyshko & Lukanska, 2019; Volchenko & Nikishyna, 2015), while other language registers are mainly left unexplored. This master thesis aims to fit in this gap by examining the instances of inversion as a type of translation procedure in popular science texts translated from English to Ukrainian. In this context, the thesis project tries to shed light on the patterns and trends in the occurrence of inversion, its overall impact and importance for translation practices, as well as for the comprehension and readability of popular science texts translated into Ukrainian.

The **object** (focus) of the project is inversion in the context of English-Ukrainian translations of popular science texts. The **subject** is the structural and functional patterns of word-order inversion in Ukrainian translations. The **aim** is to identify, classify and explain obligatory and non-obligatory inversion patterns in popular science texts translated from English to Ukrainian.

The research **objectives** are embedded in the following tasks:

1. to describe the characteristics of popular science texts, particularly in relation to scientific discourse;
2. to carry out the analysis of research literature on inversion as one of the translation procedure types;
3. to compare the source and target segments of popular science texts, and identify the structural types of inversion found in the Ukrainian translations, specifying the most common one for this type of texts;
4. to analyse the reasons, functions and purposes of inversion in the target language.

Research questions:

- What causes the occurrence of inversion in popular science texts?
- What structural types of inversion can be found in the Ukrainian translations of popular science texts?
- What type is the most common? What are the patterns and trends?

To answer these research questions, this project applied comparative translation analysis. Data was gathered through compiling the English-Ukrainian parallel corpus that pairs the original BBC popular science texts with their Ukrainian translations to identify inversion present within text segments. Using Vinay and Darbelnet's framework of translation procedures, inversion was categorized, evaluated and analyzed. This methodology was chosen because it accommodates a comprehensible systematization of word order changes between the two languages.

Overall, this master thesis will contribute new valuable insights into the linguistic aspects of popular science texts, with the focus on translation procedures, particularly inversion. This work will help to find practical examples of the implementation of this particular translation procedure as according to the existing theories and models, in addition to creating a basis for further research, perhaps in the context of other languages. These insights will be relevant to translators as well as linguists, language teachers and learners, who would like to to know more about the word order and inversion in the English and Ukrainian languages. Therefore, this thesis has considerable practical value, since the results can be used in translation teaching, editing popular science translations, and corpus analysis of translation procedures.

1. Theoretical part: literature review

1.1. Popular science texts as a subcategory within the scientific register

Translating science is as ancient as the science itself. Because of the role of translation in both collecting and distributing knowledge, it has been and continues to be just as essential to scientific progress as teaching and research are (Montgomery, 2012, p.299).

The history of scientific discourse, popular science and translation are intertwined. In the seventeenth century when the discourse of science was forming, scholars started to write about their research in a way which can be described by the following characteristics: clear, concise, consistentб impersonal, neutral, technical and precise. For example: at first, Isaac Newton presented his ideas in *Treatise on Optics* (1704) in a manner that resembles ordinary everyday speech, and then reformulated them using what is called the process of nominalisation (a technique commonly used in modern scientific writing to make it compact and abstract); according to Bennett (2024), these linguistic reformulations can essentially be called translation (p.407).

Some translations of scientific or philosophical works from the 18th and 19th centuries in Europe are viewed by Forget (2010) as essentially a popularization process. The goal of many translations was to bridge the knowledge gap and make source texts more accessible, rather than merely overcoming the language barrier at a time when well-educated readers could easily access source texts (typically written in Latin, French, or English).

Just like any translation, transferring science between languages presupposes a degree of interpretation. Consciously or not, every translator at some point faces a choice: to be more loyal to the source or the target language or to strive for a mix of both – and the translator of scientific texts is no exception; “choosing the target language, based on demand for utility of the translated result, is common in science but by no means universal. … The common notion that translating science is a linguistically unsophisticated process, based on word-for-word rendering, is false” (Montgomery, 2012, 302 -303).

It is worth noting that popular science, which serves as illustrative material for this study, despite being intrinsically connected to the scientific discourse, is nevertheless a separate type of discourse according to the modern view. By definition of the school of Functional Stylistics, popular science discourse is a subgenre of a scientific language register; it is a complex and a rather original phenomenon, which interprets “scientific concepts in plain language (i.e., in nontechnical language) for the general audience who may or may not have a background in science” (Rashid & Bauld, 2016).

A typical impersonal style of scientific research articles is dense in technical terminology, accompanied by the very precise numerical data. There is also “a predominance of longer and more complex subordinated sentences in research articles, in keeping with the scholarly tone” (Bennett, 2024, p. 412). While in effect, the scientific discourse presupposes translating the ordinary, conversational language of “commonsense knowledge” into the impersonal technical style, the task of “producing popular science from scientific research is essentially translation in the opposite direction” (Bennett, 2024, pp. 408-410).

The process of making specialized knowledge more accessible, understandable or attractive to a general audience is called popularization and it "is not a process of simplification, but a process of recontextualization to meet the existing knowledge of the lay readers. The genre of popular science is distinguished from other specialised texts particularly in its interactive features" (Liao, 2013, p.130).

Bennett (2024) describes the process of creating a popular science piece on the basis of a research article: the first task would be to select and supplement the "content in accordance with the knowledge and expectations of the new target readership" (p.414) and the second step is to replace "the dense discourse of science with a more explicit and personal style" (p.414) with the help of certain grammatical reformulations and lexical changes. So, not surprisingly, popular science writers use a very different type of language. Bennett (2024) considers the grammatical changes which take place "clearly the most obvious differences between the scientific and popular science discourses" and lists some of them:

- mostly, the impersonal and passive structures are converted to the active voice;
- unlike in a source text, direct speech is allowed now, so indirect speech is also converted*;*
- a reader is actively included with the help of the first-person plural*;*
- long and complex subordinated sentences are replaced by lexical items and structures found in informal English (pp.410-412).

In addition to the grammatical reformulations, the author also mentions some of the stylistical and lexical ones:

- style becomes relaxed and conversational;
- focus is shifted to the active agent, usually it is "the researcher, who now becomes a named and speaking personality in his own right";
- storytelling techniques such as first-and third-person narrations are included;
- "the couple of technical terms that appear, must be defined in lay terms";
- the very precise percentages "are rounded off to make them easy to process" (Bennett, 2024, pp.410-412).

The content is also reframed by new paratexts (like eye-catching titles, headings and subheadings, abstracts and summaries, illustrations, author's bio etc.) and an introductory section, which similarly to a scientific article's introduction "helps to frame the science in accordance with the respective genre and target public, setting the tone for what follows"; predictably, this part of the narration in both discourses diverges the most from each other (Bennett, 2024, p.413 - 414).

However, "popularization is a distinctive genre, and is not necessarily derived from a specialized text" (Liao, 2013, p.130). To popularize science does not simply mean to carry out a binary operation of transforming a source text into a target text, at least not always. Not only can a single popular science publication combine research results obtained from different scholars, but it can

also use the data regarding the conducted experiments and research findings from sources other than academic articles, such as interviews. (Bennett, 2024, p.415)

When talking about scientific and technical translation, Byrne (2014) emphasizes the significance of usability and readability. The former is related to the question whether the text is simple enough for readers to follow and accomplish their tasks or intentions, and the latter whether the technical language is appropriate for the target audience.

Similarly to other science-related translations, some of the questions associated with the analysis of translated popularized texts include, in particular: how was terminology translated? Or how can one maintain accuracy of scientific information? But at the same time, when evaluating a translation directed at lay readers, accessibility for those target readers may become even more important than precision and correctness of scientific information (Liao, 2013, p.131).

Translators of popular science tend to include interactive features that aim to show the writer's involvement (for example, hedge words expressing uncertainty) or vividly visualise the world within the text (e.g. use the words of proximity in place or time: "here", "now", and "this"); employment of second person pronouns encourages readers' participation (Liao, 2013, p.131).

Because of its style directed at clarity, which in turn requires a linguistically natural expression, popular science is a perfect illustration of how translation procedures are utilized to make a translated text sound natural for native speakers.

1.2. Translation procedures in translation studies

For a long time, researchers have tried to describe and categorise what happens during the process of translation. Since the 1950s, numerous lists or taxonomies have appeared, analysing the translation process from the point of view of different linguistic approaches (Munday, 2016, pp.87-109).

At the same time, translation studies was taking quite a lot from other disciplines, and one of the consequences of its terminology being borrowed, as noted by Gambier (2010), is a certain terminological incoherence, which occurs as multiple synonyms coexist together, in addition to polysemy, and unclear or inaccurate concepts (p. 412).

The terminology in this master thesis project was chosen due to the differentiation between the obligatory and non-obligatory *procedures* (see Subsection 1.2.1 and 1.2.3 for definitions) that were first introduced by Vinay and Darbelnet (1958/1995). Procedure is one of those ambiguous terms in translation studies: "it is not only used in different ways, but it also seems to be in competition with a dozen other terms" in English: strategies, shifts, techniques, methods, operations, changes, replacements, and so forth (Gambier, 2010, p. 412). This incoherence was accompanied by underlying differences in individual authors' understanding of translation procedures.

However, regardless of all the complications, the role of this concept should not be underestimated. Transforming the target language output with the help of translation procedures is and has always been an integral part of translation work. While discussing the level of professionalism crucial for translators, researchers highlight the capability to transform text in order to overcome lexical and grammatical difficulties (Krasulia & Myklashchuk, 2020, p. 300) – an ability which is directly related to the use of translation procedures.

Here, the most well-known and illustrative scientific traditions were chosen to show how the understanding of translation procedures has been evolving till modern days. The concept of translation procedures will be among the most important ones for this master thesis project.

1.2.1. Vinay and Darbelnet's concept of translation procedures

Two French scholars Jean-Paul Vinay and Jean Darbelnet are very well known for their monograph *Stylistique comparée du français et de l'anglais* [Comparative Stylistics of French and English] (1958/1995), where they explored the linguistic aspects of English-French translation. According to Vinay and Darbelnet, "an explanation for certain linguistic phenomena, specially stylistic ones" can be found outside language rather than the linguistic structure of the language itself (p. 279). This opinion was influenced by the linguistic relativity hypothesis, proposed in the late 1930s and connected with the names of Edward Sapir (1929) and Benjamin L. Whorf (1940). Following the hypothesis, Vinay and Darbelnet agree that "our language is influenced by our world view and our social and cultural environment; but our way of seeing this environment is in turn shaped by our language which mediates between us and the world" (p. 278).

They also state that "the relationships between languages can be classified according the frequency with which oblique translation methods [methods that do not follow a word-for-word or literal approach] have to be used"; this leads them to the assumption that English is as far apart from French as from some indigenous languages of the Americas, if not further (Vinay & Darbelnet, 1958/1995, p. 279). However, this is contradicted by the fact that the Vinay and Darbelnet's model is sometimes criticised because it can be less easily applied to non-European languages (Munday, 2016, p. 95; Meifang & Li, 2009).

They were criticised by newer researchers for other things as well. As pointed out by Molina and Hurtado Albir (2002), every example used to illustrate Vinay and Darbelnet's procedures were decontextualized, while their pioneer proposal was grounded in comparative linguistics. In turn, this promoted a confusion between phenomena linked to the translation of texts on one hand, and comparative linguistic phenomena on the other hand (including the categories needed for analysis of comparative linguistic phenomena's similarities and differences). Molina and Hurtado Albir concluded that following the approach of *Stylistique comparée du français et de l'anglais*, the application of translation techniques is limited to the categorization of differences between two language systems, rather than the textual solutions required for translation (2002, p. 507).

Nevertheless, Vinay and Darbelnet's (1958/1995) model of translation procedures has become fundamental in the field of translation studies. They describe a translation procedure as the process translators are going through in their search for a necessary solution. In their minds, translators reflect upon the units of the source language text or the text as a whole until they discover an appropriate target language unit. This process should reveal a target language message, that is, the source language text is expected to lead to the target language message. Before the process is finished, translators have to make sure that no element from the source language has been omitted (p.31). However, the subsequent classification of translation procedures by these two authors only shows what specific unit a translator might deem to be an appropriate equivalent in each case, but not how they reached a decision to utilize this particular unit.

As indicated by Molina and Hurtado Albir (2002), when Vinay and Darbelnet introduced "the procedures as a description of the ways open to the translator in the translation process" (p. 506),

they established a confusion "between translation process and translation result. Nevertheless, the procedures, as they are presented in the SCFA [*Stylistique comparée du français et de l'anglais*] do not refer to the process followed by the translator, but to the final result. The confusion has persisted" and contributed to the translation procedures being confused with the other translation categories like techniques, methods and strategies (Molina & Hurtado Albir, 2002, p. 506).

1.2.2. Further evolution of the concept: Catford's shifts, Molina and Hurtado Albir's techniques, Chesterman's strategies

Scholars-successors of Vinay and Darbelnet did not use the term "translation procedures" very often, even though they continued to study the concept itself. When John C. Catford published a book *A Linguistic Theory of Translation* (1965), he introduced the term *translation shifts*. Catford (1965) defines translation shifts as "departures from formal correspondence in the process of going from the source language to the target language" (p. 73).

What does formal correspondence mean if we talk about the particular type of translation shifts? Let us consider a type which deals with sentence restructuring and is the closest equivalent of *inversion* (for the definitions of inversion, see Section 1.3): in terms of Catford's (1965) paradigm that would be a *clause-structure shift.* In the case of clause-structure shift, formal correspondence means that both the source language and the target language should have the same particular elements of clause structure (such as subject, verb, object, etc.). In this case, a translation shift can be either caused by a change in the occurrence of those elements (if a sentence contains different elements after it is translated from the source language into the target language); or it can be related to different sequence of those elements: even if the same particular elements are present in both the source language and the target language, but some of them are placed in a different order. (pp.77-78)

Catford's approach was criticised by other researchers as well, because of its contrastive linguistic basis being too static, in addition to his choice of decontextualized examples (Munday, 2016, p. 97).

Later, there was a new category which in a certain way substituted translation procedures: *translation strategies*, regarded as a type of mental operation during the translation process (cf. Lörscher 1991; Jääskeläinen 1993, as cited in Gambier, 2010). There was a shift from Vinay and Darbelnet's view in a sense that a strategy turned into a tool to address potential issues that arise while translating and a concept to characterize the translation as a decision-making process, rather than a constitutive element for a general translation theory (Gambier, 2010, p. 414).

Molina and Hurtado Albir (2002) called strategies an essential element of problem-solving. They suggested that strategies should be distinguished from procedures, and saw the name "procedures" as ambiguous, since in Vinay and Darbelnet's examples they affect the results rather than the process. They also proposed one should refrain from using here the word "procedures" and utilize the term "translation techniques" instead (p. 507).

For Chesterman, strategies are "tools, types of process to achieve a *good* [emphasis added] translation" (Gambier, 2010). According to Chesterman (2016), translators resort to translation strategies, when they decide to change something while being "not satisfied with the target version that comes immediately to mind – because it seems ungrammatical, or semantically odd, or

pragmatically weak, or whatever … the 'being not satisfied' is thus evidence of the existence of a translation problem" (p. 90).

Chesterman (2016) described translation strategies as follows:

- they are "ways in which translators seek to react to norms: primarily, but not necessarily always, to try to conform to them";
- they describe "types of linguistic behaviour: specifically, text-linguistic behaviour, and are thus forms of explicitly textual manipulation";
- the endpoint of a strategy is a certain goal, while its starting point is a certain problem;
- strategies are potentially conscious, learnable, and hence "portable" and readily accessible problem-solving processes (pp. 86-89).

However, according to Chesterman (2016), we can consider change as a strategy only when it is out of the scope of the "obvious change from one language to another" and when it involves "a choice between possibilities. This means we are not concerned with changes that are obligatory for obvious grammatical reasons" (p. 90).

As observed by Gambier (2010), the majority of publications about procedures focus on either text types or problem types, though both can be addressed together. Rather than being descriptive (how so and so has been dealt with in real-life translations?), they are prescriptive (what procedures should be used for translating so and so?). They offer guidelines for translating belles lettres, children's books, poetry, theatre plays, operas, audiovisual screenplays, songs, comics, advertisements, political speeches, legal documents, and so on (p. 413).

1.2.3. Relations between word order and translator's thought process. Servitude and option

The differentiation between a *servitude* and *option* introduced by Vinay and Darbelnet (1958/1995) determined the choice of terminology for this master thesis project, since it is especially relevant for our analysis of both the obligatory and non-obligatory inversion employed in translations of popular science texts from English into Ukrainian.

Vinay and Darbelnet (1958/1995) wrote that when translators are analysing a source language text, they should distinguish between the "servitudes imposed upon writers and the options they have freely chosen. … grammar is the domain of servitudes whereas options belong to the domain of stylistics" (p. 16). Both an author who writes a text in a source language, and a translator who translates this text are limited by servitudes, but often have some available options to choose from. In a context of a target language, servitude is an obligatory change, when a translator has no choice but to translate in a certain way because of the differences between the two language systems; option, in its turn, depends on the translators' own preferences and decisions, or their inclination to put emphasis (Munday, 2016, pp. 93-94).

Another founder of modern translation theory, Eugen Nida (1964), paid attention to obligatory changes in word order (servitudes in Vinay and Darbelnet's (1958/1995) terms) as well, and said if those appear in certain target languages, it may possibly lead to severe alterations of expressions. Nida wrote that when comparing servitudes and options translators might come to a conclusion that nevertheless "these obligatory modifications are ultimately not so much a problem as are the

optional variants in order, which serve to highlight emphatic elements in the sentence, provide a pleasing rhythm, or adjust the linguistic to the historical order of events" (p.235).

In order to develop our understanding of servitude and option as related to the other authors' models found in the examined literature, let us analyse an example of the clause-structure shift proposed by Catford (1965) – the researcher with a markedly the most complicated approach towards limits imposed upon a translator by grammar and language system.

Being Scottish himself, in his book Catford (1965) showcased the sentence in English translated into Scottish Gaelic, since the Scottish Gaelic language is always ordered strictly as verb–subject–object (VSO) and changes of clause structure are mostly inevitable while translating into it. The English sentence "John loves Mary" follows the structure of subject–verb–object (SVO). The same sentence translated into Scottish Gaelic "Tha gradh aig Iain air Mairi" (a word-for-word equivalence: Is love at John on Mary) follows the structure of verb–subject–object (VSO). In addition to real examples, Catford (1965) also mentions a hypothetical one (p. 77).

Table 1. Analysis of the hypothetical examples of the clause-structure shift proposed by Catford (1965)

Hypothetical language 1	**Hypothetical language 2**	
Example 1	Example 2	Example 3
The only grammatically possible sentence structure: subject–verb–object (SVO)	The first grammatically possible sentence structure: subject–verb–object (SVO)	The second grammatically possible sentence structure: verb–subject–object (VSO)
Translation shift does not occur ⇓⇓⇓ The structure of the sentence translated into Scottish Gaelic: verb–subject–object (VSO)	Translation shift occurs ⇓⇓⇓ The structure of the sentence translated into Scottish Gaelic: verb–subject–object (VSO)	Translation shift does not occur ⇓⇓⇓ The structure of the sentence translated into Scottish Gaelic: verb–subject–object (VSO)

Catford (1965) says the sequence subject–verb (SV) is not the only possible sequence in English, which can be true depending on the context, but not true in the case of the English sentence *John loves Mary*. Thus, it is not clear to which one of the Hypothetical Languages does English correspond to in the table according to Catford, nor does he give any real example of the second possible sentence structure in Example 3 (p. 77). Instead, readers are expected to find or imagine compatible examples on their own, even though their absence in fact could possibly make understanding more difficult. Catford's (1965) choice of examples was criticised by other researchers, for instance, Munday (2016) says that his examples are very often "invented and not taken from actual translations", which makes them idealised and taken out of context (p. 97).

To make things less hypothetical, let us think of some real example that corresponds to the given clause structure.

Table 2. Analysis of the examples of the clause-structure shift proposed by Catford (1965)

Scottish Gaelic	**Modern Standard Arabic (MSA)**	
Example 1	Example 2	Example 3
The only grammatically possible sentence structure: verb–subject–object (VSO)	The first grammatically possible sentence structure: subject–verb–object (SVO)	The second grammatically possible sentence structure: verb–subject–object (VSO)
Chì an duine an càr.	الرجل يرى السيارة Transcription: *ar-rajulu yarā as-sayyārata*	يرى الرجل السيارة Transcription: *yarā ar-rajulu as-sayyārata*
Literal word-for-word: "Sees the man the car."	Literal word-for-word: "The man sees the car"	Literal word-for-word: "Sees the man the car"
⇓⇓⇓ The structure of the sentence translated into English: subject–verb–object (SVO) **The man sees the car** Translation shift does not occur	⇓⇓⇓ The structure of the sentence translated into English: subject–verb–object (SVO) **The man sees the car** Translation shift does not occur	⇓⇓⇓ The structure of the sentence translated into English: subject–verb–object (SVO) **The man sees the car** Translation shift occurs
⇓⇓⇓ **The man sees the car** Translation shift does not occur According to Vinay and Darbelnet: translation procedure takes place (servitude) According to Chesterman: classification can not be applied	⇓⇓⇓ **The man sees the car** Translation shift does not occur	⇓⇓⇓ **The man sees the car** According to Vinay and Darbelnet: translation procedure takes place (servitude) According to Chesterman: classification can not be applied

All three example sentences have the same clause structure (verb–subject–object, VSO) after being translated into English. However, as per Catford's (1965) view, structure-shift occurs only in Example 3, even though in Examples 1 and 3 both the Source Languages and the Target Language have absolutely identical sentence structures. But what matters for the researcher here is a formal correspondence between the Source Language and the Target Language, and Example 1 lacks this formal correspondence, because subject–verb–object (SVO) is the only grammatically possible sentence structure in the Scottish Gaelic language.

Therefore, according to Catford (1965), translation shifts depend on how the source and the target languages employ different word orders, and not so much on the translator's thought process during translation. This approach is completely different from that of Vinay and Darbelnet (1958/1995) as well as Chesterman's (2016) or Molina and Hurtado Albir's (2002).

As we remember, Vinay and Darbelnet (1958/1995) defined servitude as an obligatory change caused by differences between the two language systems. Therefore, since a translator has no

choice but to translate both example 1 and example 3 in a particular way, there will be no distinction made between them and they will be equally considered servitudes.

In the decades after Vinay and Darbelnet (1958/1995), Nida (1964) or Catford (1965), researchers considered non-obligatory options to be more noteworthy and gave them higher priority because of their potential to reveal how translators make choices (Munday, 2016, p.179). For this reason, in his book Chesterman (2016) is "not concerned with changes that are obligatory for obvious grammatical reasons" (p.90) at all. Therefore, Chesterman's classification can not be applied to none of the above-mentioned examples in the table.

Molina and Hurtado Albir (2002) held the same view. In fact, the reality of many inversions being servitudes led these authors to the conclusion that inversion should not be considered a translation technique at all (p. 507), which will be discussed below.

1.3. Inversion and word order in translation theory

Translation studies scholars paid attention to word order since the beginning of the discipline. Vinay and Darbelnet (1958/1995) described the inversion of word order that can sometimes be obligatory in terms of grammar. As for stylistic inversions, this aspect of translation has been little studied at the time of writing their monograph, and for that reason it is only given a brief outline in the book. Vinay and Darbelnet (1958/1995) discuss the topic of word order quite extensively, but in a context of translation methods inversion can only appear if it is accompanying modulation and transposition procedures.

As regards Nida's (1964) *techniques of adjustment*, what interests us the most among them is one of the seven main classes of *alterations.* His alterations are adjustments made necessary as a result of the incompatibilities between two languages (Molina & Hurtado Albir, 2002, p. 502), and the type of interest constitutes changes in word order caused by the structural differences between two languages.

Nida (1964) wrote that the necessity for adjusting the order of words while translating seems so obvious that it is hardly worth mentioning and it would not be surprising that a drastic alteration in word order can take place in a translation when the order of an expression in a text's source language is obviously complicated. Yet, there might arise certain situations in which changing word order would not seem vital, but nevertheless, in those cases changing it would still be "important, if the translation is to be natural" (p.235).

Nida (1964) describes how attempts to recast a language into a different language family mold can end up with unfortunate results, even though "one can often force a language into a particular pattern without completely destroying the meaning" (p.235). However, this can produce a bad style in a particular target language, and Nida's examples in the book demonstrate how.

Vázquez Ayora (1977, as cited in Molina & Hurtado Albir, 2002, p. 504) was another author who introduced some new procedures, and one of them was inversion, also called displacement, which takes place where two elements change position.

The reason why servitudes and options in this thesis are analysed separately and not together, is based on the theorization by Molina and Hurtado Albir (2002), who observed: following approach of *Stylistique comparée du français et de l'anglais* is restricted to the categorization of variations

between language systems, not the textual solutions necessary for translation. Inversion cases shown in *Stylistique comparée du français et de l'anglais* "should not be considered as translation techniques. They are not a textual option open to the translator, but an obligation imposed by the characteristics of the language pair" (p. 507), because Vinay and Darbelnet (1958/1995) focused on inversion primarily determined by rules of word order or thematic structure.

As for Chesterman (2016), he also paid attention to word order and differentiated between clause structure change and sentence structure change; his classification involves both of them as two separate strategies.

1.3.1. English and Ukrainian word order compared

Ukrainian is a synthetic language, whereas English is an analytical language. Synthetic languages demonstrate grammatical relationships by inflecting words. In analytical languages, on the other hand, the primary determinant of the relationship among words in a sentence is word order (Vysotska et al., 2021). This is due to the fact that analytical connections are of two types: syndetic (with the help of prepositions) and asyndetic (through word order). And since modern English is primarily analytical in its structure, its word groups primarily contain these analytical grammatical connections. Very often these two forms of connection are semantically relevant to the same extent, which is why it is possible to replace one type with another (Pavlyuk, 2010, p.53).

Word order is one of those grammatical aspects that sets sentences of different functional types apart. For example, while interrogative sentences are grammatically characterized by a special word order (Pavlyuk, 2010, p.63) which involves inverting the subject and verb or starting with an auxiliary verb, statements are distinguished by the direct word order structure where a subject is followed by a predicate.

It is commonly known that in English, the object usually comes after the verb. Thus, the most common word order of English declarative sentences has the basic pattern of Subject-Verb-Object (SVO), which forms a grammatical clause. As identified by Pavlyuk (2010), if a sentence contains two non-prepositional objects, the indirect object comes first, followed by the direct object; if one of the objects is prepositional, it follows the non-prepositional. However, since the predicate verb and its object are sometimes separated by another sentence element, the tendency to put the object right after the predicate verb should not be seen as a rigid rule (p.75).

The other parts of the sentence sometimes have a general pattern too, even though it can often change for clarity or emphasis. These other sentence components are often used along with the object or placed instead of it, which gives us "the default, canonical and dominant, unmarked word-order configuration, prevalent in the English language" (Assaiqeli et al., 2021, p.527): a pattern SVX, where X represents any category other than subject and verb. Now, after having established the standard order of subject, predicate and object, let us examine the position of other sentence parts, namely two types of modifiers: adverbial modifiers and attributes, in order to further explore the norms of English clauses.

Attribute is a secondary sentence part that modifies a noun, or occasionally a pronoun. An attribute's morphological type largely determines whether it appears before or after the word it modifies (i.e., its head). An attribute which consists of a prepositional phrase can appear only

following its head word. Adjectival attributes typically come before their head words, although they occasionally appear after them (Pavlyuk, 2010, p.77).

As pointed out by Pavlyuk (2010), adverbial modifiers are known to have a relatively more flexible position compared to other parts of a sentence. There are some distinctions between the various types of modifiers in this case, though. The types of modifiers which are closely connected to the parts of sentence they modify, tend to occupy positions close to these elements. For example, adverbials of manner come immediately after the verb phrase they modify, adverbials of frequency are typically positioned between the subject and the main verb, but after the auxiliary verb if it is present. This being said, it does not necessarily mean that these types of adverbial modifiers cannot be found elsewhere in the sentence or that their typical position cannot be occupied by adverbial modifiers of other types (p. 80).

Another thing pointed out by Pavlyuk (2010) is that adverbial modifiers of time and place are usually found at the start or at the end of a clause, that is, outside the Subject-Verb-Object (SVO) group. The information structure (i.e., theme and rheme) is one important factor out of many that determine either of these two locations. However, the common claim that the adverbial modifiers of time are *never* part of the subject-predicate group is far too rigid and unsupported by real-life usage. In English, adverbial modifiers of time may appear within the predicate made up of multiple words or between the subject and the verb (p.80-82).

Modifiers are integrated into the syntactical structure of a verb phrase as opposed to supplements which are not. An adjunct may be either a modifier or a supplement, which makes its position in a clause extremely adaptable and suitable for the beginning, middle, or the end of a sentence. The purpose of clause-initial adjuncts is to give the reader background information that will prepare them for the discussion that follows, such as whether the topic will change or if the writer wants to present a continuation, closure, or some other change (Assaiqeli et al., 2021, p.530). To put it briefly, the main purpose of such adjuncts is to inform the reader of what will happen next by giving them some orientating information (Assaiqeli et al., 2021, p. 541).

Comparing the structure of English and Ukrainian clauses, one can find that more often the former has a direct word order, while the latter has at its disposal more possibilities to employ free word order in a sentence. Since English is an analytical language, its "word order is strict and relatively inflexible. English relies on word order to show relationships between words in a sentence, as there are few endings in English, which show person, number, case and tense" (Vysotska et al., 2021, p.21).

Since Ukrainian is a synthetic language, its word endings can provide insight into how words interact within a sentence. This could be illustrated by the following sentence: "Вчені розгадали таємницю" [Scientists solved the mystery]. Changing the word order here would not alter the overall meaning of the clause, which can be expressed in Ukrainian in a number of ways:

1. Вчені розгадали таємницю.
2. Вчені таємницю розгадали.
3. Таємницю вчені розгадали.
4. Таємницю розгадали вчені.
5. Розгадали таємницю вчені.
6. Розгадали вчені таємницю.

Though, the same sentence: “Scientists solved the mystery.” would only have one structure in English: Subject–Verb–Object, and would never allow inversion. This is explained by the fact that inversion is one of the changes enabled by the word-forming suffixes in the Ukrainian language, but not in English (Vysotska et al., 2021, p.21).

As these examples illustrate, Ukrainian has an object scrambling over the verb. Object scrambling is defined as a movement of the direct object from the base verb phrase argument position to the landing site located before the verb, closer to the beginning of a sentence (Mykhaylyk & Ko, 2010, p.11). The primary driver of scrambling is pragmatics. Nevertheless, it is only an addition to SVO which is the base structure of Ukrainian, same as English.

Another distinguishing characteristic of Ukrainian is the free position of some adjectival and noun phrase components, which in most cases would be absolutely impossible in English:

- adjectival phrases: *дуже добра – добра дуже* [very kind]*; значно молодший за мене – за мене значно молодший* [much younger than me]*, добрий до всіх – до всіх добрий* [kind to everyone], *радий чути – чути радий* [glad to hear].
- noun phrases: *щось нове – нове щось* [something new]*, дехто з учнів – з учнів дехто* [some of the students], *нічого казати – казати нічого* [nothing to say] (Pavlyuk, 2010, p.57).

It should also be pointed out that if a Ukrainian verb phrase is composed of a complement or an adverbial adjunct in addition to the main verb, their position does not have to be fixed too, unlike in English:

- complement: *слухати музику – музику слухати* [to listen to music];
- adverbial adjunct*: гарно співати – співати гарно* [to sing beautifully] (Pavlyuk, 2010, p.56).

Any rearranging of a clause's components by users is intended to produce “a semantic, functional value that enhances the pragmatic process of communication and the functional purposes” a language and linguistic systems have evolved to fulfill (Assaiqeli et al., 2021, p.524).

There is a belief that the second clause (and any subsequent clauses) is the most incomplete of the clauses in terms of their independence, and that the first clause somewhat dictates the next clause’s structure. The connection between the second and first clauses may affect the word order of the latter, and the verb forms of the predicates in co-ordinated clauses are often mutually dependent. Although English also has some degree of interdependence between the clauses too, the Ukrainian language’s more flexible word order makes some of these processes more significant (Pavlyuk, 2010, p.85).

Ukrainian is a language where a rise or fall in voice tone (i.e., pitch) puts emphasis on prominent syllables. The realization of pitch accents depends on the position in a sentence and the information structure (theme/rheme) that is being conveyed. Words are organized into phrases “or the so-called accent units in which the last word is usually accented” (Pompino-Marschall et al., 2017, p.355).

1.3.2. Ukrainian word order, information structure, specificity and language acquisition

It is well known that information structure "has an impact on word order" (Erteschik-Shir, 2013, p. 23). The information structure of the sentence is described by the Functional Sentence Perspective (FSP), according to which a clause can be divided into two key components: the theme and the rheme. Singling these components out can be achieved by the following means: intonation (including pauses and different types of stress), the use of limiting adverbs, context, rheme stressing constructions (e.g., "It is... that…"), and the most relevant for us – word order. In Ukrainian the theme is usually "placed in the beginning, while the rheme is found in the end. … the direct 'theme - rheme' order prevails and is considered to be progressive, objective and non-emphatic, the reverse 'rheme - theme' order is thought to be regressive, subjective" and expressing emphasis (Pavlyuk, 2010, p. 66-67). In Ukrainian, the realization of pitch accents that highlight prominent syllables within a phrase depends on both the word order and the information structure they convey (Pompino-Marschall et al., 2017, p.355).

At the same time, in English there is another tool allowing us to distinguish between the theme and the rheme: the use of definite and indefinite articles, absent in Ukrainian (Pavlyuk, 2010, p. 66). While Ukrainian lacks articles, it also does not have a lexical item that would directly mark whether a determiner phrase (historically determiner was viewed as a modifier which defines, specifies, or quantifies the noun) is definite or indefinite (Mykhaylyk & Ko, 2010, p.10).

Since studies on free-word-order languages (Mykhaylyk & Ko, 2010; Schaeffer, 2000a, 2000b; Unsworth's, 2005) have demonstrated the interaction between the semantic feature of specificity and scrambling (see Subsection 1.3.1 for definition), it is necessary to understand how the Ukrainian language is dealing with the notion of specificity. In some contexts, there can be other words pointing to a referential definiteness, and thus in many cases serving as a specificity marker:

- demonstratives such as "цей", "ця", "це", "ці" [this] and "той", "та", "те", "ті" [that], which strongly imply that a speaker and a hearer have a shared knowledge about a particular thing or individual,
- the cardinal numeral "один" [one], its other gender forms "одна", "одне", and a plural "одні", all of which often have a meaning of "specific" and can be translated as "a certain" (Mykhaylyk & Ko, 2010, p.10).

On the other hand, non-specific interpretation is typically linked to:

- the indefinite determiner "якийсь", "якась", "якесь" and "якісь" [some/any];
- other indefinite pronouns "будь-який", "деякий", "який-небудь" [whichever], and so forth, with the strong meaning of indefiniteness.

However, the above mentioned determiners in Ukrainian are only optional (unlike English articles), and they do not convey the same semantic meaning which the definite and indefinite articles have in English (Mykhaylyk & Ko, 2010, p.10).

Mykhaylyk and Ko (2010) argue that Ukrainian only allows scrambling of an object in those cases when this object is specific, so when a direct object's semantic meaning changes, it is indicated by scrambling under analysis. Their examples suggest that the movement is used to remove uncertainty

of semantic meaning from the direct object and induce its interpretation as specific: “in particular, it was shown that the direct object that was moved out of the VP [verb phrase] is usually interpreted as specific” (p. 9).

Studies (Mykhaylyk and Ko, 2010; Schaeffer, 2000a, 2000b; Unsworth's, 2005) reported optionality of scrambling in groups of different ages. Children and adults show different scrambling patterns in certain contexts and studies propose that this is due to the fact that children may find it challenging to correlate the syntactic and semantic elements of grammar, in contrast to adults.

Specifically, Mykhaylyk and Ko (2010) hypothesize that while syntactic movement helps “Ukrainian adult speakers resolve the semantic ambiguity of the SVO structure … children may scramble at a lower rate than adults due to an unstable mapping between syntactic feature (EPP [Extended Projection Principle]) and semantic feature” of specificity (p. 3). The Extended Projection Principle is one of the fundamental principles of syntax in generative grammar which stipulates that a sentence or clause needs to include a subject, irrespective of whether it carries out a meaningful role or not. The above-mentioned, as well as the other authors, posed the following research question: how well do young children understand and apply the relationship between word order and specificity in their speech?

Schaeffer (2000a, 2000b) believes that young learners might not understand the concept of specificity and thus be unable to connect it to scrambling. In terms of scrambling acquisition, Schaeffer identifies two developmental stages: in the first, children as young as two scrambled very freely, and in the second, children as old as three and up behaved more like adults by rapidly scrambling particular objects.

According to Unsworth's (2005) findings, the initial stage of adults who are learning Dutch as a second language matches the SVO word order from their first language, which is English; however, the subsequent stages are comparable for both native speakers and child and adult Dutch learners. Therefore, it was determined that adults and children use the same mechanisms in language acquisition because they go through the same optional scrambling stage. That is, the adult test subjects who learned the second language were choosing to scramble optionally, despite being old enough to understand the pragmatic principles.

This means that while free word order is common in Ukrainian, the way how it is employed is not random, but depends on one's level of language intuition and fluency. In essence, inverted word order in Ukrainian sometimes performs the functions of certain lexical items that English has, but Ukrainian lacks. Native speakers unconsciously understand this and choose the appropriate clause structure, while language learners, especially beginners, often do not. Thus, it would be useful for the learners of Ukrainian to have access to the resources with the in-depth explanations of the implicit processes behind inversion that native speakers perceive and adopt automatically.

1.3.3. Inversion as a type of translation procedure

A concept of inversion is among the most important ones for this master thesis project. Before entering translation studies, the idea of a word order change, called inversion, was presented in several other disciplines. Historically, researchers have identified two categories of inversion: grammatical and stylistic. Tymoshchuk (2025) defines *grammatical inversion* a syntactic structure in which two sentence members reverse their canonical positions (i.e., become inverted); according

to some linguists, its aim is to change the functional type of a sentence, and it does not have any stylistic value (p.253).

Other definitions describe inversion as the deliberate rearrangement of the standard word order (Qudratullayeva, 2025, p.10) or changing standard word order (Vysotska et al., 2021). Researchers point out that it is typical for the English language, especially with the aim of emphasis, but not as common as in Ukrainian (Vysotska et al., 2021).

Stylistic inversion is a technique that breaks the direct word order in a sentence for the purpose of highlighting new information, and the primary source of material used to analyze stylistic inversion is written texts (Tymoshchuk, 2025, p.252-254).

As can be noticed, the above definitions are quite wide, allowing to include different parts of the sentence, and not just subject and predicate as in the most famous examples. However, some authors (e.g. Pavlyuk, 2010) consider it as undesirable to use the word “inversion” to indicate an unusual position of a secondary part of the sentence, for example, of an adverbial modifier or an object, suggesting that it could cause misinterpretations and significantly impair word order study. For instance, they advocate that there is no inversion in a declarative sentence where subject and predicate come in their normal order, even if the object is placed at the beginning, which is not a usual place for an object in this type of sentence. Nevertheless, in our study we claim that there is an inversion in some sense in the given sentence as well.

According to some scholars, like Pavlyuk (2010), if every instance in which an object occupies an unusual location was referred to as inversion, this can lead to confusion in certain situations where there is no proper clarification. Therefore, they prefer not to apply the term “inversion” to a secondary part of the sentence, and assert that it can occur only in the sentences with the verb coming before the subject (p.75). However, we are following the tradition of Vinay and Darbelnet (1958/1995), which is why the term “inversion” here is applied to secondary parts of the sentence too.

Why does inversion appear? What is its reason? Traditionally, inversion or non-inversion was thought to be triggered by syntactic impetus. As believed by Assaiqeli et al. (2021), these kinds of explanations rely on rules; however, they do not fit with the idea that language was created to facilitate communication and has evolved for communicative purposes (p.525).

In fact, the phenomenon of inversion is distinct from many other English grammatical systems, because despite being a part of syntax, occurrence of inversion is not caused by syntactic elements, as noted in Assaiqeli et al. (2021). Inversion is triggered by the desire to achieve a specific communicative effect, such as attention, involvement, focus, or an emphatic effect (p.527-528).

Inversion serves an expressive purpose, highlighting for the audience the very fragment of the sentence that the speaker believes to be the most significant or informational (Tymoshchuk, 2025, p.254). It highlights the lexical-semantic meaning of this marked fragment by changing its position, playing the role of a stylistic marker for articulating the author's style (Turko, 2021, p.111).

Different word-order arrangements indicate varying degrees of engagement or focus in English: “initial positions are … marked with emphasis. Automatically, the mere placement of an element, i.e., the subject or the participant in an initial position brings out emphasis and attention” (Assaiqeli

et al., 2021, p.530). The inverted word-order construction puts the event (i.e., verb) first and the event participant (i.e., subject) second, whereas non-inversion does the opposite (Assaiqeli et al., 2021, p.528).

Inversion as a stylistic device is used across various mediums by writers and poets, journalists, public speakers, formal and legal writers. For example, it was demonstrated by Tymoshchuk (2025) that inversion is also a potent stylistic tool used by political leaders to accomplish particular objectives, having in mind the amount and variety of purposes, as well as functions of political discourse. Political leaders frequently use stylistic inversion as an evaluative linguistic technique, thus it plays a significant role in contemporary political discourse by assisting them in drawing listeners' attention to particular elements of events or phenomena, and bringing forth an emotional reaction. Its powerful cognitive impact turns it into an effective medium of persuasion (p. 254-261).

While stylistic inversion is the structural device used for literary flair, there is also an *expressive inversion* that defines the psychological purpose of the word-order change. Expressive inversion is a linguistic phenomenon in which the typical word order is switched for rhetorical or expressive reasons; its powerful cognitive impact and effectiveness as a tool of persuasion are proven by the fact that every single US president of the 21st century has used an expressive inversion in his inaugural speech (Tymoshchuk, 2025, p.252-256).

Authors employ inversion if they need it to perform one or several of the following so-called universal functions; sometimes other functions can be added too. For instance, in addition to grammatical, logical, pragmatic, communicative and structural-semantic functions, which are universal, the US presidents' inaugural speeches also implement stylistic, expressive, emotional-evaluative and figurative-semantic functions (Tymoshchuk, 2025, p.261). It is logical to assume that sometimes translators as well want the translated message to serve at least one function from these lists, and then they choose to utilize inversion where it was absent in the original text.

In translation studies, inversion is considered a procedure "that transfers one term in the source language to another part of a sentence in the target language" (Volf, 2020). Vinay and Darbelnet (1958/1995) do not offer a detailed definition of the inversion of word order, only state that in certain circumstances it is an obligatory grammatical feature, while inversion for stylistic reasons is the same as dislocation (p.222). Molina and Hurtado Albir (2002) analysed inversion in *Stylistique comparée du français et de l'anglais* and defined it as a movement of "a word or a phrase to another place in a sentence or a paragraph so that it reads naturally in the target language" (p.500). In the book, inversion did not belong to seven basic procedures, it was among other translation procedures that complemented them. Inversion was one of the only two complementary procedures not classified as an opposing pair to some other complementary procedure, the second one being compensation.

According to Qudratullayeva (2025), inversion serves as a tool alongside the various syntactic mechanisms that translators use to emphasize meaning, adjust focus, and replicate stylistic features of the source text. Inversion is not "merely a stylistic device but a strategic tool … . In translation discourse, the use of inversion becomes particularly significant when transferring texts between languages with differing syntactic norms" (p.10).

Syntactic manipulation has importance as a vital aspect of the translator's craft. Analysis of the collected corpus by Qudratullayeva (2025) highlights three primary factors influencing the use of

inversion: linguistic structure, cultural context, and genre-specific requirements. The analysis highlights that inversion is not a mere linguistic adjustment, but a deliberate stylistic choice translators make in order to replicate tone, preserve meaning and resonate with the target audience (p. 11).

Qudratullayeva (2025) proves that genre-specific requirements influence the frequency of inversion, as is commonly used in literary texts, which are renowned for their expressive and stylistic richness, to highlight important themes or the feelings of characters. On the other hand, inversion is rarely employed in technical or journalistic texts, where directness and clarity are valued over artistic flourish. Clarity and accuracy are given priority in technical or legal translations, which frequently restrict the use of inversion to prevent ambiguity. This genre-dependent approach demonstrates the translator's intention to balance between communicative clarity and readability on one hand, and stylistic fidelity on the other hand (p. 11-12).

Inversion is a sophisticated tactic catered to the requirements of every translation situation rather than a one-size-fits-all answer; proficiency in both source and target languages is necessary to effectively utilize inversion (Qudratullayeva, 2025, p. 12).

1.3.4. Research of inversion in English-to-Ukrainian translations

As we know, it is not always possible to find linguistic parallels between the source and target languages, which is one of the main factors that drives translators to use inversion when translating between them, including languages like English and Ukrainian. Translators use translation procedures in cases where there are no semantic or structural analogues like identical models of sentences or word combinations, or complete coincidence of the semantic meanings of words, and so forth (Loshchenova & Nikishyna, 2014). According to Shemuda (2013), inversions of words in a target text are primarily due to the syntactic characteristics of the target language – in this case Ukrainian.

Shyshko and Lukanska (2019) as well assert that, in addition to subjective and objective factors, the current norms of the Ukrainian language also significantly influences the quantity of grammatical translation procedures aimed at achieving adequacy and semantic equivalence of literary translation. Therefore, a perfect knowledge of their native language, including its fundamentals, characteristic properties and nuances, as well as awareness of modern trends, changes and innovations, continues to be a guarantee of quality and a key component of a translators' professional competence. Together, these factors ensure the high quality and accuracy of any translation (p.128). Translators may face different kinds of difficulties when translating from English into Ukrainian, and inability to use translation procedures where justified can also be considered as one of them (Krasulia & Myklashchuk, 2020).

Unlike in Western translation theory, the central term in Ukrainian tradition is *translation transformation*, which overlaps with the term "procedure" representing a distinct viewpoint on the same process. Based on the level of language they impact, transformations are typically divided into three major categories in Ukrainian studies: lexical, grammatical and complex.

Ukrainian scholars Karaban (2018) and Selivanova (2011) proposed classifications of translation transformations (i.e., procedures). Their classifications differ in the quantity of recognized types, as

well as in the fundamental ideas and methods of systematization. Both researchers agree, though, that when working with a text, it is nearly impossible to distinguish between grammatical and lexical procedures because of the intricacy of language structure and the variations in grammatical structure and lexical composition between the source and target languages (Matvieieva & Safonova, 2022).

Similarly, a number of authors noted that, as a rule, various kinds of procedures are carried out simultaneously and are rarely encountered in their "pure" form (Loshchenova & Nikishyna, 2014; Volchenko & Nikishyna, 2015). That is, for example, inversion is often accompanied by substitution, which is another type of grammatical procedure (Loshchenova & Nikishyna, 2014; Shyshko & Lukanska, 2019; Volchenko & Nikishyna, 2015). But also, grammatical procedure can frequently be accompanied by lexical procedure, and so forth.

This is how the third type called a *complex procedure* works, it consists of several translation procedures combined, and translators frequently employ in order to ensure that the translated text is as close to the original as possible (Matvieieva & Safonova, 2022). It is precisely this complex nature of translation procedures, including the grammatical ones, that turns translating into a difficult task, but their skillful application makes the translation adequate (Loshchenova & Nikishyna, 2014; Volchenko & Nikishyna, 2015).

Several authors have calculated the frequency of the use of inversion in English-to-Ukrainian translations. However, different research results show different numbers. For example, after analysing the original and translated texts of different functional styles of language and making calculations, Loshchenova and Nikishyna (2014) came to the conclusion that even though the number of grammatical transformations used in each individual text is not the same, but inversion turned out to be the third most used grammatical translation procedure – 21% of all cases. As a result of the research conducted by Shyshko and Lukanska (2019), the frequency of application of inversion was established as 13.5%, which also made it the third most used grammatical translation procedure; nonetheless, it could also be part of a complex transformation, which was the most frequently used grammatical translation procedure found – 33.9% (Shyshko & Lukanska, 2019).

Among all the translation procedures used in the belles-lettres translations analysed by Volchenko and Nikishyna (2015), translators used inversions in almost 25% of the cases. At the same time, the analysis by Shemuda (2013) indicates that inversion is the type of translation procedures most frequently encountered in the text of J. Salinger's (1951/n.d.) novel *Catcher in the Rye* translated by O. Logvynenko. In particular, these were inversions of words, but inversions of phrases were also found in a small amount. The inversion of the main and subordinate clauses was the most common.

2. Inversion occurrence and distribution patterns in popular science texts

2.1. Research design and methods

The study employs a mixed-method approach. In order to answer our research questions, the following steps were taken:

1. Literature Review – formation of the theoretical basis, interpretation of terminological units.

At this stage, the theoretical framework for the study was established with the help of an extensive review of relevant literature on the four main topics:

- popular science discourse and its relation to the scientific register,
- translation procedures,
- word order,
- inversion.

It involves analysis of existing research concepts, clarifying the meanings of terms with the help of definitional analysis.

2. Selection of the source base – compiling the set of texts for the pilot English-Ukrainian parallel corpus of popular science texts, using the LF Aligner software (Farkas, 2023).

This task was accomplished by searching for and selecting popular science texts in English with existing translations into Ukrainian. It was carried out in two steps:

- Compiling a corpus of the translations of popular science texts into Ukrainian from

  BBC Україна. (2023). Наука Retrieved May 18, 2023, from https://www.bbc.com/ukrainian/topics/cyx5kzy4w5yt

- Compiling a corpus of the original popular science texts from

  BBC News. (2023). Science & Environment. Retrieved May 18, 2023, from https://www.bbc.com/news/science_and_environment,

Texts of any length were accepted. The criteria for the texts to be excluded were unavailability of Ukrainian translations and their timeline. The only popular science articles included were those with Ukrainian translations published within the time frame between May 2024 and June 2024. LF Aligner version 4.25 (Farkas, 2023) was used to process the raw documents and create bilingual XLS files for further analysis.

The text was segmented at the sentence level and the unit of analysis in this study is a sentence. The choice of the sentence as a unit of analysis is due to the purpose of the work and the need to study structural features and linguistic means of inversion cases in the context of the communicative-syntactic unit which has a relatively full semantic completeness.

Links to all the illustrative material can be found in Appendix 1 on page 56.

Table 3. Corpus and data

Source	BBC Science & Environment / BBC Україна
Period when texts were published	June 2016 - June 2024
Number of source texts	12
Number of Ukrainian translations	12
Total number of sentences in source texts	622
Total number of sentences in target texts	638
Total source words	12564
Total target words	10015
Alignment tool	LF Aligner 4.25
Unit of analysis	sentence
Number of sentences containing inversion cases that were found and analysed	209

3. Comparative Translation Analysis

Within the compiled corpus of popular science articles, the source texts were compared with the target texts translated into the Ukrainian language. The next step included identifying instances of employed translation procedures, inversion in particular, with help of continuous sampling method, as well as recognizing and categorising collateral patterns and trends.

- Criteria for determining instances of inversion are based on its definitions by Volf (2020) and Molina and Hurtado Albir (2002). Any word or a phrase is considered an instance of inversion if it was transferred to another place in a sentence to make it sound natural in the target language.
- Rules for differentiation between obligatory and non-obligatory inversion are grounded in definitions of servitude and option introduced by Vinay and Darbelnet (1958/1995), in addition to Chesterman's (2016) characteristics of a translation strategy (applicable only to options). A word order change can be considered as an option when it occurs as the result of a choice between possibilities, unlike the case of servitude.

Our goal was to examine approximately 200 instances of inversion. The analysed data was presented numerically and partially consolidated into graph tables.

2.2. Obligatory inversion in English-Ukrainian translation

As was explained earlier (see Subsection 1.2.3), it is the translators' motivation behind their decision regarding a translation procedure that determines whether this specific change belongs to the category of obligatory or non-obligatory ones, that is, servitudes or options. Lexical, grammatical or syntactic constraints can cause incompatibility between the languages of the source and target texts, and this is the reason why obligatory changes are necessary. If the change is aimed at making the sentence grammatical or idiomatic in the target language, it is an obligatory change.

Even though obligatory changes were not considered as translation strategies by translation studies scholars subsequent to Vinay and Darbelnet and therefore could not become an important object of investigation for many of them, understanding how servitudes function is without any doubt essential for a successful foreign language teaching, learning and analyzing.

As compared to five different structural types of non-obligatory inversion (or four, depending on the number of types the inverted adverbials are divided into) identified here as the result of investigation of the bilingual corpus, the obligatory inversion in the corpus has a smaller variety: only three different structural types. The number of sentences with each structural type, that were found and analysed in this study, is presented in the table below. If a sentence contains two or more cases of inversion of the same structural type, the sentence was counted only once. If a sentence contains several cases of inversion of two or more different structural types, the sentence was counted once for every structural type present.

Table 4. Inversion classification table

Structural types		**Number of sentences**	**Percentage**
1. Obligatory inversion	Noun-noun compound	46	22%
	Direct speech	24	11.5%
	Possessive	17	8.1%
2. Non-obligatory inversion	Subject and predicate	18	8.6%
	Adverbials	45	21.5%
	Time adverbial	29	13.9%
	Question	5	2.4%
3. Complex translation procedures	Passive	6	2.9%
	Other	31	14.8%

Perhaps, if the free word order had not been so common in Ukrainian, there would have been more categories of servitudes included here. However, one of them was the most numerous category among all the structural types of inversion found. This will be the first category presented below.

2.2.1. Noun-noun compound

A genitive construction in Ukrainian became the most common approach to translating noun-noun compounds from English (in addition to acting as a possessive, see Subsection 3.1.3). These compounds consist of two nouns, one of which describes or categorizes (or to put it simply, specifies) the type or purpose of the second one. The first noun (i.e., the specifier) serves as an attribute to the second noun, its head. As we remember, attribute is a subcategory of modifiers, and adjunct can also act either as modifier or supplement, so in this case the first noun is a specific type of optional modifiers called noun adjunct.

In a noun-noun compound in the sentence below, the word "skin" can be called an attributive modifier, a noun adjunct or a specifier. In the process of translation of such a compound, the first noun turns into a genitive modifier of the second noun, here – the word "cells" (in Ukrainian: клітини шкіри), and thus their positions become reversed:

Source language: *In moderate amounts, exposure to UV radiation from sunlight helps our **skin cells** to generate vitamin D.*

Target language: *У помірних кількостях вплив ультрафіолетового випромінювання від сонячного світла допомагає **клітинам шкіри** виробляти вітамін D.*

As we can see from the following examples, these noun adjuncts are especially relevant in popular science texts, since they help create new scientific terminology that belongs to different scientific fields, like:

1. Medicine (melanoma skin cancer)
   Source language: *More than 80% of **melanoma skin cancer** cases are caused by sunburn – and this number is rising year on year.*
   Target language: *Понад 80% випадків **раку шкіри меланоми** спричинені сонячними опіками, і їхня кількість зростає щороку.*
2. Chemistry (zinc oxide)
   Source language: *This is because many sunscreens that contain metal nanoparticles like **zinc oxide** may be less effective because of how these ingredients react with other ingredients.*
   Target language: *Це пов'язано з тим, що багато сонцезахисних засобів, які містять металеві наночастинки, як-от **оксид цинку**, можуть бути менш ефективними через взаємодію з іншими інгредієнтами.*
3. Paleontology (braincase volume, fossil record)
   Source language: *For example in a recent 2023 study, Ian Tattersall, a paleoanthropologist and curator emeritus with the American Museum of Natural History in New York City, tracked the **braincase volumes** of ancient hominins through time.*
   Target language: *Наприклад, у нещодавньому дослідженні 2023 року Ян Таттерсолл, палеоантрополог і почесний куратор Американського музею природознавства в*

*Нью-Йорку, відстежував зміни **об'єму черепної коробки** стародавніх гомінідів з плином часу.*

4. **Source language:** *However other palaeontologists argue that the **fossil record** shows that brains began shrinking more recently than Tattersall **suggests**, meaning the change couldn't be linked to language.*
   Target language: *Однак інші палеонтологи стверджують, що **дослідження скам'янілостей** показують, що мозок почав зменшуватися не так давно, як **припускає** Таттерсалл, тобто ця зміна не може бути пов'язана з мовою.*
5. Anthropology (brain size, hunter-gatherer societies)
   Source language: *"Not all **hunter-gatherer societies** became complex in the same type of way as, say, the Egyptians did 3,000 years ago, but **brain sizes** have reduced in these societies too," says Eva Jablonka, professor emeritus at the Cohn Institute for the History of Philosophy of Science and Ideas at Tel Aviv University in Israel.*
   Target language: *"Не всі **суспільства мисливців-збирачів** стали складними так само як, скажімо, єгиптяни 3000 років тому, але **розмір мозку** в цих суспільствах також зменшився, - каже Єва Яблонка, почесна професорка Інституту Кона Тель-Авівського університету в Ізраїлі.*
6. Environmental Science (climate warming)
   Source language: *When he carefully examined the climate record, he found that decreasing **brain sizes** correlated with periods of **climate warming**.*
   Target language: *Уважно вивчивши кліматичні дані, він виявив, що зменшення **розміру мозку** корелює з періодами **потепління клімату**.*

The inversion as the result of noun-noun compounds being translated as a genitive construction turned out to be the most numerous category among all the structural types of inversion (both servitudes and options) analysed in this study. Keeping in mind the important role that the scientific terminology plays in popular science articles, in addition to noun-noun compounds in general being very common in English and genitive constructions in Ukrainian, perhaps this should not come as a surprise.

2.2.2. Direct speech

In Ukrainian, the presence of direct speech in a sentence triggers inversion within the reporting clause after it:

Source language: *"A rollercoaster ride is a good way to describe it," **he says.***
Target language: *"Це було схоже на американські гірки", - **каже він**.*

Source language: *"If the exposure is too high, the skin can't protect itself and you get a burn," **he says**.*
Target language: *"Якщо вплив занадто високий, шкіра не може захистити себе, і ви отримуєте опік", - **каже дослідник**.*

Source language: *"The most important message is to use sunscreen every day from April to September," **he says**.*
Target language: *"Найважливіше повідомлення - користуватися сонцезахисним кремом щодня з квітня по вересень", - **стверджує експерт.***

Reporting clauses in all the previous examples are located at the end of the sentence. However, this change also applies to sentences with reporting clauses in interposition – not closing but interrupting a quotation:

Source language: *"Low SPF sunscreen slightly reduces radiation exposure from the sun," **Gallo says**, but "in most cases, this allows all of the harmful effects to still occur.*
Target language: *"Сонцезахисний крем із низьким рівнем захисту SPF дещо зменшує вплив сонячного випромінювання, - **каже вчений**, - але "у більшості випадків шкідливі наслідки все одно залишаються.*

Source language: *Most formulations available in the UK, for example, are reliable when worn on their own, **Blackburn says**, but he advises against mixing different brands of sunscreen, or mixing a sunscreen with other skin products, in case some of their ingredients are incompatible with each other.*
Target language: *Більшість рецептур кремів - надійні, якщо їх використовувати самостійно, **каже Блекберн**, але він радить не змішувати сонцезахисні креми різних брендів або з іншими продуктами для шкіри, якщо деякі з їхніх інгредієнтів несумісні одне з одним.*

Source language: *Now, **Argate says**, if another person with cancer tells her that they don't want to go to the doctor, "I will tell them not to be afraid to seek treatment because there is someone helping us."*
Target language: *"Тепер, - **запевняє Аргейт**, - якщо онкохворий не хоче йти до лікаря, я кажу, що не потрібно боятися, адже є люди, які нам допомагають".*

The same thing happens when a reporting clause, which was originally at the beginning, is transposed into the end of the sentence:

Source language: ***As Stefaniuk says**, "A simple example would be an off-grid house powered by solar panels: using solar energy directly during the day and the energy stored in, for example, the foundations during the night."*
Target language: *"Простим прикладом може бути автономний будинок, що живиться від сонячних панелей: вдень в хід йде сонячна енергія, а вночі - енергія, збережена, наприклад, у фундаменті", - **пояснює Стефанюк**.*

Hence, in Ukrainian an inversion is triggered inside the reporting clause regardless of its location in the original sentence, as long as it appears before the beginning of a direct speech in the translated sentence. Even if the sentence continues after the reporting clause and includes more words or clauses, inversion still occurs:

Source language: *"Why are we doing this, Dad?" **she asked** as the minutes ticked by.*
Target language: *"Тату, навіщо ми це робимо?" - **спитала вона** мене.*

Source language: *"I'll come back later," **she says**, and goes to leave the room.*
Target language: *"Я прийду пізніше", - **сказала вона**, направляючись на вихід з кімнати.*

Source language: *"Wait!" **I cry**, but she's gone.*
Target language: *"Чекай!" - **кричу я** їй, але вона вже вийшла.*

The inversion triggered by the presence of direct speech in a sentence is one of those language usage examples which are obvious to native speakers but not so much to language learners. All the same, there is a need for the detailed grammar books of Ukrainian that would elaborate more on this pattern, because the existing grammar books pay no attention to this aspect. For instance, while talking about the narrator's speech, that is, reporting clauses in different positions in a sentence, Ponomariv et al. (2001) is explaining in detail the complex punctuation of quotative frames in Ukrainian, but not their word order.

A literature search in the available databases did not locate any of the previous studies which have addressed the observation regarding direct speech and inversion being related, except for Shukhova (2021). Namely, there it was found that among sentences with the reporting clause after direct speech, indirect word order appears in the reporting part in 90% of cases, and 71.4% of sentences have indirect word order in the reporting clause in the middle of direct speech. On the other hand, in the reporting clause before direct speech, 77.8% of sentences have direct word order (p.72).

The topic of inversion in reporting clauses needs more investigation, and research articles can help with this task before the more detailed grammar books are written. The above examples show that the most effective in the task would be articles like Shukhova (2021), which analyzed word order changes in syntactic units identified within monolingual corpus using the continuous sampling method, or articles based on the results of comparative translation analysis of bilingual corpora.

2.2.3. Possessive

The next structural type of obligatory inversion found here is connected to a possessive form. In Ukrainian, similarly to many other languages that have a genitive case included into their case system, the genitive form of a noun can often be used as a possessive. When a possessive construction is translated from English into Ukrainian as a genitive one, the word order of that phrase becomes reversed, because in Ukrainian the thing possessed should always be followed by the possessor in the genitive case that, nevertheless, always comes first in English – for instance, as in sentences:

Source language: *The **river branch's** proximity to the pyramid complexes suggests that it was "active and operational during the construction phase of these pyramids", the paper said.*
Target language: *Близькість **рукава Нілу** до пірамід дозволяє припустити, що він був активним і діяв на етапі будівництва пірамід.*

Source language: ***Young children's skin** is extra sensitive to UV radiation, so it's particularly important that they're protected from the sun.*
Target language: ***Шкіра маленьких дітей** особливо чутлива до ультрафіолетового випромінювання, тому дуже важливо, щоб вони були захищені від сонця.*

Source language: *Other parts of the **volunteers' hands** were home to hundreds to thousands of bacteria, while the subungual areas yielded hundreds of thousands of bacteria per fingertip.*
Target language: *На відкритих ділянках **долонь волонтерів** жили сотні тисяч бактерій, тоді як приблизно таку ж кількість можна було знайти під кожним з нігтів.*

A possessive construction can be translated into Ukrainian both as a servitude and option, the latter cases will be addressed more in detail in the Subsection 2.3.4.

In conclusion, our analysis reveals that obligatory inversion (which involves noun-noun compound, direct speech and possessive) as a translation procedure is a grammatical necessity, caused by norms of Ukrainian syntax and a requirement for the translation to be more natural.

2.3. Non-obligatory inversion in English-Ukrainian translation

As was explained in Subsection 1.2.3, non-obligatory changes (i.e., options) are stylistic, cultural, or interpretative choices made by the translator to improve readability, tone, or impact. They are also utilized in the cases when a more literal translation is not possible. In other words, non-obligatory change is the combination created to emphasize, improve style, or simplify understanding.

To draw a line between servitudes and options means to draw a line that separates two disciplines. Indeed, contrastive linguistics is concerned with grammar rules, while translation studies are concerned more with the translator's thought process. But in fact, just like it is not always easy to distinguish between obligatory and non-obligatory change (as it will be demonstrated later), contrastive linguists and translation studies also can never be fully separated. Whenever someone is learning a language, they inevitably have to compare two linguistic systems, and without any doubt, they would benefit greatly if the comparison has already been made for them. In addition, every translator was a language learner at some point in their lives, and the nature of their work prompts them to continue exploring language all the time.

Today drawing the line between contrastive linguistics and translation studies is very easy compared to how it was in the 1960s, not least because introducing the concepts of servitudes and options became one of the steps on the way to making translation studies an emancipated discipline.

2.3.1. Subject and predicate

The most classical case of inversion is when subject and predicate are reversed in the sentence. One of the observed tendencies was that it sometimes appears alongside the modal verb “can”:

Source language: ***Creating cues*** *can* ***help that to happen.***
Target language: ***Допомогти цьому*** *може* ***створення підказок.***

Source language: *But sometimes* ***our imagination can seep*** *into the memory.*
Target language: *Але іноді в пам'ять* ***може просочитися наша уява.***

In these sentences, “створення підказок” (“creating cues”) and “наша уява” (“our imagination”) represent the newly introduced piece of information (i.e., the rheme). That is why, according to the norms of the Ukrainian language, they have to appear only after the already known information, that is, at the end of the sentence. Similar thing can also be said about the following sentences:

Source language: ***"Meeting people where they live rather than expecting them to come to you*** *could be* ***one way of addressing this,"*** *says Smith.*
Target language: ***"Одним зі способів розв'язання цієї проблеми*** *може бути* ***зустріч з людьми на місцях, а не очікування, що вони самі прийдуть до вас"****.*

Source language: *Stibel believes that* ***a changing climate, and not language***, *could* ***explain our smaller brains.***

Target language: *Стібел вважає,* ***пояснити менший мозок сучасних людей*** *може* ***зміна клімату, а не мова.***

However, here the emphasis has to be even stronger because of the juxtaposition created with the help of the coordinating conjunctions “and not” and “rather than”. In the last sentence in English, it would be impossible to put more emphasis on a phrase “changing climate, and not language” without rewriting a clause (e.g., turning it into passive) or including additional words. But Ukrainian grammar rules allow it, thanks to the free word order.

A degree of interdependence between the clauses in the Ukrainian language is more significant than in English (see Subsection 1.3.1); the first clause may somewhat dictate the next clause’s structure.

In the next example in the phrase “як припускає Таттерсалл” (literal word-for-word translation: “than suggests Tattersall,”) the main new message is not the action of suggesting itself, but the source of this action – a scientist named Tattersall. Since the surname “Tattersall” carries the main semantic load, according to the logic described earlier, in Ukrainian it comes at the end. If we said “як Таттерсалл припускає” (“than Tattersall suggests,”) the emphasis would shift to the verb, which sounds unnatural in this context:

Source language: *However other palaeontologists argue that the fossil record shows that brains began shrinking more recently than* ***Tattersall suggests****, meaning the change couldn't be linked to language.*
Target language: *Однак інші палеонтологи стверджують, що дослідження скам'янілостей показують, що мозок почав зменшуватися не так давно, як* ***припускає Таттерсалл****, тобто ця зміна не може бути пов'язана з мовою.*

Here is a subordinate adverbial clause of time:

Source language: *Unfortunately, to understand why brains shrank, you would need to pinpoint exactly when the* ***shrinkage began****.*
Target language: *На жаль, щоб зрозуміти, чому саме мозок зменшився, потрібно точно визначити, коли саме* ***почалося зменшення****.*

A translator wanted the last clause to answer a question: “What began that you would need to pinpoint exactly?”, that is why an inverted word order was used there. The same clause with non-inverted word order would answer a question: “You would need to pinpoint exactly when the shrinkage did what?”. The next subordinate adverbial clause of time is a similar case:

Source language: *Jablonka argues that if even if [sic] brains did shrink when* ***complex societies emerged****, it doesn't necessarily follow that smaller brains were necessarily an adaptive response.*
Target language: *Вона стверджує, що навіть якщо мозок зменшився, коли* ***виникли складні суспільства****, це не обов’язково означає, що це була адаптивна реакція.*

The last clause with non-inverted word order would answer a question: “Brains shrinked when complex societies did what?”, but with inversion it answers a question: “What emerged when brains shrinked?”.

Similarly, had the following relative clauses been translated with non-inverted word order, they would have answered a different question, compared to the question the inverted clauses answer there now:

Source language: *Sunblock, on the other hand, creates a physical barrier from the sun that **UV rays** can't pass **through**.*
Target language: *Крем-блок, навпаки, створює фізичний бар'єр від сонця, **через** який не можуть пройти **ультрафіолетові промені**.*

Source language: *When it comes to inevitability, one expression of fatalism that Samuel Smith, a professor of behavioural oncology at the University of Leeds in the UK, often sees implied in news stories is the idea that **just about everything** causes cancer.*
Target language: *Коли справа доходить до неминучості, одним з проявів фаталізму, який часто спостерігає Самуель Сміт, професор поведінкової онкології з Університету Лідса у Великій Британії, є міф, що рак викликає **майже все**.*

In short, during the translation process, a classical subject-predicate inversion is used as a translation procedure to preserve the information structure, or logical emphasis of a sentence, striving for translation naturalness.

2.3.2. Adverbials

There are four main locations in the sentence that adverbials can occupy after a translator chooses to change the position they had in the original text: they can be fronted, put before a word or a phrase they modify (which is usually a verb or a predicate), after it, and at the end of the sentence. In English, the crucial rule is that an adverb can not be placed between a verb and its object, but in Ukrainian it is possible.

But at the same time, single-word adverbials proved to behave differently than those adverbials that are expressed by a phrase or a full clause. Talking of the latter, the initial findings did not find that adverbials of cause, condition, contrast/alternative, frequency and purpose are predisposed to any particular location. There is a small amount of evidence which suggests that adverbials of manner are more often placed at the end of the sentence, while adverbials of place frequently come before verbs; however, research data is insufficient and more scrutiny is needed to confirm these trends.

These inconclusive findings are by no means a research failure; on the contrary, they confirm that these translation procedures are options and highlight the very essence of them as such. If all the adverbial types were occupying only one location each, regardless of the text they appeared in and its translator, they would have to be considered servitudes. Since there are no two translators whose thought process is exactly the same, there can be no options that would be used in the same way in all of the texts.

The only type of adverbials expressed by a phrase or a full clause which proved to have a tendency toward one specific place in a sentence was time adverbial, fronted most of the time.

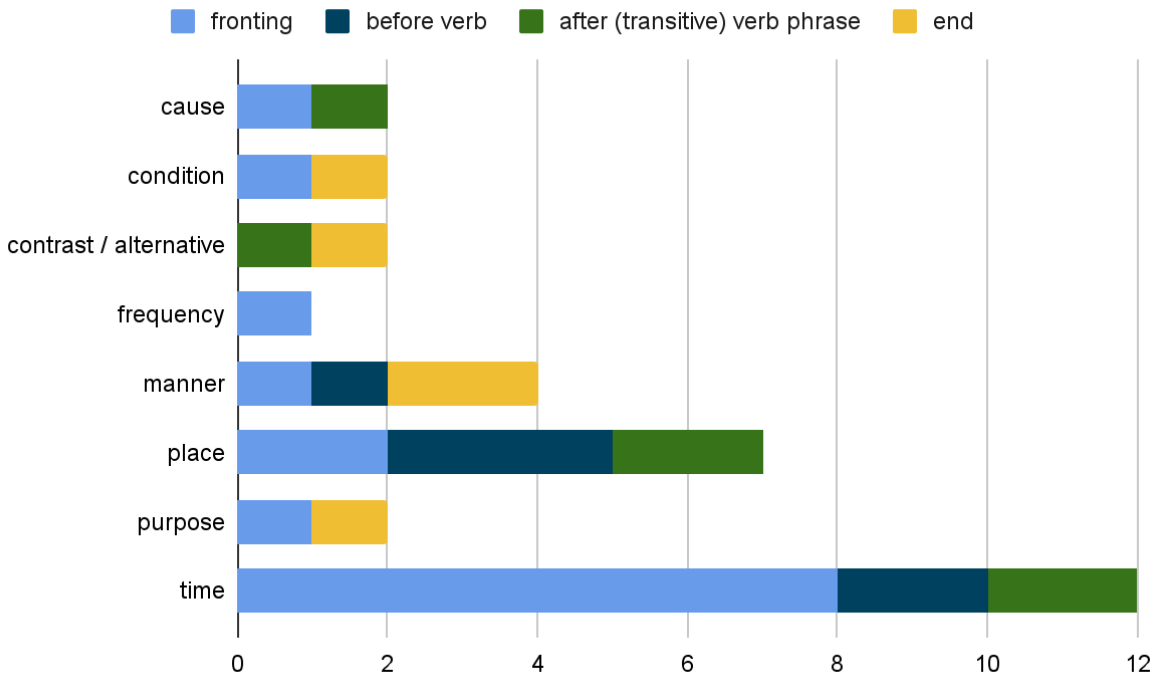

Fig. 1. Positions of different types of adverbials expressed by a phrase or a clause

On the other hand, single-word adverbials of degree, frequency, manner, place, time, as well as additive adverbs tend to be placed before the word they modify (which is predominantly a verb) either in the majority of cases, or at least in the half of them.

Originally in end position, adverbials in the following sentences were put before a modified word (mid-position) in Ukrainian; this phenomenon has been recorded in relation to five types of adverbials, namely:

1. additive

Source language: *Our theory is that smaller brains dissipate heat better, and have a reduced heat output* ***too****.*
Target language: *Наша теорія полягає в тому, що менші мізки краще розсіюють тепло, а* ***також*** *мають меншу тепловіддачу", - пояснює вчений.*

2. degree

Source language: *Unfortunately, to understand why brains shrank, you would need to pinpoint* ***exactly*** *when the shrinkage began.*
Target language: *На жаль, щоб зрозуміти, чому саме мозок зменшився, потрібно* ***точно*** *визначити, коли саме почалося зменшення.*

3. frequency

Source language: *Anyone who's sat in a crowd will know that a mere handful of clappers can* ***sometimes*** *trigger a room of people to mimic their behaviour.*
Target language: *Будь-хто, хто бував у натовпі, знає, що жменька плескачів* ***іноді*** *може змусити всю кімнату повторювати за ними.*

4. manner

Source language: *We know, for instance, that songs can **naturally** evoke memories from particular periods in your life.*
Target language: *Ми знаємо, наприклад, що пісні **природним чином** можуть викликати спогади про певні періоди вашого життя.*

5. place

Source language: *It wasn't until the late 1980s that scientists began to poke around under our fingernails to see who, exactly, lives **there**.*
Target language: *Тільки наприкінці 1980-х вчені нарешті зазирнули під нігті й з'ясували, хто **там** мешкає.*

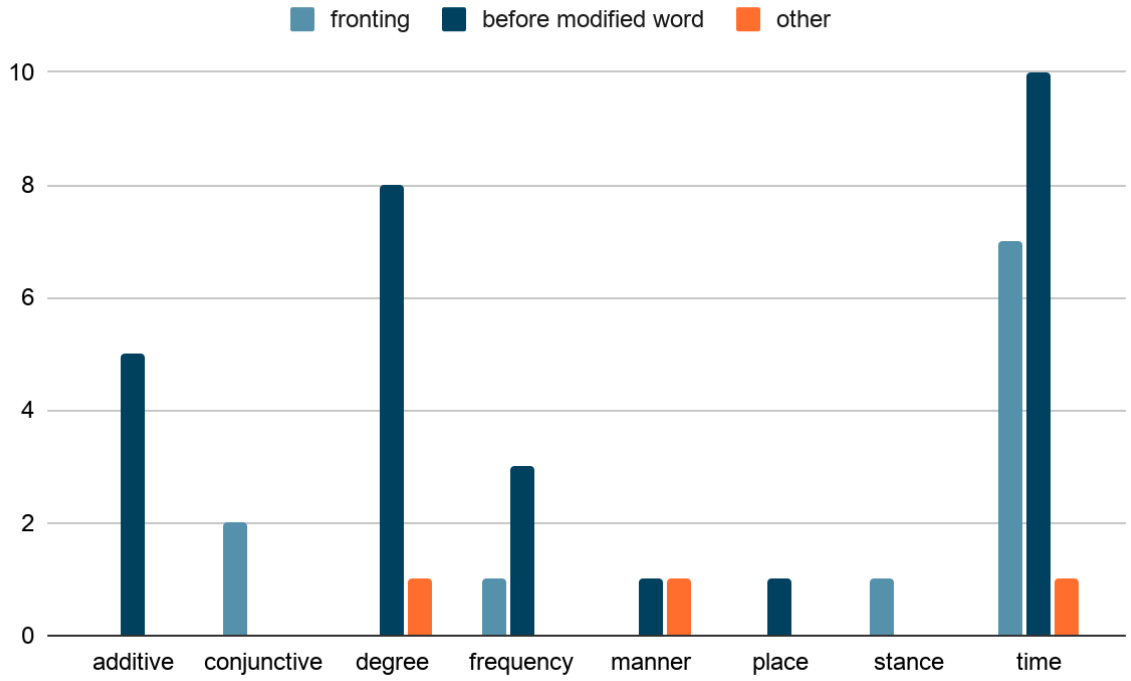

Fig. 2. Positions of different types of one-word adverbials

In the previous examples, the modified word was a verb, but adverbials can also be placed before other parts of speech they modify. For instance, adverbials of degree in the following sentences modify:

1. another adverb

Source language: *It can be hard to hear anything else – like the fact that some types of cancer are essentially chronic illnesses, which can be well managed if caught early **enough.***
Target language: *Вони ніби впадають в емоційний ступор і не сприймають інформацію про те, що деякі типи раку - це, по суті, хронічні захворювання, з якими можна впоратись, якщо виявити їх **досить** рано.*

2. adjective in target language, verb in source language

Source language: *In other words, as smaller and better organised brains were able to perform more complex computations, metabolically expensive larger brains **simply** became unnecessary.*
Target language: *Іншими словами, оскільки менші та краще організовані мізки змогли виконувати складніші обчислення, великий мозок, який потребував більше енергії, став **просто***

непотрібним.

3. prepositional phrase in target language, verb in source language

Source language: *However, the SPF **only** indicates the level of protection from UVB rays – the amount of UVA protection is specified via a separate rating (more on this later).*
Target language: *Однак SPF вказує **лише** на рівень захисту від UVB-променів – ступінь захисту від UVA вказують в окремому рейтингу (докладніше про це пізніше).*

In the following English sentence the adverb of probability "maybe" is a sentence adverbial, which is why it modifies the entire clause to show uncertainty. In the sentence translated into Ukrainian, the adverb "можливо" functions as a parenthetical word and modifies the entire predicate clause that follows:

Source language: *"I see that for a patient hearing this powerful word, it leads to a whole process of reflection and **maybe** they're not ready right away to talk about all of the treatments," Polnik explains.*
Target language: *"Я бачу, що пацієнта, який чує це потужне слово, накриває хвиля різних думок, і він, **можливо**, не готовий відразу говорити про лікування", — пояснює Польник.*

Located like that, the adverb "можливо" bears more emphasis. Had it been placed before "він" ("they" in the original), the emphasis on the "не готовий" ("not ready ") would have been significantly stronger.

As our analysis shows, when it comes to adverbs, inversion is used to preserve the emphasis and naturalness of translation. It makes the sentence flow smoothly, without interruptions. The next subsection is dedicated exclusively to time adverbials – an adverbial type selected in the connection with inversion the most during this study.

2.3.3. Time adverbials

In Ukrainian, there is a strong tendency of fronting time adverbials if they are expressed by a phrase or a clause:

Source language: *"But we haven't seen the data to show that there was a decline as far back as **100,000 years ago** that didn't result at some point in a reversal where brain size began increasing again.*
Target language: *"Але ми не бачимо даних, які б свідчили, що **100 000 років тому** почалося зменшення мозку, і після цього вже не відбувався зворотний процес, коли розмір мозку знову почав збільшуватися.*

Source language: *A research team in the Gunung Leuser National Park, Indonesia spotted Rakus with a large wound on his cheek **in June 2022**.*
Target language: ***У червні 2022 року** дослідницька група в національному парку Гунунг Леузер в Індонезії помітила орангутанга Ракуса з великою раною на щоці.*

Source language: *Indeed, nearly a hundred years ago, physicians began to realise that bacteria would always show up in tests **even after multiple re-washings**.*
Target language: *Ще століття тому лікарі зрозуміли, що **навіть після багаторазового миття рук** на них залишаються бактерії, які незмінно проявляються в аналізах.*

The reason might be that in this type of sentences, a time adverbial is systematically perceived by native speakers as a theme, because they see the information provided there as the point of departure before introducing a rheme. Adverbials often act as adjuncts, and as was mentioned in Subsection 1.3.1, clause-initial adjuncts provide the reader with the background information, prepare them for the discussion that follows or inform the reader of what will be discussed next.

At the same time, the rheme represents information related to the theme which is the part of the sentence a reader should be most focused on, and in Ukrainian it has to be located at the end of the sentence. To illustrate the rheme's shift in a target language: in the last example sentence, placing the noun phrase "*бактерії, які незмінно проявляються в аналізах"* ("bacteria that always show up in tests") at the end gives the communicative focus or weight to the word "бактерії".

Since the frequent fronting of time adverbials, for example, is also present in Hungarian (Klaudy, 2007, 2010), a geographical neighbor of Ukrainian, it raises a question regarding the potential role of the language contact in shaping this phenomenon. Hence, a suggestion for the future research would be: as a first step, to analyse the inversion occurrence and distribution patterns in languages from the same or distinct language families; and as a second step, to compare the research results concerning two different languages. The study of this type would contribute significantly to the research areas of comparative and contrastive linguistics.

However, just like with the adverbials of other types in Ukrainian, the time adverbials expressed by a single word do not always behave the same way as those expressed by a phrase or a full clause. Besides fronting, the former might also be placed before the clause verb. Moreover, at the same time the analysis of research findings shows that adverbs often tend to have the same position in different sentences and texts. For example, "now" or "right now" is usually translated as "зараз" and in Ukrainian it shows an inclination towards fronting:

Source language: *He's **now** the head of quantum biotechnology at CSIRO, Australia's national science agency.*
Target language: ***Зараз** він очолює відділ квантової біотехнології в CSIRO, національному науковому агентстві Австралії.*

Source language: *I'm trying **now** to exercise regularly, and I'm very mindful of my diet, to make sure that I maintain my cognitive health in my old age.*
Target language: ***Зараз** я намагаюся регулярно займатися спортом і стежу за своїм харчуванням, щоб зберегти своє здоров'я в старості.*

Source language: *"The fact that our brain size is decreasing significantly **right now** yields the logical conclusion that our capacity for greater intelligence is either shrinking, or at least not growing," says Stibel.*
Target language: *"Той факт, що **зараз** розмір нашого мозку значно зменшується, дає логічний висновок, що наша здатність мати більший інтелект або зменшується, або принаймні не зростає", - говорить Стібел.*

The same position is often occupied by "then" when it is translated as "потім":

Source language: *The team **then** saw Rakus chewing the stem and leaves of plant called Akar Kuning - an anti-inflammatory and anti-bacterial plant that is also used locally to treat malaria and diabetes.*
Target language: ***Потім** команда побачила, як Ракус жує стебло та листя рослини під назвою Акар Кунінг — протизапальної та антибактеріальної рослини, яка також використовують місцево для лікування малярії та діабету.*

Source language: *Rakus **then** smeared the chewed leaves onto his wound until it was fully covered.*
Target language: ***Потім** Ракус намазував рану пожованим листям, доки вона повністю не була покрита.*

On the other hand, whenever a sentence would contain a prepositional phrase "over time" it would be translated as "з часом" and placed before the clause verb:

Source language: *Sunscreen becomes less effective **over time**, experts say, but generally, it should work for up to three years from the date you purchase it.*
Target language: *Експерти кажуть, що сонцезахисний крем **з часом** стає менш ефективним, але, як правило, він повинен діяти протягом трьох років з моменту покупки.*

Source language: *If friendlier, more social humans were more successful from an evolutionary perspective, then brains may have shrunk **over time**.*
Target language: *Якщо більш соціальні люди були успішнішими з еволюційної точки зору, то мозок, можливо, **з часом** зменшився.*

Source language: *This is despite cancer survival rates increasing **over time**, especially in wealthy countries like the US.*
Target language: *І це попри те, що рівень виживання при раку **з часом** збільшується, особливо у багатих країнах, як-от США.*

A similar thing can be said about clauses with adverbs "again" ("знову") or "yet" (translated as "ще" or "наразі") – they were always placed before the verb:

Source language: *But we haven't seen the data to show that there was a decline as far back as 100,000 years ago that didn't result at some point in a reversal where brain size began increasing **again**.*
Target language: *Але ми не бачимо даних, які б свідчили, що 100 000 років тому почалося зменшення мозку, і після цього вже не відбувався зворотний процес, коли розмір мозку **знову** почав збільшуватися.*

Source language: *But then brain size started growing **again**, so the data doesn't **yet** match that hypothesis.*
Target language: *"Але потім розмір мозку **знову** почав зростати, тому дані **наразі** не підтверджують цю гіпотезу", - каже він.*

Source language: *"My dream come true would be that large-scale quantum computers are available and we can run quantum algorithms that I am developing to find solutions to the problems that we haven't found **yet**, and that will revolutionise everything."*
Target language: *"Моя мрія - доступні великомасштабні квантові комп'ютери, щоб можна*

було запускати квантові алгоритми, які я розробляю, щоб знайти вирішення проблем, які ми ***ще*** *не знайшли, - і це революціонізує все".*

Two components that make up the link verb's analytical form in the sentence can be separated by the adverbial modifier of time:

Source language: *The advantage for quantum systems* ***has always been*** *that you can achieve much, much better sensitivity and easier identification of chemicals at a much lower cost.*
Target language: *Перевага квантових систем* ***завжди полягала*** *в тому, що з ними можна досягти набагато кращої чутливості та легшої ідентифікації хімічних речовин за набагато менших витрат.*

This example is similar to the one Pavlyuk (2010) analysed in her book. The adverbial modifier here is more in the shade as it stands within the predicate, yet another variant "would certainly also be possible, but there would probably be some greater emphasis on the adverbial modifier, which would have tended to represent the theme of the sentence" (p.82). In order to keep the adverbial modifier in the shade, in Ukrainian the word "завжди" was located before the verb.

On the contrary, defronting can be used as a tool to put stress on time adverbial:

Source language: ***But it wasn't until the early 1970s*** *that researchers began to identify the reason that hand-dwelling bacteria was so persistent.*
Target language: *Однак причину такої стійкості виявили* ***лише на початку 1970-х.***

This can be explained by the fact that in Ukrainian the rheme and the pitch accent usually appears at the end of a sentence.

Similarly to the classical subject-predicate inversion, movement, and particularly fronting of time adverbials during the translation process is utilized to preserve the information structure or logical emphasis of a sentence, and ensure translation naturalness.

2.3.4. Possessive

As was already mentioned in 3.1.2, in Ukrainian the genitive form of a noun can function as a possessive:

Source language: *Quantum mechanics emerged in the early 20th Century from studies of* ***nature's*** *smallest objects.*
Target language: *Квантова механіка виникла на початку 20-го століття в результаті досліджень найменших об'єктів* ***природи****.*

Source language: ***Men's*** *brains are around 11% larger than* ***women's*** *brains due to their bigger body size.*
Target language: *Мозок* ***чоловіків*** *приблизно на 11% більший за мозок* ***жінок*** *через більший розмір тіла.*

Source language: *In one 1988 study, a trio of researchers from the University of Pennsylvania's Department of Dermatology swabbed the hands of 26 adult volunteers, all employees of the*

university's medical school *who did not interact with patients.*
Target language: *Усі вони працювали у* ***медичній школі університету****, але не контактували з пацієнтами.*

Here, the word order was reversed following the same process that was described in the Subchapter 3.1.2. However, none of the examples here can be considered as an obligatory change, because they allow other ways to translate English possessive forms, for example, by turning a possessor into an adjective form with the use of a suffix. If using this alternative procedure, the previous examples of possessives would look like the following:

Table 5. Translation of the English possessives by turning a possessor into an adjective form

Source language:	**Target language:**
nature's smallest objects	*найменші природні об'єкти*
men's brains	*чоловічий мозок*
women's brains	*жіночий мозок*
university's medical school	*університетська медична школа*

These examples show that when a possessor is turned into an adjective form, it does not always strictly indicate ownership, but rather association, origin, or type. There are exceptions, such as possessive adjective formed by adding suffixes "-ів" or "-їв" for owners of masculine gender, and "-ин" or "-їн" for owners of feminine gender, which are only possible in case of proper names or animate nouns. Let us consider one of the examples:

Source language: ***Tattersall's*** *finding replicates those of others.*
Target language: *Відкриття* ***Таттерсалла*** *лише підтверджує інші.*

Due to the basic phonetic principle in the Ukrainian language, the sound "і" in closed syllables is alternated with "о" or "е" in open syllables. Thus, the suffix "-ів" becomes "-ов", and the possessive adjective in the given clause would look like this:

Source language: ***Tattersall's*** *finding*
Target language: ***Таттерсаллове*** *відкриття*

Popular science articles often cite scholars who belong to various institutions. When there is a possessive referring to a geopolitical, educational, or national institution, it may be translated into Ukrainian as a phrase of different types, for example:

Source language: *As a result of this longer process to approve new, potentially more effective UV filters, researchers have found that some US sunscreens fail to meet the* ***European Union's*** *higher UVA protection standards.*
Target language: *У результаті цього тривалого процесу затвердження нових, потенційно ефективніших УФ-фільтрів дослідники виявили, що деякі сонцезахисні засоби США не відповідають вищим стандартам захисту від ультрафіолетових променів* ***в Європейському Союзі.***

Here, the possessive was reinterpreted to imply location or context rather than ownership with the help of preposition “в”[in].

Another way to translate similar phrases referring to institutions into Ukrainian is to use adjectives. “University of California” which is not a possessive in grammatical form, but in meaning, becomes “Каліфорнійський університет”:

Source language: *When we're exposed to the sun, UV radiation damages the DNA , proteins and other molecules found within our skin cells, says Richard Gallo, professor of medicine at* ***University of California****.*
Target language: *Коли ми перебуваємо під впливом сонця, ультрафіолетове випромінювання пошкоджує ДНК, білки та інші молекули, які містяться в клітинах нашої шкіри, каже Річард Галло, професор медицини з* ***Каліфорнійського університету****.*

And finally, already familiar to us genitive phrases:

Source language: *He's now the head of quantum biotechnology at CSIRO,* ***Australia's national science agency.***
Target language: *Зараз він очолює відділ квантової біотехнології в CSIRO,* ***національному науковому агентстві Австралії****.*

All these three different ways may be unproblematically used in each of the previous three examples (e.g. наукове агентство в Австралії, наукове агентство Австралії, Австралійське наукове агентство), which is why inversion here was non-obligatory. But this is not always the case, as possible options depend on the context, like in this example where an adjective (Австралійське) cannot be used:

Source language: *"Quantum is one of* ***Australia's*** *most promising growth opportunities - a chance to create new markets, new applications," said CSIRO's chief scientist, Prof Bronwyn Fox.*
Target language: *"Це одна з найперспективніших галузей* ***Австралії****, шанс створити нові ринки, нові програми", - каже головний науковий співробітник CSIRO, професор Бронвін Фокс.*

It is not always easy to separate servitudes from options. As we saw, the same grammatical phenomenon – possessive – can belong to both of these categories, because sometimes there is only one way to translate a phrase in a grammatically correct way, but sometimes there are several. Another instance when it is impossible to separate servitudes from options are complex translation procedures, which will be addressed in Subchapter 3.3.

2.3.5. Question

When translating English questions that start with “do” (so-called do-support questions) into Ukrainian, several grammatical and word order changes occur due to differences in how questions are formed in those two languages. In questions with emphasis or clarification, word order may shift to emphasize certain elements, Ukrainian might front the object or move the verb. This is due to the fact that Ukrainian allows flexible word order to highlight focus or emphasis.

Source language: *Does **sunscreen block** vitamin D production?*
Target language: *Чи **блокує сонцезахисний крем** вітамін D?*

Source language: *Does **sunscreen contain** toxins?*
Target language: *Чи **містить сонцезахисний крем** токсини?*

Source language: *Are **we becoming** less smart?*
Target language: *Чи **стаємо ми** менш розумними?*

A similar process happens when translating clauses that begin with “whether” into Ukrainian. “whether”-clauses in English are subordinate clauses expressing indirect questions or alternatives, and their translation involves structural adaptation:

Source language: *For instance, she asks how healthy such thoughts are, and whether **they have** a factual basis.*
Target language: *Наприклад, цікавиться, наскільки здорові такі думки та чи **мають вони** наукове підґрунтя.*

To conclude, optional inversion (which involves subject-predicate inversion, movement of adverbials, inversion within possessive and questions) can act as a translation procedure in the translation process with the aim to preserve the information structure and logical emphasis of a sentence, as well as naturalness of translation, which is essential due to a genre requirement for clarity in popular science.

2.4. Complex translation procedures

A complex translation procedure can fall into the category of either obligatory or non-obligatory changes, depending on the context – or sometimes both. Since it is a procedure that may include both types of changes, we put it into a separate category on its own. One of the examples of complex translation procedures is the dynamic approach to translating a passive voice.

When translating a passive voice sentence from English into Ukrainian, a translator often has to make decisions that go beyond just changing the verb form. Ukrainian uses passives far less frequently than English, so alternatives are commonly used – and each of these may shift word order and sentence structure. So, more than one translation procedure may be at play.

The analysis of the bilingual popular text corpus showed three distinct ways to translate passive voice from English into Ukrainian, which in turn lead to changes in word order of the target language. The first way is to translate passive as infinitive:

Source language: *Stefaniuk says he and his colleagues are working on a solution that would allow their carbon-cement version **to be tuned** by adjusting the mixture, but they will not disclose the details until they have finalised the tests and published a paper.*
Target language: *Стефанюк каже, що вони з колегами працюють над рішенням, яке дозволить **покращити** їхню вуглецево-цементну версію шляхом коригування суміші.*

Source language: *"Ginger cats themselves **could be said** to have a Viking disposition, friendly to people they get on with, but fierce with opponent tom cats."*

Target language: ***"Можна сказати****, що руді коти самі мають характер вікінгів: вони доброзичливі до людей, з якими ладнають, але жорстокі до супротивників".*

The second way is to change a form of the verb that was originally in passive by using the the 3rd person plural, the most prevalent way:

Source language: *Traditionally our "big brain"* ***is thought to be*** *what sets our species apart from other animals.*
Target language: *Традиційно* ***вважають****, що наш "великий мозок" відрізняє наш вид від інших тварин.*

Source language: *In Ely, Cambridgeshire, ginger puss Garfield became so popular with Sainsbury's shoppers that after his death a* ***eulogy was held*** *at the city's cathedral and a brass monument erected in his memory.*
Target language: *А кіт Гарфілд став настільки популярним серед покупців одного з магазинів Sainsbury, що після його смерті в міському соборі* ***виголосили панегірик*** *і навіть встановили пам'ятник.*

Source language: *It is the first time* ***a creature*** *in the wild* ***has been recorded*** *treating an injury with a medicinal plant.*
Target language: *Це перший випадок, коли в дикій природі* ***зафіксували, що тварина*** *лікує травму рослиною.*

And lastly, it might be translated as noun, which is the least common way to translate a passive construction:

Source language: *One 2018 study found that after sunscreen* ***is applied,*** *some UV protection kicks in immediately – though it takes around 10 minutes for this to become stable.*
Target language: *Одне дослідження 2018 року показало, що після* ***нанесення*** *сонцезахисного крему миттєво спрацьовує захист від УФ-променів, ще через 10 хвилин захист стає стабільним.*

Thus, in this context, we are dealing with a combination of translation procedures: voice shift, grammatical change in addition to word order adjustment, which can be seen as part of adaptation to syntactic norms of the target language.

To summarize: in the translation process, inversion can be a part of a complex translation procedure caused either by a grammatical necessity, as per norms of Ukrainian syntax, or by the desire for translation naturalness stemming from the genre requirement for clarity in popular science.

Conclusions

1. Popular science discourse interprets scientific concepts in simple language for the general audience who might not have background in science. Popularization is not a process of a mere simplification, but rather recontextualization driven by the readers' expectations and background knowledge. There are several linguistic and stylistic shifts involved in the transformation of a scientific discourse into popular science, the main ones are concerned with grammatical structures, voice, terminology, narrative style, and others. Interactive features of popular science texts contribute to their communicative goals through involvement of the reader, author visibility and personalization.
2. Inversion, changing standard word order, was among translation procedures introduced by Vinay and Darbelnet (1958/1995). Inversion is a movement of a word or a phrase to another place in a sentence to make it sound natural in the target language. Unlike in the case of servitude (i.e., obligatory inversion), a word order change can be considered as an option (a non-obligatory inversion) when it occurs as the result of a choice between possibilities. Inversion serves as a critical mechanism available to translators for emphasizing meaning, adjusting focus, and replicating stylistic nuances present in the source text. While Ukrainian word order is more flexible than English due to its inflectional nature, inversion is more common in Ukrainian than English, and its frequency is influenced by the current norms of Ukrainian. Several authors have calculated the frequency of the use of inversion in translations from English into Ukrainian, and a number of them concluded that inversion is the third most used grammatical translation procedure; though in some texts, it even turned out to be the translation procedure that was encountered most frequently. Inversion can also be part of a complex translation procedure, which consists of several procedures carried out simultaneously.
3. Structural types encountered in this study after comparing the source and target segments of popular science texts can be classified as follows: obligatory changes (subject-predicate inversion after direct speech, inversion within possessive, inversion within noun adjuncts), non-obligatory changes (subject-predicate inversion, fronting or moving adverbials, inversion within possessive and questions), complex translation procedures (various types, including passive voice). The most numerous structural category of inversion covers noun-noun compounds translated as genitive constructions. The fact that they help create new scientific terminology which plays an important role in popular science articles, in addition to noun-noun compounds in general being very common in English and genitive constructions in Ukrainian, can explain why this structural type was so commonly observed.
4. Inversion has different faces: it can be the result of applying the well-known basic grammar rules; its necessity can be obvious to native speakers but not so much to language learners; or it can be optional and subtle. Obligatory inversions of words in the target text are primarily due to the syntactic characteristics and norms of the Ukrainian language, while optional – due to information structure (them/rheme) and emphasis. In Ukrainian translations of popular science texts inversion-option can have various functions: shifting focus or emphasis, conveying thematic progression, creating questions, highlighting or de-emphasizing specific sentence elements. When arranging Ukrainian sentences, inversion is frequently used to place the theme

(already known information) earlier and the rheme (significant new information) later. It also makes the sentence flow smoothly, without interruptions. The two very important factors for both servitude and option are the genre requirement of clarity in popular science and striving for naturalness of translation. This study created a general chart of what different kinds of inversion might be there, and future research can zoom into each kind of word order change individually.

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Appendix. Illustrative material

Source text: How quantum physics could 'revolutionise everything'
Retrieved from https://www.bbc.com/news/business-68880569
Target text: Як квантова фізика може змінити світ
Retrieved from https://www.bbc.com/ukrainian/articles/c03d2jwzx0wo

Source language	**Target language**
Growing up on a farm in Australia, Liam Hall was a mechanic "getting greasy, scraped knuckles", but in recent years his career has taken a more technical turn.	Ліам Голл **виріс на фермі в Австралії**, був автомеханіком з постійно брудними від роботи руками, але останніми роками його кар'єра зробила несподіваний поворот.
He's **now** the head of quantum biotechnology at CSIRO, **Australia's national science agency.**	**Зараз** він очолює відділ квантової біотехнології в CSIRO, **національному науковому агентстві Австралії**.
However, **Dr Hall's** nano-scale quantum sensors can detect those tiny fields and measure them.	Однак мініатюрні квантові датчики **доктора Голла** можуть виявляти ці крихітні поля.
"Quantum is one of **Australia's** most promising growth opportunities - a chance to create new markets, new applications," said **CSIRO's** chief scientist, Prof Bronwyn Fox.	"Це одна з найперспективніших галузей **Австралії**, шанс створити нові ринки, нові програми", - каже головний науковий співробітник **CSIRO**, професор Бронвін Фокс.
Quantum mechanics emerged in the early 20th Century from studies of **nature's** smallest objects.	Квантова механіка виникла на початку 20-го століття в результаті досліджень найменших об'єктів **природи**.
David Awschalom is the Liew Family Professor of Molecular Engineering and Physics at **the University of Chicago's Pritzker School of Molecular Engineering.**	Девід Авшалом – професор молекулярної інженерії та фізики **у Прітцкерівській школі молекулярної інженерії Чиказького університету.**
A rollercoaster ride is a good way to describe it," **he says.**	Це було схоже на американські гірки", **- каже він**.
His team has been developing diagnostic technologies, experimenting with micro sensors crafted from tiny slivers of diamonds about 50 nanometers **in size** (about 1,000 times finer than human hair) to test patients' iron levels.	Його команда розробляє технології для перевірки рівня заліза у пацієнтів, експериментуючи з мікросенсорами, виготовленими з крихітних шматочків алмазів **розміром** близько 50 нанометрів (приблизно в 1 000 разів тонше людського волосся).
While monitoring ferritin is a good way to measure iron, **it would be more accurate to measure the actual iron levels inside the protein.**	Хоча моніторинг феритину є хорошим способом вимірювання рівня заліза, **виміряти фактичний рівень заліза в білку було б точніше.**
"The advantage for quantum systems has always been that you can achieve much, much better sensitivity and easier identification of chemicals at a much lower cost," **Dr Hall says**.	"Перевага квантових систем завжди полягала в тому, що з ними можна досягти набагато кращої чутливості та легшої ідентифікації хімічних речовин за набагато менших витрат", **- каже Голл**.

There could be molecules that "eat up carbon" and remove it from the atmosphere, quantum batteries to power cars, aircraft that are designed to lower their emissions and transport logistics to reduce **road** congestion.	Можуть бути молекули, які "з'їдають вуглець" і видаляють його з атмосфери, квантові батареї для живлення автомобілів, літаки, розроблені для зниження викидів, і транспортна логістика для зменшення заторів **на дорогах**.
It opens up the possibility of doing some quite amazing calculations that can **be world changing**," explains Prof Andrew Dzurak from the University of New South Wales.	Це відкриває можливість робити дивовижні обчислення, які можуть **кардинально змінити світ**", - каже професор Ендрю Дзурак з Університету Нового Південного Уельсу.
The power driving quantum computing comes from entanglement, a natural phenomena, according to Dr Muhammed Usman, a team leader at Data 61, a business within CSIRO.	**За словами доктора Мохаммеда Усмана, керівника групи Data 61, що працює в межах CSIRO, потужність квантових обчислень походить від природного феномена квантової сплутаності.**
In the US, the University of Chicago has built one of the country's longest quantum networks.	У Чиказькому університеті побудували одну з найдовших **у США** квантових мереж.
The CQE also leads The Bloch Quantum Tech Hub, a coalition of industry, academic, government, and nonprofit partners that expects to create 30,000 **quantum** jobs by 2035 and generate **$60bn for the economy.**	Він також є директором-засновником університетського центру Bloch Quantum Tech Hub, який планує створити 30 000 робочих місць **у квантовій галузі** до 2035 року та принести **економіці 60 мільярдів доларів.**
"We've extended how far we can send secure quantum messages through many miles of underground fiber," **he explains.**	"Ми розширили можливості надсилання безпечних квантових повідомлень через багато кілометрів підземного волокна", - **каже він**.
With quantum computing, for instance, we are working on maintaining quantum coherence, which means keeping a quantum system intact; **error correction**, which means detecting and correcting errors caused by decoherence; and scalability, which means being able to increase the number of qubits in a quantum system to solve more complex problems."	У випадку квантових обчислень ми працюємо над підтримкою квантової когерентності, тобто збереженням квантової системи недоторканою; **виправленням помилок**, тобто виявленням та виправленням помилок, викликаних некогерентністю; і масштабуванням, тобто можливістю збільшити кількість кубітів у квантовій системі для вирішення більш складних проблем", - пояснює вчений.
Years of painstaking research lie ahead, but the future appears to hurtling quickly towards us.	**Попереду - роки досліджень**, але майбутнє, схоже, мчить до нас.
"Quantum artificial intelligence is one of the key areas of research in our team.	**"Однією з ключових сфер досліджень нашої команди є квантовий штучний інтелект.**
Machine learning and artificial intelligence is very **computationally** intensive and quantum computing promises computational power," explains Dr Usman from CSIRO.	Машинне навчання та штучний інтелект інтенсивні **з точки зору обчислень**, квантові обчислення обіцяють більшу обчислювальну потужність", - каже доктор Усман з CSIRO.
So, what we have found is that integrating	Ми виявили, що інтеграція квантових

quantum computing in artificial intelligence leads to very reliable and **trustworthy systems," he said.**	обчислень у штучний інтелект призводить до надійних систем, **вартих довіри"**, - **пояснює він.**
"My dream come true would be that large-scale quantum computers are **available** and we can run quantum algorithms that I am developing to find solutions to the problems that we haven't found **yet**, and that will revolutionise everything."	"Моя мрія - **доступні** великомасштабні квантові комп'ютери, щоб можна було запускати квантові алгоритми, які я розробляю, щоб знайти вирішення проблем, які ми **ще** не знайшли, - і це революціонізує все".

Source text: Scientists may have solved mystery behind pyramids
Retrieved from https://www.bbc.com/news/articles/c99zwkzzrxvo
Target text: Вчені розгадали, як єгиптяни будували стародавні піраміди
Retrieved from https://www.bbc.com/ukrainian/articles/cjewrl4jee0o

Source language	Target language
The team were able to "penetrate the sand surface and produce images of hidden features" **by using the radar technology**, **the study,** published in the journal Communications Earth and Environment, **said**, external.	**За допомогою радіолокаційних технологій** команда змогла "проникнути в поверхню піску й отримати зображення прихованих об'єктів", **йдеться в дослідженні,** опублікованому в журналі Nature.
Among those features were "buried **rivers and ancient structures**" running at the foothills of where the "vast majority of the Ancient Egyptian pyramids **lie**," **Prof Ghoneim said**.	Там "поховані **стародавні споруди й річки**", що протікали біля підніжжя пагорбів, де **розташовані** більшість давньоєгипетських пірамід, **розповіла професорка Гонейм.**
The team found that the **river** branch - named the Ahramat branch, with "ahramat" meaning pyramids in Arabic - was roughly 64km (39 miles) **long** and between 200-700m (656-2,296 ft) **wide**.	Команда виявила, що рукав **річки**, названий Ахрамат (арабською "піраміди"), мав **довжину** приблизно 64 км і **ширину** 200-700 м.
The discovery of this extinct river branch helps explain the high **pyramid density** between Giza and Lisht (the site of Middle Kingdom burials), in what is now an inhospitable area of the Saharan desert.	Відкриття цього зниклого водного шляху допомагає пояснити високу **щільність пірамід** між містами Гіза та Лішт (місцем поховань фараонів епохи Середнього царства).
But up until now, "nobody was certain of the location, the shape, the size or proximity of this mega waterway to the actual pyramids site", according to one of the **study's authors**, Prof Eman Ghoneim.	Але досі "ніхто точно не знав, де саме лежав цей водяний шлях, наскільки він був великим, яку мав форму та як близько проходив від пірамід", стверджує одна з **авторок дослідження**, професорка Еман Гонейм.
The **river branch's** proximity to the pyramid complexes suggests that it was "active and operational during the **construction phase** of these pyramids", the paper said.	Близькість **рукава Нілу** до пірамід дозволяє припустити, що він був активним і діяв на **етапі будівництва** пірамід.
Dr Onstine explained that ancient Egyptians could "use the river's energy to carry these heavy blocks, **rather than human labour**," adding, "it's just a lot less effort".	Сюзанн Онстайн пояснила, що прадавні єгиптяни могли "покладатись на силу річки, **а не на людську працю** задля транспортування важких будівельних матеріалів, оскільки це вимагало

	значно менше зусиль".

Source text: Scientists solve mystery of ancient tree of life
Retrieved from https://www.bbc.com/news/science-environment-69012221
Target text: Вчені розгадали таємницю прадавнього "дерева життя"
Retrieved from https://www.bbc.com/ukrainian/articles/cv2x2xpdk40o

Source language	**Target language**
Baobabs are known as "the tree of life" or "upside down tree" **for their strange shapes** and longevity.	**Через незвичайну форму** баобаби відомі як "дерево життя" або "перевернуте дерево".
"And the data have enabled us to provide **important new insights** which will inform their conservation to safeguard their future."	Ці дані дозволили нам отримати **нову важливу інформацію**, яка допоможе зберегти їх та убезпечити їхнє майбутнє".
The trees can live for thousands of years, growing to a huge size and storing large amounts of water **in their trunks** to survive through the dry seasons.	Вони можуть жити тисячі років, виростаючи до величезних розмірів та зберігаючи **у своїх стовбурах** велику кількість води, щоб пережити посушливі сезони.

Source text: Sunscreen: Are you using it correctly?
Retrieved from https://www.bbc.com/future/article/20240607-are-you-using-suncream-correctly
Target text: Сонцезахисний крем: чому без нього влітку ніяк
Retrieved from https://www.bbc.com/ukrainian/articles/ce55r7gp3rlo

Source language	**Target language**
More than 80% of **melanoma** skin cancer cases are caused by sunburn – and this number is rising year on year.	Понад 80% випадків раку шкіри **меланоми** спричинені сонячними опіками, і їхня кількість зростає щороку.
There are an **estimated** 1 .5 million new cases of **skin cancer** globally each year, with this figure expected to rise by 50% by 2040 .	**За оцінками**, кожного року у світі реєструють 1,5 мільйона нових випадків **раку шкіри**, і очікується, що до 2040 року ця цифра зросте на 50%.
Despite these stark facts and repeated **public health** warnings about the risks of sun exposure, there's a lot of confusion around how, and when, to apply sunscreen.	Попри ці промовисті факти та неодноразові попередження **медиків** про ризики перебування на сонці, існує багато плутанини щодо того, як і коли наносити сонцезахисний крем.
When we're exposed to the sun, UV radiation damages the DNA , proteins and other molecules found within **our skin cells**, says Richard Gallo, professor of medicine at **University of California**.	Коли ми перебуваємо під впливом сонця, ультрафіолетове випромінювання пошкоджує ДНК, білки та інші молекули, які містяться в **клітинах нашої шкіри**, каже Річард Галло, професор медицини з **Каліфорнійського університету**.
In moderate amounts, exposure to UV radiation from sunlight helps our **skin cells** to generate vitamin D .	У помірних кількостях вплив ультрафіолетового випромінювання від сонячного світла допомагає **клітинам шкіри** виробляти вітамін D.
But as we expose our skin to more sunlight, it tries to protect itself **by tanning** through the production of melanin , **Gallo says.**	Але коли сонячне світло більш інтенсивне, шкіра намагається захистити себе і починає виробляти меланін, **засмагаючи, каже Галло.**
"If the exposure is too high, the skin can't protect itself and you get a burn," **he says**.	"Якщо вплив занадто високий, шкіра не може захистити себе, і ви отримуєте опік", **- каже**

	дослідник.
This can lead to **DNA damage** in our cells, which can cause premature ageing, and can increase the risk of developing **skin cancer**, **Gallo says**.	Це може призвести до **пошкодження ДНК** у наших клітинах, що спричинює передчасне старіння та збільшує ризик розвитку **раку шкіри**, **каже Галло**.
Exposure to UV radiation is the main cause of the most common forms of **skin cancer**.	Вплив УФ-випромінювання є основною причиною найпоширеніших форм **раку шкіри**.
"**Low SPF** sunscreen slightly reduces **radiation exposure from the sun**," **Gallo says**, but "in most cases, this allows all of the harmful effects to still occur.	"Сонцезахисний крем **із низьким рівнем захисту SPF** дещо зменшує **вплив сонячного випромінювання**, - **каже вчений**, - але "у більшості випадків шкідливі наслідки все одно залишаються.
SPF stands for **"sun protection factor"**, and the number attached to it on bottles of sunscreen indicates how much UV radiation from the Sun is required before it becomes ineffective.	SPF розшифровується як **"фактор захисту від сонця".**
The higher the SPF, **therefore,** the more protected your skin is.	**Отже**, що вищий SPF, то більш захищена ваша шкіра.
However, the SPF **only** indicates the level of protection from UVB rays – the amount of **UVA protection** is specified via a separate rating (more on this later).	Однак SPF вказує **лише** на рівень захисту від UVB-променів – ступінь **захисту від UVA** вказують в окремому рейтингу (докладніше про це пізніше).
The Sun's rays are **at their strongest** between 10am and 4pm.	**Найбільш інтенсивне** сонце з 10:00 до 16:00.
One **2018** study found that after sunscreen **is applied,** some **UV protection kicks in immediately** – though it takes around 10 minutes for this to become stable.	Одне дослідження **2018 року** показало, що після **нанесення** сонцезахисного крему **миттєво спрацьовує захист від УФ-променів**, ще через 10 хвилин захист стає стабільним.
It's also important to not mix sunscreen with other **skin products**, such as moisturiser, says Richard Blackburn, professor of sustainable materials at the University of Leeds' school of design .	Також важливо не змішувати сонцезахисний крем з іншими **засобами для шкіри**, такі як зволожувальний крем, каже Річард Блекберн, професор стійких матеріалів з Університету Лідса.
This is because many sunscreens that contain metal nanoparticles like **zinc oxide** may be less effective because of how these ingredients react with other ingredients.	Це пов’язано з тим, що багато сонцезахисних засобів, які містять металеві наночастинки, як-от **оксид цинку**, можуть бути менш ефективними через взаємодію з іншими інгредієнтами.
But this doesn't mean we shouldn't use sunscreen, **Blackburn says**.	Але це не означає, що ми не повинні використовувати сонцезахисний крем, **каже Блекберн**.
"The most important message is to use sunscreen every day from April to September," **he says**.	"Найважливіше повідомлення - користуватися сонцезахисним кремом щодня з квітня по вересень", - **стверджує експерт.**

Most formulations available in the UK, for example, are reliable when worn on their own, **Blackburn says**, but he advises against mixing **different brands of sunscreen**, or mixing a sunscreen with other **skin products**, in case some of their ingredients are incompatible with each other.	Більшість рецептур кремів - надійні, якщо їх використовувати самостійно, **каже Блекберн**, але він радить не змішувати **сонцезахисні креми різних брендів** або з іншими **продуктами для шкіри**, якщо деякі з їхніх інгредієнтів несумісні одне з одним.
In the US, sunscreens are treated as non-prescription drugs, so every ingredient has to go through a long **regulatory process**, which means new sunscreen filters can take a **long time** to be approved.	У США сонцезахисні засоби вважають безрецептурними препаратами, тому кожен інгредієнт має пройти тривалий **процес регулювання**, а це означає, що нові сонцезахисні фільтри можуть затверджувати **довго**.
As a result of this longer process to approve new, potentially more effective UV filters, researchers have found that some **US sunscreens** fail to meet the **European Union's higher UVA protection standards**.	У результаті цього тривалого процесу затвердження нових, потенційно ефективніших УФ-фільтрів дослідники виявили, що деякі **сонцезахисні засоби США** не відповідають вищим **стандартам захисту від ультрафіолетових променів в Європейському Союзі.**
Sunscreen becomes less effective **over time**, **experts say**, but generally, it should work for up to three years from the date you purchase it.	**Експерти кажуть**, що сонцезахисний крем **з часом** стає менш ефективним, але, як правило, він повинен діяти протягом трьох років з моменту покупки.
Most **sunscreen bottles** in the UK will have a jar symbol indicating how many months the product will last for once opened.	Більшість **пляшок із сонцезахисним кремом** мають позначки терміну придатності.
It's also recommended that you check the sunscreen for any obvious changes in consistency and colour **if you're not sure**.	**Якщо ви не впевнені** у якості крему, подивіться, чи не змінилася його консистенція чи колір.
Does sunscreen **block** vitamin D production?	Чи **блокує** сонцезахисний крем вітамін D?
There have been some concerns that wearing sunscreen can **block vitamin D absorption**, but a review of studies concluded that, on balance, the **risk of sunscreen affecting** how much vitamin D we absorb is low.	Були певні побоювання, що використання сонцезахисного крему може **блокувати засвоєння вітаміну D**, але огляд досліджень показує, що загалом ризик **впливу сонцезахисного крему** на кількість вітаміну D, який ми засвоюємо, низький.
Does **sunscreen contain** toxins?	Чи **містить сонцезахисний крем** токсини?
The evidence suggests that the ingredients used in **UK, EU or US-approved** suncreams are safe and effective, and any potential harm is outweighed by their benefits in protecting people from UV radiation.	Докази свідчать про те, що інгредієнти, які використовуються в сонцезахисних кремах, **схвалених у Великій Британії, ЄС або США**, є безпечними та ефективними, а будь-яка потенційна шкода переважує їхню користь у захисті від ультрафіолету.
"The myths about toxins in sunscreens are a sensational exaggeration and do not compare with the	"Міфи про токсини в сонцезахисних кремах є сенсаційним перебільшенням і не зрівняються з

toxic effects of solar radiation **itself**," says Gallo.	токсичним впливом **самих** сонячних променів", - каже дослідник.
"Sunscreens are safe when used as directed, and much better than getting **skin cancer**."	"Сонцезахисні засоби безпечні, якщо використовувати їх за інструкцією, і вони точно безпечніші, ніж захворіти на **рак шкіри**".
The FDA advises that **2 mg/cm2 (0.16in2) of sunscreen should be applied to the skin** for testing, which means that if we apply any less than this, it won't offer the amount of protection on the label.	FDA рекомендує наносити **на шкіру 2 мг сонцезахисного крему на кожні см2 шкіри**.
This amount is often likened to roughly six teaspoons for the face and body on an **average-sized** adult.	Ця кількість дорівнює приблизно шістьом чайним ложкам для обличчя та тіла у дорослої людини **середнього зросту**.
Young children's skin is extra sensitive to UV radiation, so it's particularly important that they're protected from the sun.	**Шкіра маленьких дітей** особливо чутлива до ультрафіолетового випромінювання, тому дуже важливо, щоб вони були захищені від сонця.
For **older** children, scientists recommend reapplying sunscreen every two hours.	Дітям **старшого віку** вчені рекомендують повторно наносити сонцезахисний крем щодві години.
It's important to use **a high-SPF** sunscreen that says "broad spectrum" **on the label**, as this means it protects against both UVA and UVB rays.	Важливо використовувати сонцезахисний крем **із високим рівнем SPF**, **на етикетці** якого також написано, що він має "широкий спектр", тобто захищає як від UVA променів, так і від UVB.
The UVA star rating indicates the level of protection against UVA, in proportion to the amount of UVB protection – so **SPF50 suncream** with a **UVA rating of five** has more protection than **SPF30 suncream** with the same **UVA rating**.	Тому **сонцезахисний крем SPF50** з **рейтингом UVA п'ять** має більший захист, ніж сонцезахисний крем SPF30 з таким самим **рейтингом UVA**.
Blackburn recommends using sunscreen with a five star rating of at least 30 SPF, and covering skin up with clothing, **too**.	Блекберн рекомендує використовувати сонцезахисний крем із п'ятизірковим рейтингом не менше 30 SPF, а **також** прикривати шкіру одягом.
It absorbs UV rays from the Sun, **rather than block them**, before they get to our skin.	Він поглинає ультрафіолетові промені, перш ніж вони потраплять на шкіру, **але не блокує їх.**
Sunblock, on the other hand, creates a physical barrier from the sun that **UV rays** can't pass **through**.	Крем-блок, навпаки, створює фізичний бар'єр від сонця, **через** який не можуть пройти **ультрафіолетові промені**.

Source text: The cement that could turn your house into a giant battery
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https://www.bbc.com/future/article/20240610-how-the-concrete-in-your-house-could-be-turned-into-a-battery
Target text: Цемент, який може забезпечити будинки електрикою. Вчені винайшли унікальний матеріал
Retrieved from https://www.bbc.com/ukrainian/articles/c255r1r0q21o

Source language	**Target language**
On a laboratory bench in Cambridge, Massachusetts, a **stack of polished cylinders of black-coloured**	На лабораторному столі Массачусетського технологічного інституту (MTI) **стоять цементні**

concrete sit bathed in liquid and entwined in cables.	**циліндри**, залиті рідиною й перевиті кабелями.
This is where Stefaniuk and his concrete come in.	**Тут і приходять на допомогу Стефанюк і його цемент.**
This means that when carbon black is combined with cement powder and water, it makes for a kind of concrete that is full of networks of conductive material, taking a form that resembles ever-branching, tiny roots.	**Вода природним чином утворює розгалужену мережу отворів усередині конструкції при взаємодії з цементом, а вуглець мігрує в ці отвори, утворюючи відгалуження всередині затверділого цементу.**
	Відгалуження нагадують кореневу систему дерев, яка заповнює надзвичайно велику площу поверхні.
When an **electric current was applied to the salt-soaked plates,** the positively-charged plates accumulated negatively charged ions from the potassium chloride. And because the membrane prevented charged ions from being exchanged between the plates, the separation of charges created an electric field.	Коли **до просочених сіллю пластин подають електричний струм**, утворюється електричний подвійний шар, що дозволяє зберігати велику кількість енергії.
As Stefaniuk says, "A simple example would be an off-grid house powered by solar panels: using solar energy directly **during the day** and the energy stored in, for example, the foundations **during the night**."	"Простим прикладом може бути автономний будинок, що живиться від сонячних панелей: **вдень** в хід йде сонячна енергія, а **вночі** - енергія, збережена, наприклад, у фундаменті", - **пояснює Стефанюк**.
Stefaniuk says he and his colleagues are working on a solution **that would allow their carbon-cement version to be tuned by adjusting the mixture,** but they will not disclose the details until they have finalised the tests and published a paper.	Стефанюк каже, що вони з колегами працюють над рішенням, **яке дозволить покращити їхню вуглецево-цементну версію шляхом коригування суміші.**

Source text: The mystery over why human brains have shrunk over time
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https://www.bbc.com/future/article/20240517-the-human-brain-has-been-shrinking-and-no-one-quite-knows-why
Target text: Загадка еволюції. Чому людський мозок з часом зменшився і які це має наслідки
Retrieved from https://www.bbc.com/ukrainian/articles/cjkk1608j6po

Source language	**Target language**
Traditionally our "big brain" **is thought to be** what sets our species apart from other animals.	Традиційно **вважають**, що наш "великий мозок" відрізняє наш вид від інших тварин.
However, studies show this trend toward larger brains **has reversed in Homo sapiens.**	Однак дослідження показують, що ця тенденція до збільшення мозку **у Homo sapiens змінилася**.
In our species, average brain sizes have shrunk over the course of the last 100,000 years.	**Середній розмір мозку у нашого виду протягом останніх 100 тисяч років зменшився.**
For example in a recent **2023** study, Ian Tattersall, a paleoanthropologist and curator emeritus with the	Наприклад, у нещодавньому дослідженні **2023 року** Ян Таттерсолл, палеоантрополог і почесний

American Museum of Natural History in New York City, tracked the **braincase volumes** of ancient hominins through time.	куратор Американського музею природознавства в Нью-Йорку, відстежував зміни **об'єму черепної коробки** стародавніх гомінідів з плином часу.
He found that rapid **brain expansion** occurred independently in different species of hominins, and at different times across Asia, Europe and Africa.	Він виявив, що швидке **розширення мозку** відбувалося незалежно у різних видів гомінідів і в різний час в Азії, Європі та Африці.
Species whose brains grew **over time** include Australopithecus afarensis, Homo erectus, Homo heidelbergensis , and Homo neanderthalensis .	Види, чий мозок **з часом** виріс, включають Australopithecus afarensis, Homo erectus, Homo heidelbergensis і Homo neanderthalensis.
Tattersall's finding replicates those of others.	Відкриття **Таттерсалла** лише підтверджує інші.
Tattersall suggests that the shrinkage in **brain size** began around 100,000 years ago, which corresponds to a period of time in which humans switched from a more intuitive style of thinking to what he terms "**symbolic information processing**" – or thinking in a more abstract way to better understand your surroundings.	Таттерсалл припускає, що зменшення **розміру мозку** почалося близько 100 тисяч років тому, що відповідає періоду часу, коли люди перейшли від більш інтуїтивного стилю мислення до того, що він називає "**обробкою символічної інформації**", або мислення більш абстрактним способом, що дозволило краще розуміти своє оточення.
Tattersall believes that the catalyst that caused this **change in thinking style** was the spontaneous invention of language.	Таттерсалл вважає, що каталізатором, який спричинив таку **зміну стилю мислення**, було спонтанне винайдення мови.
In other words, as smaller and better organised brains were able to perform more complex computations, **metabolically expensive** larger brains **simply** became unnecessary.	Іншими словами, оскільки менші та краще організовані мізки змогли виконувати складніші обчислення, великий мозок, **який потребував більше енергії**, став **просто** непотрібним.
"It seems **to me** that probably our predecessors processed information in a sort of a brute-force way, and intelligence in this context scaled with **brain size**.	**"Мені** здається, що, ймовірно, наші попередники обробляли інформацію за допомогою "грубої сили", і інтелект у цьому контексті масштабувався залежно від **розміру мозку**.
However other palaeontologists argue that the **fossil record** shows that brains began shrinking more recently than Tattersall **suggests**, meaning the change couldn't be linked to language.	Однак інші палеонтологи стверджують, що **дослідження скам'янілостей** показують, що мозок почав зменшуватися не так давно, як **припускає** Таттерсалл, тобто ця зміна не може бути пов'язана з мовою.
"I love this theory, I think it's actually brilliant," says **cognitive scientist** Jeff Morgan Stibel from the **Natural History Museum** in California.	"Мені подобається ця теорія, я вважаю, що вона справді геніальна", - каже **вчений-когнітивіст** Джефф Морган Стібел із **Музею природознавства** у Каліфорнії.
"But we haven't seen the data to show that there was a decline as far back as **100,000 years ago** that didn't result at some point in a reversal where **brain size** began increasing **again**.	"Але ми не бачимо даних, які б свідчили, що **100 000 років тому** почалося зменшення мозку, і після цього вже не відбувався зворотний процес, коли **розмір мозку знову** почав збільшуватися.
There were declines **back then**.	Так, **у той час** дійсно було зменшення.
But then brain size started growing **again**, so the data	Але потім розмір мозку **знову** почав зростати, тому

doesn't **yet** match that hypothesis."	дані **наразі** не підтверджують цю гіпотезу", - каже він.
Stibel believes that a **changing climate, and not language, could explain our smaller brains.**	Стібел вважає, **пояснити менший мозок сучасних людей може зміна клімату, а не мова.**
When he carefully examined the climate record, he found that decreasing **brain sizes** correlated with periods of **climate warming**.	Уважно вивчивши кліматичні дані, він виявив, що зменшення **розміру мозку** корелює з періодами **потепління клімату**.
Smaller brains could have allowed humans to cool down **quickly**.	Менший мозок міг дозволити людям **швидше** охолоджуватися.
It's well known that humans in hot climates have evolved leaner and taller bodies to maximise **heat loss**.	Загальновідомо, що люди в жаркому кліматі розвинули стрункіші та вищі тіла, щоб максимізувати **втрату тепла**.
"The brain is the largest **energy hog** of all the organs, as it weighs about 2% of **our body mass** but consumes over 20% of our **resting** metabolic energy.	"Мозок є найбільшим **споживачем енергії** серед усіх органів, оскільки він важить близько 2% **маси нашого тіла**, але споживає понад 20% нашої метаболічної енергії **в стані спокою**.
So, if the brain is a huge consumer of energy and heat, then it should **likely** adapt to climate **as well**.	Отже, якщо мозок є величезним споживачем енергії та тепла, то він, **імовірно, також** має адаптуватися до клімату.
Our theory is that smaller brains dissipate heat **better**, and have a reduced heat output **too**."	Наша теорія полягає в тому, що менші мізки **краще** розсіюють тепло, а **також** мають меншу тепловіддачу", - пояснює вчений.
He calculated that our brains started shrinking just 3,000 years ago, at around the same time that **complex civilisations** first began to emerge (although he has **since** revised his estimate, arguing that the decline in **brain size** happened between 20,000 and 5,000 years ago).	Він підрахував, що наш мозок почав зменшуватися лише 3 000 років тому, приблизно в той самий час, коли почали з'являтися **складні цивілізації** (хоча **відтоді** він переглянув свою оцінку, стверджуючи, що зменшення **розміру мозку** відбулося між 20 000 і 5 000 років тому).
People no longer had to know everything, and as individuals no longer had to think **as much** to survive, their brains reduced in size.	Людям більше не потрібно було знати все, а оскільки людям більше не потрібно було **багато** думати, щоб вижити, їх мозок зменшився в розмірі.
"Not all **hunter-gatherer societies** became complex in the same type of way as, say, the Egyptians did 3,000 years ago, but **brain sizes** have reduced **in these societies too**," says Eva Jablonka, professor emeritus at the **Cohn** Institute for the History of Philosophy of Science and Ideas at Tel Aviv University in Israel.	"Не всі **суспільства мисливців-збирачів** стали складними так само як, скажімо, єгиптяни 3000 років тому, але **розмір мозку в цих суспільствах також** зменшився, - каже Єва Яблонка, почесна професорка Інституту **Кона** Тель-Авівського університету в Ізраїлі.
Jablonka argues that if even if brains did shrink when **complex societies emerged**, it doesn't necessarily follow that smaller brains were necessarily an adaptive response.	Вона стверджує, що навіть якщо мозок зменшився, коли **виникли складні суспільства**, це не обов'язково означає, що це була адаптивна реакція.
"If 3,000 years ago much larger more complex societies **emerged**, this could correlate with much	"Якщо 3000 років тому **виникли** набагато більші та складніші суспільства, також могли виникнути

greater differences in social classes.	набагато більші відмінності в соціальних класах.
Marta Lahr, from **Cambridge University's Leverhulme** Centre for Human Evolutionary Studies, has also suggested that **nutrient deficiency** could explain our contracting craniums.	Марта Лар з Центру еволюційних досліджень людини **Леверхулмського університету Кембриджа** також припустила, що зменшення розміру нашого мозку може пояснити **дефіцит поживних речовин**.
She argues that a reliance on farming may have created **vitamin and mineral deficiencies**, resulting in stunted growth.	Вона стверджує, що залежність від сільського господарства могла спричинити **дефіцит вітамінів і мінералів**, що призвело до затримки росту.
If friendlier, more social humans were more successful from an evolutionary perspective, then brains may have shrunk **over time**.	Якщо більш соціальні люди були успішнішими з еволюційної точки зору, то мозок, можливо, **з часом** зменшився.
"I don't buy the **self-domestication theory**," says Jablonka.	"Я не вірю в **теорію самоодомашнення**", - каже Яблонка.
Unfortunately, to understand why brains shrank, you would need to pinpoint **exactly** when the **shrinkage began**.	На жаль, щоб зрозуміти, чому саме мозок зменшився, потрібно **точно** визначити, коли саме **почалося зменшення**.
Older fossils are **harder to find**, so the record is heavily skewed towards newer specimens.	Старіші скам'янілості **знайти важче**, тому дані сильно спотворені в бік новіших зразків.
But when the decrease in size began is **a question** that is not entirely clear because the record isn't that good.	**Але питання**, коли почалося зменшення розміру, не зовсім зрозуміле, тому що дані не такі надійні.
All we know is that back then brains were large, and they're about 13% smaller **today**."	Ми знаємо лише, що тоді мозок був великим, а **сьогодні** він приблизно на 13% менший", - пояснює він.
Are **we becoming** less smart?	Чи **стаємо ми** менш розумними?
Depending on which theory you believe, smaller brains could either make us smarter, dumber, or have no effect whatsoever on intelligence.	Менший мозок може або зробити нас розумнішими, або дурнішими, або взагалі не вплинути на інтелект - **залежно від того, якій теорії ви вірите.**
Men's brains are around 11% larger than **women's** brains due to their bigger body size.	Мозок **чоловіків** приблизно на 11% більший за мозок **жінок** через більший розмір тіла.
There is some contested evidence that **smaller brained** hominin species, such as Homo floresiensis and Homo naledi, were capable of complex behaviours, suggesting that how a brain is wired is the **ultimate determinant of intelligence**.	Існують деякі суперечливі докази того, що гоміниди **з меншим мозком**, такі як Homo floresiensis і Homo naledi, були здатні до складної поведінки, що свідчить про те, що **визначальним фактором інтелекту** є те, як те, як саме влаштований мозок.
"The fact that our brain size is decreasing **significantly right now** yields the logical conclusion that our capacity for greater intelligence is either shrinking, or at least not growing," says Stibel.	"Той факт, що **зараз** розмір нашого мозку **значно** зменшується, дає логічний висновок, що наша здатність мати більший інтелект або зменшується, або принаймні не зростає", - говорить Стібел.

Source text: What lives under your fingernails?
Retrieved from https://www.bbc.com/future/article/20160622-what-lives-under-your-fingernails

Target text: Хто живе у вас під нігтями
Retrieved from https://www.bbc.com/ukrainian/articles/ckvvk9ypn0ko

Source language	**Target language**
The impossibility of sterilisation **is why** doctors and nurses so often wear gloves while interacting with patients.	**Саме через** неможливість досягти повної стерильності лікарі й медсестри так часто надягають рукавички.
Indeed, nearly a hundred years ago, physicians began to realise that bacteria would always show up in tests **even after multiple re-washings**.	Ще століття тому лікарі зрозуміли, що **навіть після багаторазового миття рук** на них залишаються бактерії, які незмінно проявляються в аналізах.
But it wasn't until the early 1970s that researchers began to identify the reason that hand-dwelling bacteria was so persistent.	Однак причину такої стійкості виявили **лише на початку 1970-х.**
These thin keratin shields, made of the same stuff as **rhino or impala horns**, harbour a bacterial menagerie.	Під цими тонкими кератиновими пластинками, які за складом схожі з **рогами носорога і антилопи**, можна знайти цілий "бактеріальний зоопарк".
It wasn't until the late 1980s that scientists began to poke around under our fingernails to see who, exactly, lives **there.**	Тільки наприкінці 1980-х вчені нарешті зазирнули під нігті й з'ясували, хто **там** мешкає.
In one 1988 study, a trio of researchers from the University of Pennsylvania's Department of Dermatology swabbed the hands of 26 adult volunteers, all employees of the **university's medical school** who did not interact with patients.	Усі вони працювали у **медичній школі університету**, але не контактували з пацієнтами.
Other parts of the **volunteers' hands** were home to hundreds to thousands of bacteria, while the subungual areas yielded hundreds of thousands of bacteria per fingertip.	На відкритих ділянках **долонь волонтерів** жили сотні тисяч бактерій, тоді як приблизно таку ж кількість можна було знайти під кожним з нігтів.
The prior findings that persistent scrubbing doesn't sterilise the hand, combined with the finding from their study "that there are significant numbers of bacteria in the subungual compartment suggest[s] that this hand region may be relatively inaccessible to antimicrobial agents **during normal hand-washing procedures**," they wrote.	У своїй роботі дослідники врахували попередні спостереження і дійшли висновку, що "**при звичайному митті рук** ця ділянка відносно недоступна для антимікробних засобів".
Think about it: the space under your fingernails is completely impervious to **the best, and simplest**, means we have of preventing the spread of diseases.	Лише вдумайтесь: **найпростіші та найефективніші** засоби для боротьби з поширенням хвороб абсолютно марні, коли йдеться про наші нігті.
They discovered that nurses with artificial nails had more bacteria **on their fingertips** than did those with natural nails, both before and after **handwashing**.	Автори наукової роботи виявили, що у медсестер зі штучними нігтями **на кінчиках пальців** було більше бактерій, ніж у їхніх колег з натуральними нігтями – як до **миття**, так і після.

All had short fingernails, and all were assessed both before and four days after **nail polish was applied**.	Аналіз проводили до **нанесення лаку** та через чотири дні після цього.
Some two to three million people die **each year** from diarrhoea; it's thought that handwashing with soap could save perhaps a million of them.	**Щорічно** від діареї вмирає від двох до трьох мільйонів людей.

Source text: What makes ginger tom cats so adventurous
Retrieved from https://www.bbc.com/news/uk-england-68847274
Target text: Чому руді коти особливі? Відповідь криється у зв'язках з вікінгами
Retrieved from https://www.bbc.com/ukrainian/articles/c72p4r2g9y8o

Source language	Target language
"Measurements have also shown that **generally** male ginger toms are heavier than most cats of other colours.	"Дослідження також показали, що руді коти-самці **зазвичай** важчі, вищі й більші, ніж їхні побратими інших забарвлень, за винятком північноамериканського мейн-куна".
"We **once** had a neighbour knock on our door to let us know he'd taken an **entire resting roast chicken** off her kitchen side and out her kitchen window."	"**Якось** до нас у двері постукав сусід і розповів, що наш кіт вкрав і витяг через їхнє вікно в кухні **цілу смажену курку**".
In Ely, Cambridgeshire, ginger puss Garfield became so popular with Sainsbury's shoppers that after his death a **eulogy was held** at the city's cathedral and a brass monument erected in his memory.	А кіт Гарфілд став настільки популярним серед покупців одного з магазинів Sainsbury, що після його смерті в міському соборі **виголосили панегірик** і навіть встановили пам'ятник.
Sylvester is often out and about in the campus grounds and buildings and this clever kitty regularly attends lectures or can be found asleep on the **library** information desk.	Він часто гуляє територією кампусу, регулярно відвідує лекції або спить на інформаційній стійці **бібліотеки**.
"Ginger cats themselves **could be said** to have a **Viking disposition**, friendly to people they get on with, but fierce with opponent tom cats."	**"Можна сказати**, що руді коти самі мають **характер вікінгів**: вони доброзичливі до людей, з якими ладнають, але жорстокі до супротивників".

Source text: Why belief in cancer fatalism can harm your health
Retrieved from
https://www.bbc.com/future/article/20240429-why-belief-in-cancer-fatalism-can-harm-your-health
Target text: Міфи про рак, які заважають лікуванню
Retrieved from https://www.bbc.com/ukrainian/articles/c9wzjd07rrmo

Source language	Target language
And after she was diagnosed with breast cancer, she didn't turn up **for a surgical consultation**.	Однак навіть після того, як у неї діагностували рак молочної залози, **на консультацію до хірургів** вона не прийшла.
"I really didn't want to get treatment because I was scared," **she explains**.	"Я не хотіла лікуватись, бо боялась", — **пояснює жінка.**
Argate's cancer moved through several stages.	**Хвороба Аргейт** пройшла кілька стадій.
Fatalism has been tricky to define.	**Визначити, що таке фаталізм – складно.**
The researchers found that of fatalism and these related factors, it's the helplessness that influences	Втім саме безпорадність **найбільше** впливає на поведінку у питанні здоров'я.

health behaviours **the most**.	
This was contrary to some perceptions that fatalism is more common in **low- and middle-income** countries.	Це суперечило уявленням про те, що фаталізм більш поширений у країнах **з низьким і середнім рівнем доходу**".
Esparza-Del Villar and colleagues created the first **fatalism scale** to be developed simultaneously in Spanish and English .	Еспарза-Дель Вільяр і його колеги створили першу **шкалу фаталізму**, розроблену одночасно іспанською та англійською мовами.
In research with migrants near the **Mexico–US** border , "those with higher fatalism reported lower levels of depression and anxiety," **Esparza-Del Villar explains**.	Вчені провели дослідження серед мігрантів на кордоні **Мексики й США**.
	Виявилось, що "ті, що мали вищий рівень фаталізму, менше страждали від депресії і тривоги", **пояснює Еспарса-Дель Вільяр**.
In the US, kids use sunscreen **less** when their parents are both fatalistic and have a family history of melanoma.	А в США діти **менше** користуються сонцезахисним кремом, якщо їхні батьки - фаталісти, а в сімейному анамнезі є меланома.
"This **statement is very fallible** in a way that some Filipino patients would not even seek consult nor pursue life-saving treatments that can **potentially** prolong and/or improve their quality of life," **Pajimna says.**	"Це **дуже помилкове твердження**, оскільки деякі філіппінці навіть не звертаються за консультацією та уникають лікування, яке **потенційно** може продовжити та/або покращити якість їхнього життя, — **каже Паджімна**.
"It is alike to merely accepting their fates without doing **anything** because that is the hand they were dealt," she says.	— Це все одно, що просто змиритися зі своєю долею і **нічого** не робити, бо так вже склалося".
When it comes to inevitability, one expression of fatalism that Samuel Smith, a professor of behavioural oncology at the University of Leeds in the UK, **often sees** implied in news stories is the idea that **just about everything** causes cancer.	Коли справа доходить до неминучості, одним з проявів фаталізму, який **часто спостерігає** Самуель Сміт, професор поведінкової онкології з Університету Лідса у Великій Британії, є міф, що рак викликає **майже все**.
It can be hard to hear anything else – like the fact that some types of cancer are essentially chronic illnesses, which can be well managed if caught early **enough.**	Вони ніби впадають в емоційний ступор і не сприймають інформацію про те, що деякі типи раку - це, по суті, хронічні захворювання, з якими можна впоратись, якщо виявити їх **досить** рано.
"I see that for a patient hearing this powerful word, it leads to a whole process of reflection and **maybe** they're not ready right away to talk about all of the treatments," **Polnik explains.**	"Я бачу, що пацієнта, який чує це потужне слово, накриває хвиля різних думок, і він, **можливо**, не готовий відразу говорити про лікування", — **пояснює Польник.**
There are **of course** many practical and structural barriers to obtaining diagnosis or treatment for cancer.	**Звісно**, існує багато практичних і структурних перешкод для діагностики чи лікування раку.
But depending on the person, cognitive and emotional responses to this health threat may be **just as significant**, **Smith says**.	Але **не менш вагомі** - наші когнітивні й емоційні реакції на цю хворобу, **каже Сміт**.
In 2015. he coauthored a US study which found that	У 2015 році він став співавтором американського

66% of participants thought that **everything causes cancer**, and 58% automatically associated cancer with death.	дослідження, яке виявило, що 66% учасників вважали, що **причиною раку може стати будь-що**, а 58% автоматично пов’язували онкологію зі смертю.
This is despite **cancer survival rates** increasing **over time**, especially in wealthy countries like the US.	І це попри те, що **рівень виживання при раку з часом** збільшується, особливо у багатих країнах, як-от США.
For instance, she asks how healthy such thoughts are, and whether **they have** a factual basis.	Наприклад, цікавиться, наскільки здорові такі думки та чи **мають вони** наукове підґрунтя.
Where healthcare is unaffordable or inaccessible, cancer fatalism is especially unsurprising, says Smith.	Однак особливо часто фаталізм зустрічається там, **де охорона здоров'я не по кишені чи взагалі недоступна**, додає професор Сміт.
"Meeting people where they live rather than expecting them to come to you could be one way of addressing this," says Smith.	**"Одним зі способів розв'язання цієї проблеми може бути зустріч з людьми на місцях, а не очікування, що вони самі прийдуть до вас".**
Now, **Argate says**, if another person with cancer tells her that they don't want to go to the doctor, "I will tell them not to be afraid to seek treatment because there is someone helping us."	"Тепер, - **запевняє Аргейт**, - якщо онкохворий не хоче йти до лікаря, я кажу, що не потрібно боятися, адже є люди, які нам допомагають".

Source text: Why do we clap
Retrieved from https://www.bbc.com/future/article/20240523-why-do-we-clap
Target text: Чому люди плескають в долоні
Retrieved from https://www.bbc.com/ukrainian/articles/c1330re10j1o

Source language	Target language
"Why are we doing this, Dad?" she asked as the minutes ticked by.	**"Тату, навіщо ми це робимо?" - спитала вона** мене.
Not knowing what else to say, I could only reply: "It's for science."	**"Це для науки", - відповів я, не знайшовши, що ще сказати.**
Do other animals do it?	**Чи роблять це інші тварини?**
Homo sapiens probably started clapping early in our history, writes psychologist Alan Crawley in a **2023 review of research on the topic.**	Homo sapiens, ймовірно, почали плескати в долоні ще на початку своєї історії, пише психолог Алан Кроулі в **огляді досліджень на цю тему за 2023 рік**.
Wild grey seals do it **too**, while underwater, to show strength and dominance to mates.	Дикі сірі тюлені **теж** роблять це, перебуваючи під водою, щоб продемонструвати силу та домінування партнерам.
If I spoke dog, I could explain to him that I'm embarking on an important exploration of human socio-cultural norms, but I can't - so he starts **to bark at me.**	Якби я говорив по-собачому, то прогавкав би йому, що беруся за важливе дослідження соціокультурних норм. Але я не можу - тому він починає **на мене гавкати**.
It's mentioned in the Bible **a few times**, as a way to rejoice or worship.	**Кілька разів** це згадується в Біблії як спосіб радіти чи поклонятися.

The Ancient Egyptians may have done it too.	**Можливо, стародавні єгиптяни теж так робили.**
For Roman leaders, clapping **was also** an audible measure of popularity, akin to an approval poll or social media likes.	Для римських лідерів плескання в долоні **також було** звуковим показником популярності, подібним до опитування чи лайків у соцмережах.
My hands ache, and I regret wearing my wedding ring.	**У мене болять руки** і я шкодую, що вдягнув обручку.
I remember how actress Nicole Kidman was once ridiculed for clapping like a seal **at the Oscars.**	Згадую, як колись **на "Оскарі"** актрису Ніколь Кідман висміяли за те, що вона плескала як тюлень.
While observational studies suggest that babies aren't coordinated **enough** to clap until late into their first year of life, children can easily **do it**.	Хоч дослідження показують, що немовлята **недостатньо** координовані, щоб плескати в долоні протягом першого року свого життя, діти вже легко можуть **це робити**.
"Clapping is par excellence, the non-vocal signal with the highest acoustic volume... and a simple, quick and effective action," **Crawley observes.**	"Оплески - це чудовий сигнал, не голосовий і з найвищою гучністю... проста, швидка й ефективна дія", **- зауважує Кроулі.**
Apparently it was around this point that actor Adam Driver lit a cigarette during a lengthy **Cannes** ovation in 2021.	Очевидно, саме в цей момент актор Адам Драйвер запалив сигарету під час тривалих овацій **в Каннах** у 2021 році.
Some researchers have pointed out that clapping can **also signal more than appreciation alone**: in some cases, it allows audiences to collectively mark transitions during a ritual event, as in: "the national anthem has now finished, let's watch some sport."	Деякі дослідники вказують на те, що плескання в долоні **також може означати більше, ніж просто вдячність**: у деяких випадках це дозволяє аудиторії колективно відзначати перехід під час ритуальної події, як-от "національний гімн закінчився, тепер давайте дивитися спортивні змагання".
For example, during **the pandemic** lockdowns, the practice of organised clapping at certain times of day was, **on the surface**, about showing appreciation for key workers.	Під час карантину **через пандемію ковіду** практика організованого плескання в певний час доби **на перший погляд** була ознакою вдячності критичним працівникам.
It's discouraged in the UK House of Commons, for instance, and pity the naïve person who claps between movements in a classical music concert.	**Наприклад, у Палаті громад Великій Британії це не рекомендується**, і шкода ту наївну людину, яка плескає між частинами на концерті класичної музики.
"I'll come back later," **she says**, and goes to leave the room.	"Я прийду пізніше", **- сказала вона**, направляючись на вихід з кімнати.
"Wait!" **I cry**, but she's gone.	"Чекай!" **- кричу я** їй, але вона вже вийшла.
They say the sound of one hand **clapping** is silence.	Кажуть, що звук однієї **плескаючої** долоні - це тиша.
There's an element of social contagion to applause.	**Оплески мають елемент соціального зараження.**
Anyone who's sat in a crowd will know that a mere handful of clappers **can sometimes** trigger a room of	Будь-хто, хто бував у натовпі, знає, що жменька плескачів **іноді може** змусити всю кімнату

people to mimic their behaviour.	повторювати за ними.
They found that the start of applause often followed a similar pattern to the way a **disease spreads**.	Вони виявили, що початок оплесків часто відбувався за такою ж схемою, як і **поширення хвороби**.
The answer, in short, seems to be: it's the most effective way to make a lot of noise, show our appreciation, and strengthen the social bond that comes from **enjoying something together**.	**Якщо коротко, то відповідь така**: це найефективніший спосіб створити багато шуму, показати свою вдячність, і зміцнити соціальний зв'язок, який виникає через **спільну насолоду чимось**.
"You have this social pressure to start (clapping), but once you've started there's an equally strong social pressure **not to stop**, until someone initiates that stopping."	"Ви відчуваєте соціальний тиск, щоб почати аплодувати, але коли починаєте, виникає такий же сильний соціальний тиск, **щоб не зупинятися**, поки хтось не ініціює цю зупинку".
My daughter **may** not be impressed, but surely that deserves a round of applause?	**Можливо**, моя донька не вражена, але це заслуговує на оплески?

Source text: Why forgetting is beneficial
Retrieved from https://www.bbc.com/future/article/20240514-why-forgetting-is-beneficial
Target text: Чому забудькуватість - це насправді корисно
Retrieved from https://www.bbc.com/ukrainian/articles/ck5574y0j45o

Source language	**Target language**
"Memory," **writes neuroscientist Charan Ranganath in his new book Why We Remember**, "is much, much more than an archive of the past; it is the prism through which we see ourselves, others, and the world."	"Пам'ять - це набагато більше, ніж архів минулого; це призма, через яку ми бачимо себе, інших і світ", **- каже нейробіолог Чаран Ранганат у своїй новій книзі "Чому ми пам'ятаємо" (Why We Remember).**
The principle of **error-driven learning** is simply that, when you try to retrieve these memories, your recollection is always going to be a little imperfect.	Принцип **навчання, що базується на помилках**, полягає в тому, що коли ви намагаєтеся щось згадати, ваші спогади завжди будуть дещо недосконалими.
Right now I'm staying in a hotel, and it just **wouldn't make sense for me** to remember **this room number two weeks from now.**	Зараз я зупинився в готелі, **і мені просто не має сенсу** пам'ятати **номер цієї кімнати через два тижні.**
Why do we become more forgetful **as we age**?	Чому **з віком** ми стаємо більш забудькуватими?
The problem, **as we get older**, is not necessarily that we can't form memories, but that we're not focusing on the information that we need to remember.	**З віком** проблема полягає не в тому, що ми не можемо запам'ятовувати, а в тому, що ми не зосереджуємося на інформації, яку потрібно запам'ятати.
And so focusing on the sensory details, as opposed to being stuck in our heads, really helps us to **remember better**.	Тому зосередження на сенсорних деталях справді допомагає нам **краще запам'ятовувати**.
In the book I discuss the **"memory palace" method**, which involves associating the information you want to learn with information that you already have.	У книзі я згадую **метод "палацу пам'яті"**, який передбачає пов'язування інформації, яку ви хочете вивчити, з інформацією, якою ви вже володієте.

Creating cues can help that to happen.	**Допомогти цьому може створення підказок.**
We know, for instance, that songs **can naturally evoke** memories from particular periods in your life.	Ми знаємо, наприклад, що пісні **природним чином можуть викликати** спогади про певні періоди вашого життя.
If you've seen a relative that you haven't seen **in a long time**, and their face has changed relative to the first time you saw them, you need to create a more accurate memory of their appearance.	Якщо ви бачили родича, якого **давно** не бачили, і його обличчя змінилося порівняно з попереднім разом, вам потрібно створити точнішу пам'ять про його зовнішність.
But sometimes our imagination can seep into the memory.	**Але іноді в пам'ять може просочитися наша уява.**
When we share memories with other people, it can lead the **memories to be updated**.	Коли ми ділимося спогадами з іншими людьми, це може привести до **оновлення спогадів**.
When I'm explaining an event **to you**, the act of making up that story to tell you can change the way that I **remember it.**	Коли я розказую **вам** про якусь подію, акт відтворення цієї історії може змінити те, як я **її запам'ятав.**
Your reactions to the way I tell the story, for example, will shape my memory of it **later on**; it may become more humorous.	Ваша реакція на те, як я розповідаю історію, наприклад, може **пізніше** впливати на мою пам'ять про неї. Це може стати більш жартівливим.
I'm trying **now** to exercise **regularly**, and I'm very mindful of my diet, to make sure that I maintain my cognitive health in my old age.	**Зараз** я намагаюся **регулярно** займатися спортом і стежу за своїм харчуванням, щоб зберегти своє здоров'я в старості.

Source text: Wounded orangutan seen using plant as medicine
Retrieved from https://www.bbc.com/news/science-environment-68942123
Target text: Поранений орангутанг вилікував себе рослиною. Вчені бачили таке вперше
Retrieved from https://www.bbc.com/ukrainian/articles/c80zykr0y1ko

Source language	**Target language**
A Sumatran orangutan in Indonesia has self-medicated **using a paste made from plants** to heal a large wound on his cheek, say scientists.	Орангутанг із Суматри в Індонезії сам вилікував велику рану на своїй щоці, **накладаючи на неї пасту з рослин**, кажуть вчені.
It is the first time **a creature in the wild has been recorded** treating an injury with a medicinal plant.	Це перший випадок, коли **в дикій природі зафіксували, що тварина** лікує травму рослиною.
A research team in the Gunung Leuser National Park, Indonesia spotted Rakus with a large wound on his cheek **in June 2022**.	**У червні 2022 року** дослідницька група в національному парку Гунунг Леузер в Індонезії помітила орангутанга Ракуса з великою раною на щоці.
The team **then** saw Rakus chewing the stem and leaves of plant called Akar Kuning - an anti-inflammatory and anti-bacterial plant that is also used locally to treat malaria and diabetes.	**Потім** команда побачила, як Ракус жує стебло та листя рослини під назвою Акар Кунінг — протизапальної та антибактеріальної рослини, яка також використовують місцево для лікування малярії та діабету.
Rakus **then** smeared the chewed leaves onto **his wound** until it was fully covered.	**Потім** Ракус намазував **рану** пожованим листям, доки вона повністю не була покрита.

The scientists concluded that Rakus knew he was applying medicine because orangutans very rarely eat this particular plant and **because of the length of the treatment.**	Вчені дійшли висновку, що Ракус свідомо застосовував ліки **через тривалість лікування**, а також тому, що орангутанги дуже рідко їдять цю конкретну рослину.
The entire process lasted really a considerable amount of time - that's why we think that he **intentionally** applied it," explains Dr Laumer.	Весь процес тривав справді довгий проміжок часу — тому ми вважаємо, що він наносив її **навмисно**", — пояснює доктор Лаумер.