

A Systemic Functional Grammar Approach to the Study of Emphatic Constructions in English and Arabic Scientific Texts

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Abstract

The study deals with emphatic constructions in English and Arabic scientific texts. To the researcher's best knowledge, this topic received little attention from linguistic researchers, exceptionally in functional grammar analysis. The importance of this study arises from the fact that some syntactic forms are effective linguistic choices for conveying the meaning of emphasis to the readers. The study aims to identify and analyze different types of linguistic constructions in English and Arabic scientific texts and show the similarities and differences between the two types of scientific texts under investigation. The study intends to analyze the structure of complex clauses by adopting Halliday and Matthiessen's (2004) modal of 'Systemic Functional Grammar' of syntax and Prince's (1978) modal of 'Given-New' information of discourse analysis. These models analyze-samples of English 'Spaceport' magazine and pieces of Arabic 'Sadeem Bulletin' magazine. Moreover, the study depends on a qualitative approach to answer the research questions and confirm its hypothesis. The results show that both languages use some syntactic forms, but Arabic is rich in its constructions. This difference is due to the nature and flexibility of both languages. The findings will be helpful for researchers concerned with syntax and scientific issues because it provides a rigorous analysis of complex clauses into simple parts and shows the focus of information in its suitable.

Keywords: Arabic, emphatic constructions, information focus, linguistic devices, scientific texts, Systemic Functional Grammar Approach

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Introduction

One of the main characteristics of scientific texts is the objective representation of facts. Andrews and Blickle (1978) point out that an excellent scientific text should be accurate, precise, conscious, and appropriate. Scientific authors should present the information clearly without complexity in the syntactic structures. Trotzke (2017) indicates that the term 'emphasis' refers to information structural aspects of language; phonetics, syntax, semantics, and pragmatics. It belongs to the field of scope-discourse semantics and encodes in the functional makeup of the clause. It is essential to note that the general approach to determining the emphatic in syntactic structure goes back to Chomsky (1970) and Jakendoff (1972). They mentioned some crucial notions such as focus and presupposition. The former denotes newly supplied information. The remaining part of the sentence indicates the latter. According to Al-Samarra'i (2000), 'emphasis' in Arabic aims to reinforce the meaning of important information in the sentence and remove doubt from the readers/hearers.

Literature Review

According to Hart (2014), systemic functional grammar (SFG) presents a theory of language based on purpose and choice. Halliday developed SFG in (1973, 1978, and 1994). This theory is concerned with what speakers are doing when they use language and why on particular occasions of use, they formulate their utterances in the way they do. Hence, the main objective of SFG is "to facilitate explanation of meaning in context through a comprehensive text-based grammar that enables analysts to recognize the choices speakers and writers make from linguistic systems and explore how those choices are functional for constructing meanings of different kinds." (Gee & Handford, 2012, p.12).

Emphatic Constructions in English

There are various linguistic ways for achieving the meaning of emphasis in the sentence. These ways encompass (the phenomenon of fronting, passive voice, cleft constructions, the concept of negation, and modal auxiliaries).

1. The Phenomenon of Fronting

Crystal (1980) defines fronting as a transformational process that requires transposing a constituent from the middle or end of a string to the initial position. It provides emphasis in sentences:

(1) The strange man entered the house.

(1a) Into the house, the strange man entered. (fronting of prepositional phrase)

2. Passive Voice

Depending on Maggie's (1998) view, the formation of passive voice in English relies on transitive verbs. In passivation, the subject and object change grammatical relations. The object of the active sentence promotes to the subject of the passive sentence. In contrast, the real subject of the active sentence demotes in the prepositional position, as in:

(2) The scientist counted the cells. (Active sentence)

(2a) The cells were measured by the scientist. (Passive sentence)

3. Cleft Constructions

Trask (1992, p.46) defines cleft constructions as "A marked structure in which a focused constituent is extracted from its logical position and often set off with some additional material, including an extra verb." There are several types of Cleft Constructions in English:

A-It-Cleft Construction

Wales (2011, p.57) states that "it-cleft is used in GRAMMAR to describe a process whereby EMPHASIS OF FOCUS a simple sentence appears to have been 'cleft' or divided into two CLAUSES. One contains CATAPHORIC it+ AUXILIARY VERB be, the other a RELATIVE CLAUSE."

(3) It is nice that you could come.

(4) It was the sparrow who killed Cock Robin.

B-All Cleft Construction

Collin (1991) notes that the secondary type of cleft construction in English is 'all-cleft' with a nominal clause headed by the word (all). All clefts concentrate on the object of the verb, whether it is a noun phrase or a nominalized sentence:

(5) She enjoyed the hotel.

(6) All she enjoyed was the hotel.

C-Existential Cleft Construction

Banks (1993, p. 20) defines an Existential Cleft construction as "An existential clause begins with a there which is a semantically empty and is followed by the verb be." This type of a Cleft Construction refers to the notion of existence:

(7) There is a book in the cupboard.

(8) There are two patients in the writing room.

4. The Concept of Negation

Gibbons and Whiteley (2018) demonstrate that the concept of negation in English usually contrasts affirmative constructions and occurs on several levels, such as syntactic, morphological, and semantic. In the case of the syntactic level, negation uses the negative participle (not):

(9) This is not a letter.

Other syntactic forms of negation are negative nouns (none, nothing, nowhere), negative pronouns (nobody, no one), negative adverbs (never), and conjunction (nor), such as:

(10) There is no logic to that.

(11) None can escape death.

5. The System of Modality

Based on Praninskas's (1975) system, English comprises ten modal auxiliaries that used in different academic texts like (must--should-ought to-can-could-will-would-may-might), as in:

(12) The lecture must begin now.

(13) Should we go to Europe next year?

(14) George can read English well.

Emphatic Constructions in Arabic

Several methods of conveying the meaning of emphasis in Arabic used to strengthen the purpose in texts (the phenomenon of fronting, passive voice, the manner of restriction أسلوب القصر and modality expressions).

1. The Phenomenon of Fronting

Fronting is one of the essential characteristics of the Arabic language. It enables the author to front whatever they want to emphasize. Ghazala (1995) mentions that fronting or 'foregrounding' can be used widely at sentence and the text levels. It requires moving a phrase or clause from its original place at the end of the sentence to the front position of that sentence:

(15) Our guard is working hard in the garden. *يعمل حارسون بجهد في الحديقة.*

(16) In the garden, our guard is working hard. *في الحديقة، حارسون يعملون بجهد.*

2. Passive Voice

Ryding (2005) points out that the passive sentence in Arabic is formed inflectionally by altering of vowel pattern within the verb:

(17) Ahmed held the meeting (Active sentence) *عقد أحمد الاجتماع.*

(17 a) The meeting was held (Passive sentence) *عُقد الاجتماع.*

hawary (2016, p.105-106) states that "passive voice *الجملة السلبية* in Arabic used mainly when the subject/doer of the verb/action is not known. In this case, the object /recipient of the action takes the grammatical position and nominative case *مفعول به* ending of the subject /doer and is called deputy subject/ doer."

(18) Reputation for producing the excellent perfume was gained after many years.

لقد سبقت مع قاتل عطر الهمت نوعه سنوات وطول.

3. The Pronoun of Separation

It is essential to note that a vital pronoun, labeled as 'the pronoun of separation' *ضمير الانفصال* used for an emphatic purpose in Arabic. Wright (1976) defines the 'pronoun of separation' as a type of Arabic pronoun appended to the subject to give it a special prominence and contrast it with another topic:

(19) Sami is the martyr. *سامي هو الشهيد.*

4. The Concept of Negation

In Arabic, the manner of restriction *أسلوب القصر* refers to the concept of negation. Awe (1989, p.84) defines the manner of restriction as "specifying something by something else." The manner of restriction consists of two ways:

1-Negation and exception: This type of negation focuses on something or someone specifically other than anything else:

(20) There is no boy but Ali, and no sword but Thulfiqar. *الفتى إلا علي ولا سيف إلا ذو الفقار.*

2-Negation by syndetic tools *أدوات العطف* and the device 'but' /Enma/ *لما*: This type of negation uses some linguistic tools like ('not' /la/ *لا*, 'but rather' /bal/ *بل* and 'but' /laken/ *لكن*).

(21) Saeed is an engineer, not a doctor. *سعيد مهندس وليس طبيب.*

(22) Saeed is not a doctor, but an engineer *سعيد ليس طبيب بل مهندس.*

5. Modality Expressions

Aziz (1989) notes that several lexical and verbal words refer to willingness, ability, obligation, and necessity like ('should' / yajib an/ يجب أن 'It is possible to'/ min-Almumkan an/ من الممكن أن , 'It is necessary to'/ min-Al dharury an/ من الضروري أن , and 'capable of'/Kader/ قادر. These lexical items denote a high degree of emphasis in sentences:

(23) You should visit me in Beirut.

يجب أن تزورني في بيروت

(24) It is necessary to get 8 hours of sleep. من الضروري أن تحصل على ثمانية ساعات من النوم.

Nama (n.d.) articulates that the Arabic particles like ('may be'/ qaad / قد 'will' /al –seen/ ليسين and 'will', sawfa, سوف) are used for the emphasis, followed by a verb in the past or present tense. Syntactically, these particles are an expletive (meaningless) like:

(25) I will visit you tomorrow. سأزورك غدا.

The Model of 'Systemic Functional Grammar' of Halliday and Matthiessen (2004)

This model clarifies three layers of meaning present in the clause. Halliday and Matthiessen (2004, p.60) describe the clause as a meta-functional construct that comprises three meta-functional lines of meaning: Textual, Interpersonal, and experiential sense.

1-The Textual Meaning

This type of meaning consists of two essential parts: the 'theme' followed and commented on by the 'rheme.' Halliday and Matthiessen (2004, p.66) define the 'rheme' as the point of departure of the message, and its primary function is to locate and orient the clause within its context. The complements of the message are known as the 'rheme'. They classify two main types of the 'theme' in functional grammar:

A-Simple/Complex Theme

This type of theme consists of one structural element, nominal group, or prepositional phrase, whereas the complex theme comprises two or more groups or terms, as in:

(26) From house to house, I went my way.

(27) The Walrus and Carpenter were walking close at hand.

B-Thematic Equative Theme

Halliday and Matthiessen (2004, p.70) describe this type of theme as a pseudo-cleft sentence because it sets up the Theme-Rheme parts in the form of an equation, in which all the elements of the clause are arranged into two constituents. They combine together and use the form of the verb (be):

(28) What the duck gave to my aunt was that teapot.

(29) What the thing the duck gave to my aunt was that teapot.

2-The Interpersonal Meaning

The interpersonal type covers two parts: the modal element and the residue. The former comprises 'Mood and Modality'. The latter includes a predicator, complements, and adjunct.

A-Modal Element System

Halliday and Matthiessen (2004, p.111) point out that the 'modal element system' contains two parts which are mood and modality. The structure of mood encompasses the subject plus a finite operator, which is a verbal group:

(30) The duck has given that teapot away.

The structure of the modality system consists of the subject plus a finite operator, which are specific modal verbs such as 'can, could, should, must, will', as in:

(31) He can read English very well.

B-The Residue Part

It is essential to mention the second part of the modal element system, termed the 'Residue' Halliday and Matthiessen (2004, p.121) classify the residue into three functional components: Predicator, complement, and adjunct, as in:

(32) Sister Susie's sewing shirts for soldiers.

3-The Experiential Meaning

According to Halliday and Matthiessen (2004, p.168), the transitivity system construes the world of experience into six process types. Each type provides its model for construing a particular domain of expertise:

1-Material clauses: The process of doing-and-happening

Material clause is the process of doing and happening in the transitive or intransitive clauses. Halliday and Matthiessen (2004, p.179) classify two inherent participant roles in this process: the 'Subject' and 'Goal.' They explain a contrast between 'operative'- 'receptive' clauses. The former is the unmarked cases in declarative sentences. By contrast, the latter refers to the phenomenon of fronting and passivation:

(33) The lion caught the tourist. (Active / Operative)

(34)The tourist was caught by the lion. (Passive / Receptive)

2-Mental clauses: Process of sensing

Halliday and Matthiessen (2004, p.197) assert that the mental clause involves one participant role: the 'sensor' and the entity or the phenomenon that the 'sensor' perceives. Notably, there are four sub-types of sensing in mental clauses: perceptive-cognitive-desiderative and emotive:

(35) Mary liked the gift.

3-Relational clauses: The process of being-and-having

Halliday and Matthiessen (2004, p. 210) point out that relational clauses serve to characterize and identify. There are three basic types of relations in English: intensive, possessive, and circumstantial. These three types come in two modes of connection: attributive and identifying mode. The fundamental difference between these two modes is that the identifying mood is reversible: Sarah is the leader/ and the leader is Sarah. By contrast, the attributive mode is not reversible, as in: Sarah is wise. Halliday and Matthiessen (2004, p.219) define the attributive mode as "an entity has some class ascribed or attributed to it." The attributive mood contains two terms: the attribute and the carrier:

(36) Today's weather is going to be warm and sunny.

4. Behavioral Process

Halliday and Matthiessen (2004, p.248) describe this type of process as the process of physiological and psychological behavior like (breathing, coughing, dreaming, and staring). It involves one participant role that is the 'behavior', as in:

(37) You are dreaming.

5. Verbal Process

According to Halliday and Matthiessen (2004, p.252), this type of process involves four participant roles:

1- The Sayer: This participant refers to the speaker or writer like I, we, you.

2- The Receiver: This function points out the one to whom the saying is directed: me, your parents.

3- The Verbiage: This function explains the content of the speech or report.

4- The Target: It means the aim of the speech.

(38) John said, 'I am hungry.'

6. Existential Clauses

It refers to something that exists or happens. Halliday and Matthiessen (2004, p.257) show that those existential clauses have the verb 'be' as a process and introduce the entity or event which is said to exist. It means the 'existent':

(39) There is a man at the door.

The Model of 'Given-New information' of Discourse Analysis of Ellen Prince (1978)

Prince (1978) shows that there are two kinds of information in natural language to convey the objective information: given and new information. Prince (1978) shows three types of 'givenness' information in the sentence:

1- Predictability:

Prince (1978) indicates that an element in a sentence represents old or (predictable information) if it is recoverable from the preceding context; if it is not recoverable, it represents new or (unpredictable information), as in:

(40) John called Mary a Republican, and then she insulted him.

In the example above, the pronouns (she, him) are old information because 'she' refers to Mary in the previous text and (him) refers to John. Therefore, the word 'insulted' is new information because it is not recoverable from the preceding text.

2- Saliency:

Prince (1978) shows that the term 'given' information refers to knowledge the speaker assumes to be in the consciousness of the addressee at the time of the utterance. By contrast, the term 'new' information means what the speaker believes he is introducing into the addressee's consciousness by what he says, as in:

(41) If I write loosely of a noun as being in the status GIVEN, I mean that the idea which this noun expresses has this status.

In the example above, "the writer is purporting to assume that it is appropriate for the reader to have in mind, by the time he/ she reaches the comma, that the writer means something if he writes loosely of a noun as being in the status given." (Prince, 1978, p.230).

3-Shared knowledge:

Prince (1978) defines the term 'given' as information (the speaker) believes that the listener already knows and accepts as 'true,' whereas the word 'new' denotes the information in which the speaker thinks the listener does not yet know:

(42) John hit a boy on the head.

(42 a) A boy was hit on the head by John.

In the example (a) above, the word (A boy) is new information.

The Procedures

The procedures adopted in this study are as follows:

1-Presenting a theoretical survey of SFG theory and the emphatic constructions in English and Arabic along with its definitions, types, and examples.

2- The study follows appropriate methodology and explains the models of analysis which are Halliday and Matthiessen (2004) and Prince (1978).

3-Analyzing the selected data to achieve the study's aims and test its hypotheses.

4- The study reaches the conclusions and makes some recommendations and suggestions for further studies.

Data Analysis

It is important to note that the data analyze over three levels: syntactic, lexical, and discourse levels. Halliday and Matthiessen's (2004) modal of 'Systemic Functional Grammar' of syntax analyzes the sentence syntactically and lexically. Otherwise, Prince's (1978) modal of 'Given-New' information for discourse analysis.

English Data

Data (1)

As part of the test, Space X configured Crew Dragon to trigger a launch escape about 1.5 minutes after liftoff. *All major functions were executed*, including separation, engine firings, parachute deployment, and landing. Crew Dragon splashed down at 10:38 a.m. just off the Florida coast in the Atlantic Ocean.

At the syntactic level, the author selects the 'All-Cleft' sentence to convey the meaning of emphasis in the sentence. The subject is 'All major functions' that contains the word 'All' uses for emphasis. Notably, the information after the copula (were) functions as the rhematic part that contains the focus of information. The author wants to emphasize the achievement of all functions in the space.

At the lexical level, the sentence above conveys a specific fact; it belongs to a declarative mood, in which the author adopts the subject followed by one form of the verb (be). Hence, this combination asserted the second part of the sentence.

At the discourse level, the sentence 'All major functions' is 'Given-information'. This type of information can be recoverable from the preceding text. However, the author wants to make the readers know that the employees achieve all functions. In addition, he offers other types of operations besides the basic ones. Hence, the information after the copula 'was' act as 'New information.'

Data (2)

In 2020, Exploration Ground Systems (EGS) activities will ramp up as launch hardware arrives and teams put systems in place for Artemis 1 and 11 missions.

At the syntactic level, the author selects the fronting of prepositional phrases for emphasis. The fronted prepositional complements (*In 2020*) occupy the subject position in the sentence. Thus, this fronted information is the 'marked theme,' whereas the remaining part of the sentence represents the rheme. The author wants to emphasize the time in which the (EGS) activities will ramp up.

At the lexical level, the marked theme 'In 2020' occupies the subject position of the sentence, followed by the modal verb 'will' to assert that (EGS) activities will ramp up in the future for Artemis 1 and 11 missions.

At the discourse level, the fronted phrase 'In 2020' is 'new information. The noun phrase (EGS)-activities represents 'given information'. This type of information is mentioned in the previous text.

Data (3)

Taking place on Dec. 14, the demonstration was intended to validate the lunch teams' capability to perform an EM-1 countdown and respond to problems put into the system for practice.

At the syntactic level, in the above example, the author fronted the verbal phrase 'Taking place on Dec. 14' to the initial position of the sentence, and this fronted information is the marked theme of the sentence. The rest of the sentence represents the rheme part. The information focus is the first position of the text.

At the lexical level, the example belongs to the material process (the process of doing and happening) in which the goal complements is moved to the initial part of the sentence and occupies the subject position. In contrast, the real subject demotes in the complement position.

At the discourse level, the 'given information' is the reminder of the sentence because it is part of the reader's common knowledge. New information is 'Taking place on Dec. 14.'

Data (4)

There are so many NASA's contributions to society that people constantly overlook the agency's impact. I would highly recommend that all NASA employees even to check out the annual "Spinoff" publications to stay abreast of all the beautiful things the agency is doing.

At the syntactic level, in the above example, the author selects the 'Existential-Cleft' sentence for the aim of emphasis. Notably, the word 'There' is regarded as a simple theme of the sentence, which occupies the subject position. The information after the copula 'is' acts as the rheme part. In effect, the focus occurs in the second part of the sentence, and the author wants to emphasize the existence of many of NASA's contributions to society.

At the lexical level, this example depends on the system of transitivity (2004). The above example belongs to the existential process type. The sentence begins with the word 'there,' denoting the existence of something plus the process (are). The author wants to emphasize the presence of a specific 'entity' that reveals NASA's contributions to society.

At the discourse level, the word 'There' is regarded as 'given information' because this word is part of the readers' consciousness; it stands for the meaning of the existence of something. Therefore, 'new information' is represented by 'so NASA contributions to society that people constantly overlook the agency's impact.'

Data (5)

For the emergency training rehearsal, Wilmore is the backup crew member for both the first and second crewed Starliner flights. Although Starliner is designed to land in the desert, *it must also be able to land in the water in an emergency, and its crew must be prepared for all possibilities.*

At the syntactic level, the author uses the 'It-Cleft' sentence to express the meaning of emphasis. The subject 'it' acts as a simple uses to attract reader's attention to something important in the sentence. The complements of the sentence 'must be able to land in the water in an emergency.' The emphasis lies in the last part of the example.

At the lexical level, the author adopts the modal verb 'must' to reveal the necessity of Starliner flights to land in the water in case of an emergency.

At the discourse level, the pronoun 'it' is 'given information' because the author uses the pronoun 'it' as an anaphor marker which refers to the noun 'Starliner' mentioned previously. Therefore, the remainder of the sentence is 'new information.'

Data (6)

Participants can enhance their award by using one of the existing capabilities of amateur radio on the space station, such as a packet (digital operations) or listening in to an astronaut giving answers to school children during one of the scheduled school contacts.

At the syntactic level, the author wants to emphasize the ability of the participants to show their works. The subject of the sentence 'participants' functions as a simple theme. The remaining part 'can enhance their awards functions as the rheme. In the rhematic detail, the author explains the focus of information by showing the existing abilities that help the participants reinforce, like packet (digital operations).

At the lexical level, the subject 'participants' combined with the modal verb 'can' to convey the meaning of modality in the sentence. The verb 'can' denotes a high degree of ability that emphasizes the second part of the sentence.

At the discourse level, the word 'participants' represents 'given information.' Accordingly, the reader can infer that the word 'participants' means a group of members working in a specific institution. Hence, the remainder of the sentence acts as new information.

Data (7)

Participants can enhance their award by using one of the existing capabilities of amateur radio on the space station, such as a packet (digital operations) or listening in to an astronaut giving answers to school children during one of the scheduled school contacts. *No special activity is planned from the station, and only one activity from the space station is needed to qualify.*

At the syntactic level, the sentence 'No special activity' is the theme, which contains the negative device -"not"- for emphasis. The second part 'is planned from the station-and only one activity from the space' is the rheme. The author wants to assert that the station has only one activity is needed to qualify. So, the focus of the information lies in the remainder of the sentence.

At the lexical level, the subject 'No special activity' with a finite operator 'is' in the unmarked case constitutes the declarative mood. The residue part is the rest of the sentence. The author employs the lexical word 'No' for emphasis.

At the discourse level, the 'given information' is 'No special activity is planned from the station.' This information can be recoverable from the previous text; the word 'station' mentions previously. New information is 'only one activity from the space station is needed to qualify.'

Data (8)

In Sight was developed and built by Lockheed- Martin Space Systems in Denver, Colorado, and arrived at Vandenberg on Feb. 28 aboard a U.S. Air Force C-17 aircraft. The spacecraft then was transported to the Astrotech facility at the West Coast launch site.

At the syntactic level, the author employs passive voice construction for emphasis. The word 'insight' is the marked theme of the sentence that represents the focus of the information. The author wants to emphasize the word 'insight.' The prepositional part of the sentence functions as the rheme.

At the lexical level, the above example based on the system of transitivity (2004), in particular, the material process. The 'Goal' of the sentence 'Insight' moves onto the subject place, and the 'doer' of the action 'by Lockheed-Martin Space Systems in Denver' becomes in the rheme place.

At the discourse level, the information in the prepositional position 'Lockheed- Martin Space System in Denver' represents 'given information' because it belongs to author-reader shared knowledge. Therefore, the promoted information 'Insight' appears as 'new information.'

Data (9)

"What we really see now is a much greater emphasis on safety" said Ferguson. "We're returning to a full capability ascent abort system to keep astronauts safe all the way through the profile, and that's something that the shuttle didn't have."

At the syntactic level, the author uses the cleft sentence for emphasis. The theme of the sentence begins with a 'Wh-word' to attract the reader's attention to something important in the sentence. The second portion is 'much greater emphasis on safety' functions as the rheme. The author wants to assert that the focus is on 'the astronauts' safety.'

At the lexical level, the sentence based on the system of transitivity (2004). It belongs to the mental process. The theme contains the pronoun 'we' as a 'sensor' and the cognitive verb 'see.' However, the rhematic part represents the entity that the sensor can perceive.

At the discourse level, the given information is the sentence 'What we really see now.' This information exists in the reader's consciousness. The new information is 'much greater emphasis on safety.'

Data (10)

Exploration Mission-1(EM-1) will put Orion in space without a crew on board and bring it out to a distant retrograde orbit around the Moon. *The most important thing NASA will get from the mission is a check of the thermal protection system of the Orion crew module during lunar reentry velocities.*

In the example above, the first part of the sentence is 'The most crucial thing NASA' acts as a complex theme. The second part is 'a check of the thermal protection system of the Orion crew module during lunar reentry velocities' acts as the rheme, which contains the focus of information.

At the lexical level, the subject 'the most important thing NASA' is followed by a finite operator 'will' to form the modality part. The author uses the modal verb 'will' as a linguistic choice to assert that NASA will gain a particular benefit from the mission in the future.

At the discourse level, the sentence 'The most important thing NASA will gain from the mission' contains the anaphor noun 'mission.' The word 'mission' exists previously in the text. Accordingly, the reader can predict that the second part of the sentence is 'new information.'

Arabic Data

Data (1)

نقاط آل بعدال هي نقاط طاقط اع نظره آلستوالس ماوي مع نظره الولوج ال نظره الولوجي ه (التي هي مسار آلرض حول الشمس أو مسار آلشمس الظاهري حول آلرض).

Transliteration: nuqat al-ietidal heya nuqat taqatue dayirih alestiwa' alsamawii mae dayirih alburuj (aldaayirah alksufiyah) allati tadur haul al shams 'aw masar al shams aldaahirii haul alard.

Translation: Moderation points are points across the equator with the zodiac (ecliptic), the earth path around the sun, or the sun path around the earth.

At the syntactic level, in the example above, the author selects the pronoun of separation 'heya/ هي' to determine the focus of information. The first part, 'nuqat al-ietidal/ نقاط آل بعدال' represents the theme, and the information after the dummy pronoun (Heya/ هي) is the rheme. The author uses this dummy to emphasize the theme's function in the sentence.

At the lexical level, the theme 'nuqat al-ietidal/ نقاط الاعتدال' occupies the subject position is followed by the pronoun 'hyea/ هي' to constitute a declarative mood. In such a mood, the author expresses what is essential in the sentence as a constant fact.

At the discourse level, given information is 'nuqat taqatue dayirih alaistiwa alsamawii mae dayirih alburuj/ نقاط تقاطع نظره الاعتدال ستوا على سماوي مع نظره الولوج'. This type of information can be recoverable from the preceding text. New information is 'nuqat al-ietidal/ نقاط الاعتدال'.

Data (2)

أن علم الفلك هو جزء من علوم الطبيعة والماضي الذي يهتم بدراسة مسارات (الأفلاك) (الاجسام الملمسة ما هي) طليخ تفي به نخل الكوكب وألقدار والنجوم والامجرات. أم/ علم الفلك/ هي يدرس تراكيب الأفلاك جسم المتكيفة الكون وطريقة تشكلها وتطورها. علم الفلك هو علم طبيعي والفلكاء الذين يهتمون بحركتها مثل كوكب.

Transliteration: 'anna elm alfalak huwa juzun' mina elum altabieiih almaddiyah alathi yahtamu bidirasat masaarat ('aw 'aflak) al'ajsam alsamawiyah almukhtalifah mithl alkawakib wal'aqmar walnujum walmajaraat.'amma elm alfalak' fayadrus tarkeeb al'ajsam allati fi alkawn watariqat tashkilaha watarikhaha wamustaqbaliha, alawatan alaa tabieiat alfadhaa' allathi tataharak fihi tilka al'ajsam.

Translation: Astronomy is part of the physical sciences concerned with studying the paths (or orbits) of different celestial bodies such as planets, moons, stars, and galaxies. It explores the composition of bodies in the universe, the way they are formed, their history and future, in addition to the nature of space in which these bodies move.

At the syntactic level, the author uses one type of fronting by using the emphatic particle 'ama/ أم' to proceed the theme for prominence. Accordingly, the first part of the above example is the marked theme, which is 'elm alfadhaa/ علم الفلك' commented by the rhematic part. The author moved the subject 'elm alfadhaa/ علم الفلك' obligatorily in front of the verb 'fayadrus/ يدرس' to emphasize its role in the space.

At the lexical level, the example above is analyzed by the system of transitivity (2004), specifically material process type, in which the goal complements the sentence 'elm alfadhaa/ علم الفلك' moved to the initial position of the sentence and assigned the 'marked' case. In contrast, the actor of the sentence becomes in the rest of the sentence.

At the discourse level, the given information is 'fa-yadrus tarkeeb alajsam allati fi alkawn watariqat tashkilaha watarikhaha wamustaqbaliha, alawatan alaa tabieiat alfadhaa allathi tataharak fihi tilka alajsam.' This type of information contains the anaphor noun 'alfadhaa/ علم الفلك' which refers back to 'elm alfadhaa/ علم الفلك'. The new information is 'elm alfadhaa.'

Data (3)

توصيه من اف سركونز قاديون في رص دهل وقت لخل يفي يكون عمره 8 و 3 ليل يارسنه حد رين الالغلي هو 6 ليل يارسنه ضوي ه أي يزداد حد رين المقيت بالي بسببه 33% بتقريب 1 ليل سنه ضوي ه.

Transliteration: aqsa masafah sa-nakun qadirin alaa rasdiha fi alwaqt alhalii fi kawm eumrih 13.8 milyar sinih had ruyatina al-eali hua 46 milyar sinih dawyiyh 'ay yazdad hadu ruyatina al-mustqabiliha nasabah 33%, taqriban 61 milyar sinih dawyiyh.

Translation: The maximum distance we will be able to observe at present in a universe that is 8 and 13 billion years old. Our high vision limit is 46 billion light- years, which means that our future vision increases by 33%, approximately 16 billion light-years.

At the syntactic level, the author employs the particles ('will'/al-seen/السين) and the lexical word ('able'/ qadirin/قادرين) for the sake of emphasis. The thematic part is 'aqsa masafih/ أقصى المسافات' and the rhematic part is the remainder of the clause. Hence, the focus of information occurs in the second part.

At the lexical level, the subject 'aqsa masafih/ أقصى المسافات' combined with the modal expression 'al-seen/السين' to form the first part of modality. By using such modal terms as 'al-seen/السين' and the lexical word 'qadirin/قادرين' the author emphasizes the ability of the participants to determine a specific distance in the process of checking.

At the discourse level, the given information is 'aqsa masafih/ أقصى المسافات' The new information is the remaining part of the example.

Data (4)

نشر مؤخر بحث علمي جديد حول المسافات التي يمكن رؤيتها بالعين المجردة في سطح القمر (وهو أكبر قمر لكوكبنا) وحول ثلثي القمر في المجموع (لشمسنا) مع القمر (جديد في ذلك الترتيب).

Transliteration: nushir mu'akharan bahth eilmi jadid hawl almuasafat almikanikih alkhasuha bitise hafr ealaa sath alqamar (titan) wahu 'akbar qamar likawkab zahal wathani 'akbar qamar fi almajmueih alshamsih baed alqamar (janimid) altaabie lilmushtari.

Translation: A new scientific research has been published recently on the mechanical description of nine craters on the moon 'Titan,' the largest Moon in the solar system after Jupiter's Janimid Moon.

At the syntactic level, the author selects passivation process for emphasis. The first portion of the sentence is 'nushir mu'akharan/ نشر مؤخر' promoted to the initial position of the sentence and termed as the 'marked theme.' The author fronted this piece of information to emphasize the action of publication. However, the second portion 'bahth eilmi jadid/ بحث علمي جديد' functions the rheme that contains the time adverb 'mu'akharan' as the deputy subject.

At the lexical level, the example above based on the system of transitivity (2004). The above passive voice sentence belongs to the material process type, in which the 'Goal' is fronted into the initial part and receives the action of the verb. The 'Actor' is deleted and replaced by a 'deputy subject.'

At the discourse level, the new information is 'nushir,' which is not mentioned before and promoted by the author to direct the reader's attention to the act of publication. The given information is 'bahth eilmi.' This type of 'Givenness' is part of the reader's predication.

Data (5)

في كل يوم الظمي، والظياري، في هذه الأرض، يوجد فوهة مادي وعلمي مهمين (مبدأ القياس العلمي).

Transliteration: fi Kul al-Elum altabieih, walfizia minha ealaa wajh alkhusus, yujad mafhum madiy wa-eilmi muhim yusamaa (mabda alqias almieyarii aw alkami).

Translation: In all-natural sciences, and physics, in particular, there is essential physical and scientific concept called (the principle of standard or quantitative measurement).

At the syntactic level, the author fronted the prepositional complements to the initial part for emphasizing it. Hence, this information is the marked theme. The first part 'fi kul al-elum altabieih, walfizia minha ealaa wajh alkhusus' وفيزياء الفيزياء وعلوم الطبيعة, 'Kul/ كُـلْ' and the phrase 'ealaa wajh al-khusus/ وفيزياء الفيزياء'. However, the rheme part is the rest of the sentence. The focus of information occurs in the initial part of the sentence since the author wants to emphasize that there is an important concept found in all-natural sciences, particularly the 'physics.'

At the lexical level, the example above belongs to the material process type, in which the goal complements places at the initial part of the sentence. By contrast, the real subject occurs in the complement. In the above example, the author employs the lexical word 'ealaa wajh alkhusus/ وفيزياء الفيزياء' to give special prominence to physics.

At the discourse level, the given information is 'yujad mafhum madiy waeilmi muhim yusamaa (mabda alqias almieyarii)/ يوجد مفهوم مادي وعلمي مهم يسامى (مبدأ القياس العلمي)' This type of information is shared knowledge for both hearers and readers. The new information is 'fi kul al-elum altabieih, walfizia ealaa wajh alkhusus/ وفيزياء الفيزياء وعلوم الطبيعة'.

Data (6)

تم نشر نتائج البحث من قبل العالم "أومان" في مؤتمر الولايات المتحدة وكان أول بحث صدى في بيرو واس غي الم مؤتمر بحث الأول مره يتم رصد ذرات من الغبار التي تبيت في طبق جوملته تباع على يسى.

Transliteration: tam nashr natayij albaht min qibal alealam 'awman' fi mutamar alwilayat almutahidih wakan linatayij albaht sadaa kabir wawasie fi almutamar hayth li'awal marih yatim rasd dharaat min alghubar alati tuhit binujum altatabue alrayiysiu.

Translation: Research results were published by the scientist 'Awman' at the United States conference. They have showed significant echo for the first time. Dust particles surrounding the stars of the main sequence were observed.

At the syntactic level, the author selects passive voice for emphasis. The information 'tam nashr natayij albaht' تم نشر نتائج البحث is the marked theme. The author promoted this piece of information to entice the readers' attention to the action of the publication. The second part of the sentence exemplifies the rheme part, which contains the doer of the action 'the scientist 'Awman/ أومان.'

At the lexical level, the example above, belongs to the material process. Particularly, the 'receptive sentence' in which the doer of the action places into the prepositional phrase. The 'Goal' occupies the subject position of the sentence emphasis.

At the discourse level, the new information is 'tam nashr natayij albahth تبني شريحتي ج البحث'. The given information is 'Awman/ أو مان'. This type of 'givenness' information relates to the reader's common knowledge.

Data (7)

تطلق الشمس مس طاقه حراري هائل في كل ثاني هو يصل الى سطح الأرض طاقه مقدارها 1360 جول لكل متر مربع في كل ثانيه
لواحدة. ومن سجا اب انبسي طه أخ في ان مس اف مي ن الأرض الى ش مس بمقدار 150 مليون كيلومتر
سرج أن سطح الشمس مس يرسل طاقه كلي مقدارها 19^{10+14} أي 384 مليار مليار جول كل ثانيه.

Transliteration: tutliq al shams taqah hararayh hayilah fafi kul thanih yasil ela sath alard taqah miqdaruha 1360 jul likuli mitr murabae fi althaani alwahiduh. wamin hisabat basituh akhdhin almasafuh bayn alard walshams bimi qdar 150 milyun kilu mitr sanajid 'ana sath alshams yursil taqah kuliyh miqdaruha $10 + 14^{19}$ aiy 384 milyun milyun jul likul thanih.

Translation: The sun releases enormous heat energy, and every second it reaches the earth's surface, power of 1360 joules per square meter per second. From simple calculations, taking the distance between the earth and the sun by 150 million kilometers, we will find that sun's surface sends total energy of 19^{10+14} , which is 384 billion joules per second.

At the syntactic level, the author employs: verbal and semantic emphasis. The noun phrase 'sath al shams/ سطح الشمس' is the theme which proceeds by the emphatic particle 'anna/ أن'. The remaining part of the sentence contains the repetition of the noun 'milyar milyar/ مليار مليار' a verbal emphasis as well as the semantic emphasis 'Kul/ كل'. Hence, the focus of information occurs in the second part of the sentence because the author wants to emphasize the total energy transmitted by the sun.

At the lexical level, the above example relates to the relational process. The first part of the sentence 'sath al shams/ سطح الشمس' occupies the subject position and represents the 'Carrier' part which follows some elements that attributed to it. The verb 'yursil/ يرسل' describes the intensive process and the complements of the sentence function as the 'Attribute' of the 'Carrier.'

At the discourse level, the given information is 'sath al shams/ سطح الشمس' because this part contains the noun 'al shams' which is found in the title of the text 'maelumat mukhtasaruh ean al shams/ معلومات مختصره عن الشمس'. The new information is 'yursil taqah kilih miqdaruh 384 milyar milyar jul likuli thanih/ يرسل طاقه كلي مقدارها 384 مليار مليار جول كل ثانيه'.

Data (8)

لباب اخون تمكنو من الكشف عن مزيد من التفاصيل حول ائني متاثير ال عوام ال جويه أو الت جويه (في تطوير سطح القمر الشير
لأل تمام ووب ما م لي عت حذ لك ال سطح .

Transliteration: albahithun tamakanu min alkashf ean mazidan min altafasil hawl kifih tathir aleawamil aljawyh 'aw (altajwih) ealaa tatawur sath alqamar almuthir lil'ahtimam-wa-rubama ma yaqae that dhalik alsathi.

Translation: The researchers revealed more details about how atmospheric factors influence the evolution of the lunar surface of interest - and perhaps what lies below that surface.

Translation: The sun's mass is enormous, and it is 20 by ten by 30. If the sun loses 4,000 of its mass in one second, it can continue with that for 2660 billion billion years. But the age of the sun does not reach this extent, not because the loss of mass will change, but the sun's age and stars, in general, they don't measured in mass lost per second.

At the syntactic level, the author uses many emphatic particles: 'laken/ لكن lays/ ليس bal/ بل and al-seen الـسـيـن for emphasizing the stability of the age of the sun. However, the first part of the sentence realized by 'laken eumar al shams/ لكن عمار الشمس functions as the theme. The second part 'la-yasil ela hadha alhad fielia, lays lan fuqdan al kutlih sayataghayar bal lan eumar al shams wa-amar alnujum eumuman la tuqas bimiqdar ma tafqiduh min kutalih fi althaanihi' functions as the rheme.

At the lexical level, the first portion 'laken eumar al shams لكن عمار الشمس occupies the subject position of the sentence followed by the negative particle 'la/ ال and the verb 'yasil/ يصل in present tense. This combination constitutes the declarative mood. The author wants to assert a constant scientific fact by employing the present tense and the negative tool 'la/ال'

At the discourse level, the given information is 'eumar al shams/ عمار الشمس.' This type of information contains the word 'al shams/ الشمس This word exists in the in the previous text. The new information occurs in the remaining of the example.

Conclusions

1-The data analysis reveals that both languages are similar in adopting the marked processes for emphasis like (passivation, fronting). In English, the subject in the passive voice process demotes to the prepositional position. In Arabic, the subject in the passive sentence is either demotes in the prepositional place or replaces by 'deputy subject.'

2- The phenomenon of fronting employs in both languages. In English, the process of fronting is optional, whereas, in Arabic, it can be used either optionally or obligatory.

3- Modality in English is limited only to verbs like (can, should). Arabic exhibits verbs and particles like ('will'/ al-seen/ الـسـيـن 'able'/tamakan/ تمكّن and 'should'/ yajib/ يجب (ي). Moreover, both languages are similar in employing some particles for negation, such as (not) in English and ('but rather'/bal/ بل 'but' / laken/ لكن and 'not' /laysa/ ليس in Arabic.

4- Both languages are similar in using the dummy pronouns for dividing the sentence into two parts for emphasis. The difference lies in the position of the focus of information. In English, the 'it-cleft' sentence emphasizes either the first or the second part of the sentence. In Arabic, the pronoun of separation like ('she'/heya/ هي) emphasizes the first part of the sentence.

5- both languages are similar in recognizing the 'Given New' information in written discourse by recoverability, saliency, and shared knowledge. They have different anaphors to determine whether a specific constituent is previously mentioned or not:

6- In English, the analysis results show that some anaphors exist, such as the pronoun 'it' and nouns like 'mission' and 'station.' In Arabic, the authors employ anaphors like the nouns ('points'/ nuqat/ نقاط 'the space'/ al-fadhaa, and 'the sun'/ al shams/ الشمس)

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Appendix (A): Spaceport Magazine

Text (1)

NASA, Space X successfully complete critical In-Flight Abort Test

January/ February 2020 Vol. 7 P. 4

By: Jim Cawley

-"As part of the test, Space X configured Crew Dragon to trigger a launch escape about 1.5 minutes after liftoff. All major functions were executed, including separation, engine firings, parachute deployment, and landing. Crew Dragon splashed down at 10:38 a.m. just off the Florida coast in the Atlantic Ocean."

Text (2)

NASA Ring in Busy New Year in Florida to prepare for Artemis missions

January/ February 2020 Vol. 7 P.10

By: Linda Herridge

-"In 2020, Exploration Ground Systems (EGS) activities will ramp up as launch hardware arrives and teams put systems in place for Artemis 1 and 11 missions."

Text(3)

Kennedy Launch team prepares for Exploration Mission-1

February 2019 Vol. 6 p. 4

By: Bob Granath

-"Taking place on Dec. 14, the demonstration was intended to validate the lunch teams capability to perform an EM-1 countdown and respond to problems put into the system for practice."

Text(4)

NASA's Kennedy Space Center Innovator's Launchpad

April 2019 Vol. 6 P. 19

By: Daren Hienne

-"There are so many NASA's contributions to society that people constantly overlook the agency's impact. I would highly recommend for all NASA employees even to check out the annual "Spinoff" publications to stay abreast of all the wonderful things the agency is doing."

Text(5)

Commercial crew rescue training up ramp

June 2019 Vol. 6 P. 4

By: Tori Mclendon

-"For the emergency training rehearsal. Wilmore is the backup crew member for both the first and second crewed Starliner flights. Although Starliner is designed to land in the desert, it must also be able to land in the water in an emergency, and its crew must be prepared for all possibilities."

Text (6)

NASA on the Air" events to highlight key space milestone

January 2018 Vol.5 P. 31

By: Bob Granath

"Participants can enhance their award by using one of the existing capabilities of amateur radio on the space station, such as packet (digital operations) or listening in to an astronaut giving answers to school children during one of the scheduled school contacts."

Text(7)

NASA on the Air" events to highlight key space milestone

January 2018 Vol.5 P. 31

By: Bob Granath

"Participants can enhance their award by using one of the existing capabilities of amateur radio on the space station, such as packet (digital operations) or listening in to an astronaut giving answers to school children during one of the scheduled school contacts. No special activity is planned from the station and only one activity from the space station is needed to qualify."

Text(8)

Insight Space Craft prepared for testing

April 2018 Vol. 5 P. 12

"In Sight was developed and built by Lockheed- Martin Space Systems in Denver, Colorado, and arrived at Vandenberg on Feb. 28 aboard a U.S. Air Force C-17 aircraft. The spacecraft then was transported to the Astrotech facility at the West Coast launch site."

Text(9)

NASA assigns first crew to fly commercial Space craft

August Vol. 5 P. 5 2018

By: Madison Tuttee

"What we really see now is a much greater emphasis on safety" said Ferguson. "We're returning to a full capability ascent abort system to keep astronauts safe all the way through the profile, and that's something that the shuttle didn't have."

Text (10)

Kennedy Space Center accomplishments focus of center director's

April 2019 Vol. 6 P. 11

By: Linda Herridge

"Exploration Mission-1(EM-1) will put Orion in space without crew on board and bring it out to a distant retrograde orbit around the Moon. The most important thing NASA will get from the mission is a check of the thermal protection system of the Orion crew module during lunar reentry velocities."

Appendix (2): Sadeem Bulletin Magazine

Text (1)

(أل عالف في مدار الأرض وعلفت هب موهيت ويأج الشروق ولأروب للشمس)

لجلد الأول/بشرون الأول/2020

د. سح الرحمن حسي صالح

يقاطأل عدال هيقاطق اطع طظرهأل ستوالس ماوي مع طظرهأل هروج)ال نظرالوكس فويه(التي هي مسار الأرض حول الشمس أو مسار الشمس الظاهري حول الأرض.

Text(2)

هلقتناجه العدد الأول)

لجلد الأول/بشرون الأول/2020

د. أسح الرزاق سل مان

- "أن عالف لكالك هو جزء من علوم الطيحي هال ماوي هالذي ينفه مدراس مسارات) أوفللك(أل سح المسماوي هال صنفه نخللك والوكب والأقمار والنجوم والهجرات. أماع للصنفه اني درس وتولي بأل سح امالتيفي للكون وطريقه شوالكي هال وتاريخ هال وسبقك هال، عال وهعلى طيحي لوفضاء الذي يتحرف لفي تلك ألحسام "

Text (3)

(الكون بلبلون لفيروال جزء لمدوي في ص غير)

المجلد السادس / يونيو 2021

د. أحمد عبدلكي محسن

- فأصمى مسرفله سرنكون قاديون على صدها في الوقت الذي فيكون عمره 8 و13 مليار سنة حد رهي العالوي مو 46 مليار سنه وضوي ه. أي زاد حد رهي العالوي من قبله 33% بقربا 61 مليار سنه وضوي ه."

Text (4)

فهو هك التصاد على سطح القمر بيبتان (كش ف علي انت جوه مستمره)

المجلد الثالث عشر / يونيو 2020

د. لاس عه الرزاق سلمان

- لشر موء خرب بحث في جيء حول لوصفات لويكروبي ه لخص مبسوع خبر في سطح القمر بيبتان (و هو لبرق مرلكوكب زحل وتلي القوم في المجمع والشهر مع القمر) جوي (التعليل مشيري ."

Text (5)

المجلد الرابع عشر / يونيو 2021

مدلج العالوي اسلاف في يوي

د. أحمد عه الرزاق سلمان

"- في كلال علوم الطوي عه الوفي ناء في اعلو وج هال خصوص يوج فهوم مادي وعلمي م مهمي م (بهالقياس الم عاري اولك ممي) .
القياس كفهوم عام له صوره ملخص في علم لفي طوق لسن لسن دد شر لقياس الطوي في هذا المقال."

Text (6)

(هليو جفي م جموع لاش مسري قمر ص م حطم)

المجلد الثالث عشر / أول 2020

د. لاس سلمان طه

- مشري رتي جال بحث من قبل العالم " أو مان لفي مومر والو الهات لبحده وكان لتي جال بحث صدى لفيرو اس ع في المومر م حط اول مره م رصد ذرات من لاش لتي جال طوي جوم التعليل الويي ."

Text (7)

معلومات مقتصره ع الشمس)

المجلد التاسع / حزيران 2021

- شطل قل شمس طقه حرايه ه هال فني كل لفي هيص لال سطح الأرض طق موق دار ه 1360 جول لكل نهر مبه في الثري هال واحد. ومن حسب استبرسي طه أخ في رال مسرفل مبي الأرضو الشمس ميم دار ٥٠ مليون ليلو ونهر سن ج د أن سطح شمس يوس ل طق لفي موق دار ه 14+10¹⁹ years أي ٣٨٤ مليار مليار جلي لكال لفي ه."

Text (8)

فهو هك التصاد على سطح القمر بيبتان (كش ف علي انت جوه مستمره)

المجلد الثالث عشر / يونيو 2020

د. أحمد عه الرزاق

"- الباخون وتم لفي ه لكال كشف عن مويدا من القاصيل حول لفي ممتقير ل عوام لال جي ه (أو التجي ه) على يتطور سطح قمر لفي رال لبقام .
وبما م في عحتك السطح ."

Text (9)

(هل يتعل م ؟)

المجلد الثالث عشر / يونيو 2020

د. لاس سلمان طه

- " هل يتعل م ؟ جوي ع الكوكب بتدور حول قس ه من لغرب لال الشرق ما عدا كوكب لزه ه بكتك شرق الشمس من الشرق وغرب من لغرب لال كوكب لزه ه ."

Text (10)

معلومات مقتصره ع الشمس)

حزيران / 2021 المجلد السادس

- لالكن ع الشمس الي يصل الي هال حفع لفي ه لفي رال لفي دان لال فقه سري في ريل الن ع الشمس و اعمار النجوم عومما لفي اس موق دار ما فتقه من لفي لفي ه لال هال حفع لفي ه لفي رال لفي دان لال فقه سري في ريل الن ع الشمس و اعمار النجوم عومما لفي اس موق دار ه لفي ه لفي لفي ه ."