A Study on the Influence of Task Complexity on Interactive Discourse Behavior and Engagement in L2 Peer Collaborative Writing

DONG Hang[1]

[1] School of Foreign Studies, Nankai University, China

Correspondence: DONG Hang, School of Foreign Studies, Nankai University, China. E-mail: dh19952022@163.com

Abstract

This study takes 36 Chinese foreign language learners as the research subjects, and examines the influence of task complexity on their interactive discourse behavior (brief feedback, collaborative contribution, cooperative co-construction) and engagement (cognitive engagement, affective engagement, social engagement) in L2 peer collaborative writing. The findings indicate that: (i)Task complexity significantly affects brief feedback and collaborative contribution, but not cooperative co-construction. Specifically, the simple task obviously generates more brief feedback and collaborative contribution; (ii) Task complexity significantly affects learners' cognitive and affective engagement, but not social engagement. Specifically, learners obviously demonstrated higher cognitive and affective engagement in the simple task. This study demonstrated the impact of task complexity on L2 peer interaction performance in the process of cooperative writing from both macro and micro levels, with the aim of providing insights for the practice and research of foreign language interactive teaching.

Keywords: peer interaction, l2 collaborative writing, interactive discourse behavior, engagement, task complexity

1. Introduction

Successful communications not only require individuals to have sufficient language knowledge, but also to possess good interactive pragmatic abilities. A key way to improve L2 pragmatic abilities is through peer interaction, where learners engage in cooperative dialogues to solve problems and construct knowledge (Chiu et al, 2022). Previous studies have found that learners use different types of discourse behaviors during peer interaction tasks (Cekaite et al, 2019; Aline et al, 2021; Ren, 2022, etc.). Additionally, the complexity of tasks has been recognized, and scholars have examined the impact of task complexity on L2 peer interaction performance, such as interactive discourse behavior (Ren et al, 2022) and engagement (Qiu, 2022). However, there is limited research on L2 peer collaborative writing contexts, and scholars mainly investigate the influence of task complexity on the complexity, fluency, and accuracy of foreign language forms in peer interaction (Wu et al, 2024). Therefore, exploring the multidimensional influences of task complexity on peer interaction performance in collaborative writing is essential to effectively improve the learning effects. In light of this, this study is based on the L2 peer collaborative writing context, examining the impact of task complexity on L2 learners' interactive discourse behavior and engagement, providing insights for interactive foreign language teaching practice and research.

2. Literature Review

Effective learning is derived from interpersonal interaction, which is the process of information exchange between two or more participants (Allwright, 1984). When learners participate in peer interaction, they can contribute resources to each other, jointly construct new knowledge, and then solve problems (Kadriye et al, 2021). Chiu et al (2022) found that learners use a variety of interactive discourse behaviors to establish communication mediation in completing peer collaborative tasks, and their pragmatic awareness can be enhanced. Among them, "interactive discourse behavior" refers to the communicative speech act in which students use language as a form carrier to exchange information, construct knowledge, create ideas, and show their understanding and participation in peer interaction (Dobrikova,2019;Ren et al, 2022).The study of Cekaite et al (2019) found that there are many discourse behaviors in peer interaction, such as excessive language repetition, language form conversion, and the use of metalanguage to express emotions and positions. Murphy et al (2021) divided the interactive discourse behaviors into four types according to whether they are related to peer interaction tasks: question, command, reply, and statement. Based on the formulaic utterances in peer interaction, Aline et al (2021) discovered four types of interactive discourse behavior, namely, choosing peers, changing topics, proposing solutions and expressing

opinions. Ren et al (2022) summarized three types of discourse behavior in peer interaction, namely brief feedback, collaborative contribution and cooperative construction. It is not difficult to see that some current research mainly investigates discourse behaviors in peer interaction based on their conversational functions. Because of the different interactive situations, the classification of interactive discourse behavior present diversified characteristics. However, existing studies need to dig deeper into learners' interactive discourse behaviors based on specific peer interaction situations.

At present, a few scholars have investigated the influence of task complexity on interactive discourse behavior in L2 peer interaction. For example, Ren (2022) found that task complexity had a significant impact on discourse behavior in peer interactive listening, specifically, learners produced more brief feedback in simple tasks, and used more collaborative contributions in the task with higher complexity. Chen (2022) revealed that task complexity could affect the number of interactive discourse behaviors that have the function of building rapport in peer oral interaction tasks. Ren et al (2023) showed that in the more complex decision-making task, peers used more self-correcting discourse behaviors to solve problems. Among them, "task complexity" is an inherent and unchanging characteristic of a task (Long, 2015), involving the attention, memory, reasoning, and other information processing loads caused by task structure to learners (Robinson, 2001). Robinson (2001) divided task complexity into two dimensions: resource-directing and resource-dispersing. The resource-directing dimension mainly includes the number of task elements, contextual supports and reasoning requirements. The resource-dispersing dimension mainly includes whether learners have preparation time, whether the task includes more sub-tasks, and the previous relevant knowledge that learners have the theoretical frameworks for task complexity mainly include Skehan's Limited Attention Capacity Hypothesis and Robinson's Cognitive Hypothesis. It has become a consensus among many researchers that learner's L2 output is affected by task characteristics, especially task complexity, but researchers have different opinions on the specific impact of task complexity on language output, and there are only a few studies on the resource-directing dimension of task complexity and their conclusions are inconsistent. Moreover, there are limited and different measures of language output (Su et al, 2022).

Although some scholars have studied the effects of task complexity on the accuracy, fluency and content quality of written texts (Chen et al, 2022), topic and conversation wheel management (Ren et al, 2023), and interaction mode (Hsu, 2020) based on the context of peer collaborative writing task. However, few studies have examined the influence of task complexity on students' discourse behaviors in this interactive context. "Collaborative writing" is "an activity where there is a shared and negotiated decision-making process and a shared responsibility for the production of a single text" (Storch, 2013: 3) Storch (2002) pointed out that equality and reciprocity are two essential attributes of peer interaction in face-to-face collaborative writing environment. The former is characterized by balanced contributions among peers and mutual guidance among peers to successfully complete interactive tasks; The latter is characterized by mutual feedback, constant responses to each other, and sharing of ideas. Abe (2020) research shows that collaborative writing is a social learning activity and a complex and dynamic interactive practice that relies on peers. Therefore, students need to use complex communication skills to control the interaction process and gradually achieve the task goal through continuous negotiation. Therefore, collaborative writing activities stimulate and improve students' interactive ability. It is worth mentioning that Payant et al (2023) found that improving task complexity can prompt students to produce more interactive discourse sequences in collaborative writing, but it did not pay attention to the specific purpose and function of interactive discourse. Wang et al (2020) shows that high task complexity has a positive impact on interactive discourse behavior in collaborative writing. Although the research focuses on the purpose and function of discourse, it involves mother tongue rather than second language discourse, and the factor of task complexity only includes cognitive needs. Therefore, what impact task complexity will have on students' interactive discourse behavior in collaborative writing situations, and how to effectively design and utilize task complexity to enhance students' interactive discourse behaviors in collaborative writing situations, so as to better play the potential of collaborative writing activities to promote the development of their interactive ability, still need to be explored in depth.

The quantity of interactive discourse behaviors in peer interactions does not necessarily represent the quality of interaction, and high-quality interaction also requires good cognitive, affective, and social engagement from both peers (Zabihi, 2022). In second language task-based teaching and acquisition research, the scope of examination of engagement is generally restricted to tasks. Of note, some studies have described the engagement of foreign language learners in collaborative writing tasks with peers, thereby enhancing the understanding of peer interaction. In this study, "engagement" refers to the state in which individuals are highly attentive and involved in peer interaction, including cognitive, affective, and social engagement(Dao, 2018).Specifically, cognitive engagement refers to the learners' attention, alertness, and the mental effort they put into the task content and linguistic form in peer interactions; Social engagement means the reciprocity and mutuality between learners, and the degree of

mutual support; Affective engagement focuses on the positive emotions that learners experience during peer interactions(Philp et al, 2016; Dao, 2018; Dao, 2021). Zhang (2021) found that peers demonstrated increased engagement when they interacted and perceived the task as useful during collaborative writing. Phan et al(2023) showed that learners were more engaged in peer interaction when they had greater control over the content of the collaborative writing task. Wang (2024) demonstrated that peers were able to actively engage in tasks and construct new knowledge collaboratively during collaborative writing. It is worth mentioning that Aubrey (2022) found through learner interviews that task design is an important factor influencing learner's engagement in collaborative writing with peers. In the context of L2 collaborative writing, task complexity is a potential driver of learning engagement, and learning engagement is a multi-dimensional and complex construct, so it is necessary to fully and concretely understand the influence of task complexity on it(Tabari et al, 2024).However, there is currently limited researches examining the impact of task complexity on learner engagement in collaborative writing tasks with peers. Although a few scholars have explored the impact of task complexity on learner engagement in peer interaction, such as Qiu (2022) and Wu et al (2024). However, the results show that task complexity has different effects on students' learning engagement at cognitive, emotional and social levels, and there is no consensus among the studies. For example, Qiu (2022) found that task complexity could not significantly affect emotional engagement and social engagement. Wu (2024) showed that task complexity did not significantly affect social engagement. At the same time, we should also be aware that different task characteristics may have different effects on learning engagement, and increasing task complexity is not necessarily beneficial to learning input (Qiu, 2022). For example, Qiu et al (2021) found that compared with complex interactive tasks, students have higher levels of cognitive and social engagement in simple interactive tasks. Therefore, it is necessary to further investigate the impact of task complexity on learner's cognitive, affective, and social engagement in peer collaborative writing context, and how to design task complexity to better promote learning engagement.

According to the pragmatic competence model of Celce-Murcia et al (1995), pragmatic competence includes speech act competence and interaction competence. Among them, interactive ability is jointly constructed by both conversational parties (He et al, 1998), which involves both conversational parties choosing and using various resources including verbal and non-verbal resources to carry out appropriate communication, generate a series of discourse behaviors, and successfully solve problems (Hall et al, 2011). From this point of view, interactive discourse behavior in interaction reflects students' interactive ability and performance to some extent, and plays an indispensable role in the positive development of students' pragmatic ability. Consequently, it is worthwhile to consider how to enhance learners' pragmatic competence in peer interaction through the intervene of task complexity. It should also be noted that interactive discourse is only one of the resources used by students in the interaction process, which not only involves the use of different types of discourse behaviors, but also relates to their engagement in conversational events (Kasper et al, 2001; Beltran-Plaques et al, 2018). Schulze et al (2022) found that peer interaction is a communicative task that especially requires students to have a high degree of social and cognitive engagement, and their social and cognitive engagement in peer interaction can positively affect their pragmatic competence. Sun & Pan et al (2021) has shown that engagement positively impacts students' collaborative and communicative performance, i.e. students share ideas with peers to complete learning tasks and express thoughts and ideas effectively in different forms. Peer interaction is not only a process of jointly constructing and interpreting communicative behaviors between interlocutors, but also an individual's psychological activity (McNamara, 1997). Therefore, how to effectively use task complexity factors to increase students' performance in peer interaction obviously plays an important role in the development of their interactive and pragmatic competence.

Indeed, peer interaction exhibits highly contextualized and personalized characteristics (Li et al, 2020), which means that peer interaction often needs to be based on specific collaborative learning activities or interactive task situations. Thus, this study adopts interaction as its research perspective, focusing on peer collaborative writing as a real context, selecting Chinese English major students as participants, and examining the impact of task complexity on L2 learners' interactive discourse behavior and engagement, thereby offering insights for foreign language teaching practice and research. In other words, can foreign language teachers leverage task design to enhance learner's interactive performance in the process of L2 peer collaborative writing at both macro and micro dimensions? In order to make us more comprehensive and specific insight and grasp the performance characteristics of students in the process of peer interaction, so as to better help their interaction and pragmatic ability to improve, this study poses the following questions:

(i) Does task complexity affect the learners' interactive discourse behavior in L2 collaborative writing?

(ii) Does task complexity affect the learners' engagement in L2 collaborative writing?

3. Method

3.1 Participant

The subjects of this study are 36 English major learners from a university in China. They are classmates and familiar with each other, aged between 17 and 20 years old, with approximately 11 years of English learning experiences. Their English scores in the college entrance examination were above 115 points and they has passed the latest comprehensive English course test, which shows that they has a good command of English. The purpose of the study was explained in detail to the subjects, who are assured that their personal privacy can be protected, and they volunteer to participate. The participants are allowed to choose their own partners, resulting in a total of eighteen paired groups.

3.2 The Task

The task design of this study is inspired by Hsu (2020)'s collaborative writing topics, where two peers collaboratively completed an English composition of at least four paragraphs, with substantive content, coherent structure, and approximately 350 words, based on the given topics. This is because the two free discussion tasks are the types of tasks commonly encountered in universities, suitable for college students as second language learners, and basically meet the task complexity factors of resource-directing and resource-dispersing. Peers could engage in free exchange of ideas and insights regarding language form or content during the collaborative writing process, without a time limit for task completion. In addition, they were not allowed to use reference books or electronic devices to query materials during the collaborative writing process, except for ten minutes of self-preparation time.

Task I involves "Arguing and reasoning whether students should be held legally responsible for bullying if victims consequently committed suicide." Task II involves "Exploring the advantages of online social technologies." According to the complexity characteristics of two given writing tasks, prior to commencing them, learners need to comprehensively assess the two tasks' complexity based on prior experience and reasoning demands (Robinson, 2001). Scores ranging from "1" to "4" represent: very simple, somewhat complex, fairly complex, and very complex, respectively.

Results indicates that over 95% of learners perceive task I as fairly complex. Specifically, regarding reasoning demands, task I requires learners to provide sufficient reasons for their self-proposed viewpoints, and offer logical arguments for their own positions, thus having higher cognitive demands in the communicative process, whereas task II mainly requires participants to engage in information description, i.e., stating basic facts and details, and relatively less cognitive inferences were needed. Regarding prior experience, participants are not highly familiar with the topic of task I, comparatively with limited prior relevant knowledge.

Based on the survey results, this study ultimately designed two interactive tasks: one simple and one complex. To avoid the influence of task sequence, half of the groups followed the simple-to-complex task sequence, while the remaining groups completed the two tasks in the reverse order, with one peer volunteering to write the composition and using a recording device for transcription.

3.3 Data Collection and Analysis

To ensure thorough communication between peers, the participants could use Chinese to assist in the conversation when necessary. They completed the tasks in a quiet environment, and their conversations were recorded throughout the interaction process. Subsequently, the audio files were submitted to the researcher. The present study transcribed the conversations in their entirety, yielding a corpus of over 34,000 words.

Firstly, in view of the fact that the coding framework of Xu et al(2019), Lam (2021) and Ren et al(2022) fits the context of peer interaction and have been applied to the study of interactive discourse of Chinese native L2 college students, this study referred to the coding frameworks of their researches to encode the corpora step by step, merged the interactive discourse behaviors with common features, and finally summarized all the interactive discourses into three categories according to the characteristic they have in common. It should be noted that if each discourse sequence contains two or more categories, they would be coded separately. Among the three categories, "Brief feedback" refers to the interlocutor's short response to what the other speaker has said, including confirmation, evaluation, consent, and signal to continue markers; "Collaborative contribution" refers to the interlocutor's supplementing and negotiating the meaning of the other speaker's discourse at the level of content. "Cooperative co-construction" refers to the interlocutor's helping the other speaker to complete the discourse, and negotiating at the level of form. Secondly, the coded corpus was sent to the participants to confirm that the coding results were in line with their discourse purposes. Finally, the other scholar was invited to randomly re-encode

about 20% of the corpus according to the three interactive discourse categories, and the results were consistent with the previous ones (See the coding examples in Table I).

After completing each task, each peer filled in the Engagement Scale to evaluate the self-engagement in their own peer collaborative writing interaction. Given that Dao (2021)'s engagement scale is relatively mature and has been widely applied in peer interaction researches, the content expression of each item is based on Dao et al (2021), including cognitive engagement, affective engagement and social engagement, with a total of 20 items. In the cognitive engagement part, students were asked to rate their attention and thinking about the language form and content in the process of completing the task, with 8 items. In the social engagement part, students evaluated the degree of mutual help and collaboration between themselves and their peer, with 8 items. The emotional engagement section asked students to rate the positive emotions they experienced during their interaction, with 4 items. The questionnaire was in the form of five-point Likert scale (1-5 points respectively represent: completely inconsistent, fairly inconsistent, generally consistent, fairly consistent, completely consistent).

SPSS 22.0 was used to test and analyze the data. This study firstly used the mean method to generate variables for all items. The reliability test shows that Cronbach α coefficients for each engagement dimension are respectively 0.895、0.862, and 0.855, greater than 0.80, indicating high reliability quality. The validity test shows that the KMO values for each engagement dimension are respectively 0.827、0.842, and 0.876, greater than 0.80, indicating good validity. The confirmatory factor analysis shows that the values of GFI、RMSEA、RMR, and CFI are respectively $0.958 > 0.90$、$0.013 < 0.10$、$0.012 < 0.05$, and $0.928 > 0.90$. Thus, it indicates that the data has a good structural validity. Overall, the data can be used for the subsequent statistical analysis.

Table 1. Examples of interactive discourse behavior coding

Interactive discourse behavior categories	Examples
Brief feedback	Yeah; OK; Anything else? Thanks; Good; Ah
Collaborative contribution	A: Although some students has bias, it is no doubt that online social tools are powerful. B: because they can communicate with best friends at any time... A: Through learning excellent traditional culture on social media, students can develop well. B: Not exactly. With the development of our modern society... A: Some mild verbal conflicts and behaviors may just be considered as jokes or misunderstandings... B: What you said seems a bit vague. Can you give specific explanations for mild...?
Cooperative co-construction	A：...They give unfriendly comments which really hurt other's erm erm... B：Perhaps what you want to say is 'self-esteem'？ (ii) A: ...especially in China the social technology is used for communication, entertainment and save notes. B：Oh, it should be saving notes.

4. Results

4.1 The Influence of Task Complexity on interactive Discourse Behavior

Given the presence of two categories of task complexity in this study, a paired t-test is conducted to analyze the significant impact of task complexity on learner's interactive discourse behavior in collaborative writing. As

shown in Table II, there is significant difference in the brief feedback between the simple and complex task (t=9.485, *p*<0.01), as well as in the collaborative contribution between the simple and complex task (t=11.243, *p*<0.01). Furthermore, no significant difference is observed in the cooperative co-construction between the simple and complex task (t= -0.926, *p* ＞ 0.05), Specifically, learners demonstrates significantly higher use of brief feedback and collaborative contributions when completing the simple task, while they exhibits significantly less use of brief feedback and collaborative contributions in the complex task.

Table 2. Analysis results of paired t-test

Simple task *vs* Complex task	Pairing (mean ± standard deviation)		Difference value	*t*	*p*
	Simple task	Complex task			
Brief feedback *vs* Brief feedback	35.62 ± 3.37	29.50 ± 4.22	6.98	9.485	0.000**
Collaborative contribution *vs* Collaborative contribution	60.50 ± 6.94	54.04 ± 4.61	8.79	11.243	0.000**
Cooperative co-construction *vs* Cooperative co-construction	15.28 ± 3.52	15.79 ± 3.30	-0.72	-0.926	0.895

* *p*<0.05 ** *p*<0.01

4.2 The Influence of Task Complexity on Engagement

Given the two categories of task complexity in this study, a paired t-test is used to analyze the significant impact of task complexity on the learner's engagement in collaborative writing. As shown in Table III: there is significant difference between cognitive engagement in the simple and complex tasks (t=5.683, *p*<0.01), emotional engagement in the simple and complex tasks (t=11.034, *p*<0.01). Furthermore, no significant difference is observed between social engagement in the simple and complex tasks (t=0.109, *p* ＞ 0.05). Specifically, learners shows significantly higher cognitive engagement and emotional engagement in the simple task compared to the complex one.

Table 3. Analysis results of paired t-test

Simple task *vs* Complex task	Pairing (mean ± standard deviation)		Difference value	*t*	*p*
	Simple task	Complex task			
Cognitive engagement *vs* Cognitive engagement	4.00 ± 0.63	3.44 ± 0.49	0.77	5.683	0.001**
Affective engagement *vs* Affective engagement	4.39 ± 0.49	3.08 ± 0.65	1.46	11.034	0.000**

Simple task *vs* Complex task	Pairing (mean ± standard deviation)		Difference value	t	p
	Simple task	Complex task			
Social engagement *vs* Social engagement	4.28 ± 0.42	4.18 ± 0.50	0.18	1.643	0.109

5. Discussion

5.1 The Influence of Task Complexity on Interactive Discourse Behavior

Firstly, this study finds that task complexity has a significant impact on brief feedback in collaborative peer writing. In other words, there was significantly more brief feedback in simple tasks than in complex tasks. Consistent with the findings of this study, the Ren et al (2022) study showed that the overall frequency of students' brief feedback in simple cooperative tasks were higher than in complex tasks. According to the Cognitive Hypothesis, learners can simultaneously invoke multiple attention repositories at different levels of the language, but the language output of second language learners is affected by task characteristics, such as task complexity (Robinson, 2001).Since simple tasks do not occupy too much cognitive resources, students' cognitive load is low, which facilitates them to confirm the content of their peers' discourse in short language forms, allocate more attention resources to monitor their peers, and deploy their own oral output to show understanding and interaction (Ren et al, 2022). The results of this study is also consistent with the Limited Attention Capacity Hypothesis of Skehan (2015), which means that sufficient attention promotes students to pay more attention to language forms and content, and thus produces more brief feedback in simple tasks. In addition, although the relationship distance and social status between students in simple and complex tasks are the same, for the former, less reasoning and more prior knowledge enable peers to have a better understanding of the interactive context, thus promoting the use of short discourse markers. At the same time, the implicit learning opportunities of its pragmatic language forms are increased (Kim et al, 2016). Expectation-value theory holds that task characteristics play an important role in students' learning environment, and students' perceptions of the intrinsic value of tasks directly affect their behaviors in learning activities (Wigfield et al, 2000). Specifically in this study, the simple cooperative task is close to the real daily life of college students, and students are more familiar with the topic, which not only helps them establish mutual knowledge links with their peers in interactive dialogue, but also stimulates their interest and attention more easily. Thus improving their willingness and behaviors to give feedback (Kikas et al, 2023; Almeda, 2023).

Secondly, this study finds that task complexity has a significant impact on collaborative contribution in peer collaborative writing. In other words, the number of collaborative contributions in simple tasks is significantly higher than in complex tasks. From the perspective of cohesion, peer cooperation is not only a psychological state based on self-perception and attitude, but also behaviors of other individuals. The cohesion among students in achieving task goals reflects their internalization of the value of collaborative learning and the actions they take to create an atmosphere of collaboration and trust (Costa et al,1993; Williams et al, 2006). However, the I-P-O theoretical framework proposes that task-related input factors affect students' interaction processes and thus their discourse behaviors or outcomes (Hackman,1983). In this regard, Bravo et al (2019) shows that the excessive task load and complexity lead to the lack of sufficient information for students to perform and process interactive tasks, which has a significant negative effect on peer cohesion and thus reduces their collaborative behavior. Specifically, in this study, relatively less reasoning needs in simple collaborative tasks can promote students to have more opportunities to use meaningful negotiation strategies (Deng, 2014). Moreover, higher topic familiarity leads to more information exchange between the two sides, which helps students to expand their views and mutual construction of knowledge, thus generating more collaborative contributions. This is in line with the working memory theory (VanPatte, 1990), that is, peers have less resource reserve in complex tasks, which is not conducive to their calling on relevant information in long-term memory to carry out in-depth reasoning and knowledge expansion, and peers have fewer language barriers in completing simple tasks. This provides good conditions for them to focus on the contribution of discourse content (Xu et al, 2024). In contrast to the findings of this study, Ren et al (2022) shows that students produce more collaborative contributions when completing complex tasks. The reason for the difference in research results may be that students can refer to the task prompt information when making joint decisions based on a given task scenario. Moreover, the number of elements in complex tasks is more than that in simple tasks, which is different from this study, and may stimulate students to make more specific negotiations and in-depth expansion of their discourse content.

Thirdly, this study finds that task complexity has no significant impact on cooperation co-construction in peer collaborative writing. In other words, partners produce roughly the same amount of cooperation co-constructions in the process of completing simple and complex tasks. This reflects that the development of L2 interaction ability is a nonlinear, self-organizing, adaptive, and complex dynamic system capable of presenting inconsistent performance characteristics in one or more dimensions (Li et al, 2020). Consistent with the results of this study, Ren et al (2022) shows that there is no significant difference in co-construction between simple and complex tasks, which is attributed to the low level of second language proficiency of the study subjects. What is different in this study is that the participants are English majors with good second language proficiency. It is worth noting that Lee (2020) finds that task complexity does not have a significant impact on students' language complexity, which also means that when tasks are too complex, students will ignore the complexity and cognitive requirements of the task itself to some extent, thus reducing the use of complex syntax and language forms. Moreover, the increase in reasoning requirements tends to direct students' attention resources to specific language structures and forms, thus ensuring the accuracy of language and the smooth achievement of tasks (Robinson, 2011; Lee, 2019). Meanwhile, simple tasks enable students to create more complex ideas and contents while ensuring the accuracy of language. In addition, research subjects can rely on the support of their mother tongue when necessary, so they do not have to pay much attention to each other's discourse forms in communication (Sasayama et al, 2012; Lee, 2020), this can be reflected in the low amount of cooperation co-constructions in both tasks; What's more, writing for both tasks in this study involves finding ideas, organizing ideas, and creating products, which is conducive to activating their facilitative orientation, thus providing supportive positive feedback to peers when they need it, and helping them complete the current round of conversation (VanDijk et al, 2011). Therefore, task complexity does not have a significant difference on cooperation co-construction. From another perspective, the insignificant difference in cooperation co-constructions may also be related to the fact that participants are familiar with each other.

5.2 The Influence of Task Complexity on Engagement

Firstly, this study finds that task complexity has a significant impact on learners' cognitive engagement and affective engagement, that is, the average value of the simple task is higher than that of the complex one. The findings echo Wang (2024), which shows learners engaged in and cared about the quality of peer interaction in collaborative writing. However, there were some differences in how much students engaged in simple and complex tasks. According to "flow theory" (Csikszentmihalyi,1990), when individuals are emotionally involved in an activity, they will not only focus their attention on the activity, but also devote themselves to the behavioral and social levels, thus striving to complete the task. This theory emphasizes the role of tasks with optimal challenge level in individual flow, which means that learners perceive simpler tasks to create more supportive conditions, thus helping them to generate more positive flow experiences in specific situations (Cho, 2018). In view of this, task complexity is not only related to cognition, but also related to emotion, and learners can have different levels of flow experience in simple and complex tasks. Specifically, in this study, learners have a higher degree of ease in the simple task (Baralt et al, 2016). By contrast, complex tasks will bring learners much pressure, depression and anxiety, which will adversely affect their internal motivation, self-efficacy and other positive psychology (Cho, 2019). In this study, there is no denying that the complex task has brought about relatively more cognitive and psychological challenges as well as potential unfavorable factors to learners, which distract their attention and are not conducive to their focus on monitoring and regulating communication process (Zhang, 2021), thus negatively affecting learners' cognitive engagement to some certain extent. Consistent with the findings of this study that students are less emotionally engaged in complex task, Qiu (2022) finds that when a task has too high cognitive requirements for students, students' attention will be limited and they will not be able to focus on reasoning, which may lead to the process of completing the task being not smooth, and in this way, they are not easy to feel positive emotions. However, different from the results of this study, it shows that complex tasks increase students' cognitive engagement. The reason for the difference in conclusions may be that the task complexity factors in this study include task preparation time and cognitive reasoning needs, which are inconsistent with the results of this study. Therefore, different task design characteristics may have different effects on students' cognitive engagement. And increasing task complexity does not necessarily benefit students' engagement in the task (Qiu, 2022). In addition, it is worth mentioning that Tabari et al (2024) finds that when students write about more familiar topics, they get a higher degree of positive emotion, while the negative emotion is significantly lower, which is consistent with the findings of this study, meaning that students' good preparation and understanding of the task in their hearts provides them with psychological security. This allows them to allocate more attention and spend less time producing more ideas and more detailed and complex content, which increases their positive emotional experience.

Secondly, this study finds that learners does not show significant difference in social engagement between the two tasks. This is likely because peer familiarity moderates the negative impact of task complexity on learners' social engagement (Fan et al, 2021). Regarding this, Dao et al(2021) shows that interacting with familiar peers can create a beneficial conversational environment, in which learners can easily discuss freely according to their previous experience and provide and receive support in the interaction process, thus improving their social engagement. This implies that the adverse effects of complex tasks on social engagement may be offset to some extent by the positive effects of peer familiarity, so that the effect of task complexity on social engagement is not significant. This finding is consistent with Qiu (2022), which showed that regardless of whether the task was complex or not, peers were more likely to support and encourage each other to complete the task, thus showing no significant difference at their social engagement. However, it is worth noting that Wu et al (2024) finds that task complexity has a differential impact on students' social engagement, that is, students have more social engagement in complex interactive tasks, which is inconsistent with the results of this study. The main reason for the different results may be that the research subjects are relatively unfamiliar with each other, and they especially need to communicate more frequently when completing complex tasks, so as to solve the communication barriers and achieve the task objectives. In addition, his research shows that if simple tasks reflect students' daily life experiences, this will help to build social bonds among peers, and peers are more likely to help each other in complex tasks. Based on this, this study speculates that the level of social engagement in simple and complex tasks is basically the same, probably due to the different effects of task complexity on social engagement in relation to mutual assistance and reciprocity. It is worth noting that Li et al (2020) uses the method of social network analysis to measure students' social engagement in peer collaboration from the aspects of breadth, cohesion, reciprocity and participation average. Among them, the degree of breadth and the degree of reciprocity are consistent with the contents of social engagement in this study. Therefore, future studies need to examine the effects of task complexity from other aspects of social engagement.

Thirdly, based on the above research results and the difference in the amount of interactive discourse behaviors used by students when completing the two tasks, this study speculates that interactive discourse behaviors may have a potential positive correlation with cognitive engagement and emotional engagement, respectively. The explanation is that collaborative dialogue in peer interaction reflects students' cognitive engagement in the interaction to a certain extent, and students' active engagement in cognition and emotion can promote their collaboration in interaction, in-depth discussion of problems, construction of knowledge viewpoints, and high-quality task output (Lambert et al, 2017). Therefore, interactive discourse behavior, cognitive engagement, and emotional engagement seem to be closely related. However, this point needs to be verified by further studies. In addition, Phan et al (2023) research shows that more responses among students reflect a higher level of social engagement. In this way, the larger amount of interactive discourse behaviors in the simple tasks of this study should imply a higher level of social engagement. But it is noteworthy that his research further found that regardless of the type of task, students' perceptions of social engagement were similar, which is consistent with the results of this study, and indicates that the evaluation of learning engagement based on learners' internal experience may better grasp and reflect their true implicit characteristics (Ren, 2021). As a whole, peer interaction is a complex and dynamic phenomenon related to macro and micro representations, and it is necessary to understand it from diverse perspectives through naturally occurring learning activities (Kibler, 2017).

6. Conclusion

This study finds that task complexity has a significant impact on the number of sub-categories of interactive discourse behaviors in peer collaborative writing. Specifically, the simple task has a higher number of brief feedback and collaborative contributions. Additionally, task complexity has significant differences in learners' engagement. In particular, learners showed higher cognitive and affective engagement in the simple task.

This study holds theoretical significance. Firstly, it adopts the interactive perspective to thoroughly examine the influences of task complexity on the interactive discourse behavior and engagement of L2 peers during interaction, going beyond the predominant focus of previous studies solely on the influences of task complexity on linguistic forms, thereby deepening the investigation into the contents of peer interaction. Secondly, grounded in the interactive context of peer collaborative writing, this study enriches and refines the classification of interactive discourse behavior in previous researches. Specifically, interactive discourse behaviors not only involve mutual responses, support, and content construction among peers, but also involve negotiation of form and meaning. Additionally, the task complexity in this study comprises two aspects: prior knowledge and reasoning demands, which differs from the design of task complexity indicators in previous researches, providing new ideas for L2 task design. At the same time, it also indicates that researchers should try to consider the overall complexity of the

task in terms of resource-directing and resource-dispersing, in order to draw different conclusions from previous studies.

This study has practical implications for foreign language teaching. Firstly, it is useful for teachers to design various peer collaborative writing tasks based on the complexity of the task to create authentic contextual conditions for peer interactions. Secondly, the explicit teaching strategies can be employed to impart rich interactive knowledge and skills to learners, such as how to effectively collaborate and provide feedback, initiate formal and meaning negotiations to resolve cognitive conflicts and inconsistent opinions, expand peers' perspectives, and deeply explore task contents together, thereby stimulating the production of diverse interactive discourse behaviors and encouraging them to take on scaffolding roles in peer interactions. Furthermore, it is very vital for teachers to design interactive tasks and materials of appropriate difficulty according to "zone of proximal development", taking into account learners' prior knowledge and ensuring that tasks are relevant to students' daily lives. Additionally, interactive tasks should be driven by meaning, have communicative purposes and values, and clear task outcomes to facilitate collective scaffolding, collaborative relationships and high interaction in designing tasks with increased complexity, instead of simply increasing the reasoning requirements and cognitive difficulty unilaterally (Robinson, 2001). Last but not least, it is essential for teachers to create a relaxed and free atmosphere for peer interactions, pay attention to learners' difficulties, and provide timely guidance and assistance to stimulate their desires for mutual communication.

On the whole, this study argues that L2 pragmatic competence should focus on learners' correct understanding of discourse meaning, the use of diverse interactive discourse behaviors and effective communication in authentic interaction and collaboration between peers. Learners interact with each other in their collaborative community, which facilitates them to acquire and apply interactive and communicative skills. In addition, their cognitive, affective, and social engagement can also be well developed to promote their positive participation in peer interaction. It should be pointed out the limitation of this study lies in the relatively small sample size. Future scholars need to enlarge the sample size to further investigate the relationship between interactive discourse behavior and engagement in L2 peer collaborative writing, as well as to examine the roles of other task-related factors.

References

Abe, M. (2020). Interactional practices for online collaborative writing. *Journal of Second Language Writing, 49,* 100752. https://doi.org/10.1016/j.jslw.2020.100752

Alemdag, E. (2023). Development of two scales measuring task value of peer feedback provision and reception for pre-service teachers. *Journal of Psychoeducational Assessment, 41*(1), 63–87. https://doi.org/10.1177/07342829221143500

Aline, D., & Hosoda, Y. (2021). Deployment of the formulaic utterance "how about (similar to)" in task-based second language classroom discussions. *Intercultural Pragmatics, 18*(4), 425–446. https://doi.org/10.1515/ip-2021-0032

Allwright, R. (1984). The importance of interaction in classroom language learning. *Applied Linguistics, 5*(2), 156–171. https://doi.org/10.1093/applin/5.2.156

Aubrey, S. (2022). Dynamic engagement in second language computer-mediated collaborative writing tasks: Does communication mode matter? *Studies in Second Language Learning and Teaching, 12*(1), 59–86. https://doi.org/10.14746/ssllt.2022.12.1.3

Baralt, M., Gurzynski-Weiss, L., & Kim, Y. (2016). Engagement with the language: How examining learners' affective and social engagement explains successful learner-generated attention to form. In M. Sato & S. Ballinger (Eds.), *Peer interaction and second language learning: Pedagogical potential and research agenda* (pp. 209–239). Amsterdam: John Benjamins. https://doi.org/10.1075/lllt.45

Beltrán-Planques, V., & Querol-Julián, M. (2018). English language learners' spoken interaction: What a multimodal perspective reveals about pragmatic competence. *System, 77,* 80–90. https://doi.org/10.1016/j.system.2018.02.008

Bravo, R., Catalán, S., & Pina, J. M. (2018). Analysing teamwork in higher education: An empirical study on the antecedents and consequences of team cohesiveness. *Studies in Higher Education, 44*(7), 1153–1165. https://doi.org/10.1080/03075079.2018.1434613

Cekaite, A., & Ann-Carita, E. (2019). Stance and footing in multilingual play: Rescaling practices and heritage language use in a Swedish preschool. *Journal of Pragmatics, 140,* 127–140.

https://doi.org/10.1016/j.pragma.2018.11.015

Celce-Murcia, M. (2007). Rethinking the role of communicative competence in language teaching. In E. Alcon Soler & M. P. Safont Jorda (Eds.), *Intercultural language use and language learning* (pp. 41–57). Dordrecht: Springer. https://doi.org/10.1007/978-1-4020-5639-0_3

Chen, T. H. (2022). The effects of task complexity on L2 English rapport-building, language use and its relationship with paired speaking test task performance. *Applied Linguistics Review.* Advance online publication. https://doi.org/10.1515/applirev-2021-0199

Chen, W. T., & Ren, W. (2022). Educating L2 learners about collaborative writing: Exploring the relationship between knowledge of collaborative writing and writing products. *Language Awareness, 31*(3), 371–391. https://doi.org/10.1080/09658416.2022.2082473

Chiu, E. F. Y., Chen, Y. S., & Tai, H. Y. (2022). Investigations into EFL students' pragmatic and grammatical awareness through peer collaboration. *Sustainability*, *(17)*, 1–12.

Cho, M. (2018). Task complexity and modality: Exploring learners' experience from the perspective of flow. *Modern Language Journal*, *(1)*, 162–180.

Cho, M. (2019). The effects of prompts on L2 writing performance and engagement. *Foreign Language Annals*, *(3)*, 576–594.

Costa, C., Roe, A., & Taillieu, T. (2001). Trust within teams: The relation with performance effectiveness. *European Journal of Work and Organizational Psychology*, *10*(3), 225–244.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper & Row.

Dao, P., & McDonough, K. (2018). Effect of proficiency on Vietnamese EFL learners' engagement in peer interaction. *International Journal of Educational Research*, *88*, 60–72.

Dao, P., Nguyen, X., Duong, P., & Tran-Thanh, V. (2021). Learners' engagement in L2 computer-mediated interaction: Chat mode, interlocutor familiarity, and text quality. *The Modern Language Journal*, *105*, 767–791.

Deng, M. (2014). The influence of different tasks on meaning negotiation in high school task-based English classroom (*Doctoral dissertation*). Gannan Normal University.

Dewaele, J. M., Chen, X., Padilla, A. M., & Lake, J. (2019). The flowering of positive psychology in foreign language teaching and acquisition research. *Frontiers in Psychology*, *10*.

Dobrikova, K. (2019). Communication and behaviour: Speech act. In Z. Marina Viktorovna (Ed.), *Journalistic text in a new technological environment: Achievements and problems*, vol 66 (*European Proceedings of Social and Behavioural Sciences*, pp. 594–603). Future Academy.

Fan, Y., & Xu, J. (2021). The influence of peer familiarity on learners' engagement in peer interaction. *Foreign Languages and Foreign Language Teaching*, *(2)*, 82–91. [In Chinese].

Gan, M. J. S., & Hattie, J. (2014). Prompting secondary students' use of criteria, feedback specificity, and feedback levels during an investigative task. *Instructional Science*, *42*(6), 861–878.

Hackman, J. R. (1983). A normative model of work team effectiveness (*Technical Report No. 2*). New Haven, CT: Yale School of Organization and Management.

Hall, J. K., & Pekarek-Doehler, S. (2011). L2 interactional competence and development. In J. K. Hall, J. Hellermann, & S. Pekarek-Doehler (Eds.), *L2 interactional competence and development* (pp. 1–15). Bristol: Multilingual Matters.

He, A. W., & Young, R. (1998). Language proficiency interviews: A discourse approach. In R. Young & A. W. He (Eds.), *Talking and testing: Discourse approaches to the assessment of oral proficiency* (pp. 1–24). Amsterdam: John Benjamins Publishing Company.

Hsu, H. C. (2020). The impact of task complexity on patterns of interaction during web-based asynchronous collaborative writing tasks. *System*. https://doi.org/10.1016/j.system.2020.102328

Kadriye, A., & İsmail, H. E. (2021). Collaborative action pursuits within EFL task-based peer interactions. *Journal of Qualitative Research in Education*, *(27)*.

Kasper, G., & Rose, K. R. (2001). Pragmatics in language teaching. In K. R. Rose & G. Kasper (Eds.), *Pragmatics in language teaching* (pp. 1–9). Cambridge: Cambridge University Press.

Kibler, A. (2017). Peer interaction and learning in multilingual settings from a sociocultural perspective: Theoretical insights. *International Multilingual Research Journal*, *11*(3), 199–203.

Kikas, E., Silinskas, G., & Härma, E. (2023). Topic- and learning-related predictors of deep-level learning strategies. *European Journal of Psychology of Education*. https://doi.org/10.1007/s10212-023-00766-6

Kim, Y., & Taguchi, N. (2016). Learner-learner interaction during collaborative pragmatic tasks: The role of cognitive and pragmatic task demands. *Foreign Language Annals*, *49*, 42–57.

Lam, D. (2021). Don't turn a deaf ear: A case for assessing interactive listening. *Applied Linguistics*, *(4)*, 740–764.

Lambert, C., Philp, J., & Nakamura, S. (2017). Learner-generated content and engagement in second language task performance. *Language Teaching Research*, *21*(6), 665–680.

Lee, J. (2020). Task closure and task complexity effects on L2 written performance. *Journal of Second Language Writing*, *50*.

Li, Z., & Ren, W. (2020). Complex system construction in the study of second language pragmatic development. *Foreign Languages*, *(03)*, 46–54. [In Chinese].

Long, M. H. (2015). *Second language acquisition and task-based language teaching*. Wiley Blackwell.

Lqassab, M., Strijbos, J. W., & Ufer, S. (2018). Training peer-feedback skills on geometric construction tasks: Role of domain knowledge and peer-feedback levels. *European Journal of Psychology of Education*, *33*(1), 11–30.

McNamara, T. (1997). 'Interaction' in second language performance assessment: Whose performance? *Applied Linguistics*, *18*, 446–466.

Murphy, S., Joffe, V., & Torgerson, D. (2021). Evaluating 'Enhancing pragmatic language skills for young children with social communication impairments' (E-PLAYS): A feasibility cluster-randomised controlled trial. *Pilot and Feasibility Studies*, *(1)*, 1–10.

Payant, C., & Reagan, D. (2023). Engaging lower proficiency learners of Spanish in collaborative writing tasks. *Spanish Journal of Applied Linguistics*, *36*(2), 643–671.

Phan, H. L. T., & Dao, P. (2023). Engagement in collaborative writing: Exploring learners' control of task content and text quality. *International Journal of Applied Linguistics*, *(2)*, 242–259.

Philp, J., & Duchesne, S. (2016). Exploring engagement in tasks in the language classroom. *Annual Review of Applied Linguistics*, *36*, 50–72.

Qiu, X. (2022). Revisiting the cognition hypothesis: The impact of task complexity on L2 learner engagement in task performance in computer-mediated and face-to-face communication. *Computer Assisted Language Learning*. https://doi.org/10.1080/09588221.2022.2142245

Qiu, X., & Cheng, H. (2021). The effects of task types on L2 oral production and learner engagement. *IRAL - International Review of Applied Linguistics in Language Teaching*.

Ren, W., Peng, Y. C., & Wu, Y. M. (2023). The influence of task complexity and task modality on learners' topic and turn management. *International Review of Applied Linguistics in Language Teaching*. https://doi.org/10.1515/iral-2023-0040

Ren, W., Wu, Y. M., & Peng, Y. C. (2023). Effects of task complexity, task sequence, and interlocutor familiarity on Chinese EFL learners' self-repair in synchronous online interaction. *Language Teaching Research*. https://doi.org/10.1177/13621688231176066

Ren, W., Wu, Y., & Peng, Y. (2022). The impact of task complexity and sequence on Chinese students' interactive listening in English. *Foreign Languages and Foreign Language Teaching*, *(04)*, 99–110+149. [In Chinese].

Robinson, P. (2001). Task complexity, task difficulty, and task production: Exploring interactions in a componential framework. *Applied Linguistics*, *(1)*, 27–57.

Robinson, P. (2011). Second language task complexity, the cognition hypothesis, language learning, and performance. In P. Robinson (Ed.), *Second language task complexity: Researching the cognition hypothesis on language learning and performance* (pp. 1–35). Amsterdam: John Benjamins.

Robinson, P. (2015). The Cognition Hypothesis, second language task demands, and the SSARC model of pedagogic task sequencing. Amsterdam: John Benjamins.

Sasayama, S., & Izumi, S. (2012). Effects of task complexity and pre-task planning on EFL learners' oral production. In A. Shehadeh & C. Coombe (Eds.), *Task-based language teaching in foreign language contexts:*

Research and implementation (pp. 23–42). Amsterdam: John Benjamins.

Schulze, C., & Saalbach, H. (2022). Socio-cognitive engagement (but not socioeconomic status) predicts preschool children's language and pragmatic abilities. *Journal of Child Language*, *49*(4), 839–849.

Skehan, P. (2015). Limited attentional capacity and cognition: Two hypotheses regarding second language performance on tasks. In P. Robinson (Ed.), *Second language task complexity: Researching the cognition hypothesis on language learning and performance* (pp. 211–230). Amsterdam: John Benjamins.

Storch, N. (2002). Patterns of interaction in ESL pair work. *Language Learning*, *52*(1), 119–158.

Storch, N., & Aldosari, A. (2013). Pairing learners in pair work activity. *Language Teaching Research*, *(1)*, 31–48.

Su, F., & Chen, Z. (2022). The influence of task complexity on language complexity in foreign language writing. *Journal of Ludong University (Philosophy and Social Science)*, *39*(06), 77–83. [In Chinese].

Sun, F. R., Pan, L. F., Wan, R. G., Li, H., & Wu, S. J. (2018). Detecting the effect of student engagement in an SVVR school-based course on higher-level competence development in elementary schools by SEM. *Interactive Learning Environments*, *29*(1), 3–16.

Tabari, M. A., Bui, G., & Wang, Y. Z. (2024). The effects of topic familiarity on emotionality and linguistic complexity in EAP writing. *Language Teaching Research*, *28*(4), 1616–1634.

Van Dijk, D., & Kluger, A. N. (2011). Task type as a moderator of positive/negative feedback effects on motivation and performance: A regulatory focus perspective. *Journal of Organizational Behavior*, *32*(8), 1084–1105.

VanPatten, B. (1990). Attending to form and content in the input. *Studies in Second Language Acquisition*, *12*, 287–301.

Vo, Y. (2018). Effects of integrated and independent speaking tasks on learners' interactional performance (Doctoral dissertation). Minnesota State University.

Wang, Y., & Chen, C. (2020). Task complexity and the use of mother tongue in group/pair cooperative tasks: From the perspective of sociocultural theory. *Journal of PLA Foreign Language and Chinese University*, *43*(06), 106–114+158. [In Chinese].

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary Educational Psychology*, *25*(1), 68–81.

Williams, E. A., Duray, R., & Venkateshwar, R. (2006). Teamwork orientation, group cohesiveness, and student learning: A study of the use of teams in online distance education. *Journal of Management Education*, *30*(4), 592–616.

Wu, Y., & Ren, W. (2024). The influence of task complexity on second language learners' engagement in interactive tasks. *Frontiers of Foreign Language Teaching and Research*, *(01)*, 60–67+92. [In Chinese].

Xu, J. F., Fan, Y. M., & Xu, Q. T. (2019). EFL learners' corrective feedback decision-making in task-based peer interaction. *Language Awareness*, *(4)*, 329–347.

Zabihi, R., & Ghahramanzadeh, B. (2022). Proficiency pairing and engagement with language in L2 peer interaction. *System*. https://doi.org/10.1016/j.system.2022.102556

Zhang, B. (2021). Engaging in dialogue during collaborative writing: The role of affective, cognitive, and social engagement. *Sage Open*. https://doi.org/10.1177/1362168821105404

Copyrights