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Research Article

An Examination of the Interaction Patterns and Argumentative Quality in Collaborative Writing

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Abstract: Given that interaction patterns are one of the most critical components of the collaborative writing (CW) strategy, especially regarding text quality, the present study investigates the interaction patterns of argumentative text quality in CW at advanced-level undergraduate L2 writing. Ninety-five undergraduate learners participated in the research and formed 37 groups. They were asked to write one collaborative task and record their CW sessions. The data in the present study were collected from students' recordings, written work, and the researchers' field notes. The study used Toulmin's Argumentative writing rubric (AWR) to evaluate the participants' written work regarding argumentative elements. The interactional patterns of the students were coded based on the framework. This framework includes interactional patterns like eliciting, greeting, justifying, requesting, questioning, or acknowledging. As a next step, we formed four interactional groups based on interactional patterns, and their written production was coded using Toulmin's model. The findings indicated a close relationship between interaction patterns and the quality of argumentation.

Anahtar Sözcükler:
İşbirlikli yazma
Tartışmacı yazı
Metin kalitesi
Etkileşim kalıpları
Toulmin

İşbirlikli Yazamada Etkileşim Şekilleri ve Tartışmacı Yazma Kalitesinin İncelenmesi

Özet: Etkileşim şekilleri işbirlikli yazma stratejisinin, özellikle de metin kalitesiyle ilgili en kritik bileşenlerinden biri olduğu göz için, bu makale, lisans düzeyinde ileri düzey ikinci dil yazımında işbirlikli yazma sürecindeki tartışmacı metin kalitesinin etkileşim modellerini araştırmaktadır. Araştırmaya doksan beş lisans öğrencisi katılmış ve 37 grup oluşturulmuştur. Çalışma kapsamında katılımcıların bir işbirlikli yazma etkinliği yapmaları ve bu yazma sürecini kaydetmeleri istenmiştir. Makalenin verileri, öğrencilerin kayıtlarından, yazdıkları materyallerden ve araştırmacıların alan notlarından toplanmıştır. Öğrencilerin yaptıkları tartışmacı yazı etkinliğinde kullandıkları tartışma unsurlarını değerlendirmek için Toulmin'in Tartışmacı yazma değerlendirme rubriği kullanılmıştır. Öğrencilerin etkileşim türleri ise taslak temel alınarak kodlanmıştır. Bu taslak, fikrini alma, selamlama, onaylama, istekte bulunma, sorgulama, onaylama gibi etkileşimsel kalıpları içerir. Bir sonraki adım olarak etkileşim şekillerine dayalı dört etkileşimli grup oluşturulmuş ve grupların yazdıkları tartışmacı metinler Toulmin'in taslağına göre kodlanmıştır. Bulgular, etkileşim kalıpları ile tartışma kalitesi arasında yakın bir ilişki olduğunu göstermiştir.

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1. Introduction

Scholars have cherished a keen interest in collaborative writing (CW), particularly with the emergence of the "sociocultural turn" in applied linguistics (Li, 2018; Storch, 2019; Su & Zou, 2020; Zhang & Plonsky, 2020). CW encourages students to collaborate, negotiate meaning, and make decisions while producing a single shared text (Dobao, 2012a; Storch, 2013). It improves awareness and reflective thinking (Storch, 2013). Additionally, CW enables increased content negotiation, the development of better material, the use of more linguistic sources (Zhang, 2018), more developed grammar (Wigglesworth & Storch, 2009; McDonough et al., 2018), and a more excellent grasp of the target audience (Li & Storch, 2017). These advantages make CW an effective method for teaching L2 writing, giving students many possibilities and better results (Zhang, 2018).

The significance of argumentative writing has been recognized by scholars over the previous decades, especially with the rise of the argumentative genre in standardized high-stakes tests like TOEFL or IELTS (Chuang & Yan, 2022; Hirvela, 2017; Yang, 2022; Yoon & Tabari, 2023). Accordingly, argumentative writing represents one of the most studied genres in L2 writing, especially in tertiary-level settings (e.g., Saricaoglu & Atak, 2022). However, getting L2 learners to establish effective argumentation is daunting, requiring much support from L2 writing teachers (Hirvela, 2017; Zorba, 2023). Hence, it is believed that interaction patterns in CW may play a role in the effective establishment of argument on the part of advanced L2 learners at the tertiary level.

Recent studies indicate the importance of learner interaction in the effectiveness of the writing process (Zhang, 2019). For instance, the type of cooperation influences the scaffolding quality and how much linguistic elements are discussed in CW tasks (Li & Kim, 2016; Li & Zhu, 2017; Watanabe & Swain, 2007). For example, Li and Zhu (2017) reported that groups with a more collaborative interaction pattern performed better in writing quality. The second group that performed relatively satisfactorily was the expert/novice group. In another study, Watanabe and Swain (2007) reported that pairs with a collaborative interaction pattern had better test performance. Unlike these studies, Zhang (2019) found no evidence to associate interaction patterns with writing test performance. Therefore, most research is needed to ascertain the potential connection between interaction patterns and writing test performance. Moreover, the abovementioned studies were conducted with various participating groups. For example, Li and Zhu's (2017) was conducted with post-graduate Chinese students. Hence, it would be reasonable to see potential associations between interaction patterns and text quality in different participant groups.

The present study aims to relate interaction patterns in CW to argumentative writing quality and argumentative power of advanced-level L2 writers in the Turkish context. We selected argumentative writing as the focus, assuming that it requires more interaction and negotiation on the part of students. The primary driving source for the present study came from Li and Zhu's study (2017), which suggested an integrated framework to evaluate the interaction patterns and the textual features. However, unlike Li and Zhu (2017), who studied interactional patterns with textual elements like errors, in the present study, we focused on the role of interactional patterns concerning argumentative power, which we examined through Toulmin's modified argumentation model. To measure the interactive patterns, like Li and Zhu (2017), we used Storch's model, which is one of the most frequently used to describe interactional patterns in CW (Storch, 2013). In a sense, in the current study, we aim

to demonstrate the significance of interaction patterns in CW concerning text quality and argumentative power.

1.1. Theoretical Framework

1.1.1. The role of collaboration in co-constructing texts

An essential component of the process-oriented approach, CW assumes tremendous theoretical and pedagogical importance, especially within the paradigm of sociocultural theory, which suggests that peer interaction improves learners' zone of proximal development (ZPD) (Vygotsky, 1978). Storch (2013) stated that students co-construct new information through "languaging." Peer interaction in CW assignments may increase scaffolding (Li & Zhang, 2021). Indeed, CW activities are effective, according to most researchers (Dobao, 2012b; Li & Zhu, 2017; Watanabe & Swain, 2007). Likewise, Li and Zhang (2021) assert that the interactionist method is closely related to CW as these tasks enable students to communicate and get peer feedback, allowing them to identify areas for additional L2 growth (Torres & Cung, 2019).

Most studies focused on the role of interaction patterns in the L2 learning process in CW tasks. Most of these studies indicated a direct relationship between the type and quality of interaction and the learning opportunities provided by CW tasks. With more efficient collaboration, learners tend to produce more accurate language-related episodes, more learning opportunities, and more efficient pair talk between or among group members (Arikan, 2006; Storch & Aldosari, 2013; Watanabe & Swain, 2007). Yet, as observed by Zhang (2019), research into the role of interaction patterns in text quality seems relatively scarce. Nevertheless, Zhang's study (2019) failed to present any relationship between interaction patterns and text quality. In contrast, Li and Zhu (2017) reported an association between interaction patterns and text quality in CW tasks.

1.1.2. Argumentation Models

Argumentation is a significant skill in L2 writing (Yang, 2022), especially with high-stakes L2 proficiency tests featuring more argumentation (Chuang & Yan, 2022). For first-year university students, argumentative writing is critical, and the capacity to write argumentatively is a must for most university-level disciplines (Hirvela & Belcher, 2021). However, L2 learners generally tend to be weak in their argumentation skills. Accordingly, L2 writing teachers strive to increase L2 writers' textual competence in argumentative writing (Qin & Uccelli, 2020).

Nevertheless, acquiring argumentation skills may pose several challenges. First, argumentative writing requires learners to engage cognitively in the writing process (Yoon & Tabari, 2023). Second, argumentative writing involves meticulous problem-solving (Tabari, 2021). In the present study, we propose that CW will play a role in overcoming the cognitive difficulties of L2 writers (Ferretti & Fan, 2016). Furthermore, learning reasoning also poses problems to learners since it requires them to use sources (Ferretti & Fan, 2016). Hence, we propose that learners may overcome such difficulties in CW.

The argumentative writing model proposed by Toulmin (1958, 2003) is one of the most widely used models to evaluate the argumentative elements in not only L1 writing but also in L2 writing (Stapleton & Wu, 2015; Chuang & Yan, 2022; Yang, 2022). Toulmin split argumentation into several components: claim, data, warrant, backing, qualifier, and rebuttal. Claim is about proposing an opinion, while data refers to facts. Warrant is about how writers

the data with the claim. Qualifiers are about how writers can delineate their claims, while rebuttals present opposing perspectives. Counter-arguments refer to opposing views presented by writers. Studies indicate that L1 and L2 writing use claims, data, or evidence, while dimensions like warrants, rebuttals, or counter-arguments are fewer (Qin & Karabacak, 2010; Stapleton & Wu, 2015). Many studies indicated the effectiveness of Toulmin's model in evaluating argumentation in L2 writing (e.g., Paek & Kang, 2017; Qin, 2013; Yang, 2022).

One line of research examined how writers perform and grow, whether comparing CW and non-CW activities or only concentrating on the educational benefits of CW assignments (Hsu & Lo, 2018; Qiu & Lee, 2020). Measures like syntactic complexity, accuracy, lexical complexity, and fluency (CALF) are used in these investigations (Housen et al., 2012; Zhang & Plonsky, 2020). Regarding fluency, accuracy, and overall essay scores, Pae (2011) found that jointly authored papers fared better than individually written ones. Conversely, research indicates that writings created in groups had a higher error rate (i.e., Dobao, 2012a). Indeed, much research has shown that CW is preferable to individual writing (Dobao, 2012a; Wigglesworth & Storch, 2009).

Wigglesworth and Storch (2009) compared collaboratively written argumentative texts with individually written texts and found that texts written collaboratively were more accurate, with little differences in complexity and fluency. According to Zhai (2021), students' motivation levels fluctuate when completing CW tasks. They start to be optimistic and encouraged but lose some enthusiasm as the activity progresses. That could be due to time restraints, group differences, or language-related problems.

Another line of research examined variables connected to tasks, such as task mode and task type, as well as learners' sociocultural backgrounds and skill levels (Zhang & Plonsky, 2020). For instance, task categories and competency in a second language have attracted much research interest (Storch & Aldosari, 2013; Storch & Wigglesworth, 2007; Watanabe & Swain, 2007). In a recent study, Zhang (2018) discovered that L1 interaction patterns helped L2 learners collaborate more effectively and produce texts with higher levels of complexity. Argumentative texts written collectively were found to be more accurate by Wigglesworth and Storch (2009) when they compared them to texts written separately. Similarly, Villarreal and Gil-Sarratea (2019) discovered that texts generated in collaboration were shorter but more correct and contained lexico-grammatically denser language.

Some of Storch's works cover the dynamics of collaboration in group work (2005, 2013). She used equality and mutuality to describe the different kinds of interactions in CW. Storch classified collaboration in CW into four categories: collaborative, dominant/dominant, dominant/passive, and expert/novice. When working collaboratively, each group member or pair often contributes equally to the activity, has control over it, and is highly engaged. In a collaborative pattern, each partner contributes equally, shares control, and provides scaffolding for the writing work.

There is considerable equality but little mutuality in the dominant/dominant pattern. Although each pair in these pairs is expected to have equal duti6fges, it is possible that they will not be open to accepting the other's input. Low equality and low mutuality are characteristics of the dominant/passive pattern; as a result, such pairings or groups have unequal contributions, unequal control, and very little reciprocity. Finally, expert and novice groups exhibit strong mutuality but low equality. In such partnerships, one of the pairs assumes the role of the expert and is more likely to contribute than the other pair or group. The specifics of these patterns are shown in Figure 1.

Low equality	High mutuality		High equality
	Expert/novice • Expert helps novices learn • Expert provides explanations instead of imposing their view • Novice accepts and repeats explanations • Expert actively encourages novice to take part	**Collaborative** • Repetition/extension of utterances • Positive and negative feedback • Requests for and provision of information	
	Dominant/passive • The dominant partner makes self-directed questions as opposed to questions for peers. • Little negotiation as a passive participant contributes little.	**Dominant/dominant** • Very little communication • Peers contribute, but negotiation is little • Voices may rise from time to time	
	Low mutuality		

Figure 1. Interactional patterns (Adapted from Storch, 2002)

Storch's model is frequently cited in CW research to examine the dynamics of collaboration (Zhang, 2019), and it is well-accepted in the literature (Storch & Aldosari, 2013; Watanabe & Swain, 2007). For instance, Chen (2018) examined Chinese collaboration patterns in a recent study. The collaboration types proposed by Storch's model efficiently examine interaction patterns in CW activities. CW involves peer interaction, so it is an effective tool for promoting learning. Interaction enhances social engagement in ways that enable the transfer of knowledge from the more knowledgeable to the novice (Vygotsky, 1978). CW is a feasible platform for learners to build knowledge together because it helps them exchange ideas, pool resources, and create a collective learning environment (Thorne & Hellermann, 2015).

The main driving force for the present study came from Li and Zhu's study (2017), which proposed an integrated framework to evaluate the interaction patterns of L2 learners' writing and textual features. Based on this framework, we worked on the interactional patterns of L2 writers in CW tasks concerning argumentation quality and general voice quality. One of the reasons why we focus on the Turkish context is that there are almost no studies that focus on the role of CW in the Turkish context. Another reason is that the Turkish context is highly teacher-fronted and mainly based on rote learning, which hinders learners' argumentation skills and leaves little room for collaborative learning. Likewise, the Turkish context values the authority of teachers, which prevents learners from expressing their opinions clearly. Based on these, the following research questions were formulated:

1. What interaction types do Turkish EFL learners have in CW tasks?
2. Do collaborative, novice-expert, dominant-passive, and dominant-dominant groups differ in argumentative elements?

2. Methodology

2.1. Participants

This study was conducted with 95 undergraduate English Language and Literature department students. The number of female students is 56, and the number of male participants is 39. In total, 37 groups were formed with two or three peers. The participants were put into student-selected groups of two or three based on the assumption that they would work more comfortably. However, in literature, some studies indicate that teacher-selected pairs tend to produce more fruitful language-related episodes than student-selected

pairs (Mozaffari, 2017). All the participants are students in the advanced-level second-grade English Language and Literature department. They took two Advanced Writing courses before the current study was conducted. It is known that these courses deal with paragraph-level writing and essay writing. However, the sole purpose of these courses is not to teach argumentation. Hence, it can be said that the participants receive considerable instruction on L2 writing with varying focus.

2.2. Context

The current study was conducted in the spring of 2023 in undergraduate classes, namely the Research Techniques course. The participants were asked to write one collaborative task for their course evaluation. The data collection process lasted for three weeks. In Week 1, the participants were informed about the procedure and obtained verbal consent. The students were given the following argumentative writing topic: "Should vaccines be mandatory?" The participants were asked to write their assignments outside of class hours. Each group recorded their sessions. Most of the groups came together twice to complete the assignment. On average, each group had around one hour of recorded data. In total, around 30.84 hours of data were collected. It took the participants three weeks to complete the CW process. When they completed their writing, they were asked to return their recordings. Before implementing the CW strategy in the study, the participants had taken Writing I and Writing II courses. However, CW was a new instructional strategy for them.

2.3. The Analytic Process

2.3.1. Toulmin's Argumentative Writing Rubric

We used a modified version of Toulmin's argumentation model to code the participants' argumentation. The modified version was utilized by Stapleton and Wu (2015). We opted for Toulmin's model because many studies reported that Toulmin's argumentative model was a viable method to measure argumentation in L2 writing (e.g., Paek & Kang, 2017; Qin, 2013; Yang, 2022). Moreover, it covers many highly relevant components for argumentation, including claim, qualifier, reason, evidence, warrant, counter-argument, and rebuttal. L2 writers' essays were coded based on these seven components. We also used the version extended by Yang (2022), which enabled a more comprehensive argumentation analysis. Yang (2022) split the original rebuttal category into counter-arguments and rebuttals. Each argumentation element was evaluated based on six-scale criteria. The papers were graded independently and compared at the end of the grading period to see if there were any discrepancies. Since the number of essays was not huge (f=36), it was possible to code all of them by the three authors. This way, consistency was ensured in the coding process. The researchers coded the papers separately first and then came together to discuss their findings. Most of the time, there was agreement. The disagreed ones were negotiated. The intercoder reliability was calculated as .87 based on Cohen's kappa.

2.3.2. The analysis of language functions

In CW, the term language functions refers to the purposes for which the interactional units are fulfilled in CW (Li & Zhu, 2017). These functions range from acknowledging, agreeing, and disagreeing to elaborating or eliciting. We adopted the categories identified by Liu and Zhu (2017) and analyzed the interactional units through a deductive approach. We followed the procedure used by Liu and Zhu (2017). We coded language functions like proposing new ideas for mutuality. First, we read and re-read the data to ensure accurate coding. Then, both

authors coded the data separately. We calculated the inter-rater agreement as 85.4%. We resolved emerging disagreements through negotiation. The interactional patterns were decided based on the number of language functions. The groups with the more favorable language functions were labeled as collaborative groups. Table 2 presents the frequency of language functions based on the interaction patterns of the groups. Furthermore, the conversation tone was another way to determine the interaction patterns. Groups with a low level of interaction did not expose much willingness to talk.

3. Findings

3.1. Findings Related to Research Question 1

A total of 37 groups' recordings were coded. The total length of the recordings was around 1861 minutes (30.84 hours). The results are presented in Table 1. To identify the language functions, the three authors first coded 10% of the data to see how to identify language functions. Having established a common approach, the second and third authors coded the whole data. A high level of inter-rater reliability was obtained (r=.84). Depending on the number of language functions, the four interactional groups were formed (collaborative, expert-novice, dominant-passive, dominant-dominant). To categorize the groups, we considered the number of language functions in addition to the respective evaluations of each author. The groups exhibiting more interaction patterns were labeled collaborative groups, with high equality and mutuality. Examples of interactional patterns include:

Groups exhibiting mid-low equality, high mutuality, and many language functions were labeled expert-novice groups. Next, groups with low equality and low mutuality with fewer language functions were labeled dominant-passive groups. In such groups, common patterns emerged where certain group members dominated the talks, and others were unwilling to contribute or took a defensive attitude. Finally, groups with moderate to high equality but moderate to low mutuality with a relatively minor number of language functions were labeled as dominant-dominant groups. In such groups, partners tended to dispute a lot and insist on their language use, with few opportunities for negotiation. Moreover, members abstained from accepting each other's contributions, leading to low consensus.

Table 1.
The number of groups and the duration of collaboration

Groups	Number of pairs/groups	Duration (min.)
Collaborative	9	593
Expert-novice	6	463
Dominant-passive	15	428
Dominant- dominant	7	377
Total	37	1861

The number of groups in the collaborative category was 9, and the total length of collaborative work for the collaborative groups was 593 minutes (9.88 hours). The number of expert-novice groups was 6, and the total length of collaborative work for the expert-novice group was 463 minutes (7.71 hours). The third group, the dominant passive group, involved 15 groups with a collaborative work length of 428 minutes (7.13 hours). Finally, the dominant-dominant group included eight groups with a collaborative work length of 377 minutes (6.28 hours).

As was mentioned, to determine the interaction patterns, we analyzed the language functions performed by the groups, and based on the frequency of language functions, groups were

assigned to either of the four types: (1) Collaborative, (2) expert-novice, (3) dominant - passive, and (4) dominant – dominant. The results are presented in Table 2. The number of collaborative and expert-novice groups is far below the dominant-passive and dominant-dominant groups. The total number of collaborative and expert-novice groups is 15, while the number of dominant-passive and dominant-dominant groups is 22.

Table 2.

Frequency of language functions based on the interaction patterns of the groups

Interaction patterns	Interaction categories	Collaborative	Expert/ novice	Dominant/ passive	Dominant/ dominant	Total
Initiating	Eliciting	36	19	14	11	80
	Greeting	+	+	+	+	
	Justifying	16	12	1	2	31
	Requesting	-	-	1	1	2
	Stating	17	14	4	6	41
	Questioning	5	3	1	-	9
	Sub-total	74	48	21	20	163
Responding	Acknowledging	4	3	1	2	10
	Agreeing	52	32	28	21	133
	Disagreeing	8	1	4	16	29
	Elaborating	37	24	9	11	81
	Suggesting	50	16	28	31	125
	Sub-total	151	76	70	81	378
	Total	225	124	91	101	541

Table 2 presents the results regarding the language functions of the four groups. The total number of language functions was 541. The total number of initiating instances was 163, while the number of responding elements was 378. Under the initiating category, the number of eliciting was 80, stating 41 and justifying 31. The smallest number of language functions was requesting (n=2) and questioning (n=9).

In total, nine groups demonstrated the collaborative pattern in which each member takes a collaborative stance and interacts with others in the writing task. They were willing to engage with each other's ideas and text contributions. Members contributed balance to group writing, smoothly negotiating the decisions and presenting a sense of accord. The number of agreeing cases was 52, elaborating cases was 37, and eliciting cases was 36. The number of justifying cases was 16. Questioning (n=5) and acknowledging (n=4) do not seem to have been performed frequently by this group. The total number of initiating functions for the collaborative group was 74, while the number of responding functions in general was 151. Finally, the total number of language functions for the collaborative group was 225.

The number of expert-novice groups was 6. Expert members typically took control of the collaborative work and provided constructive assistance for novice members when necessary. Regarding interactional patterns, the number of agreeing cases is 52, elaborating cases is 37, and eliciting cases is 36. The number of justifying cases is 16, while the number of suggesting cases is 50. Questioning (n=3) and acknowledging (n=3) do not seem to have been performed frequently by this group. The total number of initiating functions for the collaborative group was 48, while the number of responding functions for the expert-novice group was 76. The total number of language functions for the expert-novice group was 124.

In the *dominant-passive pattern,* 15 groups were identified. In such groups, certain members took control of the task differently. The passive member(s) contributed little to group

writing, while the dominant one(s) contributed more. The number of agreeing cases was 28, elaborating cases was 9, and eliciting cases was 14. The number of justifying cases was one, while the number of suggesting cases was 28. Questioning (n=1) and acknowledging (n=1) do not seem to have been performed frequently by this group. The total number of initiating functions was 48. On the other hand, the number of responding functions for the expert/novice group was 76. The total number of initiating functions for the collaborative group was 21, whereas the number of responding functions was 81. Finally, the total number of language functions for the dominant-passive group was 91, markedly lower than the collaborative and expert/novice groups.

Finally, in the dominant-dominant pattern, we identified seven groups. In these groups, members shared their opinions on the task; however, there were no balanced contributions due to raised voices and the unacceptance of the ideas. The number of agreeing cases was 21, elaborating cases was 11, and eliciting cases was 11. The number of justifying cases is two, while the number of suggesting cases is 31. The number of questioning (n=0) and acknowledging functions (n=2) were extremely low for these groups. The total number of initiating functions was 20. Conversely, the number of responding functions for the expert-novice groups was 81. The total number of initiating functions for the collaborative group was 21, whereas the number of responding functions for the dominant-passive group was 81. Finally, the total number of language functions for the dominant-passive group was 101, remarkably lower than the collaborative and expert-novice groups.

3.2. Findings Related to Research Question 2

The results of one-way ANOVA regarding the differences between the four groups regarding the sub-components of argumentation are presented in Table 3. The findings in terms of the claim category showed that there was a statistically significant difference between the groups (F(12.57, p=.00). Tamhane's T2 test for multiple comparisons found that the mean values of collaborative (M=5.33) and expert-novice groups (M=5.33) were significantly higher than the dominant-passive (M=2.93) and dominant-dominant groups (M=3.75). Tamhane's T2 test indicated that the difference between collaborative and dominant-passive groups (p=0.00, 95% C.I. = [1.13, 3.67]) and expert-novice and dominant-passive (p=0.00, 95% C.I. = [.74, 4.06]).

Secondly, the results in terms of the evidence category showed that there was a statistically significant difference between the groups (F(16.81, p=.00). Tamhane's T2 test for multiple comparisons found that the mean values of collaborative (M=4.89) and expert/novice groups (M=4.33) were significantly higher than the dominant/passive (M=2.40) and dominant/dominant groups (M=2.75). The results indicated that the difference between collaborative and dominant-passive groups (p=0.00, 95% C.I. = [1.23, 3.75]) and collaborative and dominant-dominant (p=0.00, 95% C.I. = [.60, 3.68]) were statistically significant. This means that the collaborative groups significantly differed from dominant-passive and dominant-dominant groups. In a similar vein, the findings also showed that the differences between expert-novice and dominant-passive (p=0.00, 95% C.I. = [.62, 3.25]) and expert-novice and dominant-dominant groups (p=0.00, 95% C.I. = [.03, 3.14]).

Third, the findings in the reason category showed that there was a statistically significant difference between the groups (F(6,39, p=.00). Tamhane's T2 test for multiple comparisons found that the mean values of collaborative (M=4.22) and expert-novice (M=4.67) were significantly higher than the dominant-passive groups (M=2.80). Results indicate that the

difference between collaborative and dominant-passive groups (p=0.00, 95% C.I. = [.43, 2.42]) and expert-novice and dominant-passive (p=0.00, 95% C.I. = [.21, 3.52]) were statistically significant. Collaborative groups produced more arguments for the reason category.

Table 3.

Group differences in terms of interaction patterns and argumentative quality

Dimensions of Argumentation	Interaction patterns	Mean	Sd	Group differences	F	Sig.
Claim	Collaborative	5.33	1.000	1-3* 2-3*	12.576	.000
	Expert/novice	5.33	1.033			
	Dominant/passive	2.93	1.033			
	Dominant/dominant	3.75	1.282			
Evidence	Collaborative	4.89	1.054	1-3* 1-4* 2-3* 2-4*	16.821	.000
	Expert/novice	4.33	.816			
	Dominant/passive	2.40	.828			
	Dominant/dominant	2.75	1.035			
Reason	Collaborative	4.22	.667	1-3* 2-3*	6.399	.001
	Expert/novice	4.67	1.033			
	Dominant/passive	2.80	1.014			
	Dominant/dominant	3.00	1.512			
Warrant	Collaborative	4.22	.667	1-3* 1-4* 2-3* 2-4*	19.428	.000
	Expert/novice	4.67	1.033			
	Dominant/passive	2.67	.976			
	Dominant/dominant	2.00	.000			
Qualifier	Collaborative	1.78	.441	1-3* 2-3* 2-4*	8.619	.000
	Expert/novice	2.00	.000			
	Dominant/passive	1.00	.535			
	Dominant/dominant	1.13	.641			
Counter-argument	Collaborative	.67	.707	No difference	2.750	.058
	Expert/novice	.83	.408			
	Dominant/passive	.20	.414			
	Dominant/dominant	.50	.535			
Rebuttal	Collaborative	.56	.527	No difference	3.748	.020
	Expert/novice	1.00	.632			
	Dominant/passive	.20	.414			
	Dominant/dominant	.50	.535			
TOTAL	Collaborative	21.67	2.598	1-3* 1-4* 2-3* 2-4*	27.707	.000
	Expert/novice	22.83	1.835			
	Dominant/passive	12.20	3.688			
	Dominant/dominant	13.63	3.292			

* The mean difference is significant at the 0.05 level.

Next, the results in the warrant category indicated that the differences between and among the groups are statistically significant (F(19.42, p=.00). Tamhane's T2 test for multiple comparisons found that the mean values of collaborative (M=4.22) and expert-novice novice groups (M=4.67) were significantly higher than the dominant-passive (M=2.67) and dominant-dominant groups (M=2.00). The results indicated that the difference between collaborative and dominant-passive groups (p=0.00, 95% C.I. = [.34, 3.26]) and collaborative and dominant-dominant (p=0.00, 95% C.I. = [1.45, 2.99]) were statistically significant. Similarly, the findings also showed that the differences between expert-novice and dominant-passive (p=0.00, 95% C.I. = [.34, 3.66]) and expert-novice and dominant-dominant (p=0.00, 95% C.I. = [.90, 4.44]) were statistically significant.

Statistically significant differences are also observed between and among the groups in terms of the qualifiers category ((F(8.61, p=.00). Tamhane's T2 test found that the mean values of collaborative (M=1.78) and expert-novice novice groups (M=2.00) were significantly higher than the dominant-passive (M=1.00) and dominant-dominant groups (M=1.13). The results indicated that the difference between collaborative and dominant-passive groups (p=0.00, 95% C.I. = [.19, 1.37]) and expert-novice and dominant-passive (p=0.00, 95% C.I. = [.58, 1.42]) and expert-novice and DD (p=0.00, 95% C.I. = [.05, 1.75]) were statistically significant. Finally, no statistically significant differences were observed between and among the groups for the counter-argument and rebuttal categories. At that point, almost all the groups ranked severely low in these categories.

4. Discussion and Conclusion

This study aimed to identify the interactional patterns of advanced-level L2 writers in CW concerning writing quality in argumentative essays. Our overarching theoretical background in formulating the present study was sociocultural theory, given that we focused on language functions and scaffolding strategies. The findings buttress this claim, suggesting that CW benefits learners through high mutuality and equality, which are components aligned with high interaction levels. Regarding the attitudes towards CW activities, although at the beginning they were hesitant, at the end of the CW tasks, they reported that CW enabled them to solve writing problems in harmony and gave them a sense of responsibility and self-confidence. The study found that interaction patterns play a significant role in establishing argumentative writing. When we interpret these results in terms of Storch's model, high equality and high mutuality appear as significant factors in CW.

There was a solid commitment to the topic, and engaging examples and details were adequate in collaborative groups. Moreover, the groups presented their ideas with robust, assertive language and appropriate word choice. This is related to the frequency of the language functions (initiating 74, responding 151, 225 in total) performed by the collaborative groups. Similarly, expert-novice groups also produced relatively high numbers of language functions (initiating=48, responding=76, and 124) compared to dominant-passive or dominant-dominant groups. The number of language functions is significantly lower on the part of dominant-passive groups (initiating=21, responding=70, total= 91) and dominant-dominant groups (initiating=20, responding=81, total=101) were significantly lower than collaborative or expert-novice groups.

Similar differences were also observed between collaborative and non-collaborative groups regarding the sub-components of argumentations. Collaborative groups performed much better than non-collaborative groups in the claim, evidence, warrant, and qualifiers categories of argumentation. Conversely, no statistically significant differences were observed between or among the groups regarding counter-arguments and rebuttals. However, It must be noted that the mean scores for these categories were extremely low for all the groups. This shows that L2 writers in Türkiye, at the tertiary level, have very little proficiency in exposing counter-arguments and rebuttals, which are the most essential elements of argumentation.

Regarding argumentation, it was observed that the collaborative and expert-novice groups outnumbered the dominant-passive and dominant-dominant groups regarding the argumentation components such as claim, qualifiers, reason, evidence, and warrant. Statistically significant differences were observed. Dominant-passive or dominant-dominant groups failed to provide a satisfactory number of arguments regarding all the categories

mentioned above. In a sense, collaborative groups performed better than non-collaborative groups. Similar findings were reported in the literature. For example, Wigglesworth and Storch (2009) found that students collaboratively produced more accurate argumentative texts. Another important finding is that almost all the groups, whether collaborative or not, failed to provide satisfactory counter-arguments or rebuttals. Literature indicates that counter-arguments and rebuttals are rare in student writing (Qin & Karabacak, 2010), which are critical elements for argumentation. When students fail to support their arguments through compelling evidence, they cannot present effective arguments that include sound evidence and reason (Fan & Chen, 2021). One of the fundamental reasons is the lack of effective instruction (Fan & Chen, 2021; Hirvela, 2017; Zorba, 2023). The results of the present study buttress this claim to some extent. The collaborative and expert-novice groups could produce more warrants, counter-arguments, and rebuttals. However, on average, the learners could not have produced satisfactory argumentations regarding these significant elements.

Another significant finding was that dominant-passive and dominant-dominant groups divided labor, and individuals worked alone, leading to low interaction. It also inhibited collaborative efforts. Similar findings were reported by Li and Zhu (2017), who suggested that such strict division of labor should be prevented. In their study, López-Pellisa et al. (2021) found that the participants were delighted to participate actively in the writing process. Regarding interaction patterns, the study found that the number of collaborative and expert-novice groups was far below the dominant-passive and dominant-dominant groups. We analyzed the total interaction patterns of 37 groups. Out of these 37, the number of collaborative and expert-novice groups was 15, while the number of dominant-passive and dominant-dominant groups was 22. This indicates that cooperative learning is not foregrounded in Türkiye. One reason is that Turkish educational systems do not foster cooperative learning at previous stages, with a heavy emphasis on rote learning and little room for learner involvement. Another significant factor is that, based on the observation of Turkish cultural values authority, learners in Türkiye may be hindered from voicing their opinions or increasing their tendencies for collaborative learning. This is a double-edged sword, given that it not only hinders learners' development in argumentation but also blocks their development in cooperative learning. This means that the affordances of cooperative learning are not taken advantage of. As is known, cooperative learning both expands the learning opportunities for peers (Johnson et al., 2013) and provides a supportive learning atmosphere (Jacobs & Renandya, 2019). More should be done to enhance cooperation in the Turkish context.

One theoretical underpinning of CW is the sociocultural learning theory, which suggests that learning is a social learning theory (Vygotsky, 1978). CW can be seen as a viable outcome of social learning theory as it enables learners to engage in extensive interaction. The findings of the present study justified this. In the field notes, it was seen that the participants stated that they could come up with more ideas and get feedback from their peers. Moreover, the participants also stated they had a chance to learn from each other. Another superiority of CW was an increased level of feedback engagement. In field notes, the participants, especially the 'collaborative groups,' stated that they could benefit from the peer feedback. López-Pellisa et al. (2021) demonstrated that learners benefitted from the peer feedback they received. Similar results were found by Villarreal and Gil-Sarratea (2019), who reported that secondary school students could produce more ideas and concise language.

Several pedagogical implications can be drawn. First, depending on the present study's findings, it can be suggested that learners should be provided with opportunities to tap their ZPD. The interaction opportunities afforded by CW tasks allow learners to gather more ideas and have more chances to focus on language production. Moreover, the peer dialogues during CW tasks provide more engagement for learners (Swain & Watanabe, 2012). Another implication is about the selection of partners. In the present study, the participants stated that working with student-selected partners was more advantageous. Hence, teachers can use student-selected peers in their CW plans or ask learners which they prefer. The third implication is related to the clarity of the process. Although the participants in the present study were not doing CW for the first time, they still had some problems understanding the process. Hence, teachers willing to implement CW should explain the procedures very clearly.

The present study found that even at an advanced level, L2 writers lack essential argumentation skills, especially counter-arguments and rebuttals. The low level of using warrants, rebuttals, or counter-arguments could be the difficulty of learning these elements (Chuang & Yan, 2022; Stapleton & Wu, 2015). Hence, L2 writing instruction should enable learners to understand how to form arguments (Hirvela, 2017). Similarly, Yang (2022) emphasized the critical role of scaffolding strategies in teaching argumentation. Therefore, more attention should be paid to argumentation in L2 writing courses.

All the efforts notwithstanding, there are several limitations to the present study. First, we failed to provide the learners with language-related decisions as obtaining visual data from their computer screens was impossible as students worked on their papers. With visual data, it would be possible to see their actions. We could only collect audio data, so knowing what language decisions learners made while writing was impossible. Future work could integrate this aspect into the analysis. In this study, we used student-selected pairs. Future studies can focus on the differences between interaction patterns regarding student-selected or teacher-selected peers. Despite the limitations, it is believed that the large number of participants is one of the strengths of the present study.

Note on Ethical Issues

Ethical permission for this study was obtained from Karabuk University's Ethical Committee on 8/12/2022, with decision number 2022/09.

Conflict of Interest

The authors declare no conflict of interest.

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