# UNIVERSITY OF BIRMINGHAM

# Understanding Translation as a Site of Language Contact

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## 1. Introduction

Translation as an instance of language contact between the source and the target language is a field of research that has largely been ignored by both linguistics and translation studies. Recent studies, however, mainly dictated by interest in the status of English as a modern lingua franca, have begun to address issues relating to translation and language contact and change. Ballard, for example, argues that "translation as management of two languages by the same individual, is a particular and acute form of language contact" (2003, 253) [my translation]. House (2003, 2006, 2008) and her team (Baumgarten and Özçetin 2008, Becher et al. 2009, Kranich et al. 2011, 2012) have also taken an interest in the investigation of the ways in which translation from English may affect other European languages, namely German, French and Spanish, in popular science and economic texts. Their research concludes that, while some changes observed are a result of direct influence from English, others are most likely instances of a more general tendency towards subjectivity in the genres (House 2011). McLaughlin (2011) reports that news translations from English have led to changes in the way in which information is presented through syntactic means in the genre in French, and similar observations have been made about Italian economic texts (Musacchio 2005), German business articles (Bisiada 2013), and Swedish fiction (Gellerstam 2005) translated from English. Finally, Bennett (2007a, 2007b) argues that the anthropocentric

worldview typically encoded in Portuguese academic discourse is abandoned in favour of the English positivist worldview,[1] when Portuguese academic articles are translated into English. These studies provide evidence that translation can give rise to language change, but also take a step forward from the obvious lexical changes to an examination of the possible effects that translation from English might have on the development of native genres. Although attempts have been made to provide some explanation of the role played by translation in linguistic change in specific contexts, for example by observing that there is a decline in the 'cultural filtering' in translations from English (Kranich et al. 2012, House 2011), or by establishing the factors that might have an impact on contact through translation (Kranich et al. 2011), these studies provide only partial links between translation and the wider processes of language contact and change. Thus, the question of how exactly translation can contribute to change in a range of contexts has not so far been adequately addressed.

By focusing mostly on the manifestation of linguistic changes in the target language and not on the mechanisms that allow translation to encourage these, the findings of previous studies tend to be inconsistent, since there is considerable variation in terms of the empirical data across languages, genres and linguistic features. Without a clear theoretical framework that would explain this variation, among other things, it has not been possible to

verify the relative importance of translation as a site of language contact. Although it is valuable to analyse empirical data from different language combinations in order to validate any claims made about language change, it is only by identifying and employing an appropriate descriptive mechanism for understanding the processes of contact where translation is involved that we can increase our understanding of translation and move the field forward, by providing a model for future studies.

This paper begins by acknowledging translation as a significant site of language contact and has two main aims. Firstly, it reinterprets some central concepts of Johanson's Code-Copying Framework and uses them to the examine translation as an instance of language contact, suggesting that translation can be understood using concepts taken from the field of contact linguistics. Secondly, it systematically applies these notions to the analysis of a study examining the extent to which translations from English might be related to the change in the frequency of passive reporting verbs in Greek popular science articles, thus reflecting the potential and the advantages of the Code-Copying Framework. Popular science has been chosen because it is a genre where instances of change are more likely to take place, as it is a site where dominance from English is observed (especially on less widely-spoken languages such as Greek), offering a rich dataset to which the theoretical framework can be applied. Analytically, since diachronic

development is the focus of the study, a diachronic corpus of English and Greek popular science articles is examined.

Ultimately, this paper aims to provide translation studies with a descriptive mechanism for understanding instances of language contact through translation. It is the first to adopt a theoretical framework that was designed mainly to study linguistic change, and then to systematically apply it to translation. This novel approach of adopting a language change model for the study of translation makes a significant contribution to both translation studies and contact linguistics and offers a new vantage point for the understanding of the mechanisms that allow languages to interact.

## 2. The Code-Copying Framework

2.1 Code-Copying

The Code-Copying Framework (Johanson 1993, 1999, 2002a) is a particularly relevant model for understanding translation as site of language contact. This is a model that has been used in order to examine instances of language contact where linguistic changes occur, and it has not been systematically applied to the study of translation, although some of its concepts have been occasionally used by translation scholars (Steiner 2008, McLaughlin 2011). This paper represents the first attempt to apply the Code-Copying Framework systematically to the investigation of translation

as a site of language contact and the role translation plays in the development of specific textual conventions in the target language.

A distinguishing characteristic of the Code-Copying Framework is that it provides an alternative explanatory model, where code-copying replaces traditional terms, such as 'borrowing'. The term 'code-copying', which forms the basis of the framework, refers to linguistic features being copied from one language into another, a process that is considered to be a natural development, "a universal tendency of human language" (Johanson 1999, 37). The term is particularly successful, since it refers only to the insertion of new elements into an existing code, without implying any contingent levels of acceptability from the point of view of code users.[2] Before we attempt to adapt the framework for the study of translation, some of its key concepts require further explanation.

In any situation where there is code-interaction, at least two linguistic systems, or codes, are involved. 'Code' here refers to any grammatical system with distinguishing characteristics and can cover languages, dialects, sociolects, idiolects and registers. One code is regarded as the Model Code and the other as the Basic Code. The Model Code is the starting point, the "source, donor or diffusing code" (Johanson 2008, 62). The Basic Code is the code which is positioned at the receiving end of the code-copying; it is the "recipient or replica code" (ibid.). The result of code-copying is a linguistic copy that is fully integrated into the Basic Code, with its own

properties that diverge from those of the Model Code and do not involve any kind of mixing of the two.

The most common direction for code-copying is 'adoption', which involves elements being inserted from the Model Code into the Basic Code, although the reverse direction, i.e. 'imposition', is also possible. The linguistic properties of the elements that can be copied are material, semantic, combinational and frequential properties. Material properties refer to phonic aspects of linguistic units, e.g. Latin has copied the phoneme /y/ from Ancient Greek. Semantic properties refer to the denotative and connotative meaning of linguistic units, a typical example is a calque such as *thought experiment* (*Gedankenexperiment* in German), whereas combinational properties refer to collocational patterns and syntax, such as the construction *estar siendo* + past participle in Spanish, which is claimed to be a copy from English *am/are/is being* + past participle (Pratt 1980). Finally, frequential properties refer to the frequency of use of particular linguistic units, for example the increased use of *bene* in Italian as a result of contact with the English *well* through dubbing in films (Dardano 1986). Johanson's model differentiates itself from the rest in one crucial point, namely that it systematically accounts for frequential code-copying, whereas no similar distinction can be found in the work of other scholars, where only passing references are made to the phenomenon (Weinreich

1953, Silva-Corvalán 1994, Larsson 2001, Bybee and Hopper 2001, Heine and Kuteva 2005).[3]

Code-copying can be global or selective. In the case of global code-copying, all four categories of the above-mentioned properties are copied into the Basic Code. In the case of selective code-copying, one or more properties are copied, resulting in distinct types of code-copying. The main difference between global and selective code-copying is that, in the former, blocks of the Model Code are copied "*into the frame* of the basic code", whereas in the latter, selected properties are copied "*onto units* of the basic code" (Johanson 1998, 327) [emphasis in the original]. Consider, for example, the difference between 'à la carte' in English which, as a global copy from French, has been copied together with its material, semantic, combinational and frequential properties (although some of these have necessarily been adapted to fit the Basic Code), and a calque such as 'free verse', which is a selective semantic copy from the same language (*vers libre* in French), and which retains the semantic properties of the French phrase, but not necessarily all of its other properties, e.g. material or combinational. Figure 1 summarises the two types of code-copying (Johanson 2008, 65). In the case of global code-copying, the sphere, which represents the linguistic item, consists of all four sections, i.e. material (M), semantic (S), combinational (C) and frequential (F) properties, all of which are copied to elements of the Basic Code. Representing selective code-

copying, the sphere is divided into four sections, indicating the four types of linguistic properties that may be copied individually to the Basic Code. X represents elements of the Basic Code to which the properties are copied.

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Figure 1: Global and selective code-copying (Johanson 2008, 65)

Copies develop in a continuum (Figure 2), and they typically begin as 'momentary copies', that is, "sporadic, ephemeral instances of code-copying, the result of singular individual dynamic acts" (Johanson 1999, 47). Despite being ephemeral in the first occurrence, this phenomenon can acquire long-lasting effects, leading to the emergence of new forms or to changes in existing ones. When copies begin to be used regularly, either by a group of individuals or a particular speech community, they become 'habitualised copies'. Copies may subsequently become 'conventionalised copies' and, as such, be integrated "with respect to acceptance in the speech community" (ibid.). This development from momentary to conventionalised copies is characterised by overlap between transitory stages and is understood as "a continuum of changes in the sociolinguistic status with gliding transitions between degrees of acceptability" (ibid.). The final stage of the continuum is the 'monolingualisation' of the linguistic copy; this stage is reached when copies are used by monolinguals and do not

presuppose any bilingual ability (48). At this stage, it can be said that copies have finally resulted in language change.

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Figure 2: The Code-Copying continuum

According to the Code-Copying Framework, the outcome of a language contact situation is affected by an interplay of different factors. These may be internal, that is, related to the linguistic systems of the codes in question, or external, that is, the result of "contact with other codes in specific socio-political situations" (Johanson 2002b, 285). It is important that neither internal nor external factors of change should be confused with causes of language change; they are merely "circumstances which potentially promote or prohibit influence" (Johanson 2002a, 50). This focus on facilitating factors of change, rather than causes, allows the Code-Copying Framework to view linguistic processes as complex phenomena and analyse them as such, taking into consideration all relevant factors that interact in any language contact situation.

2.2 Applying the Code-Copying Framework to Translation

The basic concepts of the Code-Copying Framework will be revisited with translation in mind, in order to examine whether it can be used as a suitable

descriptive mechanism for understanding translation as a site of language contact.

If translation is considered as a situation of code-interaction, where translators are likely to copy elements from the source language when translating into the target language, the source language can serve as the Model Code, and the target language as the Basic Code, while the direction of code-copying is 'adoption'. If we take the example of popular science, a genre that has mostly been developed in the Anglophone world, it is likely that the Model Code will be English, from which linguistic elements are copied into less widely spoken languages, such as Greek, which would serve as the Basic Code.

Although global code-copying is possible in translation, selective code-copying tends to be more common, and it has been argued that translation is "selective copying par excellence" (Verschik 2008, 133), which provides a first indication that the Code-Copying Framework can be potentially applied to translation. Different types of selective code-copying are possible with translated texts, with the exception of material code-copying that refers to phonic properties. Thus, semantic properties can be copied through translation, which is a frequent way of new words entering a language, and combinational code-copying is also possible, allowing for new combinations of words (e.g. Musacchio 2005, Gellerstam 2005). Of particular interest when considering translation is frequential code-copying,

which results in a change in the frequency patterns of an existing lexical or morphosyntactic unit, since it is a generally under-researched area of study. According to Steiner (2008, 322), different frequencies and proportionalities of native patterns often result in texts having a certain non-native quality, even in the absence of other types of code-copying. Indeed, the repeated translation of source text patterns with grammatically correct, yet infrequently used, target language linguistic patterns may ultimately override prevailing patterns and result in new communicative preferences in the target language (Baumgarten and Özçetin 2008, Becher 2011, Kranich et al. 2012). The ways these features develop and can ultimately reach the target language have not been adequately studied so far, and have often been attributed to 'translationese' or the 'law of interference' (Toury 1995). The negative connotations in these terms suggest that translation studies have failed to account for the possibility of frequential copies, and understand the mechanisms that produce these. In order to specifically address this conspicuous gap in the literature, this paper will focus on frequential properties. It has also been noted that grammatical patterns, such as the passive voice examined in this study, tend to become frequential copies more often than other linguistic elements (Backus and Verschik 2012).

The fact that the Code-Copying Framework provides a unified model where multiple stages of development can be identified, makes it particularly

suitable for the study of translation. The idea that language change is a process that comprises stages in a continuum assists considerably in the investigation of translation as language contact, since translation can be associated with a specific stage in that continuum leading to change, i.e. habitualisation. Translators can be considered as a particular speech community, and copies can be regarded as habitualised when they are regularly used by them, i.e. found in translated texts. Monolingualisation can be investigated through the examination of comparable texts, i.e. monolingual productions, since, if a particular copy is found to be used in monolingual speech, it can be assumed, in general terms, to be an accepted linguistic item that is part of the Basic Code. Conventionalised copies can be studied in the context of translation, but they require measurement of acceptability and social evaluation, which might be problematic in terms of a diachronic study. Momentary copies are generally difficult to trace in any contact situation, unless the history of the copy is documented (Csató 2002, 326), and in the case of translation, unless comprehensive textual archives are available.

Another advantage of the Code-Copying Framework is that it allows for the role of translation to be taken into account in instances of language contact in a systematic manner, since it focuses on describing the circumstances that facilitate language change, rather than on identifying factors that might be causes of language change, the interplay of which is positioned at the core

of the framework. Thus, translation should not be considered a cause of language change, but rather a propagator of influence, an activity that is capable of promoting new linguistic elements, whose subsequent adoption is the result of an interplay of a number of factors. However, the possibility that the Basic Code, i.e. the target language, would develop at least some of the linguistic features copied without coming into contact with the Model Code, i.e. the source language, albeit possibly not with the same speed, cannot be discounted. Considering such a possibility provides additional support to the argument that causes of change are almost impossible to define, and that it is therefore preferable to refer to facilitating circumstances.

## 3. The Study of Greek Popular Science

### 3.1 Popular Science

In order to examine whether the Code-Copying Framework can be employed to describe actual instances of translation, the translation of popular science articles from English into Greek will be used as a case in point and studied diachronically. Since the genre of popular science has been developed largely in the Anglophone world, with English being the international language of science, its subsequent introduction into other languages and cultures has been in many cases heavily influenced by English. Translation has played a crucial role in the dissemination of

Anglophone popular science, not least in Greece at the beginning of the 21st century, when translated editions of two well-known popular science magazines, namely *Popular Science* and *Scientific American*, began to circulate in Greek. Figure 3 summarises the circulation of popular science publications (newspapers sections and magazines) during 1990-2011 in Greece.[4] Until 1999, there was only one non-translated popular science publication circulating in Greece. Between 2000 and 2005, five different popular science publications were founded, of which three were translated editions from English. The years 2002-2003 are the years when translations of English popular science articles started to circulate more widely in Greece compared to previous years. This makes popular science a particularly useful genre for investigating the extent to which translations from English are likely to encourage linguistic changes in the target language genre, since linguistic developments are likely to be more easily identifiable compared to other genres, where the influence from English might not be so strong.

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Figure 3: Circulation of popular science publications in Greece: Temporal distribution 1999-2011

Since, according to Aitchinson (2001, 110), "change typically proceeds by attracting itself to a particular word or set or words", it is to be expected that changes will be most noticeable in a verb category that plays a central role in popular science articles, such as reporting verbs. It has been argued that this verb category is an important feature of both news articles (Floyd 2000) and academic papers (Hyland 1999, Bloch 2010), two genres that exercise considerable influence on popular science texts. In terms of reporting strategies in the genre of popular science, the textual conventions with regards to voice in English and Greek are likely to offer a rich field of investigation. Although it is generally accepted that the active voice is more frequent that the passive voice, certain genres show different preferences. For example, it has been argued that the passive voice is "generally more commonly used in informative than imaginative writing, and is notably more frequent in the objective impersonal style of scientific articles and news reporting" (Quirk et al. 1985, 166). Popular science texts are generally considered to share many characteristics with both academic writing and news articles, since they present scientific issues using a journalistic language. For that reason, the frequency of the passive in English popular science articles can be expected to be relatively high compared to other genres. More importantly, although both active and passive voice exist in English and Greek, they have different functional properties and, most importantly, are employed with different frequencies,[5] which might change under the influence of translation. A similar study conducted by

Amouzadeh and House (2010) concluded that the use of passive voice in Persian texts from psychology and education has changed due to contact with English.

By drawing on Johanson's Code-Copying Framework, the study aims to address three questions: a) what changes in the frequency of passive voice reporting verbs can be observed in Greek non-translated popular science articles, b) to what extent the patterns identified are reflected in translated texts, and c) to what extent the patterns identified can be traced back to the English source texts. Each of these questions is answered by a different type of corpus analysis.

3.2 The TROY Corpus

Since language change is the focus of this study, a diachronic corpus has been created, which consists of 500,000 words and covers a 20-year period (1990-2010), that also includes synchronic sub-corpora. The corpus is named TROY (Translation Over the Years) and consists of both translated and non-translated Greek popular science articles, as well as the English source texts of the translations. It is divided into three parts (Table 1), each of which consists of a number of sub-corpora. The first part captures the years 1990-1991 and consists of a corpus of non-translated Greek articles. Only non-translated texts are included in this sub-corpus, as translations from English popular science articles hardly existed in Greece during that

period. The second part captures the years 2002-2003 and consists of a corpus of non-translated Greek popular science articles, a corpus of translated Greek popular science articles, and a corpus of the source texts of the translations. Similarly, the third part captures the years 2009-2010 and includes three corpora: Greek non-translated texts, Greek translated texts, and the English source texts of these translations. Each sub-corpus is approximately 71,000 words. The corpus design successfully combines both diachronic and synchronic components, and both comparable and parallel corpora.

Table 1: The TROY Corpus

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Articles in the corpus are taken from a range of publications, both newspapers and magazines, including *Periscopio tis Epistimis*, *To Vima*, *Ta Nea*, *Vima Science* and *Focus* for the non-translated Greek articles, *Vima Science*, and the Greek editions of *Popular Science* and *Scientific American* for the translated material, and *New Scientist, Popular Science and Scientific American* for the English source texts. Articles included in the corpus cover a wide range of topics that are representative of the genre of popular science, such as technology, life sciences, astronomy, chemistry, and physics.

The TROY Corpus is smaller than many corpora analysed in corpus-based linguistic and translation studies, which typically consist of at least one million words. Although there is a tendency to favour large corpora, optimal size varies and smaller corpora offer advantages for morphosyntactic studies (Hundt and Leech 2012). Since the focus of this study is the passive voice and, in many cases a close reading of parts of the TROY Corpus is necessary, a smaller corpus is more appropriate.

For the purposes of the present study, three points in time are selected, the years 1990/1991 and 2009/2010, covering a total time span of 20 years, with an interim point for the years 2002/2003. 20 years is generally considered an adequate time span for language change to occur (Labov 1981). Although a longer period may be desirable for the study of syntactic change (Mair 2009), the genre of Greek popular science publications, especially as far as translations are concerned, is fairly new. Therefore, a time span of 20 years is the largest that can be studied at this point in time, due to the availability of data, and is considered adequate as it incorporates two distinct stages in the development of the genre. The reason for including a sub-corpus of texts from 2002/2003 is that, at this time, translations of popular science texts started circulating more widely in Greece, which will provide evidence on whether habitualisation – the regular use of a linguistic pattern in translates texts – is related to that period.

3.3 Method

Due to the lack of any formal categorisation of Greek verbs, it was decided to use frequency as the point of departure in analysing the TROY Corpus. A list of the most frequent verbs in the TROY Corpus was created with the help of the Wordlist Tool of *WordSmith Tools 5.0*. The list was lemmatised, i.e. the inflectional variants of different verbs were combined, and the English texts were also tagged for parts of speech to allow the word list to include information only on the verb phrases. In order to allow for an in-depth analysis of reporting verb phrases, the ten most frequently occurring reporting verbs in Greek and English identified in the TROY Corpus were analysed (Table 2). Only verb phrases that primarily have a reporting function according to their dictionary definition and have both an active and a passive counterpart have been included, thus excluding verbs such as *see* and *find*.

Table 2: Ten most frequently occurring reporting verbs in Greek and English in the TROY Corpus

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Instances of passive voice for each reporting verb were counted using the Concordance Tool of the *WordSmith* software. Since frequencies are being compared, the chi-square test was employed, without Yates' correction,

(Oakes 1998, McEnery et al. 2006) to assess whether there is significant difference in the use of the passive voice. The null hypothesis ($H_0$) was that any differences observed are a result of the inherent variability in the sub-corpora. The alternative hypothesis ($H_1$) is that any difference is attributable to a factor other than chance which, in the case of the present data, is likely to be related to language contact through translation.

Corpus analysis consisted of three stages, each addressing a specific research question. First, a comparable corpus of non-translated Greek popular science articles was analysed diachronically. Then, comparable corpora of translated and non-translated Greek popular science articles were analysed both synchronically and diachronically. Finally, parallel corpora of Greek translated popular science articles and their English source texts were analysed both synchronically and diachronically.

In order to interpret findings, concepts from the Code-Copying Framework, as presented above, were used. For this study, the direction of code-copying was from English into Greek, with English serving as the Model Code and Greek as the Basic Code. The passive voice reporting verbs were the linguistic feature that was examined as a potential frequential copy. Instances of change in Greek translated popular science articles were related to habitualisation. Finally, if changes were also observed in non-translated Greek popular science articles, this was considered an indication of

monolingualisation of the frequential copy of the passive voice reporting verbs.

**5. Results**

5.1 Diachronic corpus analysis

The first stage of the corpus analysis involved the diachronic examination of the non-translated sub-corpora to observe developments in the textual conventions of the genre of popular science in Greek between 1990 and 2010, with particular reference to the frequency of the passive voice reporting verbs. There is a clear pattern of decrease in the relative frequency of the passive voice across the 20-year period (Table 3).

Table 3: Distribution of frequency of the passive voice in non-translated Greek popular science articles

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Across all three periods, the frequency of the passive voice decreased by approximately 30 per cent (11.6 percentage points). The results of the chi-square test indicate that this decrease is significant in the frequency of the Greek passive voice ($\chi^2$=9.03, d.f.=2, p=0.0109), thus supporting the $H_1$ and providing a strong preliminary indication that the decrease in the frequency of the passive voice is not a matter of chance but, rather, is most likely

related to the development of a frequential copy. Whether translations from English are related to the development of this frequential copy in Greek is still unclear and can only be answered once comparable and parallel corpora are examined.

To illustrate, a typical example of how the textual conventions in the genre have changed is the verb *υποστηρίζω* (maintain). Although, in the 1990/1991 data, *υποστηρίζω* is used in the passive voice in 13.6 per cent of all instances of the verb, in the 2009/2010 data is found exclusively in the active voice. Thus, while passive reporting clauses (Example 1) were employed in 1990/1991, only active constructions such (Example 2) are found in the 2009/2010 data.

(1)     *Έχει επίσης **υποστηριχτεί** ότι υπάρχει κάποια συσχέτιση ανάμεσα στις μεταλάξεις τα σωματικών κυττάρων και στην παρουσία χρωμοσωματικών παρεκκλίσεων στα ηλικιωμένα κύτταρα.* [Periscopio tis Epistimis, 5/1991]

        **It has** also **been maintained** that there is some correlation between the mutations of the somatic cells and the presence of chromosomal deviations in older cells. [near-literal translation]

(2)     *Ο δρ Κλιντ Σπρίνγκερ, βοτανολόγος και ειδικός σε θέματα που αφορούν την υπερθέρμανση του πλανήτη, **υποστηρίζει** ότι τα τεχνητά δέντρα έγιναν ιδιαίτερα δημοφιλή στο καταναλωτικό*

*κοινό γιατί αποτελούν μια «βολική» λύση και όχι γιατί είναι πιο*

*φιλικά προς το περιβάλλον*. [Vima Science, 25-27/12/2009]

Dr. Clint Springer, a botanist and an expert on issues related to global warming, **maintains** that artificial trees became very popular to consumers because they are a "convenient" solution, and not because they are more environmentally friendly. [near-literal translation]

5.2 Comparable corpus analysis

The second stage of the corpus analysis involved the examination of a comparable corpus of translated and non-translated Greek popular science articles to investigate the extent to which the decrease in the frequency of use of the passive voice is related to, or at least mirrored in, translated popular science texts, and whether translated texts allow for the habitualisation of the frequential copy. Overall, the passive voice is used less frequently in translated texts than in the non-translated texts in both 2002/2003 and 2009/2010 (Table 4).

Table 4: Distribution of frequency of passive voice in non-translated and translated Greek popular science articles

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In the translated texts produced in 2002/2003, the passive voice is used approximately 40 per cent (13.1 percentage points) less frequently ($\chi^2$=16.52, d.f.=1, p<0.0001) than in the non-translated popular science texts published during the same period. In 2009/2010, the passive voice is used approximately 50 per cent (14.6 percentage points) less frequently ($\chi^2$=30.09, d.f.=1, p<0.0001) in translated articles than in the comparable non-translated articles. Based on these results, the $H_1$ is supported. On this basis, it appears that the lower frequency of the passive voice reporting verbs is a linguistic feature that characterises Greek popular science translations, since there is a statistically significant difference in their use in translated texts compared to non-translated texts. It can, thus, be argued that the lower frequency of these verbs constitutes a habitualised frequential copy, used regularly in translated texts.

Examples include the verb *θεωρώ* (consider) which, in the 2002/2003 data, is less frequently used in the passive voice in translated texts (48.6 per cent) than in non-translated texts (70.3 per cent). Example 3 is a typical passive voice construction from the translated data, whereas Example 4 is an active construction such as favoured in the non-translated data.

(3)  *Παρόλο που οι περισσότεροι γιατροί **θεωρούν** ότι πρέπει η μέγιστη τιμή να είναι τουλάχιστον 10 για να έχουμε μία ένδειξη φυσιολογικής παραγωγής ορμόνης, το Yale κατεβάζει αυτό το όριο στο 7.* [Popular Science Greek Edition, 4/2004]

Although most doctors **consider** that the peak must be at least 10 to get an indication of normal hormone production, Yale lowers the threshold to 7. [near-literal translation]

(4)  *Στο παρελθόν **έχει θεωρηθεί** ότι τα κεντροσωμάτια συμμετέχουν στον σχηματισμό της πυρηνικής ατράκτου κατά την κυτταρική διαίρεση γιατί διπλασιάζονται κατά τα πρώτα στάδια της μίτωσης.* [Periscopio tis Epistimis, 11/2003]

In the past **it has been considered** that the centrosomes are involved in the formation of the nuclear spindle during cell division because they are doubled during the early stages of mitosis. [near-literal translation]

Overall, it seems that the change in the frequency of the passive voice in popular science articles in the Basic Code is mirrored in the process of translation where the stage of habitualisation can be identified. However, the stage of monolingualisation cannot be clearly identified, at least based on the available data from translated and non-translated articles. There remains a considerable difference in the frequency of the passive voice between non-translated and translated articles in 2009/2010, which suggests that the frequential copy of the passive voice is likely still in the process of monolingualisation. It might be reasonably expected that, in time, the proportions of the passive voice in translated and non-translated texts are likely to converge.

5.3 Parallel corpus analysis

The final stage of corpus analysis consisted of the examination of a parallel corpus to investigate whether translated texts replicate patterns found in their English source texts thereby providing support for the argument that the habitualisation of copies in translated texts can be related to contact with English. Table 5 presents the results from the parallel corpus analysis.

Table 5: Distribution of frequency of passive voice in translated Greek popular science articles and their English source texts

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The data suggest that reporting verbs tend to appear more frequently in the passive voice in 2009/2010 compared to 2002/2003 in the English source texts. However, although the frequency of the passive voice in the source texts in 2002/2003 is higher than that in 2009/2010 by approximately 15 per cent (2.5 percentage points), this change is not statistically significant ($\chi^2$=2.13, d.f.=1, p=0.1444). Therefore, although there is a marginal overall change in the frequency of the passive voice, statistical calculation indicates that the frequency of the passive voice in the English source texts has remained fairly stable at approximately 15 per cent for the period in question.

When the frequencies of use of the passive voice in the English source texts are compared with those in the translated Greek popular science articles, it can be argued that the habitualised frequential copy of the passive voice is most likely related to patterns found in the Model Code. Therefore, the proportions of the passive voice reporting verbs indicate that Greek translations of English-language popular science texts employ a translation specific language that is characterised by a frequency of the passive voice that is somewhere between that of the Basic and the Model Code. This is particularly apparent in the 2002/2003 data, but evident to a much lesser extent in the 2009/2010 data.

There is a significant difference in the 2002/2003 parallel source texts and translated texts sub-corpora, where the passive voice is used approximately 40 per cent more frequently in translated texts (5.4 percentage points, $\chi^2$=7.07, d.f.=1, p=0.0078), which supports $H_1$. This suggests that, at the time when translations of popular science texts from the Model Code started to circulate more widely, the habitualisation of the frequential copy of the passive voice has not taken place. This process of habitualisation seems to have been completed by the time of the 2009/2010 data, in which the differences between source texts and translations are not statistically significant (3.1 percentage points, $\chi^2$=2.47, d.f.=1, p=0.116). Thus, passive constructions (Example 5), which were shown by the 1990/1991 data to be

preferred in Greek non-translated texts, tended to be replaced by active constructions in the 2009/2010 translated articles (Example 6).

(5)　*Μπορεί, λοιπόν να υποτεθεί ότι οι μηχανισμοί εξασφάλισης της μακροβιότητας είναι οι ίδιοι με τους μηχανισμούς που **θεωρείται** ότι παράγουν πλεονάζον γενετικό υλικό.* [Periscopio tis Epistimis, 5/1991]

It can thus be assumed that the longevity assurance mechanisms are the same mechanisms that **are considered** to produce excess genetic material. [near-literal translation]

(6)　The researchers **believe** that the medicine given to the King was contaminated with arsenic - making his predisposition to porphyria far worse. [New Scientist, 16/12/2008]

*Οι ερευνητές **θεωρούν** ότι τα φάρμακα που χορηγούνταν στον Γεώργιο ήταν μολυσμένα με αρσενικό, κάτι το οποίο επιδείνωσε κατά πολύ την προδιάθεσή του για πορφυρία.* [Vima Science, 23/8/2009]

The researchers **consider** that drugs administered to George were contaminated with arsenic, something which considerably aggravated his predisposition to porphyria. [near-literal translation]

Figure 4 illustrates the convergence over time between the Basic Code (in both non-translated and translated popular science articles), and the Model Code, in terms of the frequency of the passive voice reporting verbs.

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INSERT FIG 4 HERE

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Figure 4: Distribution of passive voice frequency of reporting verbs in non-translated and translated Greek popular science articles and their English source texts

The analysis carried out suggests that the use of the lower frequency of passive voice reporting verbs in Greek popular science articles is a development that can be related to a frequential copy from English. The corpus analysis suggests that translation has played a key role in the process and that the copy appears to have first been habitualised in the context of translation, while it continues to be in the process of monolingualisation in 2009/2010.

## 4. Discussion

In the 20-year (1990-2010) time span investigated in this study, frequential code-copying was observed in the use of passive voice reporting verbs, which were found to be used less frequently in the Basic Code, i.e. Greek

popular science texts, in 2009/2010 than it was in 1990/1991. Habitualisation, a process that is significant for the development of the new reporting patterns, was found to be related with translated texts. If habitualised copies are characterised as features of the language of translation, a hybrid linguistic code between the source and the target language (Toury 1995, Frawley 1984), then, these translation-specific features might be regarded as constituting the initial signs of possible change occurring in the Basic Code, and translated texts as playing a crucial role in their dissemination. The evidence of language development and change in the genre of popular science reported here provides an important link between studies of translation and language contact and change.

In the TROY Corpus, contact with English source texts was found to be related to the linguistic changes observed, and English seems to confirm its role as the Model Code, while Greek can be viewed as the Basic Code. However, it is worth mentioning that, even in later years, despite the development in the reporting patterns, the frequencies in the Basic Code do not match exactly those found in the Model Code, and the differences between the non-translated Greek and English articles are statistically significant, suggesting that a process of monolingualisation might still be in progress. Compared to habitualisation, which seems to have been completed in the time span investigated here, the process of monolingualisation appears to require a much longer period of time to be completed. However,

it is also possible that monolingualisation will never occur, since as Johanson (2008) notes, not all copies will successfully reach all stages of development.

The facilitating factors that can be considered as relevant in the frequential copy of the passive voice reporting verbs are those that are more closely related to the power distance between English and Greek in terms of popular science production, for example the dominance and prestige of English. It is suggested that a focus on such factors might provide an explanation for why Greek offers clearer examples of change as a result of translation from English, as compared to more widely spoken languages such as German.

Through the reinterpretation of the Code-Copying Framework for translation and its application to empirical data, this paper stresses the many advantages of employing the Code-Copying Framework as a descriptive mechanism for the examination of translation as a site of language contact. Its main advantage for this study is that it allowed us to focus on understanding the ways in which translation might be related to linguistic changes in the target language, thus placing equal emphasis on the process of language contact, as well as its results, that is, linguistic changes. Secondly, thanks to the framework, translation-specific features have been interpreted, not as alien features limited in translation texts, but rather as evidence that a process of change might be in progress, with far-reaching

consequences for the target language. A third advantage was that the framework provided translation with a dedicated space in the language change continuum (i.e. the one related to habitualisation), offering a very powerful mechanism for understanding why certain features might be observed in translated texts, but only observed much later (or not at all) in non-translated ones. Finally, the problem of identifying translation as the (only) cause of linguistic change has been addressed by focusing on translation as an activity encouraging change.  It is recognised that a range of different, both internal and external, factors might have contributed to the development of copies, but translation can also be understood as related to their development.

These last two advantages constitute also the innovatory strength of the Code-Copying Framework, when compared to other models. In other words, without the code-copying continuum, which is a novel aspect of the framework, and in particular the link between translation and habitualisation, it would have been impossible to identify the role that translation has played in a language contact situation. Also, without the focus on the interplay of facilitating circumstances instead of causes of change (on which other models seem to focus), it would have been difficult to account for the role of translation, as any argument about translation being a cause of language change would generate problems of substantiation and interpretation. It is only with the use of the Code-

Copying Framework that these problems can be overcome and we can reach original conclusions.

However, the most important innovatory strength of the framework is that it allows to create, for the first time, a clear link between translation studies and *existing* theories in contact linguistics. All previous studies that have addressed translation as a language contact phenomenon attempted to develop new explanatory frameworks, disregarding existing ones. This resulted in translation being understood as a separate, idiosyncratic, linguistic activity, which required alternative interpretation and had very few, if any, aspects in common with other instances of language contact. However, as the application of the Code-Copying Framework in this study demonstrates, there is no reason for this division: when it comes to language contact and change, translation does not differ significantly from other linguistic activity, and it can be understood using the same descriptive mechanism.

Inevitably, the Code-Copying Framework has its limitations and it can be criticised for introducing new unnecessary terminology into the field of contact linguistics. Also, as it was initially developed with Turkic languages in mind, there is a need for a substantial body of data from a range of languages to validate the applicability of its theoretical concepts. Finally, it can be criticised for being at points confusing, particularly in terms of the directionality of code-copying (for example the Model Code is not always

the dominant code), which might make it difficult to apply to specific instances of language contact. Although, none of these limitations undermine the advantages that the framework can offer to translation studies, they highlight the importance of having a good grasp of its concepts before attempting to apply it to translation.

## 5. Conclusion

This paper has been the first to systematically apply Johanson's Code-Copying Framework to the study of translation and it has demonstrated how the use of a clear theoretical framework can help translation studies acknowledge translation as a site of language contact, where linguistic changes in the target language are likely to be encouraged. By addressing the problem first from a theoretical perspective, i.e. how the framework can be understood in terms of translation, and then from an empirical one, i.e. applying the model to data from Greek popular science, this paper has highlighted both the advantages of employing such a descriptive mechanism and its validity. This is the first recognition that several features of translation could be explained by employing a model from the field of contact linguistics. In order to reach firm conclusions about the extent to which translation can be understood as an activity facilitating changes in the textual conventions of the target language it may be necessary to examine the full potential of the Code-Copying Framework and analyse other

instances of copying, e.g. semantic and combinational, and examine how other aspects of the model might apply to translation, i.e. adaptation.

As societies become more and more globalised, not least through translation, a model that helps us understand how languages develop through indirect contact will open new directions of research and will have a strong role to play for years to come. It is believed that the successful application of the Code-Copying Framework to translation in this paper will serve as a model for future studies that will examine the extent to which translation influences changes in different genres and/or languages.

**Notes**

1. According to Bennett (2007a, 151), the English tradition is labelled as positivist since it tends to favour the referential function of language, instead of the textual or interpersonal, and "crystallizes the dynamic flux of experience into static, observable blocs, rendering the universe passive, inert and devoid of meaning", which is a result of Enlightenment and the Scientific Revolution. Conversely, in Portugal the anthropocentric worldview lasted longer, since "education systems controlled by Jesuits and feudal pre-industrial economies maintained by conservative political regimes ensured that Enlightenment values never really took hold" (163).

2. A number of other scholars (Boeschoten 1999, Thomason 2001, Aitchison 2001, Clyne 2003, Winford 2005, Verschik 2008) also propose the term 'copying' as an alternative to 'borrowing'.

3. For example, Heine and Kuteva (2005, 263) briefly refer to how minor use patterns, which are linguistic features of low frequency of use in language A, can become major use patterns under the influence of language B.

4. In this paper, translated popular science articles refer to translations from Anglophone sources. It should be mentioned however that there are also other sources, e.g. the popular science magazine *GEO*

includes translations from German, whereas *Science Illustrated* from Swedish.

5. For more details on the frequency of the passive voice in English and Greek, see Quirk et al. 1985, Biber et al. 1999, Warburton 1970, Warburton 1975, Marmaridou 1987, Apostolou-Panara 1991, Apostolou-Panara 1999, Klaris and Babiniotis 2005, Sifianou 2010.

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