

Ditransitive complementation per clause type in academic research articles: Medical Science and Sociology as case studies

Dr. Sabiha Choura¹

*English Department, Faculty of Arts and Humanities of Sousse, Tunisia
Laboratory of Approaches to Discourse, Sfax*

Abstract: Transitivity plays an important role in shaping academic writers' identities and allowing them to voice their presence in their research community. Transitivity, as a system of choices including intensive complementation, intransitive complementation, monotransitive complementation, ditransitive complementation and complex-transitive complementation, allows writers to make different selections according to the generic features of the corresponding culture (Halliday & Mathiessen, 2014; Mathiessen, 2004). Considering the gap in the literature of genre analysis of ditransitivity (Mukherjee, 2005), the present research attempts to focus on writers' lexico-grammatical choices of ditransitives according to clause type and to find out how these choices are determined by the generic features of the Research Article and the characteristics of Medical Science and Sociology. In order to explore academic writers' preferences, the different types of clauses including ditransitives have been annotated via the UAM CorpusTool, one computational software. Thanks to this software, quantitative and qualitative analyses are carried out. The present research has shown that ditransitive clauses are not equally distributed in the corpus as writers more frequently opt for ditransitive subordinate clauses than ditransitive main ones. On the one hand, this is explained by academic writers' preferences for a concise packaging of information when it comes to main clauses as the latter serve as guiding statements in a sentence. On the other hand, ditransitives in subordinate clauses allow writers to describe various types of relations and contribute to the coherence and cohesion of the text. Across disciplines, the present study has proven that the distribution of the three types of ditransitive subordinate clauses, i.e. ditransitive nominal clauses, ditransitive adjectival clauses and ditransitive adverbial clauses, is determined by disciplinary norms since Medical Science and Sociology, as belonging to different domains of knowledge, have different research methods.

Keywords: clause types, ditransitives, Medical Science, Sociology, the Research Article Genre

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I. INTRODUCTION

According to Valor (2000, p. 15), "genre analysis as an insightful description of academic and professional texts has become a powerful and useful tool to arrive at significant form-function correlations." These correlations represent the norms by which writers in any genre abide by and, thus, manage to meet the expectations of the corresponding research community. An important genre which has received great attention in the literature is the Research Article Genre. This genre has been inextricably linked to the Scientific Register as it has served as a tool to disseminate new scientific discoveries. Being one of the most useful devices allowing writers to acclaim their findings and to voice their presence, the Research Article Genre will be analyzed, in the present paper, for the distribution of ditransitives per clause type. In particular, this structure will be examined across two disciplines, i.e. Medical Science and Sociology belonging to the hard and soft domains of Knowledge respectively. This is why genre, register and disciplinary variation will be described in what follows.

1.1. Genre, register and disciplinary variation

The social context in which an individual is involved triggers particular semantic meanings which, in their turn, trigger particular lexico-grammatical choices. As Hasan (2009, p. 170) claims, "contextual choices activate semantic choices [which] activate the lexico-grammatical ones." These contextual factors are mainly register and genre. In fact, within a particular culture, writers draw upon a particular register repertoire; that is to say, they select particular patterns of wordings which reflect their social positioning within a particular culture as opposed to others (Hasan, 2009, p. 171). Thus, the choice of a particular set of linguistic resources is determined by register which means "[using] certain recognizable configurations of linguistic resources in

certain contexts” (Thompson, 2004, p. 40). Accordingly, register refers to “variation according to use” (Halliday & Hasan, 1985, p. 24). The variation from one register to another is attributed to three criteria, i.e. field, tenor and mode. Field refers to the content. Tenor describes the interactants and their relationship. Mode stands for “how the language is functioning in the interaction: for example, whether it is written or spoken” (Halliday & Hasan, 1985, p. 24).

Lexico-grammatical choices are also determined by genre which “deploys the resources of a register (or more than one register) in particular patterns to achieve certain communicative goals” (Thompson, 2004, p. 43). To put it differently, genre “includes the more general idea of what the interactants are doing through language, and how they organize the language event, typically in recognizable stages, in order to achieve that purpose” (Thompson, 2004, p. 39-40). In such a way, genre is a “staged, goal-oriented, purposeful activity in which speakers engage as members of [their] culture” (Martin, 1984, p. 25). Henceforth, texts belonging to the same culture should display shared characteristics which are referred to as generic identity (Eggins, 2004, p. 55). Seeing the importance of the Research Article Genre in building academic identities, the present study has chosen to explore how this genre determines the distribution of ditransitive clauses in the corpus under study.

Though belonging to the same genre and register, articles can display variation from one discipline to another, especially if they pertain to two different domains of knowledge, i.e. hard and soft domains. These two domains of knowledge have different research interests and are based on different methods of investigation seeing the nature of the analyzed phenomena in each domain of knowledge (Sharma, 1997). This is why disciplines belonging to one domain of knowledge display particular lexico-grammatical choices differentiating them from those pertaining to the other domain.

Seeing the gap in the literature of genre analysis of ditransitivity (Mukherjee, 2005) and considering the fact that Choura (2016) explored ditransitive patterns and process types in the Research Article Genre, the present research attempts to provide a better understanding of ditransitivity through analyzing the interrelation between ditransitives and clauses types in the Research Article Genre. Since the present research tries to study how the context, i.e. the Research Article Genre, the Scientific Register and the two disciplines – Medical Science and Sociology, influences the distribution of ditransitives per clause type, the different types of clauses will be described in the following sub-section.

1.2. Types of clauses

Clauses are classified into main and subordinate clauses. The latter consist, in their turn, of three types: subordinate nominal clauses, subordinate adjectival clauses and subordinate adverbial clauses. Since the present research focuses on the distribution of ditransitives according to clause types, the characteristics of each clause will be outlined in what follows.

1.2.1. Main clauses

The main clause is also called a higher S, a matrix S and a superordinate clause (Brinton & Brinton, 2010, p.243). It consists of a main verb and it functions independently. In Brinton and Brinton’s words (2010, p.404), it is “a finite clause that can stand alone as a complete utterance.” Main clauses can be illustrated through the following sentence:

E 1. My omelette was overcooked.

(Brinton & Brinton, 2010, p. 404)

1.2.2. Subordinate clauses

Ditransitive verbs occur not only in main clauses but also in subordinate ones. Subordinate clauses are also named as lowers, embedded Ss, or dependent clauses. They cannot stand alone in the sentence; they are always related to the main clause. As Brinton and Brinton (2010, p. 243) put it, “dependent clauses are related to the main clause by a process of embedding. There are a number of different types of dependent clauses, each serving a variety of functions in respect to the main clause.” According to Jackson and Stockwell (1996, p. 50–p. 51), there are three types of subordinate clauses: subordinate nominal clauses, subordinate adjectival clauses and subordinate adverbial clauses.

1.2.2.1. Subordinate nominal clauses

Subordinate nominal clauses can occupy three positions in the clause: the subject, the object and the complement (Jackson & Stockwell, 1996, p. 50). They can be realized by four clause types: that-clauses, wh-clauses, ing-clauses and inf-clauses. As for subordinate nominal that-clauses, they are obligatory elements in the sentence (Brinton & Brinton, 2010, p. 245). An example of these clauses can be provided below:

E 2. I heard that you were there.

(Kennedy, 2013, p. 270)

The complementizer *that* initiating that-clauses can be omitted when the direct object realized by a that-clause comes after the indirect object, as is shown in the following example:

E 3. *He told his mother \emptyset coffee grows in Brazil.*

(Brinton & Brinton, 2010, p. 250)

As for their usage, Brinton and Brinton (2010, p. 245) claim that “that-clauses frequently act as direct objects after a verb of communication.” Accordingly, they have a reporting function. In this context, the present research will explore whether these subordinate nominal clauses are frequently used for reporting in the corpus under study.

Concerning subordinate nominal wh-clauses, they are introduced by a wh-word like *whether*, *who*, *what* and *why*. The wh-word, unlike the complementizer *that* in a that-cause, serves various grammatical functions. This difference between the two types of subordinate clauses, i.e. wh-clauses and that-clauses, as far as the complementizer is concerned, is highlighted in the claim of Jackson and Stockwell (1996, p. 51): “unlike the that of that-clauses, the wh-word is an element (subject, object and so on) of the wh-clause”. As an example, the following sentence includes a subordinate nominal wh-clause in which the wh-word, i.e. *what*, has the function of a direct object.

E 4. *I liked what he said.*

(Kennedy, 2013, p. 270)

As for their function, subordinate nominal wh-clauses “are [types] of indirect speech” (Brinton & Brinton, 2010, p. 269). In other words, they introduce indirect questions. This is illustrated by the following sentence:

E 5. *Rosie asked Paul whether his sister was going to Toronto the next day.*

(Brinton & Brinton, 2010, p. 269)

With regard to subordinate nominal ing-clauses, they can be in the simple, perfect, progressive or passive forms. The following sentence exemplifies these clauses:

E 6. *He resents having been asked to help.*

(Brinton & Brinton, 2010, p. 273)

As far as subordinate nominal infinitive clauses are concerned, they are of two types: bare-infinitive clauses and to-infinitive clauses. Bare infinitive clauses are not marked for tense. They “are quite limited, occurring after verbs of causation (e.g. make) and of perception (e.g. see), as well as modal auxiliaries” (Brinton & Brinton, 2010, p. 273). The following sentence is an example of bare infinitive clauses:

E 7. *The teacher made me do it.*

(Brinton & Brinton, 2010, p. 272)

Concerning to-infinitive clauses, they are composed of *to* in addition to the stem verb or auxiliary. They “can also include the perfect, progressive, and passive” (Brinton & Brinton, 2010, p. 273). The following sentence includes a subordinate nominal to-infinitive clause:

E 8. *I want to give you a present.*

(Brinton & Brinton, 2010, p. 273)

1.2.2.2. Subordinate adjectival clauses

According to Jackson and Stockwell (1996, p. 51), subordinate adjectival clauses “function as modifiers of nouns, within a noun phrase, [and they] do the same job as an adjective.” They can be realized in three different ways: the relative clause, the ing-clause and the ed-clause. As for relative clauses, they are initiated by a relative pronoun such as *who(m)*, *which*, *that*, *whose*, *why*, *when* and *where* (Brinton & Brinton, 2010, p. 261), as is shown in the following example:

E 9. *They have eight children who are black belts.*

(Brinton & Brinton, 2010, p. 260)

The wh-word introducing relative clauses can be omitted when it occurs in the following slots: direct object, indirect object and object of the preposition. An example of a removed wh-word functioning as an object of the preposition is shown in the following sentence:

E 10. *The bum at the corner \emptyset she gave fifty cents to most days would probably love this life.*

(Brinton & Brinton, 2010, p. 263)

The relative clauses in E 9 and E 10 describe their antecedents. As Brinton and Brinton (2010, p. 261) put it, “relative clauses express a quality or feature of the noun modified”. There are two types of relative clauses: restrictive and non-restrictive relative clauses (Brinton & Brinton, 2010, p. 264). Restrictive clauses are necessary in order to understand the antecedent while non-restrictive clauses are not necessary to do so. The difference between these two types is illustrated in Brinton and Brinton’s claim (2010, p. 264):

A restrictive relative clause is necessary to identify which person or thing (denoted by head noun) is being talked about; it “restricts”, limits, or picks out the referent(s) from a larger set or referents. In a non-restrictive relative clause, the head noun is sufficiently restricted or limited in order to be identified; the relative clause simply adds additional (or parenthetical) information.

The difference between restrictive and non-restrictive relative clauses can be illustrated through the two following sentences respectively:

E 11. *Any man who goes back on his word is no friend of mine.*

E 12. *John, who is a linguist, was not impressed by Professor Fish’s arguments.*

(Cowan, 2008, p.438)

Concerning ing-clauses, they are “introduced by a present participle form of the verb” (Jackson & Stockwell, 1996, p. 52). These clauses do not contain a subject as the modified noun plays the role of the subject for the ing-clause. Ing-clauses can be illustrated in what follows:

E 11. The song topping the charts at the moment

(Jackson & Stockwell, 1996, p. 52)

Like ing-clauses, subordinate adjectival ed-clauses do not have a subject. They take the form of a past participle (Jackson & Stockwell, 1996, p. 52), as can be seen in the following example:

E 12. The book given to him yesterday is very valuable.

(Brinton & Brinton, 2010, p. 274)

1.2.2.3. Subordinate adverbial clauses

Subordinate adverbial clauses which “function as adverbials replace adverbs/ prepositional phrases” (Jackson & Stockwell, 1996, p. 50-51). They can express time, manner, reason, condition, concession, contrast, result, comparison and purpose. An example of subordinate adverbial clauses is provided below:

E 13. Meg felt embarrassed because she wore only a thin T-shirt.

(Brinton & Brinton, 2010, p. 252)

Minor subordinate adverbial clauses are divided into two types: inf-clauses and ing-clauses. Inf-clauses take the infinitive form and express purpose (Jackson & Stockwell, 2011, p. 53). As for ing-clauses, they “[contain] a present participle form of the verb, sometimes introduced by a subordinating conjunction” (Jackson & Stockwell, 1996, p. 52). Examples of both clause types are mentioned in what follows:

E 14. I have to call in at the post office to buy some stamps.

E 15. I found this gold ring, (while) looking for shells on the beach.

(Jackson & Stockwell, 1996, p. 52-53)

The present research will study the distribution of ditransitive main clauses and ditransitive subordinate ones in addition to the three types of subordinate clauses (i.e., subordinate adjectival clauses, subordinate nominal clauses and subordinate adverbial clauses). It will also explore whether such distributions are determined by the generic features of the Research Article Genre and the specificities of each discipline.

II. METHODS

The present corpus consists of medical and sociological articles. Medical articles are taken from the British Medical Journal, the New England Journal of Medicine, and the International Journal of Medical Sciences while sociological ones are extracted from the International Journal of Intercultural Relations, the Journal of Family Issues and the Journal of Social Forces. These articles are made up of one million words equally divided between the two disciplines, i.e., Medical Science and Sociology. The size of the corpus can better inform the researcher about academic writers’ choices of ditransitive clause types. As Neale (2007, p. 144) puts it, a corpus is “a large body of text instances which has been collected according to defined principles, and which can be examined and queried to assist the researcher in testing hypotheses about language in use.” The corpus under study will be annotated via the UAM CorpusTool and the quantitative results will be tested for significance through the chi-square test.

2.1. UAM CorpusTool

This corpus has been annotated using one computational software which is the UAM CorpusTool. This software allows the creation of two layers corresponding to two levels of analysis. The first one is entitled disciplines. It allows the researcher to annotate the document as a whole as either sociological or medical. This layer can be seen in the following figure:

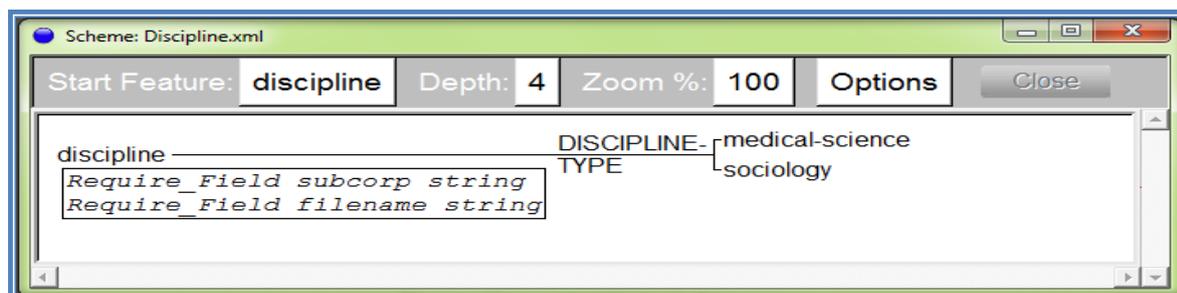


Figure 1. First layer. Discipline

The second layer is called clause types. It enables the researcher to differentiate between ditransitive main clauses and ditransitive subordinate ones and to identify subordinate clause types. This layer can be seen in the following figure:

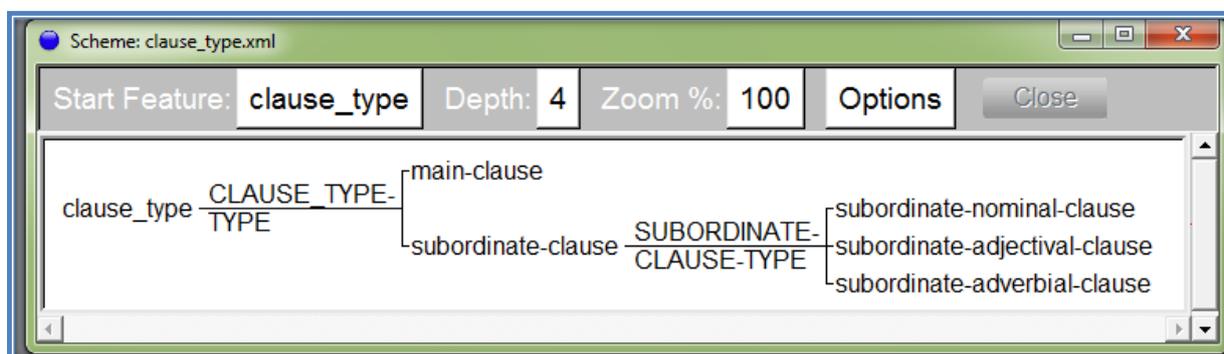


Figure 2. Second layer: Clause types

These two layers of analysis allow the generation of quantitative findings to which the chi-square test will be applied.

2.2. The chi-square test

According to Weathington, Cunningham and Pittenger (2010, p. 510-511), “the primary purpose of the χ^2 test of independence is to determine whether the variables involved function independently from one another.” If the chi-square test allows the rejection of the null hypothesis, the researcher can maintain the alternative hypothesis and confirm the relationship between the variables. The chi-square test can be calculated as follows:

$$\chi^2 = \sum (O-E)^2 / E$$

With;

E: being the expected frequency

O: the observed frequency

E: computed by multiplying the line total by the column total and dividing the sum by the general total.

The chi-square test can be counted via the UAM Corpus Tool and the extent to which the relation between the variables is significant can also be displayed. A weak significance, a medium significance and a high significance are indicated respectively as follows: (+), (++) and (+++). The values of the chi-square test and the degrees of significance are shown in Figure 3.

Feature	medical-scienc		sociology		ChiSqu	Sign.
	N	Percent	N	Percent		
CLAUSE-TYPE	N=2829		N=2727			
- main-clause	1061	37.50%	1053	38.61%	0.725	
- dependent-clause	1768	62.50%	1674	61.39%	0.725	
DEPENDENT-CLAUSE-TY	N=1768		N=1674			
- subordinate-nominal	312	17.65%	679	40.56%	220.217	+++
- subordinate-adjecti	702	39.71%	458	27.36%	58.661	+++
- subordinate-adverbi	754	42.65%	537	32.08%	40.972	+++

Figure 3. The chi-square test and the degree of significance

In the present research, the chi-square test is used to answer the following question: Are the similarities and differences in the distribution of ditransitive clause types in both disciplines significant?

III. RESULTS AND DISCUSSION

As this paper explores the distribution of ditransitives according to clause type, the frequencies of these verbs in main and subordinate clauses along two disciplines, i.e. Medical Science and Sociology, will be investigated. The analysis will also be extended to the three types of subordinate clauses, i.e. nominal, adjectival and subordinate clauses.

3.1. Distribution of ditransitive complementation in main and subordinate clauses in the corpus

Seeing that the present paper studies the distribution of ditransitive clause types in the Research Article Genre, their frequencies will be displayed in the corpus as a whole in the following table:

Table 1. Distribution of ditransitive main and subordinate clauses in the corpus

	The corpus	
	Frequencies	Percentages
Main clauses	2114	38.04%
Subordinate clauses	3442	61.95%
Total	5556	100 %

Table 1 indicates that ditransitive verbs are more frequent in subordinate than in main clauses. Indeed, 61.95% of ditransitive verbs are found in subordinate clauses compared with only 38.04 % in main clauses. The discrepancy in the distribution of these clauses is explained by the communicative functions of each clause type in the Research Article Genre. These functions will be described in what follows.

As for main clauses, writers use ditransitives as a means for explanation in the scientific corpus. This explanatory function is illustrated through the following examples:

*M 1. We then **compared** these predictions with the multi-professional estimates of survival (tables 5 and 6).*

*S 1. In the first individual-level OLS analysis (Table 4), we **compare** the earnings of partnered gay men to married men.*

Through using ditransitive verbs in the main clause (M 1 & S2), writers complement the verb with both a direct object, i.e. *these predictions* and *the earnings of partnered gay men*, and an indirect object, i.e. *with the multi-professional estimates of survival* and *to married men*, in order to clarify the message and make it more explicit. In such a way, through ditransitive main clauses, writers manage to explain the message and achieve a higher level of explicitness, which makes the message more accessible to the readership.

Just as main clauses can serve as devices for explanation and explicitness, they can also direct the readers' attention to a particular topic, as can be seen in examples M 2 and S 2.

*M 2. The patients **were told** that they could start doing light jobs 3 to 4 days after the procedure and **were asked** not to lift more than 4 kilograms for a period of 2 weeks.*

*S 2. Participants **were asked** to rate how well each sentence defines their current relationship on a 9-point Likert scale ranging from Don't agree at all (1) to Agree completely (9).*

As the abovementioned examples M 2 and S 2 show, ditransitive main clauses can be used to introduce a particular piece of information (M 2) or to provide an instruction (S 2). Accordingly, they describe the verbal activity between the participants and the researchers. These activities are later specified in subsequent subordinate nominal clauses. Thus, ditransitive main clauses serve as general statements guiding readers to particular pieces of information, situations, or actions.

As for ditransitive subordinate clauses, they are used in order to create cohesion, clarity and precision, to provide description and to create connections [See 3.2.]. In the present corpus, ditransitive subordinate clauses are nearly double of their corresponding main clauses. The cognitive processing of ditransitive subordinate clauses is difficult, in comparison with ditransitive main ones, bearing in mind that the reader has to decode the main clause so as to understand the meaning of the forthcoming subordinate clause and considering that ditransitive complementation is a rather long type of complementation (Choura, 2016). The frequency of ditransitive subordinate clauses, thus, testifies to the formality of the Research Article Genre. This claim is supported by Azevedo (2005, p.127) who maintains that:

Subordination taxes listeners' memories by requiring them to recall what has been said in order to relate it syntactically to what is being said. This is probably why the incidence of subordination increases in direct proportion to the level of formality.

Seeing that ditransitive subordinate clauses are tokens of formality, their frequency, therefore, shows the literacy of the corpus. The discrepancy in the distribution of ditransitives in main and subordinate clauses can also be accounted for in terms of the specificities of these verbs. Although ditransitive structures are explicit in meaning, they are rather long in comparison with other types of complementation such as monotransitive or intensive complementation. Considering that main clauses bear the core meaning of the message and that ditransitive complementation is long, writers avoid this type of complementation in main clauses in order to ensure that the readers manage to grasp the general context of the sentence within a relatively short period of time. The findings of the present research are not consistent with the findings of Oostdijk and Haan (1994); indeed, Oostdijk and Haan (1994, p. 48), while investigating clause structure in Modern British English by analyzing the Nijmegen Corpus, claim that 90 ditransitive verbs occur in matrix clauses while 61 of these verbs occur in embedded clauses. The results of Oostdijk and Haan (1994) may be considered as global probabilities while the findings of the present research can be seen as local probabilities as they apply only to the Research Article Genre and the Scientific Register. As Halliday and Webster (2009, p. 252) put it, "global probabilities are those pertaining to the language as a whole, in all contexts and registers. Local probabilities are those that are particular to one subsystem or text type, or even to one body of text."

As subordinate clauses are classified into three types, i.e. subordinate nominal clauses, subordinate adjectival clauses and subordinate adverbial clauses, the present research will investigate their distribution in Medical Science and Sociology.

3.2. Distribution of ditransitive complementation in subordinate clause types in the corpus

Seeing that the present research has shown that the distribution of ditransitive main and subordinate clauses is determined by the generic features of the Research Article Genre, the analysis will also be extended to the three types of subordinate clauses to find whether the latter are also affected by the nature of the corpus. The distribution of the three types of subordinate clauses, i.e. subordinate adjectival clauses, subordinate nominal clauses and subordinate adverbial clauses, is displayed in Table 2.

Table 2. Distribution of subordinate clause types in Medical Science and Sociology

	Medical Science		Sociology		The Corpus	
Subordinate nominal clauses	312	17.65%	679	40.56%	991	28.79%
Subordinate adjectival clauses	702	39.71%	458	27.36%	1160	33.70%
Subordinate adverbial clauses	754	42.65%	537	32.08%	1291	37.51%

While subordinate adverbial clauses containing ditransitive verbs are rated first in Medical Science, they are classified second in Sociology. They have a connective function, as can be seen in the following sentences:

*S 3. A study among Turkish Dutch showed that the second generation, **compared to the first generation**, was more strongly attached to the Dutch culture, whereas attachment to the Turkish culture was almost similar for both generations (Arends-Tóth & Van de Vijver, 2003).*

*M 3. We noted increased efflux capacity after therapy with pioglitazone, a phenomenon that **could be related to enhanced transcription of apolipoprotein A-I**.*

*M 4. The results showed that, contrary to expectations, the immigrant women were, **compared with the indigenous Dutch respondents**, even self-aware and capable for managing new situations, and less sensitive to others.*

*S 4. Our results, however, produced a larger earnings advantage **compared to studies using the 1990 U.S. Census data** (see Table 1).*

In example S 4, through the ditransitive verb in the subordinate adverbial clause, writers compare their study with others. However, in examples S 3 and M 4, through the ditransitive verbs in the subordinate adverbial clauses, writers compare two variables. Therefore, subordinate adverbial clauses have a cohesive function. In Hinkel's words (2002, p. 136), "[t]hese structures may have a cohesive purpose when they are used to compare the information provided earlier in discourse." Not only do ditransitive subordinate adverbial clauses have a cohesive function, but they also clarify and explain the relationships between different entities or studies. As Hinkel (2002, p. 136) puts it, "in composition instruction, comparisons and analogies are frequently encouraged as an explication device and recommended for clarification." The fact that ditransitive adverbial clauses are more frequent in Medical Science than Sociology shows that the former is accessible to a wider readership and thus more comprehensible.

While ditransitive verbs in examples S 3, M 4 and S 4 indicate comparison, the one in example M 3 stands for accompaniment whereby writers establish a relationship of association between two variables. Thus, these examples show that ditransitive subordinate adverbial clauses are used to create relationships between the present research and other studies, different groups of participants in the same experiment or between various variables. As Hinkel (2002, p. 134) claims, "adverb clauses express a variety of contextual relationships, some of which refer to cause, concession, condition, purpose, temporality, locations, and others."

In examples S 3, M 4 and S 4, ditransitive verbs occur in reduced adverbial clauses. These clauses impart conciseness to the writing. In the words of Hinkel (2002, p. 137), "in academic texts, reduced adverb clauses integrate information compactly, while retaining the meanings and functions of full adverb clauses." Obviously, reduced adverbial clauses characterize formal and written registers. They "represent a structure indicative of an advanced language proficiency and sophisticated levels of language use and discourse fluency" (Hinkel, 2002, p. 137).

The significant discrepancy in the distribution of ditransitive subordinate adverbial clauses across the two disciplines which is marked by the UAM CorpusTool as (+++) can be accounted for by the two different fields of research. While Sociology focuses on the interaction between participants, their patterns of behavior, feelings and emotions, Medical Science investigates the effects of one variable on another as far as human beings' health is concerned. This is why Medical Science is likely to focus more on the different types of

relationships between variables. The difference in the distribution of these clauses may support the finding that Medical Science is more formal than Sociology as reduced adverbial clauses have high degrees of formality. As Table 2 shows, ditransitive adjectival clauses are classified second in Medical Science and third in Sociology. These clauses have a descriptive function, as is illustrated through the following examples:

*M 5. Women **who gave birth to a stillborn baby at or after 28** completed weeks of gestation in the Auckland region between July 2006 and June 2009 were invited to participate in the study.*

*S 5. Workers'belief in their ability to advance in an organization arises from the normal promotional habits **associated with these supported performances.***

As is seen in the abovementioned examples M 5 and S 5, subordinate adjectival clauses containing ditransitive verbs describe a particular group of patients or a particular set of practices. Therefore, they specify the meaning of the head nouns they modify, i.e. *Women* (M 5) and *normal promotional habits* (S 5), thus serving as means of precise description. As Hinkel (2002, p.131) puts it, "because the amount of information included in a clause can be greater than that conveyed by an attributive adjective, the use of clauses allows for a more precise referential identification."

In example S 5, unlike example M 5, the ditransitive verb occurs in a reduced adjectival clause. Such clauses make the writing concise. They mark written discourse as they are more frequent in this genre than in informal genres. Put differently, "in text, reduced adjective clauses are largely employed in highly informational discourse because they allow for a more integrated and compact structure than full adjective clauses" (Hinkel, 2002, p.132).

The discrepancy in the distribution of these clauses across Medical Science and Sociology, which is highly significant, as is indicated by the UAM CorpusTool as (+++), can be accounted for by the finding that the former is more precise and more formal than the latter. This may also be attributed to the fact that Medical Science, as belonging to the hard domain of knowledge, is based on a precise description of the participants, materials, the different procedures and the findings because in this domain "knowledge is more likely to be represented as proceeding from laboratory activities than the interpretive operations or verbal arguments of researchers" (Hyland, 2004, p. 38).

As for ditransitive subordinate nominal clauses, they are more frequent in Sociology than in Medical Science as they represent 40.56% and 17.65% respectively. These clauses are illustrated by the following examples:

*M 6. Furthermore, several studies have shown **that metronidazole therapy, as compared with vancomycin therapy, is associated with more failures and higher rates of recurrence, especially among severely ill patients.***

*S 6. Research has demonstrated **that men's leave taking early in a child's life has been linked to men's greater participation in the household later in the child's life** (Gornick & Meyers, 2003).*

*S 7. Our data showed **that the mere quantity of intergroup contact is associated with less negative affect.***

In these examples, ditransitive subordinate nominal clauses are used to report the findings of the previous studies (M 6 & S 6) or the current study (S 7). Thus, they have a reporting function as they allow researchers to display new or previous findings. In Hinkel's words (2002, p. 130), subordinate nominal clauses "often allow the writer to display knowledge and / or provide an evaluation of the proposition expressed." By using these clauses as devices for disseminating knowledge, writers attempt at achieving objectivity. To put it differently, "the writer detaches him/herself from propositions by attributing them to others" (Tardos, 1994, p. 74). Accordingly, subordinate nominal clauses enable writers to transfer pieces of information through conveying a sense of detachment in the text.

Not only do ditransitives in subordinate nominal clauses allow writers to display new findings, but they also enable them to summarize what has been stated. The following example illustrates this idea.

*S 8. It was also found **that the level of posttraumatic symptoms is negatively associated with marital adjustment and parental functioning.***

In example S 8, writers use the ditransitive verb in a subordinate nominal clause to remind the readers of previously stated findings so to pave the way for introducing their interpretations. Thus, ditransitive nominal clauses "provide for extensive cohesive ties by means of recapitulation of the information stated earlier" (Hinkel, 2002, p. 130).

Ditransitive verbs in subordinate nominal clauses can, in addition, guide the readers through stating the objective of the research, as is shown in the following sentence:

*M 7. The primary objective of this multicenter, randomized study, called the Prophylaxis for Thromboembolism in Critical Care Trial (PROTECT), was **to compare the effect of dalteparin, a low-molecular-weight heparin, with that of unfractionated heparin on the primary outcome of proximal leg deep-vein thrombosis in critically ill patients.***

Through the ditransitive verb in the subordinate nominal clause in example M 7, writers stipulate their objective in order to inform the readers about how the ideas will be developed in the academic article. As Hinkel (2002, p. 130) puts it, "another function of noun clauses is to provide for extensive cohesive ties by means of

predicting the development of discourse/argumentation moves, particularly in introductions.” Accordingly, ditransitive nominal clauses serve as guiding clarifying devices in the present corpus.

Another function of subordinate nominal clauses is specifying the information in the previous clause. The following sentences are good examples:

S 9. we were also interested in examining how linear and orthogonal conceptualization of acculturation were associated with characteristics that have been associated with Asian culture.

M 8. Practice staffs were asked to provide each patient with a written individualized asthma-action plan.

In both examples S 9 and M 8, while main clauses direct the thoughts of the readers to a particular topic, ditransitive verbs in subordinate nominal clauses specify the propositional content. These clauses, thus, result in precision in the writing. In example M 8, the ditransitive verb in the subordinate nominal to-infinitive clause stands for a potential action. In this context, Quirk et al. (2005, p. 1062-1063) claim that “The nominal to-infinitive clause often indicates that the proposition it expresses is viewed as a possibility or a proposal rather than something already fulfilled.” However, in example S 9, the subordinate nominal wh-clause reflects writers’ lack of knowledge about this particular topic. As Quirk et al. (2005, p. 1051) put it, these clauses “leave a gap of unknown information, represented by the wh-element.” Therefore, ditransitive nominal clauses clarify information in previous clauses through framing different event situations – whether potential or unknown.

Ditransitive nominal clauses can also be used for reporting the speeches of different social agents, as is indicated in the following sentence:

S 10. She stated that women in management and professional positions are given the best leave policies, “but unfortunately, most women are not management and professional workers” (U.S. Congress, 1986 b, p.31).

The ditransitive nominal clause in example S 10 allows writers to introduce the claim of one of the feminists in order to review how gender inequality is perceived by different human beings in society. Thus, ditransitive nominal clauses serve as evaluative devices by means of which writers report either their value judgment or that of others with respect to a particular situation or topic.

The significant difference in the distribution of ditransitive nominal clauses across Medical Science and Sociology which is indicated by (+++) in the UAM CorpusTool can be accounted for by the fact that researchers in Sociology, as belonging to the soft sciences, opt for reporting more frequently than writers do in Medical Science, as pertaining to the hard sciences. The ditransitive nominal clause, thus, serves as a tool to transfer the findings of the present study and other studies and to display the claims of different social agents. This discrepancy is also explained by the fact that sociological writers restate their ideas more frequently than do medical writers due to the non-cumulative nature of knowledge in the soft domain, an idea which is further supported by the length of Sociological Research Articles.

The three subordinate clause types are not equally distributed in the corpus as a whole. Ditransitive adverbial clauses are the most frequent (37.51%). While ditransitive adjectival ones are rated second (33.70%), ditransitive nominal ones are the least frequent (28.79%). Seeing that ditransitive verbs are followed by two complements and that adverbial clauses have a rather connective function, writers use most frequently ditransitives in these clauses in order to display various kinds of relations while creating coherence and cohesion in the research article. Being rated second and having a descriptive function, ditransitive adjectival clauses allow writers to describe the participants or researchers’ actions with the adequate level of precision. As for ditransitive nominal clauses, they are the least frequent because, like main clauses, they provide information. However, the difference between the two types of clauses is manifested in the fact that main clauses include general guiding statements and provide more substantial pieces of information than ditransitive nominal ones.

IV. CONCLUSION

The analysis has shown that ditransitive verbs are more frequent in subordinate than in main clauses. While main clauses serve as general guiding statements, subordinate ones are used in order to achieve the following purposes: to create cohesion, clarity and precision, to provide description and to create connections. Being followed by two complements, ditransitives prove to be useful devices enabling writers to display different kinds of relations and to convey various rhetorical effects. Just as ditransitive verbs are studied in main and subordinate clauses, they are also investigated in the three types of subordinate clauses, i.e. subordinate nominal clauses, subordinate adjectival clauses and subordinate adverbial clauses. While ditransitive verbs in adverbial clauses are the most frequent as they have a connective function and display various contextual connections, thereby creating cohesion and coherence, those in adjectival clauses, being rated second, have a descriptive function. As for ditransitive nominal clauses, they are rated third as they are used for reporting. They are the least frequent because of their similarity to main clauses except for the fact that main clauses are general guiding statements and display more important pieces of information than subordinate ones. These three types of clauses are not equally distributed across Medical Science and Sociology as these two disciplines have different areas of research and different degrees of formality and investigate different types of data. Ditransitive adjectival clauses in Medical Science are classified second while those in Sociology are rated third. Taking into

account that subordinate adjectival clauses have a rather descriptive function, the variation in the distribution of ditransitives in subordinate adjectival clauses across Medical Science and Sociology may lead us to the conclusion that the former is more precise than the latter. As for ditransitive verbs in subordinate adverbial clauses, they are classified first in Medical Science and second in Sociology. This variation is attributed to the two different fields of research investigating different sets of data. A propos of subordinate nominal clauses containing ditransitive verbs, they are rated third in Medical Science and first in Sociology. This may be explained by the different domains of knowledge as knowledge in Sociology is not cumulative. This is why sociologists frequently opt for reporting through using ditransitives.

REFERENCES

- [1] M.A.K. Halliday & C.M.I.M. Matthiessen, *Halliday's introduction to functional grammar*. New York: Routledge, 2014.
- [2] C.M.I.M. Matthiessen, Descriptive motifs and generalizations. In A. Caffarel, J.R. Martin & C.M.I.M. Matthiessen (Eds.), *Language typology: A functional perspective* (pp.537-673). Philadelphia: John Benjamins Publishing Company, 2004.
- [3] P. Mukherjee, *English ditransitive verbs: Aspects of theory, description and a usage-based Model*. The Netherlands: Rodopi, 2005.
- [4] M. L. G. Valor, *A pragmatic approach to politeness and modality in the book review articles*. Valencia: Universitat de València, 2000.
- [5] R. Hasan, The place of context in a systemic functional model. In M. A. K. Halliday and J. J. Webster (Eds.), *Continuum companion to systemic functional linguistics* (pp.166–189). London/New York: Continuum, 2009.
- [6] G. Thompson, *Introducing functional grammar (2 nd ed.)*. Great Britain: Hodder Education and Hachette UK Company, 2004.
- [7] M.A.K. Halliday & R. Hasan, *Language, context, and text: Aspects of language in a social-semiotic perspective*. Geelong: Deakin University Press, 1985.
- [8] J.R. Martin, Language, register and genre. In E. Christie (Ed.), *Children writing: A reader* (pp. 21-9). Geelong: Deakin University Press, 1984.
- [9] S. Eggins, *An introduction to systemic functional linguistics*. London: Continuum International Publishing Group, 2004.
- [10] K. R. Sharma, *Sociological methods and techniques*. India: Atlantic Publishers & Distributors (P) LTD, 1997.
- [11] S. Choura, *Ditransitive complementation in research articles: Medical Science and Sociology as case studies*, doctoral dissertation. Faculty of Arts and Humanities of Sfax, Sfax, 2016.
- [12] L.J. Brinton & D.M. Brinton, *The linguistic structure of modern English*. Philadelphia : John Benjamins Publishing Company, 2010.
- [13] H. Jackson & P. Stockwell, *An Introduction to the nature and functions of language*. United Kingdom: Stanley Thornes Publishers Ltd, 1996.
- [14] G. Kennedy, *Structure and meaning in English: A guide for teachers*. The United States: Routledge, 2013.
- [15] R. Cowan, *The teacher's grammar of English with answers: A course book and reference guide*. Cambridge: Cambridge University Press, 2008.
- [16] A. Neale, 'Matching' corpus data and system networks: Using corpora to modify and extend the system networks for transitivity in English. In G. Thompson & S. Hunston (Eds.). *System and corpus: Exploring connections* (pp. 143- 163). London: Equinox, 2007.
- [17] B. L. Weathington, C.J.L. Cunningham, and D. J. Pittenger, *Research methods for the behavioral and social sciences*. The United States of America: John Wiley & Sons, 2010.
- [18] M.M. Azevedo, *Portuguese: A linguistic introduction*. Cambridge: Cambridge University Press, 2015.
- [19] Oostdijk, N. & Haan, P.D. (1994). Clause patterns in modern British English: A corpus-based (quantitative) study. *ICAME Journal*, 18. pp. 41-79, 1994.
- [20] M. A. K. Halliday & J. J. Webster, Keywords. In M. A. K. Halliday & J.J. Webster (Eds.), *Continuum companion to systemic functional linguistics*. London/ New York: Continuum, 2009.
- [21] E. Hinkel, *Second language writers' text: Linguistic and rhetorical features*. New Jersey: Lawrence Erlbaum Associates Publishers, 2002.
- [22] K. Hyland, *Disciplinary discourses: Social interactions in academic writing*. The United States of America: The University of Michigan Press, 2004.
- [23] A. Tardos, Predictive categories in expository text. In M. Coulthard (Ed.), *Advances in Written Text Analysis* (pp. 69-82). Taylor & Francis e-Library, 2004.

- [24] R. Quirk, S. Greenbaum, G. Leech & J. Svartvik, *A comprehensive grammar of the English language*. London: Longman, 2005.

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