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MIDDLE EAST UNIVERSITY

Translating Passive Verbs in English–Arabic Parallel Texts and their Frequency in Arabic–Arabic Comparable Texts

أفعال المبني للمجهول: ترجمتها في النصوص الإنجليزية-العربية المتوازية ومدى ترددها في النصوص العربية-العربية المقارنة

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Authorization

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Dedication

This thesis is dedicated to my beloved country Iraq and to my mother, wife, and sisters.

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Abstract

This study aimed at answering the following four questions:

Q1- What are the alternative options for translating passive verbs from English into Arabic and which is/are more frequent?

Q2- What are the conditioning factors behind opting for one of the translation alternatives, rather than the others?

Q3- What differences are there in the frequency of passive verbs in Translated Arabic texts as compared to Original Arabic texts?

Q4- What is characteristic about the frequency of the passive verbs in Translated Arabic texts, viz. their linguistic specificity, in this respect?

To achieve these goals, the researcher selected his sample from a study corpus which consisted of two types of sub-corpora: parallel and comparable. The parallel sub-corpus consisted of three Original Scientific texts in English together with three Arabic translations of these texts. While the comparable sub-corpus comprised the three Translated Arabic texts together with three Original Arabic texts. Both the Translated and Original Arabic texts were scientific texts, written in Modern Standard Arabic. The present study investigated scientific texts because such texts make more use of passive constructions than others. Moreover, all the nine texts in the study corpus roughly belong to the same period of time and text type. The researcher used the descriptive-contrastive-interpretive approach. The frequency of the passive verbs were recorded, compared, and investigated in each one of these texts.

The results showed that English scientific texts used more passive constructions in their sentences as compared to their translated Arabic texts. The present study also revealed that there were many options available to the English-Arabic translator for translating passive verbs in English. These alternatives were found to be:

1. Translating the English passive verb by an Arabic passive verb.
2. Translating the English passive verb by an Arabic active verb.
3. Translating English passive verbs by Arabic nominalized constructions with the infinitive.

4. Translating English passive verbs by Arabic nominalized constructions with the passive participle.

It was also found that the above four translation alternatives were not used in free variation. Rather, opting for one alternative, rather than the other, was subject to some conditioning factors.

As for the comparable sub-corpus, it was found that Original Arabic texts exhibited more use of the passive verb than their comparable Translated Arabic texts. This was found to be rather unexpected and specific suggestions for further research were made.

Based on the above findings, it was recommended that other researchers enlarge the study corpus, and also use different types of texts.

ملخص الدراسة

تناولت هذه الدراسة ترجمة الأفعال المبنية للمجهول من النصوص الانكليزية إلى العربية ومدى ترددها في كل من النصوص العربية المترجمة والنصوص العربية الاصلية. وطرحت الدراسة الاسئلة التالية:

1. ما هي الخيارات البديلة لترجمة الافعال المبنية للمجهول من اللغة الانكليزية إلى العربية, وأي منهما الأكثر استخداماً؟
2. ما هي العوامل المؤثرة وراء اختيار احد هذه الخيارات بدلا من الاخر؟
3. ما هو الفرق في تكرار أفعال المبني للمجهول في النص العربي المترجم مقارنةً مع النص العربي الاصلي؟
4. ما هي السمة التي تميز تكرار أفعال المبني للمجهول في النصوص العربية المترجمة من ناحية محدداتها اللغوية؟

وللإجابة على هذه الاسئلة, قام الباحث باختيار مدونة للدراسة تتكون من نوعين من النصوص: المتوازية والمقارنة. تتكون المدونة المتوازية من ثلاثة نصوص علمية انكليزية أصلية مع ثلاثة نصوص عربية مترجمة لهذه النصوص. في حين تشتمل المدونة المقارنة على نفس النصوص الثلاثة العربية المترجمة مع ثلاثة نصوص عربية اصلية. علما ان كلا من النصوص العربية المترجمة والاصلية هي نصوص علمية, مكتوبة باللغة العربية الفصحى.

استخدمت الدراسة المقدمة نصوص علمية لان هذه النصوص تميل الى استخدام المبني للمجهول بشكل كبير مقارنةً مع نصوص اخرى. علاوة على ذلك, فإن جميع هذه النصوص تتشابه بنوع النص وتمت كتابتها بنفس الفترة الزمنية. استخدم الباحث الطريقة الوصفية- التقابلية- التفسيرية حيث تم تسجيل ومقارنة وتقصي مدى تكرار الأفعال المبنية للمجهول في كل من هذه النصوص.

ولقد أظهرت النتائج أن النصوص الانجليزية تستخدم تراكيب أكثر عددا من المبني للمجهول مما تستخدمه النصوص العربية المترجمة عنها. وكذلك كشفت الدراسة أن هنالك خيارات عدة للمترجم الانجليزي- العربي عند قيامه بترجمة الأفعال المبنية للمجهول الى اللغة العربية. وتبين أن هذه الخيارات هي:

1. ترجمة فعل المبني للمجهول بالانجليزية بفعل مبني للمجهول بالعربية.
2. ترجمة الفعل المبني للمجهول الانجليزي بفعل مبني للمعلوم بالعربية.
3. ترجمة الفعل المبني للمجهول الانجليزي بتراكيب اسمية تستخدم المصدر.
4. ترجمة الفعل المبني للمجهول الانجليزي بتراكيب اسمية تستخدم اسم المفعول.

كذلك توصلت الدراسة إلى أن استخدام البدائل الأربعة أعلاه ليس حرا وحسب رغبة المترجم بل يخضع لبعض الضوابط. أما بالنسبة للمدونة المقارنة فلقد وجدت الدراسة أن النصوص العربية الأصلية تستخدم

نسبة أعلى من أفعال المبني للمجهول مقارنة بالنصوص العربية المترجمة. وكان هذا الاكتشاف غير متوقع, ولذلك فقد تم تقديم مقترحات محددة لمزيد من البحوث في هذا الجانب.

واستنادا إلى النتائج الأولية المذكورة باختصار أعلاه, تقدمت الدراسة بالعديد من المقترحات التي توصي الباحثين الآخرين باستخدام مدونات أوسع وبتحليل نصوص من أنواع أخرى.

Chapter One
Introduction

1.1 Background of the Study

Translation is very essential for cross – cultural communication; it helps people to understand each other through the transmission of ideas and beliefs. But, there have always been numerous challenges facing translators when translating from one language into another. Translation is primarily the comprehension of the meaning of a text and the subsequent production of an equivalent text. The text that is translated is called the *source text* and the language that it is translated into is called the *target language*, and the product is called the *target text*.

When translating from one language into another, some translators tend to use the same syntactic structures that were used in the language translated from the source language. Those translators are not aware of the fact that each language has its own grammatical structures. One relevant case in this respect is the frequency and use of the passive verbs in both English and Arabic texts. English tends to make a lot of use of passive verb forms, especially in its scientific texts, where the agent is usually of lesser importance than the facts themselves. Arabic, on the other hand, tends to avoid making much use of passive verb forms. Its rich morphology and flexible word order provide it with alternative means of realizing the concept of passivity in its texts.

English sentences which contain passive verbs have in many cases been translated by competent English-Arabic translators into Arabic sentences without

formally passivized verbs; nevertheless, the notion of passivity has still been retained, some such examples from the corpus of the present study are:

1. Our discussions will be based on…

   سوف تستندُ مناقشاتنا إلى ...

2. That model was developed.

   وقد تم تطوير هذا النموذج ...

3. The nucleus is actually made up of…

   إن النواة مكونة فعلا من ...

1.2 Statement of the Problem

English and Arabic are known to represent two genetically distant languages. For one thing, they use widely divergent frequencies of passive verbs in their texts. While English texts, especially scientific ones, use passive verbs frequently, Arabic texts tend to avoid making too much use of passive verb forms. This discrepancy in the frequency between the use of passive verbs in English and Arabic texts gives rise to problems when translating from English into Arabic and vice versa. For example, if the translator insists on translating every passive verb in the English text by a passive verb in Arabic, the result will be an unnatural text in Arabic with regard to both the frequency and use of the passive.

Another alternative is translating passive verbs in English by active verbs in Arabic, but that may affect the amount of information that is given in the clause. It is thus worth investigating how professional English- Arabic translators cope when confronted with the task of translating into Arabic a text which exhibits many passive verb forms in English. It is also worthwhile to describe how educated Arabs use the

passive in their own authentic Arabic texts when they write. Comparing the results of how the passive is used in translated and non-translated Arabic texts can yield interesting and worthwhile results concerning the language specificity of the former in Arabic.

1.3 Questions of the Study

The present study attempts to answer the following questions:

1. What are the alternative options for translating passive verbs from English into Arabic and which is/are more frequent?
2. What are the conditioning factors behind opting for one of the translation alternatives, rather than the others?
3. What differences are there in the frequency of passive verbs in Translated Arabic texts as compared to Original Arabic texts?
4. What is characteristic about the frequency of the passive verbs in translated Arabic texts, viz. their linguistic specificity, in this respect?

1.4 Significance of the Study

The importance of this study lies in the fact that it deals with a serious problem in translation**:** the problem of translating the passive verbs. It investigates how English, which makes much more use of the passive especially in its scientific texts, is rendered in Arabic and how professional translators deal with passive verbs when they are converted into the Arabic texts. Besides, studies are scarce both on the use and frequency of the various linguistic means which can realize the grammatical category of passivity in authentic, original Arabic texts, as well as on how translated

texts can use the various morphological and syntactic resources available in Arabic to render the meaning/ function of the passive verb in English sentences. The findings of this study are therefore expected to help translators, especially trainee translators, to deal with such problems and make them aware of the various translation options open to them. Moreover, the present study will help linguists and translation trainers understand how both original and translated Arabic texts can realize the notion of passivity in their morphology and syntax.

1.5 Definition of Terms

In this study, the following definitions will be adopted: -

- Passivity: - a grammatical category in which the subject is the recipient or "goal" of the action denoted by the verb, and not the agent or the initiator of the action. It emphasizes the fact that it is not the actor who is more important, but the process being described is of ultimate importance.

- Passive verbs: - verbs, whether in English or Arabic, which indicate passivity via morphological and syntactic changes.

- Parallel corpus: - a collection of texts which consists of a text in one language together with its translation(s) in another language, viz. a source text and its translation(s).

- Comparable corpus: - two texts within the same language, one is a translated text while the other is an original non-translated text, viz. comparable texts are not translations of each other. However, such texts are comparable also in the sense that they belong to the same text type and genre.

1.6 Limitations of the Study

The present study has certain limitations that need to be pointed out. Its findings are limited to the corpora on which they are based. The results of the current study cannot therefore be generalized either to all English-Arabic parallel texts, or to Arabic comparable texts, as far as the use and frequency of the passive is concerned. Another limitation is that the study focuses only on realizing passivity by passive verbs in English and gives less attention to other linguistic means of doing so, as in the notional passive, for example. However, these limitations can also be seen as further avenues for future research of the same and/or related linguistic and translation phenomena.

Chapter Two
Review of Related Literature

2.0 Introduction

Below is a review of some available theoretical and empirical studies that deal with the notion of passivization, and particularly with the frequency and use of passive verbs in both English and Arabic.

2.1 Review of Theoretical Studies

2.1.1 Passivization in English/Arabic

Many scholars have defined the notion and use of passivization differently. Thatcher (1942) said that the passive in Arabic is often used impersonally, viz. it must not be used when the doer of the action is overtly expressed; thus, for example, the Arabic sentence "An apple was eaten by Mohammed" must be rendered by "akala muhamadun tufahatan" or " Mohammed ate an apple". Similarly, Haywood and Nahmad (1965) mentioned that the passive in Arabic is used when the agent (doer of the act) is not specified.

Lyons (1968) accounted for the relationship between the active and passive sentences as follows:

> "(I) The object of the active sentence becomes the subject of the corresponding passive sentence.
>
> (II) The subject of the active sentence is not necessarily expressed (overtly represented) in the passive version of the same sentence, but if expressed, it takes the form of an adjunct marked as agentive by means of case inflection or by the use of a particular preposition." (P. 376).

Close (1975) talked about the difference between an-*ed* participles, used as adjective which may sometimes be followed by preposition referring to a state and an-*ed* as part of passive construction referring to an event. So, this example, Ali and Nada were married last year, may refer either (a) they were not single last year, or (b) their wedding took place last year. Therefore, the passive can be recognized when attention is directed to the event and not to the agent responsible for it.

According to Saad (1982) passivization was described by the early Arab grammarians as the deletion of the subject of the verb in an active construction; then the verb takes the passive form and the object of the active sentence becomes the subject in the passive sentence. Thomson and Martinet (1986) stated that the subject of the active verb becomes the 'agent' of the passive verb, reminding that, the agent is very often not mentioned. When the agent is mentioned, it is placed at the end of the clause preceded by a 'by-phrase'. Veit (1986) discussed the notion of passivization as follows:

"a. The subject noun phrase in the deep structure is replaced by the noun phrase that follows the verb.

b. The passive auxiliary (Be + -en) is added as the final constituent of the auxiliary.

c. The position vacated by the noun phrase that followed the verb in the deep structure is left empty (Ø).

d. A prepositional phrase, consisting of the preposition *by* and the subject noun phrase from the deep structure, is added at the end of the verb phrase." (P.181).

Baker (1992) defined the notion of passivization as a grammatical category that shows the relationship between a verb and its subject. Consequently, the subject is the affected entity, and the agent may or may not be specified, placing more emphasis on the receiver of an action to have the impression of objectivity. She also declares that the passive is used in most languages when the agent is downplayed.

Bakir (1994) reported that passivization in English language is a syntactic category, which defines the relationship between the verb (the process) and the participants in that process including both the agent (that initiates the process) and the patient (the goal). The subject of the passive sentences is the affected participant, and the agent may or may not be specified. However, the process of passivization is to bring the affected participant into the beginning of the clause. While in the Arabic language, passivization is identified by changing the vowelling of the active, for example: *Kataba* 'wrote' becomes *kutiba* 'was written'. Furthermore, the agent in the Arabic language is not usually mentioned by a 'by-phrase'.

Khalil (1999) discussed the functions of passivization both in English and Arabic. In English, he lists the following points:

1. The relationship between the passive and the active is that the passive foregrounds the object/ patient and downplays the subject/ agent of the active sentence. For example: *A thousand people were killed by the tornado*. Therefore, who is performing the action is not the important thing but the process being described is of ultimate importance.

2. The main function of the passive is to allow the construction of 'agentless' clauses, where the subject is the affected entity.

3. In some cases, the agent of the active sentence may occur at the end of the passive sentence when suspense, new information and successive clauses need to be stated. For example: *Maha made a mistake and was punished by her boss.*

As for Arabic, Khalil mentions that early Arab grammarians focused their attention mainly on the form and derivation of passive verbs in Arabic rather than on

their functions. However, some casual remarks can be found which are related to such functions. In general, the passive is used when the doer of the act (agent) is not mentioned as well as when the writer/speaker tries to hide the identity of the agent because s/he does not want the agent to be embarrassed.

2.1.2 Translating the Passive

Lyons (1968) mentioned that English is different from other languages in the quite freely use of the “agentive” adjunct (the use of the agent), because English is periphrastic. In addition, he listed three cases for the occurrence of the passive in English: - “(a) Passive with a ‘specific’ agent (Bill was killed by John); (b) Passive with a ‘non-specific’ agent (Bill was killed by someone); and (c) Passive without mention of the agent (Bill was killed)” (p.378). Consequently, some problems might be encountered when translating the English passive structures. However, the main function of the passive in most languages is to allow the construction of agentless clauses.

Saad (1982) reported that the Arabic passive construction is used mostly without the 'by-phrase' and the agent remains unknown. It is worth mentioning that Arabic has no agentive particle equivalent to English 'by'. Thus, the use of the expression /min qibal/ in Arabic translations is convenient to express the English 'by'.

Leech and Svartvik (1994) talked about the aspects of translating the English passive. The passive is associated with impersonal writing, especially in *scientific writing* where there is no need to focus on the doer of the action, since the focus is on the process in order to give the impression of objectivity. Many problems may occur when translating the English passive structure into Arabic especially when the by-

phrase is used. For example, in English, *the bold idea was rejected* (*by everyone)*, is written in Arabic as *Rufida't al- fikratu,* [sic].

In Baker (1992), and very much relevant to English-Arabic translations, Beekman and Callow stated that:

> "A passive is translated with a passive, an active with an active… even when this is unnatural in the RL (receptor language) or results in wrong sense. When faced with a choice of categories in the RL, say active and passive, the literal approach to translation leads the translator to choose the form which corresponds to that used in the original, whereas the use of that category in the RL may be quite different from its use in the original" (Beekman and Callow, 1974:27) In: Baker, 1992: (p.102).

Moreover, translating a passive structure into an active structure can pose some problems and may affect the amount of information in a sentence. Khalil (1999) explained that many problems might face the Arabic-English translators when translating the English passive since the English language has two passive constructions: agentive and agentless, whereas the Arabic passive has only the agentless. Arab translators may thus have a problem with the translation of the English passive, because the structure of the English passive is more complicated than that of the Arabic passive form of the verb. As a result, translating the English agentive passive into Arabic poses some problems, because the doer of the act (agent) of the Arabic passive is not mentioned.

2.2 Empirical Studies

Khalil (1993) conducted a study entitled “Arabic translations of English passive sentences: problems and acceptability judgments”. In his study, he tried to find out whether Arab translators transpose the English agentive passive into an Arabic active or use an Arabic passive with an agentive phrase. A questionnaire instrument was used and the population sample for that study consisted of two groups of subjects: translators and judges. The translators were eight Arabic-speaking EFL college teachers and twenty-four EFL college students: half of the twenty-four students graduated from the English department at Bethlehem University and were highly qualified. Moreover, the experts who evaluated the Arabic translated sentences were nineteen instructors of Arabic language and literature; twelve were specialized in linguistics and seven in literature. The translators were asked to render twenty-five English agentive passive sentences into Arabic. Nineteen of these sentences had passive verbs with agentive phrases. The results showed that Arab students used literal translation of the English by-agentive phrase into an Arabic equivalent by-agentive phrase. Furthermore, the results showed a need for placing more emphasis on teaching translation procedures in translation courses, such as shifting. In addition, students should practice tackling issues related to both languages, based on contrastive linguistics.

In his study entitled "The Use of Passive Voice in The Language of Journalism in Arabic and in English", Nofal (1993) conducted a contrastive analysis of the passive voice in the language of journals in both English and Arabic. In this study he tried to investigate the similarities and differences between the two languages regarding the use of the passive sentence in the language of journalism. This study was data-based.

The English corpus was taken from The Independent, The Herald, And The Guardian newspapers, while the Arabic corpus was taken from Al-Ra'i, Ad-Dustour, and Sawt Al-Shaab newspapers. The number of sentences in the English corpus was about 15308 with about 267605 words, whereas the number of sentences that was investigated in the Arabic corpus was about 21835 with 295320 words. The investigated text categories in the corpus were *Reports* and *News Items*. The findings of the contrastive analysis showed that passive constructions in the language of newspapers in English and Arabic were more similar than different. The similarities between Arabic and English passive sentences in the language of newspapers were found to be the following:

1. The ratio of passive sentences to active sentences was 1:5 in both languages.
2. Passive sentences were optional in both languages, but there were some situational contexts where passive sentences were obligatorily used.
3. Passive sentences in both languages were transformationally derived from corresponding active sentences through passivization rules.
4. Both English and Arabic newspapers had agentive and agentless passive sentences, janus agent sentences, notional passive sentences besides compound passive sentences. However, there were passive sentences found in English but not in Arabic and vice versa.
5. Passive sentences in both Arabic and English journals had similar functions, but rather Arabic passives were more restricted in use than English passives.

Khafaji (1996) conducted another study under the title “Arabic Translation Alternatives for the Passive in English”, in which he investigated the various linguistic alternatives available to the English-Arabic translator. The corpus was an English text and its Arabic translation. An attempt to study the factors that may affect choosing one of these alternatives was also made. Analyzing, describing, classifying and comparing corpora were the instruments used in the sample. The sample was an English scientific article entitled “A close look at Halley’s comet”, published in an international journal called the *Scientific American* and its Arabic translation which appeared in the Arabic version of the same journal *Majjallat Al-Oloom*. It was found that more than 50% of the English passive verbs were rendered into verbs in Arabic; twenty of these Arabic verbs were passive and twenty-one were active. Besides, twenty-one out of seventy-six of the English finite passive verbs were translated into Arabic by a nominal construction with an infinitive. The rest of the English finite passive verbs were translated into the passive participle. The study has also concluded that translators should take into consideration the syntactic structure of both English and Arabic languages. In addition, some Arabic verb patterns could not take a passivized form. In conclusion, Khafaji has found that Arabic language does not avoid passivity, as is often wrongly stated, but expresses it by different linguistic means because of the rich morphological system of the Arabic language.

Mohawsh (1997) in his dissertation called “problems of translating the passive voice for Arab learners of English and French” talked about the constraints that may face the translators when translating the passive from English into French and Arabic. He tried to study these problems, finding new solutions for handling these difficulties. A test instrument was used in the study, consisting of three samples. The first sample was twenty-five English passive sentences given to 25 fourth-year students in the

department of English language and literature where the students were asked to translate these sentences from English into Arabic. The second sample was the same twenty-five English passive sentences distributed to 25 fourth-year students in the department of modern languages at Yarmouk University, where the students were asked to translate these sentences from English into French. The third sample was twenty-five French passive sentences given to 25 fourth-year students studying French language at the same department at Al Yarmouk University and the University of Jordan. A specialists' committee of Jordanian professors validated the three tests. The study revealed certain problems when translating the passive voice from English into French and Arabic. Moreover, it was found that Arab learners may encounter some difficulties when they tend to translate the French and English passive into Arabic because the syntactic structure of the English and French language is different from that of Arabic. Finally, it was recommended that students should take courses and should do more extensive reading to be familiar with the concept of passive voice.

McEnery and Xiao (2005) investigated the passive constructions in both English and Chinese languages. They tried to explore the passive constructions in English and in Chinese from a contrastive perspective on the basis of corpus data, and to get to more systematic explanations about the passive constructions in these languages. Exploring, analyzing, and comparing were the instruments that were used in the sample of this study. The four corpora of this study comprised two written and two spoken. The first corpus was about one million words of written British English comprising (500 samples and 15 text categories). The second one was Chinese consisting of about one million words of written Mandarin Chinese (500 samples, 15 text categories). In addition to the written corpus data, two spoken corpora were used in this study to draw a comparison between the written and spoken English/ Chinese.

The findings of the study revealed some differences between the usage of the passive in Chinese and in English. These differences were classified into five categories: frequency, dynamicity, agents in long passives, semantic prosody, and genre distinctions. Moreover, the changes between active and passive voice in translation were also illustrated. The study showed that the usage of the passive in Chinese is very different from that of English. Finally, the study showed that comparable monolingual corpora can provide a useful tool for contrastive linguistics.

Massalha (2005) in his dissertation called "The Agentive passive construction in English and its translation into Arabic", aimed to investigate the agentive passive construction in English and its translation into Arabic, not only by listing the Arabic alternatives for the English agentive passive construction, but also through providing explanations and reasons for using such alternatives. This study examined and checked two English texts and their equivalent Arabic translation versions. The first text was Herman Melville's book Moby Dick (referred to as Book 1) and its Arabic version Mubi Diik, and the second book was Pearl S. Buck's book The Good Earth (referred to as Book 2), and its Arabic version Al-?ard Al- tayyiba. The total number of the examples collected from Moby Dick (Book 1) was completely outnumbered that gathered from The Good Earth (Book 2). While The Good Earth, containing 374 pages altogether, provided a total of 51 passive sentences with "by-phrase", 215 sentences of the same kind were collected from the first 378 pages of Moby Dick, whose total number of pages was 536. The findings of the study revealed some important results such as expressing what is achieved in English by *by* or *with* passivization. It was also found that *bi* was the only Arabic agentive construction that was used as equivalent to the English passive constructions *by* and *with*. Moreover, it was found that passivization can be a very useful strategy for translating English

passive sentences with the 'with-phrase' into Arabic. Finally, the translation of English *by* and with passive sentences into Arabic in the two books was basically textually-based.

Chapter Three
Methods, Procedures and Data Analysis

3.1 Introduction

The bulk of this chapter deals with the analysis of the study corpus which consists of nine texts and is divided into two types of sub-corpora: parallel and comparable. Descriptive tables on the parallel sub-corpus in this major subsection of this chapter mainly consist of descriptive tables which report the frequency of the translation alternatives of the translational Arabic texts as compared to their English source texts. On the other hand, the descriptive tables on the comparable Arabic sub-corpus, viz. the three Original Arabic texts and the three Translated Arabic texts, report the frequency of finite passive verbs in the Original Arabic texts.

The subsection on data analysis which is briefly described below is however preceded by two important subsections. The first is on the description of the study corpus and the second on describing the research method and procedures used in the present study.

3.2 Description of Study Corpus

The present study has used scientific texts in both English and Arabic for its corpus because it is well-known that such texts make more use of passive constructions than others. The study corpus consists of two types of sub-corpora: parallel and comparable. The parallel corpus consists of three scientific Original English texts (OE1, OE2, and OE3) together with three Translated Arabic texts (TA1,

TA2, TA3) which are the three Arabic translations of the English texts. Besides, the comparable corpus comprises three Original Arabic texts (OA1, OA2, OA3) which belong to the same scientific text type of the Translated Arabic texts. The three ST Original English scientific articles are entitled: - "Treating diabetes with transplanted cells", "Building a brainier mouse", and "The coolest gas in the universe". All were published in the *Scientific American* journal in Jul. 1995, Apr. 2000, and Dec. 2000, respectively. Their Arabic translations were published in *Majjallat Al-Oloom* in Nov. 1995, May. 2001, and May. 2001, respectively.

As for the Original Arabic texts, they are also three scientific articles entitled:-

1. أربعة أنواع من الديدان الشريطية وحيدة الحيين من أمعاء الأسماك الشبوطية في العراق. (OA1)
2. العصبونات الحركية المزودة لعضلات الوجه العلوية في النواة الحركية للعصب القحفي السابع (دراسة تجريبية في الجرذان البيضاء باستخدام الفلورسين). (OA2)
3. الجمع بين عمليتي الكلورة والتخثير في معالجة المياه. (OA3)

These texts were published in *Dirasat* in Oct. 1999, Jun. 2004, and Sep. 2004, respectively.

Thus, it can be observed that all the texts used in the study corpus belong to the scientific genre and all were published in recognized academic journals at about roughly the same period of time.

3.3 Methods of Analysis

The study has used the descriptive-contrastive-interpretive approach which consisted of recording, comparing, and investigating the frequency and use of the passive verbs in each one of the nine texts in the corpus. Moreover, the study also

compared the use and frequency of the passive in English and Arabic, as well as within Arabic itself. More importantly, a serious attempt was made to interpret the results. The practical procedures followed to implement the above methodology are outlined in more detail below.

In the beginning, and after specifying the topic of the study, the researcher looked for various relevant references and did a side comprehensive reading to have a holistic view of the research subject. The study corpus which consisted of two types of sub-corpora, parallel and comparable, was selected. The three Original English (OE) texts were examined and all finite passive verbs in them were detected and underlined. The English source texts were then placed side by side their Translated Arabic (TA) texts and the translation counterparts of the English finite passive verbs were specified and underlined in the three translated Arabic texts. The three Original Arabic (OA) texts were also closely examined and all finite passive verbs found in them were underlined.

That was the descriptive phase of the research methodology. Then began the contrastive phase in which all the translation alternatives in Arabic of the English finite passive verbs were noted down, classified and counted. These turned out to be four translation alternatives, as will be discussed in the next section on data analysis in this chapter.

Contrastive tables were then worked out for the English-Arabic frequency of passive verbs, as well as for the frequency of finite passive verbs within Arabic itself in the comparable corpus.

As for the interpretive phase of the study methodology, it focused on trying to discover the conditioning factors which determined opting for one translation alternative, from among the four mentioned above, rather than the other. An attempt was also made to arrive at conclusions concerning determining the specificity of the language of translational Arabic texts, with relation to the use of the passive.

To conclude this section, it may be imperative to state that the selection and sequence of the above research methodology and its procedural steps were all based on and guided by the objectives and research questions of the present study.

3.4 Data Analysis

The data analysis below is divided into two main subsections: (a) analysis of the six texts in the parallel sub-corpus, viz. the three Original English texts and the three Translated Arabic texts, and (b) analysis of the three Original Arabic texts which, together with the three Translated Arabic texts, make the comparable corpus. The data analysis of the parallel corpus is reported in a detailed contrastive table for each Original English text and its Translational Arabic counterpart text, as well as for each of the four translation alternatives, referred to above. In other words, there are four detailed tables for each OE-TA pair: the first on translating the OE passive verbs by TA passive verbs, the second on translating the OE passive by TA active verbs, the third on translating the OE passive by TA nominal structures with an infinitive, and the fourth on translating the OE passive by TA nominal structures with passive participles. Thus there are a total of twelve contrastive tables on the analysis of the parallel sub-corpus, in addition to some summary tables which are used in conjunction with the above-described contrastive tables.

As for the data analysis of the three Original Arabic texts in the comparable sub-corpus, it is reported in three detailed tables. Each of the three tables in Section (3.4.2) below reports all the instances of finite passive verbs in one of the three Original Arabic texts.

3.4.1 The Parallel Corpus

3.4.1.1 English Passive Verbs Translated by Arabic Passive Verbs

Table 1(A) Contrastive analysis of OE Text 1 and its TA counterpart

#	ST-TT	Pat. *
1	...Because functional islets would restore proper insulin production and, in theory, would have to be implanted only once. ...واحد العلاجات المثالية هو زرع جزيرات لانكرهانس التي يمكنها إعادة القدرة على إنتاج الأنسولين. ونظريا, فإنها ستزرع لمرة واحدة فقط	I
2	The results were encouraging. In subjects who were given 400,000 islets, كانت النتائج مشجعة. فقد أبدت الغرسات عند الأشخاص الذين اعطو 400000 جزيرة نشاطا وظيفيا,	IV
3	We suspect that in many cases too few islets were implanted for the individual's needs. ونميل إلى الاعتقاد بأنه في الكثير من الحالات لم يعط المقدار الكافي من الجزيرات.	IV
4	Two basic strategies have been pursued in animals for some time. One such tactic is based on a suggestion made back in 1957 by George D.Snell… ولفترة اعتمدت إستراتيجيتان أساسيتان لتحقيق هذا الغرض في التجارب المجراة على الحيوانات, قدم أحداهما سنيل من مختبر جاكسون في ولاية ماين في العام 1957,	VIII
5	These fragile droplets were then coated with plastic and placed in the abdominal cavity. وغُطيت هذه القطيرات الهشة بعدها بمادة بلاستيكية (جعلت على شكل كبسولات) ثم وضعت في التجويف البطني.	II
6	Moreover, about two million type II diabetics are treated with insulin, إضافة إلى هذا فان هناك نحو مليوني مصاب بالداء السكري من النمط الثاني يعالجون بالأنسولين ،	III
7	These fragile droplets were then coated with plastic and placed in the abdominal cavity. وغُطيت هذه القطيرات الهشة بعدها بمادة بلاستيكية (جعلت على شكل كبسولات) ثم وضعت في التجويف ألبطني.	I

* Arabic verbs have many morphological patterns, the most frequent are: Pattern I *fa9al*, Pattern II *fa99al*, Pattern III *faa9al*, Pattern IV *af9ala*, Pattern V *tafa99al*, Pattern VI *tafaa9al*, Pattern VII ?*infa9al*, Pattern VIII? *ifta9al*, Pattern IX?*if9all*, Pattern X ?*istaf9al*.

Table 1(B) Summary of Table 1(A)

Arabic verb Pattern	I	II	III	IV	V	VI	VII	VIII	IX	X
Frequency	2	1	1	2	-	-	-	1	-	-

Table 2(A) Contrastive analysis of OE Text 2 and its TA counterpart

#	ST-TT	Pat.
1	… to explain how memory is represented and stored in the brain … يفسر بها الكيفية التي تتمثل بها الذاكرة وتختزن في الدماغ	I
2	In what is now known as Hebb's learning rule , , فيما يعرف ألان بقاعدة هب للتعلم,	I
3	The reduction is also long – lasting and is known as long – term depression … ويكون هذا النقصان طويل الأمد كذلك , ويدعى الإخماد طويل الأمد ,	I
4	…that rats whose brains have been infused with drugs that block the NMDA … إن الجرذان التي سربت إلى أدمغتها عقاقير	II
5	Without memory, one cannot measure learning; without learning, no memory exists to be assessed. , ومن دون التعلم لا توجد ذاكرة تقاس.	I
6	But that test, which is called an object- recognition task, assesses only one type of memory. ولكن ذلك الاختبار, الذي يدعى اختبار تعرف الأشياء لا يقيم إلا نمطا واحدا...	I
7	The newly incorporated firm is called Eureka pharmaceuticals. وتدعى هذه الشركة يوريكا للمستحضرات الطبية, وتقع ...	I
8	We believe the tools that Joe and his colleagues have developed can be translated pretty quickly into a basis for … ...نعتقد أن الأدوات التي أوجدها جو وزملاؤه يمكن أن تترجم بسرعة إلى أساس لاكتشاف...	II
9	When the brain is starved of blood, فعندما يحرم الدماغ من الدم,	I

Table 2(B) Summary of Table 2(A)

Arabic verb Pattern	I	II	III	IV	V	VI	VII	VIII	IX	X
Frequency	7	2	-	-	-	-	-	-	-	-

Table 3(A) Contrastive analysis of OE Text 3 and its TA counterpart

#	ST-TT	Pat.
1	…, and their behavior is rigidly prescribed by deterministic laws. فللأجسام مواضع وحركات وهويات محددة وسلوكها يوصف بصورة صارمة تحكمها قوانين تحديديه.	I
2	When liquid helium is cooled to within 2.2 Kelvin's of absolute … حين يُبَرد الهليوم السائل إلى نحو 202 كلفن فوق الصفر ...	II
3	Such beams are known as atom lasers, وتعرف مثل هذه الحزم بليزرات الذرات ،	II
4	Atomic beams are already used in a Varity of scientific and … وتستخدم الحزم الذرية في العديد من التطبيقات العلمية ...	X
5	…, and that pulse is amplified when … ثم تضخم هذه النبضة حين تتبع ذرات إضافية	II
6	The hottest fraction of atoms is continuously removed, ففي حين تحتجز مصيدة مغنطيسية الذرات يُزال الجزء الأكثر سخونة من الذرات...	I
7	Their magnetic fields are produced by running current through … وتولِّد حقولها المغنطيسية بتمرير تيار كهربائي ...	II
8	Glowing sodium atoms are held in a magneto-optical trap and … تُحتجز ذرات الصوديوم المتوهجة في مصيدة مغنطيسية- ضوئية,	VIII
9	Daniel Kleppner of M.I.T. would be introduced at conferences … أصبح كلبنر يُقدّم في المؤتمرات على انه ...	II
10	A Bose-Enstein condensate in hydrogen had been observed at last … فقد رُصِدت كثافة بوز اينشتاين في الهيدروجين ...	I
11	The green ball is one atom, the other is obscured under the "twin towers" وتمثل الكرة الخضراء إحدى الذرتين في حين تحجب الذرة الأخرى تحت " البرجين التوأمين".	I

Table 3(B) Summary of Table 3(A)

Arabic verb Pattern	I	II	III	IV	V	VI	VII	VIII	IX	X
Frequency	4	5	-	-	-	-	-	1	-	1

Summary Table (4) Combination of Tables 1(B), 2(B), 3(B)

Arabic verb Pattern	I	II	III	IV	V	VI	VII	VIII	IX	X
Frequency	13	8	1	2	-	-	-	2	-	1

3.4.1.2 English Passive Verbs Translated by Arabic Active Verbs

Table (5) Contrastive analysis of OE Text 1 and its TA counterpart

#	ST-TT
1	The cause of these long-term complications has now been shown to be excess glucose in the blood. لقد اتضح ألان إن هذه الاختلاطات بعيدة الأجل تنجم عن فرط كمية الكلوكوز في الدم...
2	If such conditions are met, there is no need to return islets to the pancreas-- وإذا تحققت هذه الشروط فلن يكون من الضروري وضع هذه الجزيرات داخل البنكرياس-
3	…, that rejection of an organ is triggered not by the primary constituents of an organ but by white blood cells, إن رفض الأعضاء المغترسة لا تحرضه المكونات الأساسية للعضو بل الخلايا (الكريات) البيضاء الموجودة داخل العضو.
4	The second signal is probably issued when foreign cells release certain small proteins, أما الإشارة الثانية فغالبا ما تصدر عندما تطلق الخلايا الغريبة مجموعة من البروتينات الصغيرة,
5	Our experiments were inspired by research reported in 1990 by Ali Naji … لقد استلهمنا تجاربنا من تقرير عن بحث أجراه في العام 1990 ...
6	…, untreated islets delivered to the same site were accepted by the recipients. ، جعل المتلقي يتقبل الجزيرات غير المعالجة المعطاة لاحقاً في المكان نفسه.
7	Plastic-coated droplets that are more biocompatible have been made and …diabetes temporarily in a patient. إن القطيرات الملبسة بغطاء بلاستيكي، والتي هي أكثر ملائمة من الناحية البيولوجية، كانت –حسب احد التقارير- قد تمكنت أو بشكل مؤقت،
8	If the islets are hidden from the immune system by encapsulation, وإذا حجبنا هذه الجزيرات عن جهاز المناعة بوساطة التغليف,

Table (6) Contrastive analysis of OE Text 2 and its TA counterpart

#	ST-TT
1	I received mail by the bagful and was forwarded dozens of jokes. , ووردتني عشرات من النكات التي تفوقت بهـا الفئران...
2	The human brain has approximately 100 billion nerve cells , or neurons , that are linked in networks to give rise … يمتلك الدماغ البشري مايقارب 100 بليون من العصبونات التي , يترابط بعضها ببعض في شبكات تؤدي ...
3	… to explain how memory is represented and stored in the brain . يفسر بها الكيفية التي تتمثل بها الذاكرة وتختزن في الدماغ ....
4	…., he proposed that a memory is produced when tow … فقد افترض, فيما يعرف ألان بقاعدة هب للتعلم, بأن الذاكرة تتولد حينما ينشط عصبونان مترابطان بشكل متزامن ...
5	Although LTP and LTD had been shown to depend on NMDA receptors, ومع ما بدا من اعتماد الظاهرتين .....,..... على المستقبلات النمداوية,
6	And the memory deficits of the knockout mice might have been caused by another, وربما يكون عوز الذاكرة لدى الفئران المنتقصة جينيا قد نجم عن شذوذ أخر غير متوقع....
7	I injected this gene into fertilized mouse eggs, where it was incorporated into the chromosomes…. ثم حقنت هذه الجينة داخل بيض ملقح لأحد الفئران, حيث اندمجت داخل الصبغيات وأنتجت فئرانا...
8	…and (was) produced genetically modified mice carrying the extra copy of the….. وأنتجت فئرانا محورة جينيا....
9	Intelligence is traditionally defined in dictionaries and by many experimental biologists as problem-solving ability. تعرف القواميس والعديد من البيولوجيين التجريبيين الذكاء تقليديا....
10	We placed into the pool a nearly invisible, clear Plexiglas platform that was almost but not quite as fall as water deep, so that it was just hidden beneath the surface. ووضعنا داخل الحوض رصيفا من زجاج البل كسي الرائق وغير المرئي تقريبا, ويعادل ارتفاعه- إلى حد ما- عمق الماء, بحيث يكاد يختفي عن الرؤية تحت سطح الماء.

Table (7) Contrastive analysis of OE Text 3 and its TA counterpart

#	ST-TT
1	The locations and motions of particles are fundamentally equivocal and ruled by probabilities. فمواضع وحركات الجسيمات هي من حيث الأساس ملتبسة وغير قابلة للتحديد وتحكمها الاحتمالات.
2	Even the idea of objects having distinct identities is radically modified for quantum particles. حتى إن الفكرة بان للأجسام هويات متمايزة تتغير جذرياً في حالة ...
3	Long-lived condensates with tunable interactions were developed earlier this year by Cornell and … لقد طورت مجموعة كورنيل وويمان في وقت سابق من عام 2000 ...
4	Atoms whose spins had been flipped dropped out of the trap – crescent – shaped ... فخرجت من المصيدة الذرات التي انقلبت سبيناتها واندفعت نبضات...
5	Matter-wave amplification does not mean that matter is created out of energy by the amplifier. ولا يعني تضخيم موجات المادة إن المادة تنشأ عن الطاقة بوساطة ...
6	Rather a small atom laser pulse is created in a BEC, وإنما تنشأ نبضة صغيره عن ليزر ذرات ...
7	The time-averaged orbiting potential magnetic trap has been adopted by several group … مصيدة الكمون الدوار المعدل زمنيا, وهي التي استخدمتها مجموعة كورنيل و ويمان في المعهد المشترك للفيزياء الفلكية المختبرية لاحداث اول كثافة غازية في عام 1995, ثم تبنتها عدة مجموعات بحثية.
8	The three groups that first demonstrated BECs in 1995 and 1996 were led by … قاد طلبة كلبنر وطلبتهم من بعدهم المجموعات الثلاث ...
9	In the first directed atom laser, atoms were propelled sideways out of the trap … كانت الحزم الليزرية تدفع الذرات جانبياً فتخرج من المصيدة ...
10	"Trilobite Molecule" of two rubidium atoms, 1,000 times larger than a typical diatomic molecule, could be formed within a condensate by appropriate laser … ويمكن أن يتشكل هذا الجزيء داخل كثافة بإثارة ليزرية مناسبة.

3.4.1.3 English Passive Verbs Translated by Nominalized Constructions

3.4.1.3.1 English Passive Verbs Translated by Nominalized Constructions with the Infinitive (المصدر)

Table 8(A) Contrastive analysis of OE Text 1 and its TA counterpart

#	ST-TT
1	…,though, a serious difficulty had to be resolved. كان علينا حل إحدى المعضلات الجدية,
2	The islets could be delivered simply by making a small incision near the navel and feeding the islets… , واحد أسباب هذا الاختيار كان سهولة الوصول إلى هذه الشبكة عبر إحداث شق صغير قرب السرة...
3	When we later increased the number to 800,000 some patients were freed from injections, وعندما رفعنا كمية الجزيرات المعطاة إلى 800000 تمكن بعض المرضى من الاستغناء عن حقن الأنسولين,
4	We also learned that islets preserved by freezing would function well and hence could be banked for future use. كما وجدنا أن الجزيرات المحفوظة بالتجميد ظلت قدرتها الوظيفية كما هي, وبالتالي صار من الممكن تخزينها للاستخدام مستقبلا.
5	Delivery into the portal vein can be performed with the help of local anesthesia for a few thousands dollars; , ويمكن إيصال الجزيرات إلى الوريد ألبابي أثناء التخدير الموضعي بكلفة لاتتجاوز بضعة ألاف من الدولارات
6	… rejection was prevented completely. وجدنا بأنه استطعنا تجنب عملية الرفض بشكل كامل.
7	Leukocytes in islets were then developed in our laboratory and others. وتم لاحقا تطوير طرائق أخرى عديدة تمكن من القضاء على الخلايا المنتقلة في مختبرنا وفي مختبرات اخرى.
8	Unfortunately, a central aspect of the procedures effective in rodents cannot be copied in humans. ولسوء الحظ فان جانبا أساسيا من هذه الطرائق الفعالة في القوارض غير صالح للتطبيق لدى الإنسان.
9	Investigators essentially handpick the islets they deliver to rodents, making sure that lymph nodes and other troublesome contaminants are excluded. فقد كان الباحثون يتعاملون مع هذه الجزيرات بأيديهم تمهيدا لاغترا سها في القوارض، متفحصينها بعناية للتأكد من خلوها من أي شوائب كالعقد اللمفاوية ...

10	Such a step is feasible when 1,500 islets are being transplanted … وتكون خطوة كهذه ممكنة عندما يدور الحديث حول 1500 جزيرة للتحضير لزرعها,
11	…, after cultured rat islets were placed in the portal vein of the liver in mice and supported by … وجاءت النتيجة لتؤكد إن إعطاء الخلايا المستنبتة في الوريد ألبابي ...
12	…, encourages optimism that human patients can be " preimmunized " with relatively few, ... إلى بث نوع من التفاؤل بأننا نستطيع تمنيع مرضى السكري ...
13	, carefully selected islets and then given the balance of the cells after tolerance has been induced. ... ، لنقوم لاحقاً بإعطاء الغرسة كاملة بعد إحداث التحمل لديهم ...
14	The main reason has to do with a growing consensus that type I diabetes is caused by autoimmune process, that differs from rejection, أما السبب الرئيسي لهذا فقد كان الإدراك المتزايد بأن آليات المناعة الذاتية المتسببة في حدوث داء السكري من النمط الأول ...
15	The biocompatibility of the device has since been improved. واستمر تطوير هذه الطريقة لتحسين توافقها الحيوي ...
16	The islets were protected from both immune rejection and autoimmune destruction. ... كانت الغرسات بمنأى عن الرفض المناعي والتخريب الناجم ...
17	…, the collected research in animals and patients strongly suggests that encapsulation of islets in a biocompatible membrane should be well tolerated. ,تشير نتائج الأبحاث التي أجريت حتى اليوم على الحيوانات ثم على البشر, بقوة إلى إن الجزيرات المتعلقة بغشاء متوافق حيوياً يمكن تحملها.
18	If enough islets are supplied, وإذا استطعنا تأمين الكمية الكافية .
19	Most of them relate to the demand that huge number of islets be implanted. ، ويتصل أكثرها بالحاجة إلى اغتراس الكثير من الجزيرات ،
20	If a way could be found to pack islets even … وإذا استطعنا إيجاد طريقة لرص الجزيرات ...
21	Before any device can be used on a wide scale, إلا انه قبل استعمال أي أداة على نطاق واسع ،
22	, and only approximately 1,000 pancreases are recovered. ومن هؤلاء يمكن الحصول على نحو الألف بنكرياس فقط .
23	They are drawn to this solution partly by the prospect that precursor cells able… واحد أسباب اختيارهم لهذا الحل يكمن في الأمل بإمكان ...

24	They are drawn to this solution partly by the prospect that precursor cells able to give rise to islets could be isolated and induced to produce islets in quantity. ... يكمن في الأمل بإمكان عزل الخلايا السليفة القادرة على التحول إلى جزيرات,
25	They are drawn to this solution partly by the prospect that precursor cells able to give rise to islets could be isolated and induced to produce islets in quantity. ... القادرة على التحويل إلى جزيرات وتحريضها على التحول إلى جزيرات بكميات لا بأس بها...
26	The cells could be obtained from beta cell tumors, ويمكن الحصول على هذه الخلايا من أورام الخلايا بيتا ...
27	… , and to ensure that the transplanted beta cells would not spawn tumors in the body, are being explored ويجرى ألان البحث عن طرائق لإعادة هذه القدرة إلى خلايا بيتا ...
28	… when hollow fibers containing dopamine-secreting cells are placed near the diseased area of the brain. ، فائدة مماثلة عند وضع ألياف مجوفة تحتوي على خلايا ...
29	Undoubtedly this roadblock, like those impeding the way to islet transplantation, will eventually be overcome. وبالتأكيد سيتم في النهاية التخلص من هذه العثرة إلى جانب ...

Table 8(B) Summary of Table 8(A)

English Passive – Arabic Infinitive		#
A	**Infinitives preceded by an initial verbal elements**	17
B	**Bare infinitives**	12
Total		29

Table 9(A) Contrastive analysis of OE Text 2 and its TA counterpart

#	ST-TT
1	... and memory were laid in 1349 , وقد تم وضع أسس فهم الآليات الجينية والجزيئية للتعلم ....
2	... In which one gene has been selectively inactivated, وهي فئران تم تحصيل إحدى الجينات بصورة انتقائية...
3	... because that is where most LTP and LTD studies have been conducted and because people لان هذه المنطقة هي التي حظيت بإجراء معظم الدراسات
4	We can expect many molecules that play a role in learning and memory to be identified in the coming years. إذ يمكننا أن نتوقع وجود عدة جزيئات تؤدي دورا في التعلم والذاكرة وينتظر تعرفها في التعلم والذاكرة وينتظر تعرفها في السنوات المقبلة.
5	The possible side effects of such drugs in humans, for example, would need to be carefully evaluated, أما التأثيرات الجانبية المحتملة لمثل هذه العقاقير لدى البشر- على سبيل المثال – فستتطلب تقييما دقيقا,
6	They have been genetically engineered to make more than the usual amount of a key subunit…. لقد جرى هندستها وراثيا (جينيا) بحيث تنتج كمية تفوق الكمية المعتادة ...
7	Could the same technique be used to enhance people's aability to learn and remember? هل يمكن استخدام التقنية ذاتها في تحسين مقدرة .....
8	The safety and ethical issues surrounding human genetic engineering would also need to be addressed, لابد من مواجهة قضايا السلامة والأخلاقيات .....

Table 9(B) Summary of Table 9(A)

English Passive – Arabic Infinitive		#
A	**Infinitives preceded by an initial verbal elements**	7
B	**Bare infinitives**	1
Total		8

Table 10(A) Contrastive analysis of OE Text 3 and its TA counterpart

#	ST-TT
1	Gaseous Bose-Einstein condensates were first created in the laboratory in 1995, لقد تم إنتاج كثافات بوز- اينشتاين الغازية للمرة الأولى ...
2	…, a full 70 years after the phenomenon was predicted by Albert Einstein based on … ، أي بعد 70 عاما من تنبؤ اينشتاين بالظاهرة استناداً إلى ...
3	Superfluid helium can be produced in large enough quantities for one to watch … فالهليوم الفائق الميوعة يمكن إنتاجه بكميات كبيرة تكفي ...
4	, sometimes that had never been achieved so directly in 60 years of work on Superfluid helium. وهذا شيء لم يسبق تحقيقه بهذه الصورة المباشرة على مدى ...
5	Essentially nothing can be done about liquid helium's density … ومن حيث الأساس لا يمكن عمل شيء بالنسبة إلى كثافة الهليوم ...
6	But the density of gaseous BECs can be adjusted by tightening … لكن كثافة كثافات بوز- اينشتاين الغازية يمكن تعديلها بشد المصايد المغنطيسية ...
7	… imagine how chemistry could be studied if we could weaken or strengthen the … ... تخيل كيف تكون دراسة الكيمياء لو كان بإمكاننا ...
8	The atom's interactions can be modified by so-called feshbach resonances, ويمكن تعديل تأثر الذرات باستخدام ما يسمى تجاوبات فيشباخ ،
9	… finally produced an atom laser that could be pointed in a direction other than down … وفي الوقت نفسه تقريبا أنتج فيليبس وزملاؤهما في المعهد ليزر ذرات يمكن توجيهه في اتجاه غير الاتجاه الأسفل
10	When the population of atoms in the single quantum state is amplified by … في بداية إحداث كثافة بوز-اينشتاين حينما يتم تضخيم مجموعة الذرات التي تشغل الحالة ...
11	Concurrent scattering of the light from a pump laser beam ensures that momentum and energy are probably conserved. إن الاستطارة المتزامنة للضوء من مضخة حزمة ليزرية تضمن الحفاظ على الاندفاع والطاقة بصورة صحيحة .

12	a. Vortex Lattices have been imaged in a stirred condensate of rubidium atoms … شبكات دوامات تم تصويرها في كثافة من ذرات الروبيديوم التي ...
13	The permanent magnets cannot be turned off, ولما كانت المغانط الدائمة لا يمكن إيقاف تشغيلها ...
14	So the condensate can only be imaged in Situ. فأن تصوير الكثافة لا يكون ممكناً ...
15	Visible light and standard laser techniques can be used … ففي غازات الذرات القلوية يمكن استخدام الضوء المرئي وتقنيات الليزر ...

Table 10(B) Summary of Table 10(A)

English Passive – Arabic Infinitive		#
A	**Infinitives preceded by an initial verbal elements**	13
B	**Bare infinitives**	2
Total		15

Summary Table (11) Combination of Tables 8(B), 9(B), 10(B)

English Passive – Arabic Infinitive		#
A	**Infinitives preceded by an initial verbal elements (total)**	37
B	**Bare infinitives (total)**	15
Total		52

3.4.1.3.2 Arabic Nominalized Constructions with the Passive Participle (اسم المفعول)

Table 12(A) Contrastive analysis of OE Text 1 and its TA counterpart

#	ST-TT
1	Once studies of immune suppressed patients demonstrated that transplanted islets could be induced to perform in recipients, وحالما أظهرت النتائج بأن الغرسات المعطاة للمرضى ألمثبطي المناعة كانت فعالة وظيفيا,
2	Two basic strategies have been pursued in animals for some time. ولفترة اعتمدت إستراتيجيتان أساسيتان لتحقيق هذا الغرض في التجارب المجراة على الحيوانات.
3	We are now testing a membrane that is made of similar material … ونختبر ألان غشاء مصنوعاً من مادة مشابهة ..
4	… transplantation across species should not trigger the rejection that would normally be expected. فان الاغتراس عبر الأنواع المختلفة لن يؤدي إلى الرفض المتوقع عادة .

Table 12(B) Summary of Table 12(A)

English Passive – Arabic Passive Participle / Sub-pattern		
A	**Passive participle Preceded by an initial verbal element**	1
B	**Bare Passive Participle**	3

Table 13(A) Contrastive analysis of OE Text 2 and its TA counterpart

#	ST-TT
1	But many types of knockout mice die at or before birth because the genes they lack are required for normal development. لان الجينات التي تفتقدها مطلوبة للتنامي الطبيعي .....
2	…., in which the mice were required to use visual cues… , حيث كان المطلوب من الفئران استعمال دالات أبصارية....

Table 13(B) Summary of Table 13(A)

English Passive – Arabic Passive Participle / Sub-pattern		
A	**Passive participle Preceded by an initial verbal element**	1
B	**Bare Passive Participle**	1

Table 14(A) Contrastive analysis of OE Text 3 and its TA counterpart

#	ST-TT
1	Most of the time the bizarre features of quantum mechanics <u>are hidden</u> behind a facade of classical physics. تكون المعالم الغريبة للميكانيك الكمومي <u>مختبئة</u> خلف واجهة من الفيزياء الكلاسيكية
2	These results <u>are now well understood</u> by sophisticated theoretical modeling … وأصبحت هذه النتائج ألان <u>مفهومة</u> تماما باستخدام ...
3	The atoms of BEC <u>are confined</u> in a magnetic trap by their … وتكون الذرات في كثافة بوز- اينشتاين <u>محصورة</u> في مصيدة مغنطيسية ...
4	The first atom laser <u>was powered</u> by gravity … وكان أول ليزر ذرات (<u>مزوداً</u> بقوة) الثقالة ...
5	The photons' waves <u>are unsynchronized</u>. وتكون موجات الفوتونات في الضوء العادي، كضوء المصباح الكهربائي، <u>غير متزامنة</u> ، في حين تكون الموجات كلها في ضوء الليزر ...

Table 14(B) Summary of Table 14(A)

English Passive – Arabic Passive Participle / Sub-pattern		
A	**Passive participle Preceded by an initial verbal element**	5
B	**Bare Passive Participle**	0

Summary Table (15) Combination of Tables (12), (13), (14)

English Passive – Arabic Passive Participle / Sub-pattern		
A	**Passive participle Preceded by an initial verbal element**	6
B	**Bare Passive Participle**	5

3.4.2 Comparable Corpus

As was already pointed out in Section (3.4) above, the three scientific texts of Original Arabic were each examined for all the finite passive verbs used there. This data analysis is reported in the three tables below, each on the data analysis of one of the OA three texts.

Table (16) Analysis of OA Text 1

#	**أربعة أنواع من الديدان الشريطية وحيدة الحيين من أمعاء الأسماك الشبوطية في العراق (OA1)**
1	...التي تصيب أمعاء أربعة أنواع من الأسماك الشبوطية التي اصطيدت من نهر دجلة في العراق .
2	هذه الديدان هي : قرنفلية براكيكولس .... التي جمعت من اسماك سلطان السمك...
3	,والقرنفلية المكشكشة... التي جمعت من اسماك ألحمري ...
4	,وقرنفلية فينكيا... التي جمعت من اسماك الشصان...
5	,والقرنفلية قليلة الكشكشة... التي جمعت من اسماك بنيني كبير الفم...
6	ويعد ذلك أول تسجيل للدودتين قرنفلية براكيوكولس والقرنفلية قليلة الكشكشة في العراق.
7	اجريت العديد من الدراسات التي شخصت الديدان الشريطية المتطفلة في الأسماك ,
8	وثمة نوعان من الكاويا قد درس نموهما الجنيني هما .....,..... بصورة تفصيلية ورائعة,
9	بتسجيل نوع الكاويا الأرمنية.... من اسماك ألحمري التي اصطيدت من نهر دجلة المار بمدينة الموصل .
10	وقد جمعت هذه الأسماك من قرب جسر الموصل القديم . عندما وجدت الديدان في الأمعاء. استخرجت وثبتت إما بفورمالين...
11	وقد جمعت هذه الأسماك من قرب جسر الموصل القديم . عندما وجدت الديدان في الأمعاء. استخرجت وثبتت إما بفورمالين...
12	وقد جمعت هذه الأسماك من قرب جسر الموصل القديم . عندما وجدت الديدان في الأمعاء. استخرجت وثبتت إما بفورمالين...

13	وقد جمعت هذه الأسماك من قرب جسر الموصل القديم . عندما وجدت الديدان في الأمعاء. استخرجت وثبتت إما بفورمالين...
14	وقد جمعت هذه الأسماك من قرب جسر الموصل القديم . عندما وجدت الديدان في الأمعاء. استخرجت وثبتت إما بفورمالين.. أو محلول بون ....ثم صبغت إما بصبغة الييماتوكسلين ...المخففة ....
15	بعدها نكزت بسلسلة متدرجة من الكحولات ومن ثم روقت في الزايلول وحملت ببلسم كندا . (الديدان).
16	بعدها نكزت بسلسلة متدرجة من الكحولات ومن ثم روقت في الزايلول وحملت ببلسم كندا . (الديدان).
17	بعدها نكزت بسلسلة متدرجة من الكحولات ومن ثم روقت في الزايلول وحملت ببلسم كندا . (الديدان).
18	فحصت الديدان ورسمت باستعمال الكاميرا الاستجلائية واخذت...
19	فحصت الديدان ورسمت باستعمال الكاميرا الاستجلائية واخذت...
20	فحصت الديدان ورسمت باستعمال الكاميرا الاستجلائية واخذت القياسات عن طريق...
21	...مع الشريحة المقسمة وصورت باستعمال الكاميرا المثبتة على المجهر. (الديدان).
22	,والغدد المحيه تنتشر إلى الخارج من انتشار ألخصي والبعض منها لوحظ خلف المبيض,(الغدد المحية)
23	...وان هذا النوع سبق أن سجل في اسماك نهر الزاب الكبير من قبل Rasheed و 1988) Hussain).
24	... وكذلك يعد المضيف الذي هو سمك الشصان...
25	لقد أورد ...1959 عشرة أنواع تابعة للجنس.... ويعتبر تسجيل هذا النوع من الديدان الشريطية أول تسجيل في العراق, إذ لم يتم ذكره في أي من الدراسات والأبحاث التي جرت في العراق,
26	,كما أن سمك بنيني كبير الفم يعد مضيفا جديدا لهذا النوع من الشريطيات.

Table (17) Analysis of OA Text 2

#	العصبونات الحركية المزودة لعضلات الوجه العلوية في النواة الحركية للعصب القحفي السابع (OA2)
1	استخدمت في هذه الدراسة طريقة التألق الحديثة,
2	, إذ زرقت العضلات العلوية للوجه بالصبغة التالقية ... وبصبغة زرقاء ايفانز واورنيثين,
3	إذ زرقت العضلات العلوية للوجه بالصبغة التألقية ...وبصبغة زرقاء ....., وأحدثت علامة في النواة الوجهية وفحصت بوساطة المجهر ألتألقي.
4	وخلافا لكثير من التقارير السابقة فقد وجد أن العصبونات الموشومة تحتل الجانب الوحشي للنواة.
5	وصفت النتائج مقارنة بمواد مصبوغة بصبغة نيسل ....
6	وصفت النتائج مقارنة بمواد مصبوغة بصبغة نيسل حضرت خصيصا لهذا الغرض...
7	وصفت النتائج مقارنة بمواد مصبوغة بصبغة نيسل حضرت خصيصا لهذا الغرض ونوقشت بالرجوع إلى ما...
8	استخدمت طرائق عدة لتحديد المجاميع المكونة للنواة الحركية للعصب الوجهي ...
9	بينما استخدم باحث آخر .....طريقة (1954,.....) في تشريب عينات آدمية بالفضة اخذت بعد الوفاة.
10	, ووجد توافقا بين النتائج التي حصل عليها وبين نتائج بابيز في وصفه الطبوغرافي...
11	إذ وجد ان عصبونات العضلات العلوية للوجه تحتل...
12	,وقبل كل شيء فإن المشكلة تعود إلى الأدوات البحثية المتوفرة آنذاك وليس إلى الاختلافات بين أنواع الحيوانات التي اجريت عليها التجارب.
13	استخدم في هذه التجارب ثمانية جرذان بيضاء
14	زرقت عضلة حول الحجاج في أربعة من هذه الجرذان بكمية تتراوح...
15	, بينما حقنت العضلة الجبهية في جرذين اثنين ب... من صبغة زرقاء...
16	...وتم تطهير المنطقة بكاملها ثم شرحت العضلة بعناية تحت المجهر الجراحي وحضرت المادة التالقية...
17	...وتم تطهير المنطقة بكاملها ثم شرحت العضلة بعناية تحت المجهر الجراحي وحضرت المادة التالقية..
18	...وتم تطهير المنطقة بكاملها ثم شرحت العضلة بعناية تحت المجهر الجراحي وحضرت المادة التالقية وزرقت فورا بواسطة محقن هاملتون مثبت إلى جهاز...
19	, وبعد الانتهاء من عملية الزرق تركت الابرة في مكانها لدقائق عدة ثم سحبت ببطء...
20	...تركت الابرة في مكانها لدقائق عدة ثم سحبت ببطء وقربت حافتا الجرح من بعضهما وتمت خياطته تركت الجرذان حية...
21	...تركت الابرة في مكانها لدقائق عدة ثم سحبت ببطء وقربت حافتا الجرح من بعضهما وتمت خياطته تركت الجرذان حية...
22	...ثم سحبت ببطء وقربت حافتا الجرح من بعضهما وتمت خياطته تركت الجرذان حية قرابة 48 ساعة قتلت بعدها بوساطة جرعة زائدة من بنتوبابيتون الصوديوم حقنت في البطن...

23	...وقربت حافتا الجرح من بعضهما وتمت خياطته تركت الجرذان حية قرابة 48 ساعة قتلت بعدها بوساطة جرعة زائدة من بنتوبابيتون الصوديوم حقنت في البطن أيضا,
24	...وقربت حافتا الجرح من بعضهما وتمت خياطته تركت الجرذان حية قرابة 48 ساعة قتلت بعدها بوساطة جرعة زائدة من بنتوبابيتون الصوديوم حقنت في البطن أيضا, وعلى الفور زرقت ....سم3 من الفورمالين 10% في ...
25	بعدها نزع الدماغ ووضع في الثلاجة في نفس المحلول الذي اضيف إليه .... من السكر وتم .... ,
26	, بعدها نزع الدماغ ووضع في الثلاجة في نفس المحلول الذي اضيف اليه .... من السكر وتم ....
27	, بعدها نزع الدماغ ووضع في الثلاجة في نفس المحلول الذي اضيف إليه .... من السكر وتم ....
28	بعدها نزع الدماغ ووضع في الثلاجة في نفس المحلول الذي اضيف اليه ... من السكر وتم ...ز... ,
29	, بعدها نزع الدماغ ووضع في الثلاجة في نفس المحلول الذي اضيف إليه .... من السكر وتم إحداث شق في قاعدته في نفس جهة العضلة التي تم حقنها, ثم قطع عرضيا باستخدام ميكروتوم مجمد .....
30	...وجمعت القطاعات كلها في نفس المحلول الذي حقن فيه الجرذ,
31	...وجمعت القطاعات كلها في نفس المحلول الذي حقن فيه الجرذ,
32	, ثم سجيت القطاعات بشكل متسلسل على شرائح زجاجية ...
33	...وتم فحص هذه الشرائح بدون أغطيه وقد استخدمت مرشحات ذات استثارة ضوئية...
34	...لفحص العينات التي وشمت بالمادة التالقية .....كما استخدمت مرشحات ...
35	كما استخدمت مرشحات ذات استثارة ضوئية طولها...
36	...لفحص العينات التي وشمت بصبغة زرقاء ايفانز.
37	صورت جميع الخلايا التي اومضت في مكان تجمعها فورا بفلم حساس ابيض واسود.
38	صورت جميع الخلايا التي اومضت في مكان تجمعها فورا بفلم حساس ابيض واسود.
39	قتل جرذان اثنان آخران بجرعة زائدة من الباربيتون في البطن...
40	قتل جرذان اثنان آخران بجرعة زائدة من الباربيتون في البطن وزرقت ب ... من الفورمالين في الابهر الصاعد وقطع جذع الدماغ عرضيا بسمك .....
41	... وقطع جذع الدماغ عرضيا بسمك ... باستخدام ميكروتوم مجمد واخذ كل ثاني قطاع وسجي على شريحة زجاجية مرقمة ومدهونة بالجلاتين .
42	...وصبغت القطاعات المسجاة بصبغة نيسل.
43	اختيرت صبغة ثيونين ...% لهذا الإجراء,
44	إذ اعيدت اماهة القطاعات وغمست لأقل من دقيقة في الصبغة ثم نزع الماء منها...

45	إذ اعيدت اماهة القطاعات وغمست لأقل من دقيقة في الصبغة ثم نزع الماء منها...
46	إذ اعيدت اماهة القطاعات وغمست لاقل من دقيقة في الصبغة ثم نزع الماء منها بتمريرها في...
47	إذ اعيدت اماهة القطاعات وغمست لاقل من دقيقة في الصبغة ثم نزع الماء منها بتمريرها في تركيزات عدة من الكحول ثم نقيت بالزايلين وغطيت. فحصت جميع الشرائح بالمجهر الضوئي وقد صورت...
48	إذ اعيدت اماهة القطاعات وغمست لاقل من دقيقة في الصبغة ثم نزع الماء منها بتمريرها في تركيزات عدة من الكحول ثم نقيت بالزايلين وغطيت. فحصت جميع الشرائح بالمجهر الضوئي وقد صورت قطاعات كاملة...
49	فحصت جميع الشرائح بالمجهر الضوئي وقد صورت قطاعات كاملة...
50	فحصت جميع الشرائح بالمجهر الضوئي وقد صورت قطاعات كاملة...
51	واستنسخت صور عن صورتين فوتوغرافيتين غير ملونتين,
52	واستخدمت الصور الملونة للنواة الوجهية لمقارنتها بالعصبونات الوجهية المتالقية.
53	...ولم تظهر هذه المقاطع اية خلايا موشومة.
54	الوصف التالي وصف عام للنتائج التي ظهرت بعد استخدام المادة التالقية مقارنة مع المواد المصبوغة بصبغة نيسل. وقد اعطيت نتائج مفصلة للتجارب...
55	, مع العصبونات التي صبغت بصبغة نيسل ثيونين لنفس النواة ...
56	...وتظهر الخلايا الوحشية قرصية أو اهليجية تبعا لميلانها...
57	وقد وجد أن الأعصاب الموشومة ...
58	...الأمر الذي يشكك في النتائج التي لوحظت عند استعمال ...
59	... في نواة العصب ألوجهي تظهر تألقا ابيض في المنطقة المحيطة للنواة. يظهر العصبون محتويا على حبيبات تالقية أخذتها الخلية...
60	...على جسم الخلية المحيط بالنواة التي تظهر جيدا بأنها لم تأخذ هذه الحبيبات...
61	...مع جهة الحقن الخلايا المغزلية الشكل من المجموعة الوحشية ... والتي وشمت بالمادة التالقية,
62	وتشاهد هذه الخلايا ممتدة باتجاه المجموعة الإنسية موشومة بالمادة...
63	في الجرذين الآخرين حقنت كمية قليلة نسبيا..... من صبغة زرقاء ايفانز مع ...
64	...في موقعها المجموعة الثانية من الخلايا التي وصفت باستخدام المادة التالقية ...
65	.... بصبغة زرقاء ايفانز اورنيثين موقعا وصف في الشكلين (3,4) على انه المجموعة الانسية للجزء الوحشي...
66	، الامر الذي قد يعزى اليه الاختلاف بين ...
67	... تم استخدام طريقة حديثة فزرقت كل من العضلة الجبهوية والعضلة حول الحجاج ...

Table (18) Analysis of OA Text 3

#	**الجمع بين عمليتي الكلورة والتخثير في معالجة المياه (OA3)**
1	تعتبر عمليات الترسيب ،
2	... ومن أهم المواد المخثرة التي تستخدم بشكل واسع في معالجة ...
3	ويعتبر استخدام الكلور الطريقة الأكثر ...
4	يضاف الكلور الى المياه على شكل ...
5	وغالباً يتم تصنيع الكلور وتعبئته في مصانع مركزية ومن ثم ينقل ....
6	وغالباً يتم تصنيع الكلور وتعبئته في مصانع مركزية ومن ثم ينقل ويوزع ....
7	وغالباً يتم تصنيع الكلور وتعبئته في مصانع مركزية ومن ثم ينقل ويوزع على الأماكن التي يستخدم فيها....
8	ومن هنا تبرز أهمية إنتاج الكلور في الموقع الذي يستخدم فيه لتفادي هذه الأخطار.
9	اجريت تجارب لإنتاج الكلور النشط ...
10	... وكمية الكلور التي يفترض الحصول عليها ...
11	وقد اجريت تجارب هذه المرحلة باستخدام ....
12	واضيفت جرعات مساوية من المواد المخثرة ...
13	تعتبر قيمة الرقم الهيدروجيني pH من اهم العوامل ...
14	، حيث يلاحظ ارتفاع معدل انتاج الكلور النشط ...
15	حيث يلاحظ انخفاض قيمة pH بزيادة ...
16	حيث يلاحظ ان التحليل الكهربائي لم يرفع قيمة ...
17	حيث يلاحظ ان زيادة تركيز كلوريد الألمنيوم في الالكتروليت ...
18	ونتائج التجارب التي اجريت ...
19	ويلاحظ وجود زيادة طفيفة في كفاءة معالجة المياه من المواد العالقة ...

3.5 Summary

This chapter comprised three main sections. One presented a description of the study corpus with its two sub-corpora whereas the other described the research methodology and procedures which the study adopted and used. The third and main section, however, contained a detailed report, in the form of descriptive tables, on the analysis of the data investigated in the study.

Chapter Four
Results of Data Analysis

4.1 Introduction

Just as Chapter Three was mainly descriptive, this chapter contains the analytical and, interpretive and contrastive parts of the thesis. It highlights the four options that are likely to be selected by English-Arabic translators when translating passive sentences from English into Arabic. The chapter also tries to find out why the translators chose one of the four translation alternatives rather than the other. Representative examples drawn from the study corpus are cited, grouped, and analyzed in an attempt to discover the conditioning factors behind the different alternatives open for the English-Arabic translator when dealing with the passive voice.

The first translation alternative in Arabic to the English passive verb that this chapter tackles is the translation of English passive verbs by Arabic passive verbs. This option is understood to be due to the fact that some translators tend sometimes to transfer the structure of the source language to the target language. However, it is also worth mentioning that in both English and Arabic verbs can be passivized anyway.

The second translation alternative is the translation of English passive verbs by Arabic active verbs. It has been already mentioned that Arabic tends to avoid using many passive verb forms and does not favor much use of them in its sentences. This is partly due to the fact that English and Arabic languages belong to two genetically different families. The Arabic language is not a member of the Germanic branch of

the Indo-European family and the formal structure of the Arabic language is much different from that of the English language.

The third alternative is the translation of English passive verbs by nominalized constructions. Two types of nominalized constructions were identified. The first type is when the Arabic translation equivalent uses an infinitive. The second type of nominalized structures in Arabic, and the fourth translation alternative at the same time, is the translation of the English passive verb by nominalized constructions with the passive participle.

Moreover, this chapter also contains a comprehensive comparison, both within and between, the parallel and the comparable corpora. This comparison is based on statistics obtained from the taxonomized descriptive tables in Chapter Three.

4.2 Results of Analyzing the Parallel Sub-Corpus

In this section, the data analysis of the parallel corpus which consists of three Original English texts together with their three Translated Arabic texts was scrutinized in an attempt to discover the conditioning factors behind the distribution of the four above-mentioned translation alternatives. This section is therefore subdivided into subsections, with each subsection dedicated to the investigation and discussion of one specific translation alternative out of the four ones.

4.2.1 English Passive Verbs Translated by Arabic Passive Verbs

A general look at the Arabic passive verbs in the three translated texts of the three ST articles, as reported in the tables of (3.4.1.1) of Chapter Three, would show that about half of them (13 out of 27) belong to Pattern I, viz. the basic trilateral verb *fa9ala.* The second largest number of the Arabic passive verbs (8 out of 27) belongs to Pattern II, viz. *fa99ala*. The rest of the Arabic passive verbs (6 out of 27) are distributed among Patterns III, IV, VIII and X.

The passive verb is used in Arabic when the agent is either *unknown* or it is *obvious* and thus "the attention of the hearer or reader is directed more to the person affected by the act (the patient) rather than to the doer or performer of it (the agent). Two out of the above-mentioned thirteen Arabic passive verbs, those which belong to Pattern I, are used in sentences where the agent is unknown or uncertain, i.e. can not be predicted, while the other eleven verbs are used when the agent is obvious.

The two passivized Arabic sentences in which the agent is deleted because it is unknown are:

1) ...يفسر بها الكيفية التي تتمثل بها الذاكرة وتختزن في الدماغ .[†]

**…to explain how memory is represented and stored in the brain … [Table 2(A), 1]

2) فعندما يحرم الدماغ من الدم...

When the brain is starved of blood, [Table 2(A), 9]

[†] The nouns which are marked by double underlining in the Arabic extracts represent the patients, viz. the recipients of the actions which are denoted by the underlined passivized verbs in each case rather than their agents.

** The code at the end of each extract refers to the number of a specific table in Chapter Three, whereas the concluding number indicates the sequence of the extract in that table.

On the other hand, in the remaining eleven Arabic passive sentences in which the verbs are formally passivized, the agents are deleted because they are *obvious* and predictable. In all these examples, the agents are understood to be "scientists" or "doctors". These eleven Arabic sentences are:

3) واحد العلاجات المثالية هو زرع جزيرات لانكرهانس التي يمكنها إعادة القدرة علي إنتاج الأنسولين. ونظريا, فانها ستزرع لمرة واحدة فقط ,

Because functional islets would restore proper insulin production and, in theory, would have to be implanted only once. [Table 1(A), 1]

4) وغُطيت هذه القطيرات الهشة بعدها بمادة بلاستيكية (جعلت على شكل كبسولات) ثم وضعت في التجويف ألبطني.

These fragile droplets were then coated with plastic and placed in the abdominal cavity. [Table 1(A), 7]

5) فيما يعرف ألان بقاعدة هب للتعلم,

In what is now known as Hebb's learning rule, [Table 2(A), 2]

6) ويكون هذا النقصان طويل الأمد كذلك , ويدعى الإخماد طويل الأمد,

The reduction is also long – lasting and is known as long – term depression …[Table 2(A), 3]

7) , ومن دون التعلم لا توجد ذاكرة تقاس

Without memory, one cannot measure learning; without learning, no memory exists to be assessed. [Table 2(A), 5]

8) ولكن ذلك الاختبار, الذي يدعى اختبار تعرف الأشياء لا يقيم إلا نمطا واحدا...

But that test, which is called an object- recognition task, assesses only one type of memory [Table 2(A), 6]

9) وتدعى هذه الشركة يوريكا للمستحضرات الطبية, وتقع ...

The newly incorporated firm is called Eureka pharmaceuticals. [Table 2(A), 7]

10) فللأجسام مواضع وحركات وهويات محددة وسلوكها يوصف بصورة صارمة تحكمها قوانين تحديديه.

…, and their behavior is rigidly prescribed by deterministic laws. [Table 3(A), 1]

11) ففي حين تحتجز مصيدة مغنطيسية الذرات, يُزال الجزء الأكثر سخونة من الذرات باستمرار...

While a magnetic trap holds the atoms, the hottest fraction of atoms is continuousl removed, [Table 3(A), 6]

12) فقد رُصِدت كثافة بوز اينشتاين في الهيدروجين ...

A Bose-Enstein condensate in hydrogen had been observed at last …

[Table 3(A), 10]

13) وتمثل الكرة الخضراء إحدى الذرتين في حين تحجب الذرة الأخرى تحت " البرجين التوأمين"

The green ball is one atom, the other is obscured under the "twin towers"

[Table 3(A), 11]

We will now turn our attention to the 8 Arabic passive verbs which belong to Pattern II, viz. *fa99ala*. As was just mentioned above, one of the typical situations for the use of the passive verbs in Arabic is when the doer of the action (the agent) is obviously understood or predictable. This can be seen in all the eight sentences below were the agent is obvious to refer to "doctors", "scientists" or "physicians". Examples of these eight Arabic sentences are:

14) وعُطيت هذه القطيرات الهشة بعدها بمادة بلاستيكية (جعلت على شكل كبسولات) ثم وضعت في التجويف ألبطني.

These fragile droplets were then coated with plastic and placed in the abdominal cavity. [Table 1(A), 5]

15) إن الجرذان التي سربت إلى أدمغتها عقاقير .

…that rats whose brains have been infused with drugs that block the NMDA …[Table 2(A), 4]

16) ...نعتقد أن الأدوات التي أوجدها جو وزملاؤه يمكن أن تترجم بسرعة إلى أساس لاكتشاف...

We believe the tools that Joe and his colleagues have developed can be translated pretty quickly into a basis for … [Table 2(A), 8]

17) حين يُبَرد الهليوم السائل إلى نحو 202 كلفن فوق الصفر ...

When liquid helium is cooled to within 2.2 Kelvin's of absolute …[Table 3(A), 2]

18) وتعرّف مثل هذه الحزم بليزرات الذرات ،

Such beams are known as atom lasers, [Table 3(A), 3]

19) ثم تضخّم هذه النبضة حين تتبع ذرات إضافية

…, and that pulse is amplified when … [Table 3(A), 5]

20) وتولّد حقولها المغنطيسية بتمرير تيار كهربائي ...

Their magnetic fields are produced by running current through …[Table 3(A), 7]

21) أصبح كلينر يُقدم في المؤتمرات على انه ...

Daniel Kleppner of M.I.T. would be introduced at conferences …[Table 3(A), 9]

Moreover, our data also contain two passive verbs which belong to Pattern IV, viz. *af9ala*, as can be seen from Table 1(A). Once more, the agent in these two instances is obvious and can be predicted to be "scientists" or "doctors". Furthermore, examining the relationship between the verb and the noun which precedes or follows it will show that it is a relationship of a verb with its patient (the recipient of the

action), as has been mentioned before. Therefore, the patient is foregrounded and all the interest is directed to the deputy subject as in the following examples:

22) كانت النتائج مشجعة. فقد أبدت الغرسات عند الأشخاص الذين اعطو 400000 جزيرة نشاطا وظيفيا,

The results were encouraging. In subjects who were given 400,000 islets, [Table 1(A), 2]

23) ونميل إلى الاعتقاد بأنه في الكثير من الحالات لم يعط المقدار الكافي من الجزيرات.

We suspect that in many cases too few islets were implanted for the individual's needs. [Table 1(A), 3]

As for Pattern VIII, viz. *ifta9ala*, a special explanation is required to understand the use of the passive here since such verb patterns do not commonly appear in the passive form in Arabic. Therefore, let us first examine the following two sentences:

24) ولفترة اعتمدت إستراتيجيتان أساسيتان لتحقيق هذا الغرض في التجارب المجراة على الحيوانات, قدم أحداهما سنيل من مختبر جاكسون في ولاية ماين في العام 1957,

Two basic strategies have been pursued in animals for some time. One such tactic is based on a suggestion made back in 1957 by George…[Table 1(A), 4]

25) تُحتجز ذرات الصوديوم المتوهجة في مصيدة مغنطيسية- ضوئية,

Glowing sodium atoms are held in a magneto-optical trap and … [Table 3(A), 8]

It is to be noted, however, that in the above two sentences, the agent obviously refers to "scientists" and the grammatical subject refers to non-human patients. In other words, the NPs in the above two sentences are not the agents but rather the patients or the recipients of the action. This then can explain why verbs of Pattern VIII can sometimes appear in a passivized form.

The following sentence is the only instance in which Pattern III, viz. *faa9ala*, is used in the passive form. A close look at the following example similarly shows that the double-underlined NP is the recipient of the act indicated by the verb. It is thus quite clear why the verb in this sentence is in the passive form. Furthermore, the agent here does not need to be named since it is obvious to be "doctors".

26) إضافة إلى هذا فان هناك نحو مليوني مصاب بالداء السكري من النمط الثاني يعالجون بالأنسولين ،

Moreover, about two million type II diabetics are treated with insulin, [Table 1(A), 6]

The last pattern that we have in the data belongs to Pattern X, viz. *istafa9ala*. In the following example, it is quite clear that the verb in this sentence is in the passive because the agent is deleted since it is obvious to be "scientists" and can thus be easily retrieved. Therefore, the patient is promoted and placed in the center of interest.

27) وتستخدم الحزم الذرية في العديد من التطبيقات العلمية ...

Atomic beams are already used in a Varity of scientific and … [Table 3(A), 4]

Finally, it can be concluded that in all of the above twenty seven instances where the English passive verb has been also translated by passive verbs in Arabic, the agent NPs have been deleted because they are "obvious", and can therefore be easily retrieved, or they are "unknown" and can not therefore be expressed. Moreover, the relationship between the underlined verbs in the Arabic sentences and the NPs marked with double underlining is that between a verb and its patient. The above data also show that some verbal patterns in Arabic, like patterns I and II, are used more commonly in the passive form than others like III and IX. This translation option, viz. translating ST passive verbs by passive verbs in Arabic, is the default option since

translators normally opt for literal translation unless they have a good reason to depart from the ST. The Arabic translations do retain the intra-sentential relationship of passivity exhibited by their ST original sentences.

4.2.2 English Passive Verbs Translated by Arabic Active Verbs

It was found in the data analyzed, as reported in Tables (5), (6), and (7), that another alternative was open for the English-Arabic translator when facing the problem of translating the English passive clauses; viz. to translate the English passive verbs by Arabic active verbs. Since translating the English passive verbs by Arabic active verbs may affect the amount of information that the source text contains and may distort the semantic inter-relationships within the sentence, this option must be carefully investigated in order to find out what makes it possible in Arabic. This is especially so since the sample text which we dealt with was translated by professional translators.

It is well known that Arabic tends not to use too many passive forms in its structures and tries to avoid using them. This tendency can partly be achieved by English-Arabic translators through replacing English passive verbs by Arabic active verbs. Out of a total number of 118 Arabic verbs which appear in the English-Arabic translated text, 28 are in the active form. A close look at these twenty eight Arabic active sentences shows that in 14 out of the 28 instances, the verb is used pseudo-intransitively in sentences where the grammatical subject is not the semantic agent but rather the patient. Thus, the close semantic relationship between passivized sentences in the English source text and their active-verb comparable sentences in Arabic has been maintained since the grammatical subject in both is not the agent, but the patient.

Therefore, translating these eleven English passive sentences into Arabic active sentences is justified and it helps the translator to avert making too much use of the passive constructions since Arabic does not favor passive forms, as mentioned before.

The following fourteen sentences occur in the three Translated Arabic texts. It is worth mentioning that the double-underlined grammatical subjects in all of these sentences are represented by non-human patients:

28) لقد اتضح الآن أن هذه الاختلاطات بعيدة الأجل تنجم عن فرط كمية الكلوكوز في الدم...

The cause of these long-term complications has now been shown to be excess glucose in the blood. [Table (5), 1]

29) وإذا تحققت هذه الشروط فلن يكون من الضروري وضع هذه الجزيرات داخل البنكرياس-

If such conditions are met, there is no need to return islets to the pancreas-

[Table (5), 2]

30) أما الإشارة الثانية فغالبا ما تصدر عندما تطلق الخلايا الغريبة مجموعة من البروتينات الصغيرة,

The second signal is probably issued when foreign cells release certain small proteins, [Table (5), 4]

31) إن القطيرات الملبسة بغطاء بلاستيكي، والتي هي أكثر ملائمة من الناحية البيولوجية، كانت –حسب احد التقارير- قد تمكنت,وبشكل مؤقت, من السيطرة على مستوى السكر في الدم.

Plastic-coated droplets that are more biocompatible have been made and … diabetes temporarily in a patient. [Table (5), 7]

32) يفسر بها الكيفية التي تتمثل بها الذاكرة وتختزن في الدماغ ....

… to explain how memory is represented and stored in the brain . [Table (6), 3]

33) ومع ما بدا من اعتماد الظاهرتين .....,..... على المستقبلات النمداوية,

Although LTP and LTD had been shown to depend on NMDA receptors, [Table (6), 5]

34) ثم حقنت هذه الجينة داخل بيض ملقح لأحد الفئران, حيث اندمجت داخل الصبغيات وأنتجت فئرانا...

I injected this gene into fertilized mouse eggs, where it was incorporated into the chromosomes…. [Table (6), 7]

35) وأنتجت فئرانا محورة جينيا....

…and (was) produced genetically modified mice carrying the extra copy of the….. [Table (6), 8]

36) ووضعنا داخل الحوض رصيفا من زجاج البلكسي الرائق وغير المرئي تقريبا, ويعادل ارتفاعه- إلى حد ما- عمق الماء, بحيث يكاد يختفي عن الرؤية تحت سطح الماء.

We placed into the pool a nearly invisible, clear Plexiglas platform that was almost but not quite as fall as water deep, so that it was just hidden beneath the surface. [Table (6), 10]

37) ... فخرجت من المصيدة الذرات التي انقلبت سبيناتها واندفعت نبضات...

Atoms whose spins had been flipped dropped out of the trap – crescent – shaped [Table (7), 4]

38) وإنما تنشأ نبضة صغيره عن ليزر ذرات ...

Rather a small atom laser pulse is created in a BEC, [Table (7), 6]

39) يمتلك الدماغ البشري مايقارب 100 بليون من العصبونات التي , يترابط بعضها ببعض في شبكات تؤدي ...

The human brain has approximately 100 billion nerve cells , or neurons , that are linked in networks to give rise …[Table (6), 2]

40) فقد افترض, فيما يعرف ألان بقاعدة هب للتعلم, بأن الذاكرة تتولد حينما ينشط عصبونان مترابطان بشكل متزامن...

…., he proposed that a memory is produced when tow …[Table (6), 4]

41) كانت الحزم الليزرية تدفع الذرات جانبياً فتخرج من المصيدة ...

In the first directed atom laser, atoms were propelled sideways out of the trap … [Table (7), 9]

As for the remaining fourteen sentences, the English passive verbs are translated by Arabic active verbs since it is clear that these verbs are not used pseudo-intransitively because the grammatical subject in all of them is the agent and not the patient. Moreover, Arabic does not tolerate agentive passives used in the English STs.

42) إن رفض الأعضاء المغترسة لا تحرضه المكونات الأساسية للعضو بل الخلايا (الكريات) البيضاء الموجودة داخل العضو.

…, that rejection of an organ is triggered not by the primary constituents of an organ but by white blood cells, [Table (5), 3]

43) لقد استلهمنا تجاربنا من تقرير عن بحث أجراه في العام 1990 ...

Our experiments were inspired by research reported in 1990 by Ali Naji …[Table (5), 5]

44) ، جعل المتلقي يتقبل الجزيرات غير المعالجة المعطاة لاحقاً في المكان نفسه.

…, untreated islets delivered to the same site were accepted by the recipients. [Table (5), 6]

45) حتى إن الفكرة بان للأجسام هويات متمايزة تتغير جذرياً في حالة ...

Even the idea of objects having distinct identities is radically modified for quantum particles [Table (7), 2]

46) وإذا حجبنا هذه الجزيرات عن جهاز المناعة بوساطة التغليف,

If the islets are hidden from the immune system by encapsulation, [Table (5), 8]

47) ووردتني عشرات من النكات التي تفوقت بهـا الفئران...

I received mail by the bagful and was forwarded dozens of jokes. [Table (6), 1]

48) وربما يكون عوز الذاكرة لدى الفئران المنتقصة جينيا قد نجم عن شذوذ أخر غير متوقع...

And the memory deficits of the knockout mice might have been caused by another, [Table (6), 6]

49) تعرف القواميس والعديد من البيولوجيين التجريبيين الذكاء تقليديا....

Intelligence is traditionally defined in dictionaries and by many experimental biologists as problem-solving ability. [Table (6), 9]

50) فمواضع وحركات الجسيمات هي من حيث الأساس ملتبسة وغير قابلة للتحديد وتحكمها الاحتمالات.

The locations and motions of particles are fundamentally equivocal and ruled by probabilities. [Table (7), 1]

51) لقد طورت مجموعة كورنيل وويمان في وقت سابق من عام 2000 ...

Long-lived condensates with tunable interactions were developed earlier this year by Cornell and … [Table (7), 3]

52) ولا يعني تضخيم موجات المادة إن المادة تنشأ عن الطاقة بوساطة ...

Matter-wave amplification does not mean that matter is created out of energy by the amplifier. [Table (7), 5]

53) مصيدة الكمون الدوار المعدل زمنيا, وهي التي استخدمتها مجموعة كورنيل و ويمان في المعهد المشترك للفيزياء الفلكية المختبرية لاحداث اول كثافة غازية في عام 1995, ثم تبنتها عدة مجموعات بحثية.

The time-averaged orbiting potential magnetic trap has been adopted by several group … [Table (7), 7]

54) قاد طلبة كلبنر وطلبتهم من بعدهم المجموعات الثلاث ...

The three groups that first demonstrated BECs in 1995 and 1996 were led by kleppner's students … [Table (7), 8]

55) ويمكن أن يتشكل هذا الجزيء داخل كثافة بإثارة ليزرية مناسبة.

"Trilobite Molecule" of two rubidium atoms, 1,000 times larger than a typical diatomic molecule, could be formed within a condensate by appropriate laser … [Table (7), 10]

4.2.3 English Passive Verbs Translated by Nominalized Constructions

As has been mentioned before, the passive finite verb in the English sample text has been translated by nominalized structures in Arabic in sixty two out of 118 cases. Two types of nominalized constructions were used in the translation of the English text. These types are nominalized constructions with an infinitive as their nominal complement (51 cases), and nominalized constructions with a passive participle as their complement (11 cases).

4.2.3.1 English Passive Verbs Translated by Arabic Nominalized Constructions with the Infinitive (المصدر)

It is worth mentioning that the passive verb in some English sentences in the study corpus was translated into Arabic by nominalized constructions with the infinitive, as reported in tables 8(A), 9(A), 10(A) in Chapter Three. The nominalized constructions with the infinitive can be seen to be divided into two types: (a) where the infinitive is preceded by an initial verbal element which belongs to a list of verbs among which are *kaana* 'to be', *tamma* 'completed', *yumkin* 'could be', and *istata'a* 'could be', (b) where the infinitive is bare. The following are the instances found in the study corpus of the first type above.

56) , واحد أسباب هذا الاختيار كان سهولة الوصول إلى هذه الشبكة عبر إحداث شق صغير قرب السرة...

The islets could be delivered simply by making a small incision near the navel and feeding the islets… [Table 8(A), 2]

57) كما وجدنا أن الجزيرات المحفوظة بالتجميد ظلت قدرتها الوظيفية كما هي, وبالتالي صار من الممكن تخزينها للاستخدام مستقبلا.

We also learned that islets preserved by freezing would function well and hence could be banked for future use. [Table 8(A), 4]

58) وجدنا بأنه استطعنا تجنب عملية الرفض بشكل كامل.

… rejection was prevented completely. [Table 8(A), 6]

59) وتم لاحقا تطوير طرائق أخرى عديدة تمكن من القضاء على الخلايا المنتقلة في مختبرنا وفي مختبرات اخرى.

Leukocytes in islets were then developed in our laboratory and others.

[Table 8(A), 7]

60) ... إلى بث نوع من التفاؤل بأننا نستطيع تمنيع مرضى السكري...

…, encourages optimism that human patients can be " preimmunized " with relatively few, [Table 8(A), 12]

61) واستمر تطوير هذه الطريقة لتحسين توافقها الحيوي ...

The biocompatibility of the device has since been improved. [Table 8(A), 15]

62) تشير نتائج الأبحاث التي أجريت حتى اليوم على الحيوانات ثم على البشر, بقوة إلى إن الجزيرات المتعلقة , بغشاء متوافق حيوياً يمكن تحملها.

…, the collected research in animals and patients strongly suggests that encapsulation of islets in a biocompatible membrane should be well tolerated. [Table 8(A), 17]

63) ومن هؤلاء يمكن الحصول على نحو الألف بنكرياس فقط .

, and only approximately 1,000 pancreases are recovered. [Table 8(A), 22]

64) وبالتأكيد سيتم في النهاية التخلص من هذه العثرة إلى جانب ...

Undoubtedly this roadblock, like those impeding the way to islet transplantation, will eventually be overcome. [Table 8(A), 29]

65) وقد تم وضع أسس فهم الآليات الجينية والجزيئية للتعلم ....

The foundations for understanding the molecular and genetic mechanisms of learning and memory were laid in 1349 , [Table 9(A), 1]

66) وهي فئران تم تحصيل إحدى الجينات بصورة انتقائية...

…. In which one gene has been selectively inactivated, [Table 9(A), 2]

67) لان هذه المنطقة هي التي حظيت بإجراء معظم الدراسات

…. because that is where most LTP and LTD studies have been conducted and because people [Table 9(A), 3]

68) لقد جرى هندستها وراثيا (جينيا) بحيث تنتج كمية تفوق الكمية المعتادة...

They have been genetically engineered to make more than the usual amount of a key subunit….[Table 9(A), 6]

69) لقد تم إنتاج كثافات بوز - اينشتاين الغازية للمرة الأولى ...

Gaseous Bose-Einstein condensates were first created in the laboratory in 1995, [Table 10(A), 1]

70) وفي الوقت نفسه تقريبا أنتج فيليبس وزملاؤهما في المعهد ليزر ذرات يمكن توجيهه في اتجاه غير الاتجاه الأسفل

… finally produced an atom laser that could be pointed in a direction other than down …[Table 10(A), 9]

71) في بداية إحداث كثافة بوز-اينشتاين حينما يتم تضخيم مجموعة الذرات التي تشغل الحالة ...

When the population of atoms in the single quantum state is amplified by …[Table 10(A), 10]

72) شبكات دوامات تم تصويرها في كثافة من ذرات الروبيديوم التي ...

a. Vortex Lattices have been imaged in a stirred condensate of rubidium atoms [Table 10(A), 12]

73) كان علينا حل إحدى المعضلات الجدية,

…,though, a serious difficulty had to be resolved. [Table 8(A), 1]

74) , ويمكن إيصال الجزيرات إلى الوريد ألبابي أثناء التخدير الموضعي بكلفة لاتتجاوز بضعة ألاف من الدولارات

Delivery into the portal vein can be performed with the help of local anesthesia for a few thousands dollars; [Table 8(A), 5]

75) ... كانت الغرسات بمنأى عن الرفض المناعي والتخريب الناجم ...

The islets were protected from both immune rejection and autoimmune destruction. [Table 8(A), 16]

76) وإذا استطعنا تأمين الكمية الكافية.

If enough islets are supplied, [Table 8(A), 18]

77) وإذا استطعنا إيجاد طريقة لرص الجزيرات ...

If a way could be found to pack islets even … [Table 8(A), 20]

78) ويمكن الحصول على هذه الخلايا من أورام الخلايا بيتا ...

The cells could be obtained from beta cell tumors, [Table 8(A), 26]

79) ويجرى ألان البحث عن طرائق لإعادة هذه القدرة إلى خلايا بيتا ...

… , and to ensure that the transplanted beta cells would not spawn tumors in the body, are being explored. [Table 8(A), 27]

80) إذ يمكننا أن نتوقع وجود عدة جزيئات تؤدي دورا في التعلم والذاكرة وينتظر تعرفها في التعلم والذاكرة وينتظر تعرفها في السنوات المقبلة.

We can expect many molecules that play a role in learning and memory to be identified in the coming years. [Table 9(A), 4]

81) أما التأثيرات الجانبية المحتملة لمثل هذه العقاقير لدى البشر- على سبيل المثال – فستتطلب تقييما دقيقا,

The possible side effects of such drugs in humans, for example, would need to be carefully evaluated, [Table 9(A), 5]

82) هل يمكن استخدام التقنية ذاتها في تحسين مقدرة ...

Could the same technique be used to enhance people's ability to learn and remember? [Table 9(A), 7]

83) فالهليوم الفائق الميوعة يمكن إنتاجه بكميات كبيرة تكفي ...

Superfluid helium can be produced in large enough quantities for one to watch ... [Table 10(A), 3]

84) وهذا شيء لم يسبق تحقيقه بهذه الصورة المباشرة على مدى ...

, sometimes that had never been achieved so directly in 60 years of work on Superfluid helium. [Table 10(A), 4]

85) ومن حيث الأساس لا يمكن عمل شيء بالنسبة إلى كثافة الهليوم...

Essentially nothing can be done about liquid helium's density …[Table 10(A), 5]

86) لكن كثافة كثافات بوز- اينشتاين الغازية يمكن تعديلها بشد المصايد المغنطيسية ...

But the density of gaseous BECs can be adjusted by tightening …[Table 10(A), 6]

87) ... تخيل كيف تكون دراسة الكيمياء لو كان بإمكاننا ...

… imagine how chemistry could be studied if we could weaken or strengthen the …[Table 10(A), 7]

88) ويمكن تعديل تأثر الذرات باستخدام ما يسمى تجاوبات فيشباخ ،

The atom's interactions can be modified by so-called feshbach resonances, [Table 10(A), 8]

89) إن الاستطارة المتزامنة للضوء من مضخة حزمة ليزرية تضمن الحفاظ على الاندفاع والطاقة بصورة صحيحة .

Concurrent scattering of the light from a pump laser beam ensures that momentum and energy are probably conserved. [Table 10(A), 11]

90) ولما كانت المغانط الدائمة لا يمكن إيقاف تشغيلها ...

The permanent magnets cannot be turned off, [Table 10(A), 13]

91) ففي غازات الذرات القلوية يمكن استخدام الضوء المرئي وتقنيات الليزر ...

Visible light and standard laser techniques can be used … [Table 10(A), 15]

To understand the use of the nominalized structure in the above mentioned constructions, let us have a close look at the infinitive (the nominal complements) and the NPs which follow or precede them and try to see the semantic relation between them. It can then be clearly seen that the noun phrase which receives the action of the infinitive is really the affected entity, viz. it assumes the role of a patient in these sentences. This is precisely the semantic relation in the above English STs that is found between the passive verbs and the NPs which precede them. It is this common semantic relation of passivity that makes it possible to translate the passive verbs in the English ST sentences by nominalized structures in their Arabic translation counterparts.

In the remaining instances, bare infinitives are used in Arabic for the translation of the English passive verbs. Sixteen out of fifty-one were detected of this type of nominalized constructions. The instances of these constructions with bare infinitives in the data are:

92) ولسوء الحظ فان جانبا أساسيا من هذه الطرائق الفعالة في القوارض غير صالح للتطبيق لدى الإنسان.

Unfortunately, a central aspect of the procedures effective in rodents cannot be copied in humans. [Table 8(A), 8]

93) فقد كان الباحثون يتعاملون مع هذه الجزيرات بأيديهم تمهيدا لاغترا سها في القوارض، متفحصينها بعناية للتأكد من خلوها من أي شوائب كالعقد اللمفاوية ...

Investigators essentially handpick the islets they deliver to rodents, making sure that lymph nodes and other troublesome contaminants are excluded. [Table 8(A), 9]

94) وتكون خطوة كهذه ممكنة عندما يدور الحديث حول 1500 جزيرة للتحضير لزرعها,

Such a step is feasible when 1,500 islets are being transplanted … [Table 8(A), 10]

95) وجاءت النتيجة لتؤكد إن إعطاء الخلايا المستنبتة في الوريد ألبابي ...

…, after cultured rat islets were placed in the portal vein of the liver in mice and supported by …[Table 8(A), 11]

96) أما السبب الرئيسي لهذا فقد كان الإدراك المتزايد بأن آليات المناعة الذاتية المتسببة في حدوث داء السكري من النمط الأول ...

The main reason has to do with a growing consensus that type I diabetes is cause by autoimmune process, that differs from rejection, [Table 8(A), 14]

97) ، ويتصل أكثرها بالحاجة إلى اغتراس الكثير من الجزيرات ،

Most of them relate to the demand that huge number of islets be implanted. [Table 8(A), 19]

98) إلا انه قبل استعمال أي أداة على نطاق واسع ،

Before any device can be used on a wide scale, [Table 8(A), 21]

99) واحد أسباب اختيارهم لهذا الحل يكمن في الأمل بإمكان ..

They are drawn to this solution partly by the prospect that precursor cells able…[Table 8(A), 23]

100) ... يكمن في الأمل بإمكان عزل الخلايا السليفة القادرة على التحول إلى جزيرات,

They are drawn to this solution partly by the prospect that precursor cells able to give rise to islets could be isolated and induced to produce islets in quantity. [Table 8(A), 24]

101) ... القادرة على التحويل إلى جزيرات وتحريضها على التحول إلى جزيرات بكميات لا بأس بها...

They are drawn to this solution partly by the prospect that precursor cells able to give rise to islets could be isolated and induced to produce islets in quantity. [Table 8(A), 25]

102) ، أي بعد 70 عاما من تنبؤ اينشتاين بالظاهرة استناداً إلى ...

…, a full 70 years after the phenomenon was predicted by Albert Einstein based on …[Table 10(A), 2]

103) فأن تصوير الكثافة لا يكون ممكناً ...

So the condensate can only be imaged in Situ [Table 10(A), 14]

104) وعندما رفعنا كمية الجزيرات المعطاة إلى 800000 تمكن بعض المرضى من الاستغناء عن حقن الأنسولين,

When we later increased the number to 800,000 some patients were freed from injections, [Table 8(A), 3]

105) ... ، لنقوم لاحقاً بإعطاء الغرسة كاملة بعد إحداث التحمل لديهم ...

, carefully selected islets and then given the balance of the cells after tolerance has been induced. [Table 8(A), 13]

106) ، فائدة مماثلة عند وضع ألياف مجوفة تحتوي على خلايا ...

…when hollow fibers containing dopamine-secreting cells are placed near the diseased area of the brain. [Table 8(A), 27]

107) لا بد من مواجهة قضايا السلامة والأخلاقيات...

The safety and ethical issues surrounding human genetic engineering would also need to be addressed, [Table 9(A), 8]

From all of the above examples, it is quite clear that the translator tends to render the passive form from the English source text by nominalized construction forms in Arabic. Since Arabic does not favor using many passive verbs, using a nominalized construction with the infinitive as a translation equivalent of the source English passive verb will give the translator the chance to preserve passivity in the source English sentences, as was explained above.

Therefore, from all the above mentioned, the role of the translator is important to determine whether to choose one of many alternatives in translating the English passive verbs, e.g. by nominalized structures.

4.2.3.2 English Passive Verbs Translated by Arabic Nominalized Constructions with the Passive Participle (اسم المفعول)

It was observed when analyzing the study corpus that English passive verbs can also be translated into Arabic by nominalized constructions with the passive participle as well. Eleven such instances were detected in the study data, as reported previously in Tables 12(A), 13(A), and 14(A) in Chapter Three. These can be divided into two sub-patterns since the passive participle is either preceded by an initial verbal element, as in:

108) وحالما أظهرت النتائج بأن الغرسات المعطاة للمرضى ألمثبطي المناعة كانت فعالة وظيفيا,

Once studies of immune suppressed patients demonstrated that transplanted islets could be induced to perform in recipients, [Table 12(A), 1]

Or the passive participle stands on its own without an initial verbal element, for example:

109) ونختبر الآن غشاء مصنوعاً من مادة مشابهة...

We are now testing a membrane that is made of similar material … [Table 12(A), 3]

In all the twelve instances mentioned above, the double underlined NPs which precede or follow the passive participles are affected by the action/state represented

by the passive participle. This relationship between the passive participle and the accompanying NP is similar to that of a passive verb with its patient NP. It is therefore important to notice that this relationship between the passive participle and the NP is the same semantic relationship which exists between the verbal element and the NP assuming the grammatical subject position of the passive constructions in both English and Arabic. This is the reason then which explains why it is possible to translate the passive sentences from English into Arabic with the passive participle. This possibility is yet another option open to the E-A translator when translating sentences with English passive verbs.

Let us now closely examine the following nine English passive sentences found in the corpora which were translated into Arabic nominalized constructions with passive participles. It can be observed that the ST passive verbs, as well as the TT passive participle constructions in all the following sentences refer to a state rather than to a process. In all the first six Arabic sentences below, the passive participles are preceded by verbal elements.

110) , حيث كان المطلوب من الفئران استعمال دالات إبصارية...

…., in which the mice were required to use visual cues… [Table 13(A), 2]

111) تكون المعالم الغريبة للميكانيك الكمومي مختبئة خلف واجهة من الفيزياء الكلاسيكية...

Most of the time the bizarre features of quantum mechanics are hidden behind a facade of classical physics. [Table 14(A), 1]

112) وأصبحت هذه النتائج الآن مفهومة تماما باستخدام ...

These results are now well understood by sophisticated theoretical modeling …

[Table 14(A), 2]

113) وتكون الذرات في كثافة بوز- اينشتاين محصورة في مصيدة مغنطيسية ...

The atoms of BEC are confined in a magnetic trap by their … [Table 14(A), 3]

114) وكان أول ليزر ذرات مزوداً بقوة الثقالة ...

The first atom laser was powered by gravity… [Table 14(A), 4]

115) وتكون موجات الفوتونات في الضوء العادي، كضوء المصباح الكهربائي، غير متزامنة ، في حين تكون الموجات كلها في ضوء الليزر...

The photons' waves are unsynchronized. [Table 14(A), 5]

As for the remaining five Arabic sentences, the passive participle in each stands on its own. These are:

116) ولفترة اعتمدت إستراتيجيتان أساسيتان لتحقيق هذا الغرض في التجارب المجراة على الحيوانات.

Two basic strategies have been pursued in animals for some time. [Table 12(A), 2]

117) فان الاغتراس عبر الأنواع المختلفة لن يؤدي إلى الرفض المتوقع عادة .

… transplantation across species should not trigger the rejection that would normally be expected. [Table 12(A), 4]

118) لان الجينات التي تفتقدها مطلوبة للتنامي الطبيعي ...

But many types of knockout mice die at or before birth because the genes they lack are required for normal development. [Table 13(A), 1]

4.3 Results of Analyzing the Comparable Corpus

As can be seen from Tables (16), (17) and (18) on the data analysis of the three Original Arabic texts in Chapter Three, a large number of passive verb forms were found to be used in Arabic scientific texts. This result is, however, somewhat unexpected since Arabic is known to be a language that does not favor much use of passive forms.

A quick look at the sample examples cited below from the above-mentioned Arabic texts is enough to show that the grammatical subjects in all of them are not the semantic agents but rather the goals or the patients, i.e. the recipients affected by the action of the verb. This, as was mentioned before, is the standard situation which justifies the use of the passive in English and Arabic.

A close look at Table (16) in Chapter Three shows that twenty-six finite passive verbs were specified and registered. The following are sample representative examples selected from Tables (16), (17), and (18) in Chapter Three: -

119) ...التي تصيب أمعاء أربعة أنواع من الأسماك الشبوطية التي اصطيدت من نهر دجلة في العراق.
[Table (16), 1]

120) ويعد ذلك أول تسجيل للدودتين قرنفلية براكيوكولس والقرنفلية قليلة الكشكشة في العراق.
[Table (16), 6]

121) فحصت الديدان ورسمت باستعمال الكاميرا الإستجلائية واخذت القياسات عن طريق...
[Table (16), 20]

122) , ووجد توافقا بين النتائج التي حصل عليها وبين نتائج بابيز في وصفه الطبوغرافي...
[Table (17), 10]

123) ...تركت الابرة في مكانها لدقائق عدة ثم سحبت ببطء وقربت حافتا الجرح من بعضهما وتمت خياطته تركت الجرذان حية...

[Table (17), 20]

124) ...وجمعت القطاعات كلها في نفس المحلول الذي حقن فيه الجرذ,

[Table (17), 30]

125) وغالباً يتم تصنيع الكلور وتعبئته في مصانع مركزية ومن ثم ينقل ....

[Table (18), 5]

126) ... وكمية الكلور التي يفترض الحصول عليها ...

[Table (18), 10]

127) ويلاحظ وجود زيادة طفيفة في كفاءة معالجة المياه من المواد العالقة ...

[Table (18), 19]

4.4 Comparison of Results of Analyzing the Parallel and Comparable Corpus

In order to compare between the frequency of finite passive verbs in the parallel sub-corpus, on the one hand, and the comparable sub-corpus, on the other, it was found out that comparing the total number of such verbs detected in the two sub corpora does not yield any meaningful results. This is because the texts in the two sub-corpora are different in their length and their total frequencies of passive verbs are therefore not directly comparable. In order to resolve this problem and make the two sub-corpora comparable, the *percentage* of finite passive verbs to the number of finite non-passive verbs in each sub-corpus was worked out and used in the comparison. Thus in both sub-corpora, each and every finite passive verb was counted and each and every finite verb was also counted. The percentage of passive verbs to the finite non-passive verbs in the six texts of each sub-corpus was consequently arrived at.

The results of the above mentioned comparison are reported in the three Tables below.

Table (19) Original English Texts

≠	OE1	OE2	OE3
All finite verbs	376	370	344
Finite passive verbs	58	31	46
percentages	%15.4	%8.3	%11.7
Overall percentage	%11,8		

Table (20) Translated Arabic Texts

≠	TA1	TA2	TA3
All finite verbs	460	466	447
Finite passive verbs	54	34	43
percentages	%11,7	%7.2	%9.6
Overall percentage	%9,5		

Table (21) Original Arabic Texts

≠	OA1	OA2	OA3
All finite verbs	113	312	237
Finite passive verbs	35	76	23
percentages	%30,9	%24.3	%9,7
Overall percentage	%21,6		

4.5Summary

The above sections and subsections of chapter four focused on the results of the data analysis which was conducted in the previous chapter of the study. Results based on the data analysis of both the parallel and comparable sub-corpora were highlighted and examined. The main results arrived at in this chapter could be briefly summarized in the following:

1. In this study, it has been shown that the replacement of the English passive verb by an Arabic passive verb was normally expected since the passive in both English and Arabic languages maintain the same relationship between the verb and its patient. Moreover, the English-Arabic translators have been tempted to follow the literal translation approach which is commonly and normally used in the translation process.

2. This study has also investigated the phenomenon of translating the English passive verb by an Arabic active verb. This is in line with the general observation that Arabic does not favor the use of passive verbs in their structures. In such case, it has been observed in the analysis of the previous sections that the translators tended to translate the English passive verb by an Arabic active verb while still retaining passivity in the translated Arabic sentence. and that was done when the recipient of the action (the patient) assumed the grammatical subject. Also another instance was found when translating the English passive verb by an Arabic active verb was that when the agent assumes the grammatical subject for both, the English passive sentences and the Arabic active sentences. Moreover, the rich morphological structure of Arabic which, permits Arabic and the English-Arabic translator's ample alternatives to express the passive.

3. The study has also dealt with the third translation alternative, which is translating the English passive verb by an Arabic nominalized construction with an infinitive. It was observed that the patterns of some Arabic verbs do not normally appear in the passive form. Therefore, using the nominalized construction with the infinitive was an option for the translator to retain the passivity of the original English source text in Arabic without having to use a passive verb.

4. The current study has found that translating the English passive verb by Arabic nominalized constructions with a passive participle was another option. This was possible since the semantic relationship (a state with a patient) between the passive participle and the preceding NPs in all Arabic translated sentences is the same with that, which exist between the verbal element and the NP assuming the grammatical subject position for both English and Arabic.

5. This study has also investigated the use of the passive constructions in the original Arabic texts of the comparable sub-corpus. It was found that the original Arabic texts used more passive verbs in their sentences as compared to the translated Arabic texts, as reported in tables (19), (20), and (21) of Section (4.4).

Chapter Five
Findings and Recommendations

5.1 Introduction

In this concluding chapter, the main objective is to round off the study by presenting a brief discussion of each of the four study questions which were posed in chapter one. This is what sections (5.2), (5.3), (5.4), and (5.5) are meant to do.

Each of these sections is opened with one of the four questions which constitute the main theme of discussion for that section. In each of the above four sections, the main findings which the study arrived at concerning one of the four questions are briefly presented, with some examples cited from the study corpus.

Chapter Five is then closed down by a section comprising recommendations for further research. These stress the tentative nature of the research findings of the present study and suggest further research avenues to replicate or supplement the present study in order to confirm, refute, or modify its findings.

5.2 Discussion of Findings Relevant to Question (1):

What are the alternative options for translating passive verbs from English into Arabic and which is / are more frequent?

It was found from Chapter Three that there were many options available to the translator for translating the English passive verb. The first intuitive translation alternative was to translate the English passive verb by an Arabic passive verb since

both English and Arabic languages can use the passive forms in their structures. It was observed that this translation option was rather common.

The present study revealed that out of the 118 passive verbs found in the three English texts, 27 of them were translated into passive verbs in the Translated Arabic texts, as reported in Table (4) in Chapter Three.

Another choice open to the translator was to translate the English passive verb by an Arabic active verb. It was already mentioned many times above that Arabic does not favor the use of the passive verb forms in their sentences. Therefore, English-Arabic translators tend to avoid using the passive verb and opt for the active form in many cases. The current study has shown that in 118 instances in the ST, Arabic used 28 active verbs for translating the English passive verbs in the Original English source texts.

The other available alternative is the translation of the English passive verb by Arabic nominalized constructions. These nominalized constructions were divided into two types: the one with the *infinitive* and the other with the *passive participle*. The first type of the nominalized constructions with the infinitive was found to be widely used in the translation of the English passive verb as compared with the number of the nominalized constructions with the passive participle. Fifty-two instances (out of 118) of the Arabic nominalized constructions with the infinitive were found in the translation of the English passive verbs, while only eleven instances (out of 118) of the nominalized constructions with the passive participle were detected.

5.3 Discussion of Findings Relevant to Question (2):

What are the conditioning factors behind opting for one of the translation alternatives, rather than the others?

The present study showed that there are four alternative options for translating the English passive verbs into Arabic:

5. Translating the English passive verb by an Arabic passive verb.
6. Translating the English passive verb by an Arabic active verb.
7. Translating English passive verbs by Arabic nominalized constructions with the infinitive.
8. Translating English passive verbs by Arabic nominalized constructions with the passive participle.

(A) In fact, choosing the first translation alternative was commonly used since translators normally tend to use the literal translation approach in the translation process and hence translate SL passive verbs into Arabic passive verbs. Moreover, it is worth-mentioning, that both English and Arabic languages can use the passive verb in their sentences. It was also observed, and pointed out in Chapter Three, that some verb patterns in Arabic were found more commonly in the passive form than others. So, this translation alternative can be considered to be the default situation which is expected in the absence of any restrictions which motive English-Arabic translator to resort to the other translation alternative options. For example:

فعندما يحرم الدماغ من الدم,

When the brain is starved of blood, [Table 2(A), 9]

(B) The present study found, that rendering the English passive verb by Arabic active verb was because Arabic does not favor the use of the passive verb in its sentences. Moreover, some verb patterns in Arabic can not be passivized. Moreover, translating the English passive verb by an Arabic active does not affect the amount of information that the source text contains. So, the translator managed to keep in Arabic the same semantic component of passivity of the original English source text. For example:

لقد اتضح الآن أن هذه الإختلاطات بعيدة الأجل تنجم عن فرط كمية الكلوكوز في الدم...

The cause of these long-term complications has now been shown to be excess [Table (5), 1]

(C) The current study has also found another trend, viz. the translation of the English passive verb by an Arabic nominalized construction with the infinitive. In fact, the nominalized constructions with the infinitive were widely used in the translated Arabic texts. Moreover, it has just been mentioned that some Arabic verbs belong to morphological patterns that do not take the passive form. Thus, translating the English passive verb by Arabic nominalized constructions with the infinitive would represent another translation option for such verbs. Besides, the semantic relation between the infinitive in such nominal Arabic constructions and the accompanying NP (patient) was found to be the same of a passive verb and its patient, and its NP in the English source text. For example:

واستمر تطوير هذه الطريقة لتحسين توافقها الحيوي ...

The biocompatibility of the device has since been improved. [Table 8(A), 15]

(D) It was also found that translating the English passive verb by Arabic nominalized constructions with a passive participle was still another translation option, though less commonly used. Only eleven (out of 118) instances were detected in Chapter Three. In fact, this translation alternative was used when the passive verb of the English source text was understood to refer to a state rather than an action. Moreover, the semantic relationship between the passive participle with its NP (patient) in all the instances in the study corpus was found to be the same with that which was found in the English source text. For example:

وأصبحت هذه النتائج الآن مفهومة تماما باستخدام ..

These results are now well understood by sophisticated theoretical modeling …[Table 14(A), 2]

5.4 Discussion of Findings Relevant to Question (3):

What differences are there in the frequency of passive verbs in translated Arabic texts as compared to Original Arabic texts?

In general, Arabic tends not to use too many passive forms in its structures and tries to avoid using them, whereas English tends to make abundant use of passive verbs, especially in its scientific texts. It was already remarked that the present study used six Arabic texts; three of them represent Translated Arabic texts, while the remaining three represent Original Arabic texts. It is worth mentioning that comparing the total number of the finite passive verbs in each or all of the three Translated Arabic texts with one or all of those in the Original Arabic will not yield any meaningful or comparable results since the two corpora are of a different size. Therefore, and in order to answer the above question, statistical percentages have

been used to compare between the Translated Arabic texts and the Original Arabic texts as was shown in Section (4.4) of Chapter Four. These statistic revealed that the percentage of the passive verbs in Translated Arabic texts was (%9,5), while that of the passive verbs in the Original Arabic texts was (%21,6) percentage. This large discrepancy is rather unexpected since Original Arabic texts were said to generally use fewer passive verbs. This made the researcher check and double-check the statistical figures, but the result did not change. The questions about the high percentage of passive verbs in OA texts remain open, however. Is this high percentage in Arabic characteristic of scientific texts only? What is the situation in non-scientific texts in Arabic? Or, is it because the study corpus is very limited, viz. only three OA texts? These, and many others, remain moot questions. This motivates the present researcher, as well as other researchers, to conduct further studies.

5.5 Discussion of Findings Relevant to Question (4):

What is characteristic about the frequency of the passive verbs in Translated Arabic texts, viz. their linguistics specificity, in this respect?

As was mentioned above, Arabic generally tends to use fewer passive verbs in its structures. In order to confirm this statement, a comparison was also conducted between the frequency of finite passive verbs in the Translated Arabic texts and that of Original English source texts on the one hand, and between the Translated Arabic texts and the Original Arabic texts, on the other hand. The findings of this comparison showed that the frequency percentage of the finite passive verbs in Translated Arabic texts was (%9,5) whereas that in the Original English source texts was (%11,8) and of

the Original Arabic texts was (%21,6), as reported in Tables (19, 20, 21) in Section (4.4) of Chapter Four.

As can be seen from the above, Translated Arabic texts used less finite passive verbs in its texts, compared to Original texts, both in English and in Arabic. For Translated Arabic texts to exhibit fewer passive verbs than both OE texts and OA texts can be understood and explained by reference to various facts. First, Arabic does not in general prefer much use of passive verbs in its texts. Second, the rich morphology of Arabic as a language, compared to that of English, enables the former to express passivity by many linguistic means, other than by passive verbs. Nominalized constructions, as well as even active verbs of some verbal patterns, were found to be able to express passivity as alternatives for passive verbs. However, the use of a far less percentage of passive verbs in Translated Arabic texts, compared to Original Arabic texts, is hard to understand and explain at this stage of our research. To shed more light on this particular issue, it was already said in the previous section above, that both different and larger study corpora are needed in further research.

5.6 Recommendations for Further Research

The results and findings of the present study must only be taken as tentative due to limitations of time and space. The following recommendations are therefore made to complement the present research so as to arrive at more reliable results.

1. Larger study corpora need to be searched to investigate the phenomenon of passivization in Translated and Original Arabic texts. The results of such

replication studies are badly needed to confirm, adapt, or refute those of the present study.

2. Different types of texts, viz. other than scientific texts, are to be studied. Thus literary, legal, journalistic, as well as other types of text can be studied and the results can be compared with those of the present study.

3. Original Arabic texts are to be analyzed not only for their use of passive verbs but also for other linguistic means of expressing the passivity in Arabic, e.g. by using some active verbs, nominalized structures, etc. Such a broader analysis of passivization in OA texts will reveal more balanced and comprehensive results.

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Appendices

Appendix 1

E-A Parallel Corpus

"Treating diabetes with transplanted cells"
and
"معالجة الداء السكري بزرع الخلايا"

#	ST-TT	Tax.
1	The cause of these long-term complications has now been shown to be excess glucose in the blood. لقد اتضح ألان إن هذه الاختلاطات بعيدة الأجل تنجم عن فرط كمية الكلوكوز في الدم...	2
2	...Because functional islets would restore proper insulin production and, in theory, would have to be implanted only once. ...واحد العلاجات المثالية هو زرع جزيرات لانكرهانس التي يمكنها إعادة القدرة على إنتاج الأنسولين. ونظريا, فإنها ستزرع لمرة واحدة فقط;	1
3	…,though, a serious difficulty had to be resolved. كان علينا حل إحدى المعضلات الجدية,	3A
4	The islets could be delivered simply by making a small incision near the navel and feeding the islets… , واحد أسباب هذا الاختيار كان سهولة الوصول إلى هذه الشبكة عبر إحداث شق صغير قرب السرة...	3A
5	If such conditions are met, there is no need to return islets to the pancreas- وإذا تحققت هذه الشروط فلن يكون من الضروري وضع هذه الجزيرات داخل البنكرياس-	2
6	The results were encouraging. In subjects who were given 400,000 islets, كانت النتائج مشجعة. فقد أبدت الغرسات عند الأشخاص الذين اعطو 400000 جزيرة نشاطا وظيفيا,	1
7	When we later increased the number to 800,000 some patients were freed from injections, وعندما رفعنا كمية الجزيرات المعطاة إلى 800000 تمكن بعض المرضى من الاستغناء عن حقن الأنسولين,	3A

8	We also learned that islets preserved by freezing would function well and hence could be banked for future use. كما وجدنا أن الجزيرات المحفوظة بالتجميد ظلت قدرتها الوظيفية كما هي, وبالتالي صار من الممكن تخزينها للاستخدام مستقبلا.	3A
9	We suspect that in many cases too few islets were implanted for the individual's needs. ونميل إلى الاعتقاد بأنه في الكثير من الحالات لم يعط المقدار الكافي من الجزيرات.	1
10	Delivery into the portal vein can be performed with the help of local anesthesia for a few thousands dollars; , ويمكن إيصال الجزيرات إلى الوريد ألبابي أثناء التخدير الموضعي بكلفة لاتتجاوز بضعة ألاف من الدولارات	3A
11	Once studies of immunosuppressed patients demonstrated that transplanted islets could be induced to perform in recipients, وحالما أظهرت النتائج بأن الغرسات المعطاة للمرضى ألمثبطي المناعة كانت فعالة وظيفيا,	3B
12	Two basic strategies have been pursued in animals for some time. ولفترة اعتمدت إستراتيجيتان أساسيتان لتحقيق هذا الغرض في التجارب المجراة على الحيوانات.	3B
13	Two basic strategies have been pursued in animals for some time. One such tactic is based on a suggestion made back in 1957 by George D.Snell… ولفترة اعتمدت إستراتيجيتان أساسيتان لتحقيق هذا الغرض في التجارب المجراة على الحيوانات, قدم أحداهما سنيل من مختبر جاكسون في ولاية ماين في العام 1957,	1
14	…, that rejection of an organ is triggered not by the primary constituents of an organ but by white blood cells, إن رفض الأعضاء المغترسة لا تحرضه المكونات الأساسية للعضو بل الخلايا (الكريات) البيضاء الموجودة داخل العضو.	2

15	The second signal is probably issued when foreign cells release certain small proteins, أما الإشارة الثانية فغالبا ما تصدر عندما تطلق الخلايا الغريبة مجموعة من البروتينات الصغيرة,	2
16	… rejection was prevented completely. وجدنا بأنه استطعنا تجنب عملية الرفض بشكل كامل.	3A
17	Leukocytes in islets were then developed in our laboratory and others. وتم لاحقا تطوير طرائق أخرى عديدة تمكن من القضاء على الخلايا المنتقلة في مختبرنا وفي مختبرات اخرى.	3A
18	Unfortunately, a central aspect of the procedures effective in rodents cannot be copied in humans. ولسوء الحظ فان جانبا أساسيا من هذه الطرائق الفعالة في القوارض غير صالح للتطبيق لدى الإنسان.	3A
19	Investigators essentially handpick the islets they deliver to rodents, making sure that lymph nodes and other troublesome contaminants are excluded. فقد كان الباحثون يتعاملون مع هذه الجزيرات بأيديهم تمهيدا لاغترا سها في القوارض، متفحصينها بعناية للتأكد من خلوها من أي شوائب كالعقد اللمفاوية ...	3A
20	Such a step is feasible when 1,500 islets are being transplanted … وتكون خطوة كهذه ممكنة عندما يدور الحديث حول 1500 جزيرة للتحضير لزرعها,	3A
21	Our experiments were inspired by research reported in 1990 by Ali Naji … لقد استلهمنا تجاربنا من تقرير عن بحث أجراه في العام 1990 ...	2
22	…, after cultured rat islets were placed in the portal vein of the liver in mice and supported by … وجاءت النتيجة لتؤكد إن إعطاء الخلايا المستنبتة في الوريد ألبابي ...	3A
23	…, untreated islets delivered to the same site were accepted by the recipients. ، جعل المتلقي يتقبل الجزيرات غير المعالجة المعطاة لاحقاً في المكان نفسه.	2

24	…, encourages optimism that human patients can be " preimmunized " with relatively few, ... إلى بث نوع من التفاؤل بأننا نستطيع *تمنيع* مرضى السكري ...	3A
25	, carefully selected islets and then given the balance of the cells after tolerance has been induced. ... ، لنقوم لاحقاً بإعطاء الغرسة كاملة بعد إحداث التحمل لديهم ...	3A
26	The main reason has to do with a growing consensus that type I diabetes is caused by autoimmune process, that differs from rejection, أما السبب الرئيسي لهذا فقد كان الإدراك المتزايد بأن آليات المناعة الذاتية المتسببة في حدوث داء السكري من النمط الأول ...	3A
27	The biocompatibility of the device has since been improved. واستمر تطوير هذه الطريقة لتحسين توافقها الحيوي ...	3A
28	These fragile droplets were then coated with plastic and placed in the abdominal cavity. وغُطيت هذه القطيرات الهشة بعدها بمادة بلاستيكية (جعلت على شكل كبسولات) ثم وضعت في التجويف ألبطني.	1
29	These fragile droplets were then coated with plastic and placed in the abdominal cavity. وغُطيت هذه القطيرات الهشة بعدها بمادة بلاستيكية (جعلت على شكل كبسولات) ثم وضعت في التجويف ألبطني.	1
30	Plastic-coated droplets that are more biocompatible have been made and diabetes temporarily in a patient. إن القطيرات الملبسة بغطاء بلاستيكي، والتي هي أكثر ملائمة من الناحية البيولوجية، كانت –حسب احد التقارير- قد تمكنت أو بشكل مؤقت، من السيطرة على مستوى السكر في الدم.	2

31	The islets were protected from both immune rejection and autoimmune destruction. ... كانت الغرسات بمنأى عن الرفض المناعي والتخريب الناجم ...	3A
32	…, the collected research in animals and patients strongly suggests that encapsulation of islets in a biocompatible membrane should be well tolerated. ,تشير نتائج الأبحاث التي أجريت حتى اليوم على الحيوانات ثم على البشر, بقوة إلى إن الجزيرات المتعلقة بغشاء متوافق حيوياً يمكن تحملها.	3A
33	If enough islets are supplied, وإذا استطعنا تأمين الكمية الكافية .	3A
34	Most of them relate to the demand that huge number of islets be implanted. ، ويتصل أكثرها بالحاجة إلى اغتراس الكثير من الجزيرات ،	3A
35	We are now testing a membrane that is made of similar material … ونختبر ألان غشاء مصنوعاً من مادة مشابهة ..	3B
36	If a way could be found to pack islets even … وإذا استطعنا إيجاد طريقة لرص الجزيرات ...	3A
37	Before any device can be used on a wide scale, إلا انه قبل استعمال أي أداة على نطاق واسع ،	3A
38	Moreover, about two million type II diabetics are treated with insulin, إضافة إلى هذا فان هناك نحو مليوني مصاب بالداء السكري من النمط الثاني يعالجون بالأنسولين ،	1
39	, and only approximately 1,000 pancreases are recovered. ومن هؤلاء يمكن الحصول على نحو الألف بنكرياس فقط .	3A
40	They are drawn to this solution partly by the prospect that precursor cells able… واحد أسباب اختيارهم لهذا الحل يكمن في الأمل بإمكان ...	3A

41	They are drawn to this solution partly by the prospect that precursor cells able to give rise to islets could be isolated and induced to produce islets in quantity. ... يكمن في الأمل بإمكان عزل الخلايا السليفة القادرة على التحول إلى جزيرات,	3A
42	They are drawn to this solution partly by the prospect that precursor cells able to give rise to islets could be isolated and induced to produce islets in quantity. ... القادرة على التحويل إلى جزيرات وتحريضها على التحول إلى جزيرات بكميات لا بأس بها...	3A
43	The cells could be obtained from beta cell tumors, ويمكن الحصول على هذه الخلايا من أورام الخلايا بيتا ...	3A
44	… , and to ensure that the transplanted beta cells would not spawn tumors in the body, are being explored ويجرى ألان البحث عن طرائق لإعادة هذه القدرة إلى خلايا بيتا ...	3A
45	If the islets are hidden from the immune system by encapsulation, وإذا حجبنا هذه الجزيرات عن جهاز المناعة بوساطة التغليف,	2
46	… transplantation across species should not trigger the rejection that would normally be expected. فان الاغتراس عبر الأنواع المختلفة لن يؤدي إلى الرفض المتوقع عادة .	3B
47	… when hollow fibers containing dopamine-secreting cells are placed near the diseased area of the brain. ، فائدة مماثلة عند وضع ألياف مجوفة تحتوي على خلايا ...	3A
48	Undoubtedly this roadblock, like those impeding the way to islet transplantation, will eventually be overcome. وبالتأكيد سيتم في النهاية التخلص من هذه العثرة إلى جانب ...	3A

Appendix 2
E-A Parallel Corpus

"Building a brainier mouse"
and
"إنتاج فئران أكثر ذكاء"

#	ST-TT	Tax.
1	I received mail by the bagful and was forwarded dozens of jokes. , ووردتني عشرات من النكات التي تفوقت بهـا الفئران...	2
2	The human brain has approximately 100 billion nerve cells , or neurons , that are linked in networks to give rise … **يمتلك الدماغ البشري مايقارب 100 بليون من العصبونات التي , يترابط بعضها ببعض في شبكات تؤدي ..**	2
3	... and memory were laid in 1349 , وقد تم وضع أسس فهم الآليات الجينية والجزيئية للتعلم	3A
4	… to explain how memory is represented and stored in the brain . يفسر بها الكيفية التي تتمثل بها الذاكرة وتختزن في الدماغ	2
5	… to explain how memory is represented and stored in the brain … يفسر بها الكيفية التي تتمثل بها الذاكرة وتختزن في الدماغ	1
6	In what is now known as Hebb's learning rule , , فيما يعرف ألان بقاعدة هب للتعلم,	1
7	…., he proposed that a memory is produced when tow … فقد افترض, فيما يعرف ألان بقاعدة هب للتعلم, بأن الذاكرة تتولد حينما ينشط عصبونان مترابطان بشكل متزامن ...	2
8	The reduction is also long – lasting and is known as long – term depression … ويكون هذا النقصان طويل الأمد كذلك , ويدعى الإخماد طويل الأمد ,	1
9	Although LTP and LTD had been shown to depend on NMDA receptors, ومع ما بدا من اعتماد الظاهرتين .....,..... على المستقبلات النمداوية,	2

10	…that rats whose brains have been infused with drugs that block the NMDA … إن الجرذان التي سربت إلى أدمغتها عقاقير	1
11	…. In which one gene has been selectively inactivated, وهي فئران تم تحصيل إحدى الجينات بصورة انتقائية...	3A
12	But many types of knockout mice die at or before birth because the genes they lack are required for normal development. لان الجينات التي تفتقدها مطلوبة للتنامي الطبيعي	3B
13	…. because that is where most LTP and LTD studies have been conducted and because people لان هذه المنطقة هي التي حظيت بإجراء معظم الدراسات	3A
14	And the memory deficits of the knockout mice might have been caused by another, وربما يكون عوز الذاكرة لدى الفئران المنتقصة جينيا قد نجم عن شذوذ أخر غير متوقع....	2
15	I injected this gene into fertilized mouse eggs, where it was incorporated into the chromosomes…. ثم حقنت هذه الجينة داخل بيض ملقح لأحد الفئران, حيث اندمجت داخل الصبغيات وأنتجت فئرانا...	2
16	…and (was) produced genetically modified mice carrying the extra copy of the….. وأنتجت فئرانا محورة جينيا....	2
17	Without memory, one cannot measure learning; without learning, no memory exists to be assessed. , ومن دون التعلم لا توجد ذاكرة تقاس.	1
18	…., in which the mice were required to use visual cues… , حيث كان المطلوب من الفئران استعمال دالات أبصارية....	3B

19	We can expect many molecules that play a role in learning and memory to be identified in the coming years. إذ يمكننا أن نتوقع وجود عدة جزيئات تؤدي دورا في التعلم والذاكرة وينتظر تعرفها في التعلم والذاكرة وينتظر تعرفها في السنوات المقبلة.	3A
20	Intelligence is traditionally defined in dictionaries and by many experimental biologists as problem-solving ability. تعرف القواميس والعديد من البيولوجيين التجريبيين الذكاء تقليديا....	2
21	The possible side effects of such drugs in humans, for example, would need to be carefully evaluated, أما التأثيرات الجانبية المحتملة لمثل هذه العقاقير لدى البشر- على سبيل المثال – فستتطلب تقييما دقيقا,	3A
22	They have been genetically engineered to make more than the usual amount of a key subunit…. لقد جرى هندستها وراثيا (جينيا) بحيث تنتج كمية تفوق الكمية المعتادة...	3A
23	Could the same technique be used to enhance people's ability to learn and remember ? هل يمكن استخدام التقنية ذاتها في تحسين مقدرة	3A
24	The safety and ethical issues surrounding human genetic engineering would also need to be addressed, لابد من مواجهة قضايا السلامة والأخلاقيات	3A
25	But that test, which is called an object- recognition task, assesses only one type of memory. ولكن ذلك الاختبار, الذي يدعى اختبار تعرف الأشياء لا يقيم إلا نمطا واحدا...	1

26	We placed into the pool a nearly invisible, clear Plexiglas platform that was almost but not quite as fall as water deep, so that it was just hidden beneath the surface. ووضعنا داخل الحوض رصيفا من زجاج البل كسي الرائق وغير المرئي تقريبا, ويعادل ارتفاعه- إلى حد ما- عمق الماء, بحيث يكاد يختفي عن الرؤية تحت سطح الماء.	2
27	The newly incorporated firm is called Eureka pharmaceuticals. وتدعى هذه الشركة يوريكا للمستحضرات الطبية, وتقع ...	1
28	We believe the tools that Joe and his colleagues have developed can be translated pretty quickly into a basis for … ...نعتقد أن الأدوات التي أوجدها جو وزملاؤه يمكن أن تترجم بسرعة إلى أساس لاكتشاف...	1
29	When the brain is starved of blood, فعندما يحرم الدماغ من الدم,	1

Appendix 3
E-A Parallel Corpus

"The coolest gas in the universe"
and
"أبرد غاز في الكون"

#	ST-TT	Tax.
1	Most of the time the bizarre features of quantum mechanics are hidden behind a facade of classical physics. تكون المعالم الغريبة للميكانيك الكمومي مختبئة خلف واجهة من الفيزياء الكلاسيكية	3B
2	…, and their behavior is rigidly prescribed by deterministic laws. فللأجسام مواضع وحركات وهويات محددة وسلوكها يوصف بصورة صارمة تحكمها قوانين تحديديه.	1
3	The locations and motions of particles are fundamentally equivocal and ruled by probabilities. فمواضع وحركات الجسيمات هي من حيث الأساس ملتبسة وغير قابلة للتحديد وتحكمها الاحتمالات.	2
4	Even the idea of objects having distinct identities is radically modified for quantum particles. حتى إن الفكرة بان للأجسام هويات متمايزة تتغير جذرياً في حالة ...	2
5	Gaseous Bose-Einstein condensates were first created in the laboratory in 1995, لقد تم إنتاج كثافات بوز- اينشتاين الغازية للمرة الأولى ...	3A
6	…, a full 70 years after the phenomenon was predicted by Albert Einstein based on … ، أي بعد 70 عاما من تنبؤ اينشتاين بالظاهرة استناداً إلى ...	3A
7	When liquid helium is cooled to within 2.2 Kelvin's of absolute … حين يُبَرد الهليوم السائل إلى نحو 202 كلفن فوق الصفر ...	1
8	Superfluid helium can be produced in large enough quantities for one to watch … فالهليوم الفائق الميوعة يمكن إنتاجه بكميات كبيرة تكفي ...	3A

9	, sometimes that had never been achieved so directly in 60 years of work on Superfluid helium. وهذا شيء لم يسبق تحقيقه بهذه الصورة المباشرة على مدى ...	3A
10	Essentially nothing can be done about liquid helium's density … ومن حيث الأساس لا يمكن عمل شيء بالنسبة إلى كثافة الهليوم ...	3A
11	But the density of gaseous BECs can be adjusted by tightening … لكن كثافة كثافات بوز- اينشتاين الغازية يمكن تعديلها بشد المصايد المغنطيسية ...	3A
12	… imagine how chemistry could be studied if we could weaken or strengthen the … ... تخيل كيف تكون دراسة الكيمياء لو كان بإمكاننا ...	3A
13	These results are now well understood by sophisticated theoretical modeling … وأصبحت هذه النتائج ألان مفهومة تماما باستخدام ...	3B
14	The atom's interactions can be modified by so-called feshbach resonances, ويمكن تعديل تأثر الذرات باستخدام ما يسمى تجاوبات فيشباخ ،	3A
15	Long-lived condensates with tunable interactions were developed earlier this year by Cornell and … لقد طورت مجموعة كورنيل وويمان في وقت سابق من عام 2000 ...	2
16	Such beams are known as atom lasers, وتعرف مثل هذه الحزم بليزرات الذرات ،	1
17	Atomic beams are already used in a Varity of scientific and … وتستخدم الحزم الذرية في العديد من التطبيقات العلمية ...	1
18	The atoms of BEC are confined in a magnetic trap by their … وتكون الذرات في كثافة بوز- اينشتاين محصورة في مصيدة مغنطيسية ...	3B

19	Atoms whose spins had been flipped dropped out of the trap – crescent – shaped ... فخرجت من المصيدة الذرات التي انقلبت سبيناتها واندفعت نبضات...	2
20	… finally produced an atom laser that could be pointed in a direction other than down … وفي الوقت نفسه تقريبا أنتج فيليبس وزملاؤهما في المعهد ليزر ذرات يمكن توجيهه في اتجاه غير الاتجاه الأسفل	3A
21	When the population of atoms in the single quantum state is amplified by … في بداية إحداث كثافة بوز-اينشتاين حينما يتم تضخيم مجموعة الذرات التي تشغل الحالة ...	3A
22	Matter-wave amplification does not mean that matter is created out of energy by the amplifier. ولا يعني تضخيم موجات المادة إن المادة تنشأ عن الطاقة بوساطة ...	2
23	Rather a small atom laser pulse is created in a BEC, وإنما تنشأ نبضة صغيره عن ليزر ذرات ...	2
24	…, and that pulse is amplified when … ثم تضخم هذه النبضة حين تتبع ذرات إضافية	1
25	Concurrent scattering of the light from a pump laser beam ensures that momentum and energy are probably conserved. إن الاستطارة المتزامنة للضوء من مضخة حزمة ليزرية تضمن الحفاظ على الاندفاع والطاقة بصورة صحيحة .	3A
26	a. Vortex Lattices have been imaged in a stirred condensate of rubidium atoms … شبكات دوامات تم تصويرها في كثافة من ذرات الروبيديوم التي ...	3A
27	While a magnetic trap holds atoms, the hottest fraction of atoms is continuously removed,	1

	ففي حين تحتجز مصيدة مغنطيسية الذرات يُزال الجزء الأكثر سخونة من الذرات باستمرار ...	
28	The time-averaged orbiting potential magnetic trap has been adopted by several group … مصيدة الكمون الدوار المعدل زمنيا ، وهي التي استخدمتها مجموعة كورنيل و ويمان في المعهد المشترك للفيزياء الفلكية المختبرية لاحداث اول كثافة غازية في عام 1995 . ثم تبنتها عدة مجموعات بحثية.	2
29	Their magnetic fields are produced by running current through … وتوِّلد حقولها المغنطيسية بتمرير تيار كهربائي ...	1
30	The permanent magnets cannot be turned off, ولما كانت المغانط الدائمة لا يمكن إيقاف تشغيلها ...	3A
31	So the condensate can only be imaged in Situ. فأن تصوير الكثافة لا يكون ممكناً ...	3A
32	Glowing sodium atoms are held in a magneto-optical trap and … تُحتجز ذرات الصوديوم المتوهجة في مصيدة مغنطيسية- ضوئية,	1
33	Daniel Kleppner of M.I.T. would be introduced at conferences … أصبح كلبنر يُقدم في المؤتمرات على انه ...	1
34	The three groups that first demonstrated BECs in 1995 and 1996 were led by … قاد طلبة كلبنر وطلبتهم من بعدهم المجموعات الثلاث ...	2
35	Visible light and standard laser techniques can be used … ففي غازات الذرات القلوية يمكن استخدام الضوء المرئي وتقنيات الليزر ...	3A
36	A Bose-Enstein condensate in hydrogen had been observed at last … فقد رُصِدت كثافة بوز اينشتاين في الهيدروجين ...	1
37	The first atom laser was powered by gravity … وكان أول ليزر ذرات (مزوداً بقوة) الثقالة ...	3B

38	In the first directed atom laser, atoms were propelled sideways out of the trap … كانت الحزم الليزرية تدفع الذرات جانبياً فتخرج من المصيدة ...	2
39	The photons' waves are unsynchronized. وتكون موجات الفوتونات في الضوء العادي، كضوء المصباح الكهربائي، غير متزامنة ، في حين تكون الموجات كلها في ضوء الليزر ...	3B
40	"Trilobite Molecule" of two rubidium atoms, 1,000 times larger than a typical diatomic molecule, could be formed within a condensate by appropriate laser … ويمكن أن يتشكل هذا الجزيء داخل كثافة بإثارة ليزرية مناسبة.	2
41	The green ball is one atom, the other is obscured under the "twin towers" وتمثل الكرة الخضراء إحدى الذرتين في حين تحجب الذرة الأخرى تحت " البرجين التوأمين" .	1