

ADVERBIAL CONNECTOR USE IN PUBLISHED ACADEMIC RESEARCH ARTICLES OF TURKISH NNES WRITERS

Elif Demirel

Karadeniz Technical University
Department of English Language and Literature
TURKEY

ABSTRACT

The current study focuses on the usage of adverbial connectors (ACs) in two corpora compiled from the published research articles of academicians: Turkish Academic Corpus (TAC) consisting of the published journal articles of Turkish NNES scholars published in National and International Journals in Turkey and American Academic Corpus (AAC) consisting of the articles of NES scholars published in major international journals. The corpora consist approximately of 1.200.000 words for the TAC and 2.500.000 for the AAC. According to conjunctive roles additive, contrastive, summative, appositive, resultive and inferential ACs were chosen for the analyses. On the quantitative aspect of the study, the overuse and underuse of ACs in both corpora was examined in detail and a qualitative analysis was carried out to confirm the overuse and underuse of ACs to reveal the overall usage pattern of the two groups of writers. The results revealed significant differences in the use of ACs between NNES and NES scholars and overuse and underuse patterns for certain classes of ACs on part of Turkish NNES scholars.

Keywords: Corpus, corpus linguistics, research article, adverbial connectors, overuse, underuse.

INTRODUCTION

Writing in a foreign language requires profound knowledge of both the forms and the functions of that language. It will not be sufficient to put the words or word chains into an ordinary order to write a coherent text. The present study examines the issue of coherence through explicit relational expressions achieved through the use of ACs. The issues of cohesion and coherence are the key features which make a text clear and readable. In previous studies, ACs are stated as important devices for cohesion since they allow the reader to comprehend the logical relationships in a text by guiding the reader in interpreting the text (Oversteegen, 1997; Green et al., 2000; Lorés Sanz, 2003).

Corpus based studies of ACs by native and nonnative writers to date have shown that there exists variation among samples of not only learner writing but also expert writing stemming from linguistics background and interpersonal style (Granger, 1997; Boarcas, 2011; Koyalan & Mumford, 2011; Carrió-Pastor, 2013), but there exists little research examining Turkish scholars' texts in regards to the issue of connector use. In order for Turkish scholars, especially in the social sciences to enter the domain of scientific research with more published research articles, it is necessary to carry out more research characterizing Turkish scholar's academic texts as non-native writers. Different kinds of variation that can be detected could give us important insights about the nature of academic texts produced by Turkish scholars as non-native expert writers. For the purposes of this paper, 'non-native expert writer' can be defined as Turkish researchers whose articles have been published in

national or international scholarly journals. Throughout the paper, the term NNES (non-native English speaking) has been used to refer to Turkish scholars and NES (native English speaking) has been used to refer to native English speaking scholars. The major concern of this paper is to explore whether if any variation could be found between the published research articles written by researchers with different language backgrounds specifically in terms of connector use. Therefore, the current study attempts to offer a quantitative and qualitative account on the use of certain types of ACs in the published journal articles of non-native and native expert writers in the social sciences.

ACs as cohesive ties were explained in detail by Halliday and Hasan's *Cohesion in English* (1976). They described various types of grammatical cohesion: reference, substitution and ellipsis, and conjunction. ACs function as cohesive ties because of their specific meanings which postulate the existence of other components in the discourse. Hartnett (1986) points out that it is not easy to use cohesive ties appropriately since connectives can be used wisely by a good writer; however, poor writers can create confusion if they use them improperly. As Milton and Tsang (1993) mentioned, it is difficult to write in a foreign language since it requires mastery of both the form and the function of the target language. The results from previous studies indicate that the contribution of the ACs to understanding of discourse is contradictory but some other results show that ACs play an essential role in the way the discourse is discerned (Tapper, 2005). This suggestion is also supported with the findings of Mauranen (1993). According to Mauranen, it is considered that academic writing samples with ACs present a more coherent, persuasive and reliable discourse than the same samples without ACs.

Existing research on connector usage in research articles have reached different conclusions. Most of the studies of ACs (Shaw & Liu, 1998; De Cock, 2000; Narita, Sato & Sugiura, 2004; Tapper, 2005; Chen, 2006; Shea, 2010) have concluded with the findings of overuse and underuse of ACs in EFL/ESL learners' academic writing. For example, the research of Granger & Tyson (1996) about the connector usage in the writing of native and non-native speakers of English has clearly demonstrated the evidence of overuse and underuse of some individual connectives. They also report some semantic, stylistic and syntactic misuse of ACs in their research. In consideration of previous findings of connector studies, the case of ACs as cohesive ties in the journal articles of Turkish academicians was addressed both quantitatively and qualitatively. However, in contrast to previous studies, the present study is not concerned with EFL/ESL learners, but with academicians using English as a language of research writing.

The findings of the LSWE Corpus (Biber *et al.*, 2002) about the frequency of semantic categories of linking adverbials indicate that the most common types of ACs in academic writing are result/inference, apposition, and contrast/concessive adverbials. Thus, the ACs in the present study were listed according to the most common types of semantic categories of ACs in academic prose. Quirk *et al.* (1985, p. 634) distinguishes six semantic categories of adverbial ACs (see Table 1 below) which is similar to the taxonomy presented in Longman Grammar (Biber *et al.* 1999, pp 875-879).

Table 1: Semantic categories of adverbial ACs (Quirk et al., 1985: 634).

Categories of ACs	ACs
ENUMERATION:	
<i>enumeration:</i>	<i>firstly, secondly, thirdly (etc.); to begin with</i>
<i>addition:</i>	
<i>equative</i>	<i>correspondingly, equally, likewise, similarly</i>
<i>reinforcing</i>	<i>again, also, further, furthermore, moreover, in particular, then, too, (above all)</i>
SUMMATION	<i>in sum, to conclude, all in all, in conclusion, overall, to summarize</i>
RESULT/INFERENCE/CAUSE	<i>therefore, consequently, ,thus, so; hence, in consequence</i>
CONTRAST/CONCESSION	
	<i>on the other hand, in contrast, alternatively; though, anyway, however</i>
	<i>focus on contrast: conversely, instead, on the contrary, in contrast</i>
	<i>focus on concession: anyhow, besides, nevertheless, still, in any case</i>
TRANSITION	<i>now, meanwhile; incidentally, by the way</i>

A total of 20 ACs from among these six major categories of ACs in particular were chosen as the subject of analysis. The list of ACs selected for the current study is presented in Table 2.

Table 2: List of adverbial ACs analyzed in the study

Categories of ACs	ACs
Enumeration	
(Addition)	<i>furthermore, moreover, then</i>
(Reinforcing)	<i>in particular</i>
Summation	<i>in sum, to conclude</i>
Result/inference	<i>therefore, thus, consequently, hence, so, otherwise,</i>
Contrast/Concession	<i>on the other hand, in contrast, besides, however, nevertheless, nonetheless, in other words, though</i>

The term of cohesion was first explained in detail in the work of Hasan and Halliday (1976). As mentioned earlier, they defined five types of grammatical cohesion, one of which is conjunction. The conjunctive cohesive relation is different from the other four due to the fact that it does not connect to a second item elsewhere in the text, instead it makes clear a link between two propositions (Shea, 2010).

A corpus based study of syntactic units (i.e. logical ACs) provides a deeper understanding of semantic issues related with the important areas of contemporary research (Milton and Tsang, 1993). It has been noted by numerous researchers that it is no longer difficult to investigate large samples of writing via computer text- processing facilities and corpus based research provides an opportunity to compare writing samples of native and non-native speakers (Garside, 1998; Biber, Conrad & Reppen, 1998; Upton & Connor, 2001; Tribble, 2002; McEnery & Wilson, 2003). The current study uses corpus linguistics methods to investigate

connector usage in a large sample of academic writing in order to reach more accurate findings.

In Biber et al.'s (2002) *Student Grammar of Spoken and Written English*, ACs are illustrated as important devices for cohesion since they are the signs of linking between the pieces of a text. They have the function of clarifying the connection between two units of discourse. ACs also have an interpersonal function, they provide the speaker/ writer's intention to constitute an appeal to the hearer/ reader (Oversteegen, 1997). However, Crewe (1990) claims that most studies of the logical connectives showed that the presence of cohesive ties in a text does not mean that there will be coherence in discourse.

Chen (2006) points out that if logical ACs are placed appropriately, they function as signposts and guide the reader through the discourse; however, if the ACs are misused, the discourse as a whole can be incomprehensible or even illogical, and it will cause failure in communication (Crewe, 1990). Goldman and Murray (1992) mention that ACs are one class of signals playing important roles for the comprehension of a text. The logical relation of ACs may be inferred from the text if the reader has the necessary knowledge; however, it may be critical for a reader to find an explicit connector to comprehend the intended logical meaning if the text is in an unfamiliar field.

Milton and Tsang (1993) state that the functionality of the ACs stem from the ability to set new directions and connections between not so new ideas. There are many studies examining the use of cohesive devices and many researchers have begun to use learner corpora to study conjunctive adverbials. The main research areas for preceding studies are overuse, underuse or misuse issues of ACs. For example, Milton and Tsang (1993) were the first researchers who published a study of logical ACs using a learner corpus collected from English learners in Hong Kong. Their results revealed an overall example of overuse of some ACs. Similar results showing overuse of certain ACs by non-native student writers but no significant underuse were found by Bolton, Nelson and Hung (2003).

Granger and Tyson (1996) carried out a similar study and they claimed an overuse hypothesis but the results were not so supportive of their hypothesis. They analyzed some ACs individually and the ACs performing particular functions, i.e. corroborating the argument 'indeed', 'in fact' or adding new points to the discourse 'moreover', were overused, whereas the ACs which contrast 'however' and develop the argument 'therefore,' 'then' were underused. They found differences in the use of individual ACs but not between different categories of ACs. The cases of underuse were unexpected for their study. The issue of misuse was also analysed in the same study and it was found that some of the overused ACs were misused by the learners.

Studies on ACs also shed light on the historical trends regarding the preferences of connector use in academic texts; for example Biber and Gray (2010) have found that linking adverbial use has declined from the 18th century to the 20th century showing a tendency for structurally more compressed and less explicit discourse style. This move away from explicit marking of meaning relations has however not become the trend for NNS scholars as yet, since connector use represents a more academic and complex writing style for many NNS scholars.

METHODOLOGY**The Corpora**

Two corpora were compiled by the researcher for the present study. The NNES scholar corpus consisted of the journal articles of Turkish NNES scholars published in the national/international Social Sciences journals published by Turkish universities and some Turkish institutions related with Social Sciences. Although these journals publish articles written in Turkish, English and in a limited number in German and French, all of the selected articles included in the corpus were written in English. This corpus was labeled as Turkish Academic Corpus (TAC). In TAC, there are 283 texts in total (see Table 3) and the word count is 1.274.516. The corpus covers all articles published in English in the selected journals within a period of 3 years between 2009-2011. The corpora has been made accessible to researchers online through the TAC Corpus Project website: <http://tac.ktu.edu.tr/>. Since the selected journals in Turkey also publish in languages other than English as well (Turkish, German, French), some journals did not contain as many articles written in English.

Table 3: Overview of Turkish Academic Corpus (TAC)

Journal	# of texts	Apprx # of words
Anadolu University Journal of Social Sciences	8	60791
Ankara University, Journal of Faculty of Educational Sciences	1	5985
Çukurova Üniversitesi School of Education Journal	3	18714
Hacettepe University Journal of the Faculty of Education	15	62402
Journal of Sociology*	1	7924
Blacksea Research Journal	3	9876
Middle East Technical University Journal of the Faculty of Architecture	20	152183
Turkish Online Journal of Distance Education	33	157347
The Turkish Online Journal of Educational Technology	41	174203
Trakya University Journal of Social Sciences	4	21859
Turkish Journal of Psychiatry**	85	348822
Zonguldak Karaelmas University Journal of Social Sciences	4	20342
Turkish Psychological Counseling and Guidance Journal	15	13482
Balikesir University Journal of Social Sciences Institute	2	9876
Cukurova University Social Sciences Journal	1	4073
EKEV Academy Journal***	8	50239
Journal of Social Sciences****	4	15681
Journal of Theory and Practice in Education	23	114773
Turkish Journal of Psychology	12	25944
Total	283	1.274.516

*Published by Istanbul University

**Published by Turkish Association of Nervous and Mental Health

***Published by Erzurum Foundation of Culture and Education

****Published by Cumhuriyet University

The sub-disciplines in Turkish Academic Corpus are connected with Social Sciences. The corpus covers twelve sub-disciplines which are listed below in Table 4. The sub-disciplines of social sciences with the highest number of articles were education, and psychiatry and the least number of articles were in the field of international relations and tourism.

Table 4: Sub-disciplines in TAC

sub-disciplines	# of texts
Education	105
Psychiatry	85
ELT	23
Architecture	21
Counseling	15
Business	11
Psychology	12
Sociology	5
History	2
Computer Programming	2
International Relations	1
Tourism	1
Total	283

The NES scholar corpus used in the study consisted of international journal articles written by English native speakers and was labeled as American Academic Corpus (AAC) (see Table 5). There are 341 texts in American Academic Corpus and the approximate number of words is 2.639.904. The same time interval of three years between 2009-2011 was used for this corpus as well in order to make the two corpora parallel. The corpora reflect a fairly current overview of social sciences publications because they are compiled from recent articles.

Table 5: American Academic Corpus

Journal	#of texts	Apprx.# of words
American Educational Research Journal	56	663.226
American Journal of Community Psychology	27	227.816
American Journal of Distance Education	37	149.723
American Journal of Economics and Sociology	81	576.513
American Journal of Philology	44	517.669
TESOL Quarterly	24	208.021
Arts and Social Sciences Journal	9	51.049
Educational Planning	4	25.963
Educational Research Quarterly	10	32.219
ELT Journal	49	187.705
Total	341	2.639.904

The subfields of NES corpus AAC were chosen among social sciences fields similar to that of the NNES corpus TAC to ensure comparability of the two corpora (see Table 6). Articles published in Turkish social sciences journals come from more diverse disciplines compared to American journals since the United States has more specialized journals compared to Turkey where the journals publish articles under the umbrella term social sciences covering more areas. The researcher therefore selected American journals which published articles in related subjects when compared to the Turkish journals.

Table 6: Sub-disciplines in AAC

Sub-discipline	# of texts
Education	107
ELT	73
Psychology	27
Philology	44
Economics and Sociology	90
Total	341

Since the researchers wanted to include all articles published in English in the 3 years between 2009-2011, the number of articles published and therefore the word count were higher for the AAC. Table 7 shows the detailed description of the two corpora in terms of word count and type-token ratios of TAC and AAC. In order to compensate for the differences in word count between the two corpora, norming was used when making comparisons.

Table 7: Description of Corpora

Corpus	# of files	# of words	Type/token ratio
TAC	283	1.274.516	0.033
AAC	341	2.639.904	0.028

For this corpus based study, the first step was the selection of the ACs. The list of ACs according to their types or functions was searched and 20 ACs (see Table 2) were extracted from the list of ACs in Quirk *et al.*'s (1985) *Comprehensive Grammar of the English Language*.

Data analysis

The occurrences of selected ACs were analyzed using “AntConc3.2.2” concordance software developed by Laurence Anthony (2011). However, since AntConc could not process frequency of all ACs at the same time. In addition, in order to ease the process of obtaining raw frequencies of ACs used in the two corpora, a customized program was written by using Matlab script. This script provided the raw frequencies of each of the 20 ACs in all of the 624 files in the corpora. The raw frequencies of ACs were normed to 100.000 words. The normed frequencies were obtained by taking the proportion of number of ACs to 100.000 words. The normed frequencies were then transferred into the SPSS statistical package for further analysis.

Research Questions

The study investigates the following research questions:

1. Do Turkish NNES scholars use ACs to the same extent as the academicians of American Journals?
2. Are there any differences between TAC and AAC in terms of the preference of the connector usage?
3. Do Turkish NNES scholars use ACs properly in terms of semantic relations?

RESULTS

The comparison of 20 ACs in the two parallel corpora TAC and AAC was based on frequencies obtained through the Matlab script. The descriptive statistics for the raw frequencies of the ACs are provided in Appendix A. Overall, among the 20 ACs chosen for the current study, the top ten frequently used ACs account for 88% of all ACs used by

Table 8: Top 10 most frequently used adverbial ACs

Rank	TAC	R.F.	N.F.	%	Rank	AAC	R.F.	N.F.	%
1	however	1333	104,6	24	1	however	2818	106,7	25
2	therefore	709	55,6	13	2	thus	1826	69,5	16
3	thus	575	45,1	10	3	then	1747	66,2	15
4	then	567	44,5	10	4	therefore	947	35,9	8
5	on the other hand	481	37,7	9	5	though	691	26,2	6
6	moreover	402	31,5	7	6	moreover	446	16,9	4
7	furthermore	255	20,0	5	7	in particular	423	16,0	4
8	in other words	210	16,5	4	8	furthermore	379	14,4	3
9	though	194	15,2	3	9	in contrast	308	11,7	3
10	besides	190	14,9	3	10	in other words	293	11,1	3
	total	5606	440	88			11474	435	86

a Nonnative Corpus (Turkish Academic Corpus)

b Raw frequency

c Frequency per 100.000 words

d Native Corpus (American Academic Corpus)

NNES writers and 86% of all the ACs used by NES writers. Table 8, shows the most frequently used ten ACs used in TAC and AAC. For both corpora, the contrastive connector 'however' is the most frequently used connector in the journal articles of both NES and NNES writers. The frequency of however is notable since in the NNES corpus 'however' occurs 106,7 times per 100.000 words and accounts for 25% of all the 435 ACs used. In the present study, in order to find out whether the first language background of the NNES has an effect on the connector use, a two way ANOVA was performed.

Table 9 summarizes the results of the two way ANOVA. According to the results the null hypothesis, "H₀: The effect of the writers' nation is not important" could be rejected since the effect of the variable 'nation' reflecting first language background was found significant (F=25, df=19, p<0,005). Depending on these results, it could be concluded that there is a significant relationship between the variables connector type and nation, in other words, whether the writer is a native speaker or not has a significant effect on the use of ACs.

Table 9: Tests of Between-Subjects Effects

Source	Type Sum Squares	III of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected model	,790 ^a		39	,020	126,113	,000	,283
Intercept	,489		1	,489	3044,835	,000	,197
Connector	,656		19	,035	214,918	,000	,247
Nation	,017		1	,017	105,173	,000	,008

Connector * Nation	,077	19	,004	25,080	,000	,037
Error	1,997	12440	,000			
Total	3,297	12480				
Corrected Total	2,787	12479				

a. R Squared = ,283 (Adjusted R Squared = ,281)

Therefore, as a response to the first research question, it could be said that the use of ACs by native-speaker and non-native speaker writers in their research articles is not quantitatively similar.

Table 10: Results of the Independent Samples t-test

		t-test for Equality of Means								
		Levene's Test for Equality of Variances								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper	
moreover	Equal variances assumed	15,193	,000	-2,922	622	,004	-,0026	,0008	-,0043	-,0009
	Equal variances not assumed			-2,737	363,93	,007	-,0026	,0009	-,0045	-,0007
then	Equal variances assumed	32,086	,000	8,198	622	,000	,0148	,0018	,0112	,0183
	Equal variances not assumed			8,624	542,28	,000	,0148	,0017	,0114	,0181
in particular	Equal variances assumed	36,380	,000	5,722	622	,000	,0024	,0004	,0016	,0033
	Equal variances not assumed			5,986	565,14	,000	,0024	,0004	,0016	,0033

thus	Equal variances assumed	31,719	,000	6,946	622	,000	,0113	,0016	,0082	,0146
	Equal variances not assumed			7,309	541,53	,000	,0113	,0015	,0083	,0144
on the other hand	Equal variances assumed	41,935	,000	-5,142	622	,000	-,0038	,0007	-,0053	-,0002
	Equal variances not assumed			4,788	344,77	,000	-,0038	,0008	-,0054	-,0002
in contrast	Equal variances assumed	50,302	,000	5,899	622	,000	,0018	,0003	,0012	,0002
	Equal variances not assumed			5,988	621,60	,000	,0018	,0003	,0012	,0002
besides	Equal variances assumed	57,964	,000	-4,595	622	,000	-,0017	,0003	-,0025	-,0001
	Equal variances not assumed			4,273	339,65	,000	-,0017	,0004	-,0025	-,0001

In order to find whether there are any significant differences between the frequencies of individual ACs in the two corpora, an independent samples t-test was performed. As shown in Table 10, for 7 connectors out of the chosen 20 connectors it was found that there is a significant difference between TAC and AAC in terms of the frequency: *moreover*, *then*, *in particular*, *thus*, *on the other hand*, *in contrast*, *besides*. Out of these 7 ACs, 3 were found to be overused by NNES scholars- namely: *on the other hand*, *moreover* and *besides*, whereas the remaining 4 ACs which are *thus*, *then*, *in particular* and *in contrast* were found to be underused by NNES scholars.

On the other hand, significant differences were not found between the two corpora for the remaining ACs: *therefore*, *in sum*, *to conclude*, *hence*, *in other words*, *nevertheless*, *furthermore*, *so*, *consequently*, *otherwise*, *however*, *nonetheless* and *though*. These results provide an answer to our second research question about the preferences of writers in terms of connector use. The results show that native and non-native expert writers differ in their preferences of ACs in their research articles.

Table 11: Categories of ACs and percentages of use

Categories of adverbial ACs	TAC % ^a	AAC %
<i>Enumeration (addition)</i>	22	26
result/inference	23	24
contrast/concession	43	35

^a The percentage of ACs in the category out of the top ten most frequently used

Table 11 shows the percentages of use for the ACs according to categories. The percentages are calculated for the use of all the 20 ACs chosen for the study. As can be seen in Table 11, both NES and NNES writers used contrastive ACs the most which accounts for 43% of all the ACs used by the NNES writers and 35% of all the ACs used by the NES writers. Among the top ten most frequently used ACs, enumeration (addition) category accounts for 22% of all 20 ACs chosen for the study for nonnative writers. For the native writers, this category accounts for 26%. The result inference category accounts for 23% of all ACs for nonnative writers and 24% for the native writers.

Among the overused ACs, three: *on the other hand* and *besides* belong to the contrast/concession category of ACs. Out of the remaining three ACs, *consequently* belongs to the result/inference category and *moreover* belongs to the enumeration (addition) category. Therefore, if we were to generalize these findings, it could be said that Turkish NNES scholars tend to overuse contrastive and resultive ACs.

In order to find whether Turkish writers have used any of the ACs improperly, a closer analysis of the occurrences of ACs was performed. Firstly, the occurrences of the ACs which were overused, namely *besides*, *on the other hand* and *moreover* were closely analyzed for semantic relations. Among the overused ACs, inaccurate usages were found for *besides* and *on the other hand*. As the current and comprehensive study of English usage, Biber et al. (1999) assert in Longman Grammar of Spoken and Written English that *besides* is more common in informal context compared to academic context. The results in BNC also indicated that *besides* is preferred more in fiction and spoken language than academic language. An academic alternative of *besides* is *in addition* which is more common in academic writing in BNC. However, Turkish writers do not seem to make a distinction between *in addition* and *besides* in terms of context. In addition, the close analysis of concordances revealed that at various instances, there exist some improper or redundant uses of *besides* by Turkish writers. Although *besides* is typical of oral language, the NNES writers in this study tend to overuse it in academic texts.

Accordingly, *besides* and *also* were used in the same sentence redundantly (see excerpt 1) and *besides* was misused in place of *beside* (see excerpt 2).

Excerpts:

(1) <file no.: soc.sci.NNS.114> In this sense, student lacking the necessary self-discipline skills may do better in face to face classroom settings (Hiltz, 1995). **Besides**, the 2 students **also** reported that discipline is teacher-driven.

(2) <file no.: soc.sci.NNS.019> The relations between ground and building, and exterior and interior form additional spaces to store such as the deck and the semi open space below the deck **besides** the enclosed space.

(3) <file no.: soc.sci.NNS.003> After this division, with the construction of a mosque, fountains, a Turkish bath, and several shops, the prospect of the Grove changed from royal gardens to a small Bosphorus village (32). A re-transformation had occurred, **on the other**

hand, during the reign of Sultan Selim III (1789-1807), when towards the end of the 18th century, the whole district became one of the most popular residential areas of the high officials of the Palace.

The use of *besides* and *also* in the same sentence modifying the same new information is improper since these two ACs essentially have the same meaning. *Besides* can be used as a preposition but, this usage does not indicate spatial relationships; however, in excerpt 2, *besides* is used in place of *beside* which means *at the side of* or *by* (Swan, 1980). Another example of a misuse was found with *on the other hand* which marks contrasts, alternatives or differences (Biber *et al.*, 1999). In excerpt 3, *on the other hand* is used to indicate temporal relationships between two events, e.g. two architectural transformations made to the same place at consecutive times.

Considering that TAC corpus consists of published research articles written by non-native expert writers, it was not expected to find any inaccuracies in the usage of ACs. Nevertheless, a close analysis of the concordance lines through AntConc revealed some inaccurate uses as exemplified above. These inaccurate or sometimes redundant uses of ACs, as seen in the case of *besides*, could have affected the overuse of certain ACs by non-native writers, which is an issue also raised by Granger and Tyson (1996) regarding EFL writers.

CONCLUSIONS

This study was concerned with the nature of connector usage in Turkish NNES scholars' and NES scholars' academic research articles. Although stylistic or semantic misuses of ACs were rare in expert writing, the results showed that there are differences in the use of ACs in the form of contextual preferences, overuses and underuses. Among a total of 20 ACs, significant differences of use were found for 7, and for the remaining 13 the differences were not found to be significant. Out of the 7 ACs, 3 were found to be overused by NNES scholars- namely: *on the other hand*, *moreover* and *besides*. The other 4 ACs which are *thus*, *then*, *in particular* and *in contrast* were found to be underused by NNES scholars.

The overuse of certain ACs such as *besides* has also been highlighted by different researchers in student writing (Chen, 2006). The overuse of certain ACs such as *besides* as a conjunctive adverbial in the current study shows problems with writers' lack of consciousness about register differences since *besides* should be preferred in oral communication not in academic written communication. This could be in part due to the lack of specified training of expert writers on the conventions of research writing. Usually NNES researchers in Turkey are not given training on academic writing, but take feedback or direction from their advisors when they are writing to be published or learn inductively over a period of time by reading research in their area (Koyalan & Mumford, 2011). Therefore, more specific training on register differences is needed in training candidate research writers.

There is a growing need for the teaching of academic writing conventions especially academic vocabulary such as prefabricated patterns as also acknowledged by researchers (Granger, 1998) at graduate level in social sciences and all kinds of study fields since publishing research has become an important gatekeeper for academic promotion in Turkish tertiary institutions. Therefore, at graduate level, courses specializing on the current and accepted conventions in academic writing should be offered to Turkish candidate researchers in order to help them reach the expected standards. Especially in the social sciences, getting published in internationally acknowledged journals is quite difficult for Turkish writers,

possibly because of the lack of training of the writers in research writing. In addition to writing, improvement of reading skills, training on purposeful reading and text analysis are also crucial. For example, Canagarajah (1996) presents an alternative approach related with the reading activities instead of using writing activities in order to teach the connectives to non- native researchers. According to him, changing the emphasis from writing activities to reading activities may enable the candidate researchers to understand the meanings of connectives in authentic L1 texts. The overuse or misuse of connectives by the non- native students/researchers stem from the focus of attention to the particular connectives and for this reason he offers shifting their attention to achieve coherence and cohesion by clarifying the underlying sense of a good prose with these reading activities.

The present study was concerned solely with the field of social sciences but similar analyses could be carried out for other study fields as well. Further research on connector use can be done on research articles from different fields such as science and engineering. This study was also primarily concerned with differences in the use of ACs in expert writing but did not aim at detecting misuses. Future studies could focus on existing misuses in more detail.

ACKNOWLEDGMENTS

This study was supported by a Turkish Higher Education Council Post-Doctoral Research Grant and by the Corpus Linguistics Laboratory at Northern Arizona University. The researchers would like to express their gratitude to Dr. Douglas Biber for his guidance in the compilation of the corpora and his support for the tagging of the corpora. The Project Website: TAC Pro (Turkish Academic Corpus Project) has been funded by Karadeniz Technical University, BAP (Scientific Research Projects) Unit, Project Code: 2013-11001

REFERENCES

- Anthony, L. (2011). AntConc (AntConc 3.2.2) [Computer Software]. Tokyo, Japan: Waseda University. Available from <http://www.laurenceanthony.net/>
- Biber, D., Conrad, S., & Reppen, R. (1998). *Corpus linguistics: Investigating language structure and use*. Cambridge University Press.
- Biber, D., Johansson, S., Leech, G., Conrad, S., & Finegan, E. (1999). *Longman Grammar of Spoken and Written English*. Essex: Longman, Pearson Education
- Biber, D., Conrad, S., & Leech, G. (2002). *Longman Student Grammar of Spoken and Written English*. Essex: Longman, Pearson Education
- Biber, D., Gray, B. (2010). Challenging stereotypes about academic writing: Complexity, elaboration, explicitness. *Journal of English for Academic Purposes*, 9(1), 2-20.
- Boarcas, C. (2011) Using connectives in context in ESP. *Journal of Academic Research in Economics*, 3(3), 405- 410.
- Bolton, K., Nelson, G., & Hung, J. (2003). A corpus-based study of ACs in student writing: Research from the International Corpus of English in Hong Kong (ICE-HK). *International Journal of Corpus Linguistics*, 7(2), 165-182.
- Canagarajah, A. S. (1996). Nondiscursive'' requirements in academic publishing, material resources of periphery scholars, and the politics of knowledge production. *Written Communication*, 13 (4), 435- 472
- Carrió-Pastor, M. L. (2013). A contrastive study of the variation of sentence ACs in academic English, *Journal of English for Academic Purposes*, 12(3), 192-202
- Chen, Chun-Mei. (2006). *A Comparative Study on Formosan Phonology: Paiwan and Budai Rukai*. Doctoral dissertation, University of Texas at Austin, USA.

- Chen, C. W. Y. (2006). The use of conjunctive adverbials in the academic papers of advanced Taiwanese EFL learners. *International Journal of Corpus Linguistics*, 11(1), 113-130.
- Conrad, S. M. (1996). Investigating academic texts with corpus-based techniques: An example from biology. *Linguistics and Education*, 8(3), 299-326.
- Crewe, W. (1990) The illogic of logical connectives. *ELTJournal*, 44(4), 316-325.
- De Cock, S. (2000). Repetitive phrasal chunkiness and advanced EFL speech and writing. *Language and Computers*, 33, 51-68.
- Garside, R. (1988). *The computational analysis of English: A corpus-based approach* (Vol. 57). G. Sampson, & G. Leech (Eds.). Longman.
- Goldman, S.R., Murray, J. (1992). Knowledge of ACs as cohesion devices in a text: A comparative study of native English and English as-a-second-language speakers. *Journal of Education Psychology*, 83(4), 504-519
- Granger, S. (1997). Automated retrieval of passives from native and learner corpora: precision and recall. *Journal of English Linguistics*, 25(4), 365-374.
- Granger, S. (1998). *Prefabricated patterns in advanced EFL writing: Collocations and lexical phrases. Phraseology: theory, analysis and applications*. Oxford: OUP.
- Granger, S. & S. Tyson. (1996). Connector usage in the English essay writing of native and non-native EFL speakers of English. *World Englishes*, 15, 17- 27.
- Halliday, M. A. K., & Hassan, R. (1976). *Cohesion in English*. New York: Longman.
- Hartnett, C. G. (1986). Static and dynamic cohesion: signals of thinking in writing. *Functional Approaches to Writing. Research Perspectives*, London: Frances Pinter.
- Koyalan, A., Mumford, S. (2011). Changes to English as an Additional Language writers' research articles: From spoken to written register. *English for Specific Purposes*, 30, 113-123.
- Lorés Sanz, R. (2003). The translation of tourist literature : The case of ACs . *Multilingua*, 22, 291-308.
- Mauranen, A. (1993). *Cultural Differences in Academic Rhetoric. A Textlinguistic Study*. Frankfurt/Main: Peter Lang.
- McEnery, T., & Wilson, A. (2003). Corpus linguistics. *The Oxford Handbook of Computational Linguistics*, 448-463.
- Milton, J., & Tsang, E. ESC 1993. A corpus-based study of logical ACs in EFL students' writing: Directions for future research. R. Pemberton & ESC Tsang (Eds.), *Lexis in studies*, 215-246.
- Narita, M., Sato, C., & Sugiura, M. (2004). Connector Usage in the English Essay Writing of Japanese EFL Learners. In *Proceedings of the Fourth International Conference on Language Resources and Evaluation (LREC 2004)*.
- Oversteegen, L.E. (1997). On the Pragmatic Nature of Causal and Contrastive Connectives. *Discourse Processes*, 24, 51-85.
- Quirk, R., S. Greenbaum, G. Leech & J. Svartvik. (1985). *A Comprehensive Grammar of the English Language*. London: Longman.
- Shea, M. (2010) A Corpus-Based Study of Adverbial ACs in Learner Text. *Second Language Studies Program. MSU Working Papers in SLS*, 1(1), 1-13
- Shaw, P., & Liu, E. T. K. (1998). What develops in the development of second-language writing?. *Applied linguistics*, 19(2), 225-254.
- Swan, M. (1980) *Practical English Usage*. Oxford: Oxford University Press.
- Tapper, M. (2005). Connectives in advanced Swedish EFL learners' written English—preliminary results. *The Department of English: Working Papers in English Linguistics*, 5, 116-144.

Tribble, C. (2002). Corpora and corpus analysis: New windows on academic writing. *Academic discourse*, 131-149.

Upton, T. A., & Connor, U. (2001). Using computerized corpus analysis to investigate the textlinguistic discourse moves of a genre. *English for Specific Purposes*, 20(4), 313-329.

Appendix A

Group Statistics

	group	N	Mean	Std. Deviation	Std. Error Mean
furthermore	american	341	,0035	,00596	,00032
	turkish	283	,0034	,00632	,00038
moreover	american	341	,0037	,00629	,00034
	turkish	283	,0063	,01500	,00089
then	american	341	,0240	,02712	,00147
	turkish	283	,0092	,01474	,00088
in_particular	american	341	,0038	,00634	,00034
	turkish	283	,0013	,00374	,00022
therefore	american	341	,0092	,01217	,00066
	turkish	283	,0099	,02089	,00124
thus	american	341	,0192	,02467	,00134
	turkish	283	,0079	,01337	,00079
in_sum	american	341	,0008	,00225	,00012
	turkish	283	,0007	,00277	,00016
to_conclude	american	341	,0002	,00120	,00007
	turkish	283	,0003	,00138	,00008
hence	american	341	,0026	,00565	,00031
	turkish	283	,0028	,00892	,00053
so	american	341	,0077	,00804	,00044
	turkish	283	,0060	,01199	,00071
consequently	american	341	,0017	,00387	,00021
	turkish	283	,0011	,00363	,00022
otherwise	american	341	,0021	,00386	,00021
	turkish	283	,0007	,00310	,00018
in_other_words	american	341	,0028	,00575	,00031
	turkish	283	,0024	,00546	,00032
on_the_other_hand	american	341	,0028	,00467	,00025
	turkish	283	,0067	,01275	,00076
in_contrast	american	341	,0027	,00405	,00022
	turkish	283	,0009	,00344	,00020
besides	american	341	,0008	,00228	,00012
	turkish	283	,0025	,00648	,00039
however	american	341	,0275	,01823	,00099
	turkish	283	,0179	,02978	,00177
nevertheless	american	341	,0018	,00407	,00022
	turkish	283	,0018	,00571	,00034
nonetheless	american	341	,0012	,00344	,00019
	turkish	283	,0008	,00305	,00018
though	american	341	,0309	,02731	,00148
	turkish	283	,0198	,03187	,00189