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Children's interaction and lexical acquisition in text-based online chat

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Abstract

This is an empirical study in which we explore child foreign language learners' interactional strategy use, uptake, and lexical acquisition in synchronous computer-mediated communication (SCMC). The study was carried out with 16 10-year-old Spanish English as a foreign language learners paired with age- and proficiency-matched English native speaker peers who worked together over a 5-week period on three communicative jigsaw tasks. Results show that during text-based SCMC, the children negotiated for meaning in ways that coincided with and differed from studies of young learners' face-to-face communication. Successful uptake of target lexis occurred infrequently despite high rates of negotiation, although the children's lexical knowledge improved significantly over time. Analyses of the chat scripts revealed that the learners noticed and retained additional lexical items embedded in the task and used during the interaction. They had not been the focus of negotiation, but were useful for task completion. Participation in SCMC also raised the children's awareness of gaps in their lexical knowledge and stimulated their attempts to fill those gaps outside the classroom. The results are discussed and implications suggested for implementing SCMC in instructional settings.

Keywords: *Computer-Mediated Communication, Vocabulary, Task-Based Learning and Teaching*

Language(s) Learned in this Study: *English*

Introduction

The teaching of English as a foreign language (EFL) has steadily increased in elementary schools around the world due to the burgeoning interest in early language learning. At the same time, the expansion of technology has gradually changed the way we communicate and now plays an increasingly important role in language classrooms. Learners of all ages use web-based tools such as blogs, wikis, email, and digital platforms to interact with others and to share or showcase their work. Computer-mediated communication (CMC) has also become a thriving focus of research attention within the field of second language acquisition (SLA) and a number of studies have examined learners' digital collaboration in both synchronous and asynchronous environments. Synchronous computer-mediated communication (SCMC), especially, is held to entail a number of advantages for language learners, enabling them to communicate with speakers of the target language in real time, even in foreign language learning contexts where such opportunities are limited. However, research on children's CMC in general, and on SCMC[1] in particular, is relatively scarce. The aim of the present study is to explore the text-based chat, uptake, and lexical acquisition of a group of young EFL learners. In doing so, we hope to offer some insights into the potential of digital communication for children's language learning in instructed learning environments.

Review of the Literature

Online chat during which writers exchange written messages in real time has been recently acknowledged as a potential site for second language learning. This potential is based upon the possibilities that online chat allows learners to produce, monitor, and modify their written output and to attend to feedback provided on their texts. By doing so, they activate cognitive processes such as hypothesis formation and testing, noticing, metalinguistic reflection, and problem solving, which are thought to lead to the consolidation of existing linguistic knowledge or to the development of new knowledge (Williams, 2012). Cognitive accounts of learning assume that SCMC can generate opportunities for language learning that are comparable to traditional face-to-face (FtF) oral interactions. Hence, much of SCMC research maintains the analytical categories that have been established for FtF studies (Ortega, 2009), including clarification requests, comprehension checks (Long, 1983), and uptake (Lyster & Ranta, 1997). Although the use of facial expression, gestures, body language, or intonation that support successful communication in FtF interaction are not available in online textual environments, digital communication has moved beyond the written word to include a variety of semiotic resources through which writers can express their attitudes and emotions. Consequently, SCMC is characterized by the use of nonverbal language, including symbols such as emoticons, punctuation, capitalization, and the like, which learners employ to indicate their feelings or problems during interaction (Kawase, 2006; Lee, 2002).

Despite the real-time demands of communication, in SCMC, learners have more time to process both the incoming input and their own written output, since the contributions of both partners remain visible on the screen, thus allowing learners to review their on-going conversations (Blake, 2000; Lai & Zhao, 2006; Lee, 2002; Pellettieri, 2000). However, SCMC is also characterized by *disrupted turn adjacency* (Ortega, 2009, p. 228), since messages are posted in the order received by the system and are likely to be non-sequential. The data in chat scripts often take on a format that Smith (2003) has defined as a *split negotiation routine*, in which responses to communication problems may appear on screen later in the discourse, unlike FtF communication where speakers' reactions materialize straightaway. In other words, negotiation in online chat is not necessarily contingent to a problem signaled by one of the partners, with the result that uptake may be delayed (Lai & Zhao, 2006; Smith, 2005). Although the visibility of the text may increase learners' noticing of language, enhancing the *amplification of attention to form* (Ortega, 2009, p. 229), learners also have greater freedom to skip messages from their partner. For this reason, meaning negotiation and the provision of feedback does not necessarily guarantee its reception by the learner (Ortega, 2009). This dilemma has been the subject of much SCMC research.

So far, studies of online chat have focused on (a) discourse strategies used by learners in pair and small group chat (e.g., Kötter, 2003; Lee, 2002), (b) interaction and influence of task type with university students in instructional settings (e.g., Blake, 2000; Smith, 2003), (c) conversations between learners and native speakers (NSs) in public chat rooms (e.g., Jepson, 2005; Tudini, 2003, 2007), and (d) learner uptake from meaning negotiation (e.g., Shekary and Tahririan, 2006; Smith, 2005; Sotillo, 2005). Other studies have compared SCMC and FtF modes of communication as regards (e) noticing of interactional feedback (e.g., Lai & Zhao, 2006), (f) patterns of pair interaction (e.g., Tan, Wigglesworth, & Storch, 2011), and (g) communication strategies (e.g., Kim, 2014). Results from this research have been contradictory with variability reported across learning contexts regarding the amount and focus of negotiation, the influence of task-type, noticing, and uptake as a result of interactive exchanges.

Kötter (2003) documented the discourse moves used by German and North American university students during online text-based interactions about joint cultural projects. These included similar repair moves to those found in oral exchanges (i.e., confirmation checks, clarification requests, comprehension checks), but were used differently. A high ratio (12.0%) of the discourse moves in the corpus were clarification requests, indicating that these learners had no misgivings about asking their partners to modify their written output. The use of emoticons (e.g., grins, nods, smiles) to indicate agreement or understanding, code switching, or the lack of repetitions in the learners' chat script data were also representative features of the interactional moves of this group of learners. By the same token, Lee (2002) found that requests for assistance,

clarification requests, self-corrections, and keyboard symbols were used by her intermediate learners of Spanish during weekly peer chat sessions. Lee also draws attention to the simple sentence constructions in her learners' written output and their tendency to ignore each other's linguistic inaccuracies, leading her to suggest that fluency rather than accuracy seems to prevail when learners' attention is focused on meaning and exchanges occur at a rapid pace.

Further SCMC research has attempted to examine the focus of learners' attention and the influence of task type on learners' negotiation of meaning. These studies coincide in emphasizing lexical, rather than grammatical, concerns as the principal trigger of negotiation episodes (NEs), although to varying degrees. Blake (2000) found that lexical items were by far the most common incentive for negotiation of meaning with adult learners of Spanish, with jigsaw tasks proving superior to information-gap or decision-making tasks in fostering negotiation, although overall levels of NEs were low (4.0% of the entire corpus). Smith (2003) describes much higher levels of negotiation among his intermediate English as a second language (ESL) learners with 34.0% of the data corresponding to negotiation turns. However, both the jigsaw and the decision-making tasks deployed in Smith's (2003) study had been expressly designed to stimulate negotiation, with unknown lexical items purposely embedded within them. Focusing on open-ended conversational tasks in public chat rooms with adult learners of Italian, Tudini (2003, 2007) found that in their interactions with NSs, the levels of negotiation of non-native speakers (NNSs) were still fairly high, reaching a ratio of 9.0% and 11.0% respectively. While lexis continued to be the main trigger for NEs, problems with grammar and syntax accounted for a substantial number of instances in the data, indicating a greater concern with form in a NNS–NS environment. In his study of virtual chat rooms, Jepson (2005) recorded data from anonymous ESL learners interacting with NSs in voice-based and text-based interactions. In general, levels of negotiation were low, leading Jepson to point out, like Blake (2000), that the infrequent use of negative feedback by all participants would seem to indicate that NNS conversational chat may not promote the attention to grammatical accuracy which is necessary for second language development.

While there is consensus on the importance of noticing and attention for language learning (Schmidt, 1990), researchers have disagreed on the extent to which negotiated text-based interaction can successfully foster these processes. In comparing SCMC and FtF communication with mixed proficiency ESL dyads, Lai and Zhao (2006) found that learners' self-reported noticing of errors and interactional feedback was significantly higher in online chat than in oral communication. The noticing and successful uptake of linguistic items from language-related episodes during SCMC with NNS peers was similarly fruitful for Persian EFL learners and associated with their subsequent learning of the noticed items on tailor-made post-tests (Shekary & Tahririan, 2006). Sotillo (2005), however, exercises greater caution in advocating a decisive role for negotiation and uptake in language development. Although her ESL learners responded to corrective feedback from NS and NNS partners on lexical and grammatical errors with a high rate of successful uptake (75.0%), just over half of all the feedback provided (51.0%) was neither acknowledged nor incorporated by learners. This leads Sotillo to warn that categorical claims for the role of uptake in promoting language acquisition cannot be made. A similar position is argued by Smith (2005) who found that successful uptake of target lexis occurred only rarely during online communication tasks, despite high rates of negotiation between ESL learners, and did not significantly impact their subsequent lexical acquisition. The question of whether and how negotiation and uptake might influence language development during online chat remains an open question.

The studies of SCMC reviewed so far coincide in a number of features, including the participants, task types, and learning contexts investigated, thus highlighting a number of gaps that have still to be addressed by future research. First, all of the above studies were carried out with adult second language learners. None have yet focused on younger learners. However, in FtF communication there is a much longer tradition of research into children's interaction and negotiation of meaning. Among others, researchers have investigated children's discourse strategies while interacting with adults and children (Oliver, 2002, 2009), interactional feedback and question formation (Mackey & Oliver, 2002; Mackey & Silver, 2005), age-related differences and strategy use (Pinter, 2006), oral task repetition (Pinter, 2007), interactional feedback

and task-type (Oliver, Philp, & Mackey, 2008), and negative feedback and modified output (van den Branden, 1997). In general terms, research has confirmed that learners as young as 5 years old can and do use negotiation strategies, although in ways that are different from those of adults (Ellis & Heimbach, 1997; Oliver, 1998, 2000, 2009). While children are essentially concerned with making meaning clear for themselves, they are also capable of providing feedback to their partners and modifying their output in response to feedback. This has been shown to have beneficial effects on their interlanguage development, at least for the formation of questions (Mackey & Oliver, 2002; Mackey & Silver, 2005).

Second, research on children's CMC is still relatively scarce. Two recent studies focused on the use of wikis as a tool to support children's negotiation and decision-making during the creation of collaboratively written texts (Pifarré & Li, 2012; Woo, Chu, Ho & Li, 2011). More recently, Chen and Yang (2014) highlighted the motivational benefits of using various web-based technologies (i.e., weblogs, Skype, email) with 12-year old ESL learners in Taiwan to encourage intercultural project work with international partners. However, the above-mentioned studies explored children's learning in an asynchronous computer-mediated communication mode. To the best of our knowledge, no study has yet focused on children's interaction in SCMC. It therefore seems relevant for the present research to address this gap.

Finally, the learners participating in the SCMC studies have interacted either with expert NS interlocutors (Jepson, 2005; Sotillo, 2005; Tudini, 2007) or with NNS peers (Blake, 2000; Lai & Zhao, 2006; Lee, 2002; Smith, 2003, 2005; Shekary & Tahririan, 2006). Only Kötter (2003) investigated the interaction of two sets of NNS tandem learners who were learning their peers' L1 as an L2 at the time of the study. Furthermore, the proficiency levels of the learners participating in above-mentioned research have generally been overlooked. This is surprising since it is widely accepted that individual differences impact how learners deploy their linguistic resources (Kormos, 2012). Hence, the present study examines a number of crucial issues as yet unexplored in the second language research literature with a population that has often been neglected. Specifically, we analyze the text-based interaction of young EFL learners working with NS peers and its potential effect on the uptake and acquisition of target lexis. The following questions were formulated:

1. What interactional strategies do young EFL learners use while working with proficiency-matched NS partners on communication tasks in synchronous text-based chat?

2. What effect, if any, does participation in text-based interaction have on the EFL learners' uptake and subsequent acquisition of targeted lexical items?

Method

Participants and Context

The participants were 16 children (seven boys and nine girls) aged 9–10 from a Year 4 EFL class at a state school in Spain. The children had been learning English for six years, having begun in pre-school at the age of three. During this time, they participated in 90-minute weekly sessions aimed at developing oral comprehension skills. From age six onwards, they received 3 hours of instruction per week using communicative EFL textbooks designed for younger learners. The NNS children were placed in age- and proficiency-matched pairs with English L1 NSs from their partner school in England. The NS children, all of whom were girls, had been learning Spanish as a foreign language at school for two years, although their linguistic competence was comparable to that of their Spanish partners. In general terms, both sets of learners were at an A1 level of proficiency according to the Common European Framework of Reference for Languages (Council of Europe, 2001). For the purposes of the study, the proficiency levels of the pairs was determined by their respective teachers on the basis of their performance on school English and Spanish language tests. Although standardized tests have frequently been used to place learners, previous research has also acknowledged that, in ordinary classrooms, the teacher's ratings are often used to pair pupils (Leeser, 2004). Both teachers' assessments of their pupils' L2 competence were used to pair the stronger and weaker language learners in each class so that eight high-proficiency pairs (1–8) and eight low-

proficiency pairs (9–16) were formed.

Initial Pilot Study and Trial Sessions

Prior to the data collection, a pilot study was implemented with the aim of trialing a picture-description and a jigsaw story-sequencing task in order to select the most appropriate one for the present research in terms of its potential to foster online negotiation. Since the jigsaw task was found to afford greater opportunities for negotiation and uptake, it was chosen for the main study. Five trial sessions were then held for training purposes to introduce the learners to the Chatzy online platform and to enable them to meet their partners informally. The newly formed pairs, who remained together throughout the study, practiced over a period of two weeks with a jigsaw task in English and then in Spanish in order to become familiarized with the demands of online chat and with the task format.

The Jigsaw Tasks

Three original jigsaw tasks were created by the researchers for the purpose of the study (for an example, see Appendix A). These were story-sequencing tasks that required each pair to describe and agree on the correct order of a series of four pictures. The three stories shared a common underlying lexical theme related to clothing and certain key objects purposely embedded in the task in order to focus the NNS children's attention on the unknown lexical items (Smith, 2005). The teachers instructed both groups to collaborate in order to solve the task. It was emphasized to the NS children that it was their responsibility to help their partners use English correctly. Likewise, the NNSs were told to use as much English as possible and to seek help if they encountered any difficulties.

Data Collection Schedule and Procedure

Mixed measures of data collection were used. These included vocabulary pre- and post-tests, individual written narratives, and chat scripts of the jigsaw tasks. The data collection was inserted into the normal class schedule in both schools over a period of eight weeks (see Table 1).

Table 1. *Schedule of the Research Design*

Week	Task
Week 1	Initial pre-test
Week 2	Session 1: Jigsaw task 1, Immediate post-test 1
Week 3	Session 2: Jigsaw task 2, Immediate post-test 2
Week 4	Session 3: Jigsaw task 3, Immediate post-test 3
Week 8	Delayed post-test and small group interviews

Before the first task, the NNS children were given a pre-test to determine their knowledge of the lexical items included in the tasks. Following Smith (2005), the participants were shown 20 slides that contained twelve target lexical items projected in no particular order: four from each of the three jigsaw tasks plus eight distractors (see Appendix B). The children were provided with an answer sheet and asked to write the words in English. For each chat session, the pairs met online once a week in the computer classroom under the supervision of their teachers. The children were given 40 mins to complete each task. Immediately afterwards, the NNS learners were required to write the picture story individually. Immediate post-tests were held two days later. These followed the same procedure as the pre-test. On each occasion, the children were shown 10 slides and asked to write the words on their answer sheet. These included the four target words from each task plus six distractors arranged in a different order from the pre-test. Four weeks after the final jigsaw task, a delayed post-test, identical to the pre-test, was held with the intention of determining the NNSs' retention of the target lexical items. Finally, semi-structured interviews were held with a representative sample of the NNS participants in order to tap into their perceptions of SCMC.

Data Analysis and Coding

The data set for the study consisted of (a) a total of 48 chat scripts, 16 for each of the three jigsaw tasks; (b) a lexical pre-test, three immediate post-tests, and a delayed post-test; (c) 48 picture story descriptions written individually be the NNS children; and (d) video recordings of interviews with the NNS children. The chat scripts were read recursively to identify the range of interactional features used by the children while performing the tasks online. The coding scheme used to analyze the transcripts included discourse strategies related to task performance (Lee, 2002; Zeng & Takatsuka, 2009) and what have traditionally been termed negotiation strategies, as described in previous SLA interactional research (Long, 1983; Pica & Doughty, 1985). An additional data-driven category of social interaction was included to account for non-task-related discourse (see Appendix C).

Episodes involving negotiation of meaning were then identified for the 16 pairs across all three tasks. Negotiation of meaning, as used in the present study, is defined as "cooperative interaction that enables learners to develop mutual understanding as they work together to overcome a communication breakdown" (Oliver, 2009, p. 137). A NE includes a *trigger* that causes a communication problem, an *indicator of non-understanding*, and a *response* to the indicator. In SCMC, as noted by Smith (2005), several turns may occur between each of these stages. Following this author, a turn is operationalized as a "transfer of the floor from one participant to another" (p. 44). As such, when a learner writes several lines in succession, this constitutes a single turn.

The interactional strategies identified in the data were counted for each of the 16 pairs across all three tasks. Reliability was established by having a second rater check the entire data corpus so that any discrepancies could be solved by discussion, following procedures outlined by Smagorinsky (2008). The percentage ratio of each strategy type was calculated for all the pairs, and then for high- and low-proficiency pairs in each task. The overall mean percentage ratio for each strategy across all three tasks was then computed. To check for significance in the strategy use by pairs of different proficiency levels, the mean scores and standard deviations for each interactional strategy were calculated using descriptive statistics. Given the small number of participants and the non-normal distribution of the data, a non–parametric Mann Whitney test was run to check for significance between the high- and low-proficiency pairs.

Research Question 2 was concerned with a possible relationship between the children's negotiated interaction, uptake, and lexical gains on the target items. The categories of uptake used in the present study are adapted from Smith (2005). Hence each episode was coded as either (a) no uptake, when the learner does not produce uptake in response to a NE; (b) unsuccessful, when the learner acknowledges information received from his partner but does not use it accurately; or (c) successful, when the learner uses the target item productively in the reply phase or any time thereafter.

To calculate the ratio of each uptake category, the total number of NEs initiated by NNS was tallied for each task and the percentage ratio calculated as before. The results of the pre- and post-tests were counted and a Friedman Test was used to check for significant differences in the lexical scores across the five time periods. In addition, a series of Wilcoxon signed rank tests were run to compare the mean ranks of the NNSs vocabulary scores from the pre-test (a) to each of the three immediate post-tests and (b) to the immediate to the delayed post-test.

Results

The first research question attempted to identify the interactional strategies used by young EFL learners and NS peers while working on communication tasks during online chat. The results showed that the children interacted collaboratively using interactional strategies similar to those of studies with children in FtF communication. However, the virtual nature of the interaction also afforded several noteworthy differences, which will be discussed below. The interactional strategies identified can be categorized into three groups: task-specific discourse, negotiation strategies used to overcome difficulties or breakdowns in communication, and social exchanges. Table 2 below shows the mean proportion of strategies used by the

pairs across all three tasks.

Table 2. *Proportion of Interactional Strategies Used by Child NNS–NS Pairs across Tasks*

Strategy	Mean %
Asking for information about a picture	14.5
Describing a picture	18.2
Providing L2 equivalent for unknown lexis	5.7
Providing L1 equivalent for unknown lexis	2.2
Request for response	4.0
Clarification request	10.7
Confirmation check	2.7
Comprehension check	2.0
Self-repetition	16.3
Seeking lexical assistance	6.5
Self-correction	4.4
Recast	0.7
Explicit correction	0.2
Social (e.g., greetings, personal chat, etc.)	11.9
Total	100.0

The highest percentage of individual strategies was directly related to task performance, since the children's prime concern was to complete the jigsaw task successfully. Therefore, much of their interaction was taken up with asking for and exchanging information about each other's pictures, as seen in the high proportion of questions (14.5%) and descriptions in the data (18.2%). A significant proportion of negotiation strategies were identified, which the children used to repair, re-establish, or maintain communication. The mean percentage of self-repetition (16.3%) and clarification requests (10.7%) were relatively high. Seeking lexical assistance (6.5%) and self-correction (4.4%) were also used to negotiate meaning, the former almost exclusively by NNSs when asking their partners how to express unknown words in the L2. The NS children responded by providing unknown the lexis in the L2 (6.5%) or, to a lesser extent, giving an L1 equivalent (2.2%). Self-correction (4.4%) was used primarily by the NS children to repair spelling inaccuracies in their messages. Confirmation checks (2.7%) and comprehension checks (2.0%) were less prominent in the data, while feedback, both in the form of recasts (0.7%) and explicit correction (0.2%) was used only rarely. Socially oriented interaction (11.9%) included greetings, farewells, and personal questions unrelated to the task (for a sample of the interaction between a high- and a low-proficiency pair see Appendix D).

Use of Strategies by High- and Low-proficiency Pairs

Table 3 shows the average use of interactional strategies by high- and low-proficiency pairs. A Mann Whitney test revealed significant differences ($p < 0.05$) on four negotiation strategies in favor of the high-proficiency pairs that requested a response from their partners twice as much as their low-proficiency peers (high-proficiency $M = 4.13$, $SD = 3.68$; low-proficiency $M = 1.38$, $SD = 1.99$; $z = -2.42$, $p = .01$) and used clarification requests significantly more frequently (high-proficiency $M = 10.13$, $SD = 3.83$; low-proficiency $M = 4.88$, $SD = 3.52$; $z = -2.539$, $p = .01$). Both strategies were used mainly by the NNSs. Consequently, the provision of lexical items in both English (high-proficiency $M = 5.63$, $SD = 2.77$; low-proficiency $M = 2.38$, $SD = 1.84$; $z = -2.408$, $p = .01$) and Spanish (high-proficiency $M = 2.63$, $SD = 1.84$; low-proficiency $M = 0.75$, $SD = 1.48$; $z = -2.214$, $p = .02$), which are also significant, corresponded exclusively to NSs in response to their partners' communicative needs.

Table 3. *Mean Frequencies of Negotiation Strategies Used by Pairs of Different Proficiency Levels*

Strategy	High-Proficiency Pairs		Low-Proficiency Pairs	
	M	*SD*	*M*	*SD*
Asking for information about a picture	9.75	2.65	11.00	1.51
Describing a picture	14.13	2.85	13.13	3.72
Providing L2 equivalent for unknown lexis	5.63*	2.77	2.38	1.84
Providing L1 equivalent for unknown lexis	2.63*	1.84	0.75	1.48
Request for response	4.13*	3.68	1.38	1.99
Clarification request	10.13*	3.83	4.88	3.52
Confirmation check	2.63	1.99	1.25	1.66
Comprehension check	1.88	1.95	0.75	0.88
Self-repetition	13.38	6.90	10.75	9.30
Seeking lexical assistance	5.88	5.66	3.38	2.50
Self-correction	3.50	2.92	1.88	1.95
Recast	0.38	0.74	0.63	0.51
Explicit correction	0.25	0.46	0.13	0.35

The nature of the online environment led the children to use symbols, punctuation marks, and emoticons to express their mood during task performance. Table 4 presents the three most frequent emoticons used by the pairs across the three tasks. Negative emoticons (e.g., angry, frown) were recurrent in Task 1 when a misunderstandings occurred, although encouragement (bravo) was also given. In Task 2, two new emoticons (hug and confused) appeared in the chats, although one (angry) also indicated the children's frustration on struggling to communicate. In the final task, the children increased their use of the smile and bravo symbols while big grin emoticons were also used to express positive emotions. This gradual change in the children's mood over time could be related to their growing confidence and a more collaborative and fluent working relationship with their partners by the final task.

Table 4. *Frequency of Emoticons Used across the Jigsaw Tasks*

	1st place	2nd place	3rd place
Task 1	😠 angry (16)	🤗 bravo (9)	🙁 frown (9)
Task 2	🙂 🤗 hug (27)	😠 angry (24)	😕 confused (15)
Task 3	🙂 smile (127)	🤗 bravo (44)	😁 big grin (25)

Research Question 2 asked about the impact of text-based negotiation on the NNS children's uptake and acquisition of target lexis. The chat corpus contained a total of 108 NEs across the three tasks (37, 41, and 30, respectively), approximately 9.5% of the total turns (*N*= 1132). The mean number of NEs per pair across all three tasks ranged from 0.3 to 6.0, with an overall average of 2.4 episodes for all pairs. Although the number of episodes per task was similar, negotiation between the pairs reached a peak during Task 2 and declined to the lowest number of episodes in the final task.

Successful uptake of the target lexis by the NEs occurred infrequently, averaging at about 20.0%. The percentage of lexical items incorporated by the NNS reached a peak in Task 2 before falling in the final task (Task 1, 17.0%; Task 2, 27.5%; Task 3, 20.0%). Unsuccessful uptake gradually increased across tasks (Task 1, 12.0%; Task 2, 15.0%; Task 3, 20.0%) while no uptake was by far the most frequent response to

the NEs. No opportunity for uptake (when NNSs were simply clarifying meanings they did not understand) and missed opportunities for uptake (when NNSs failed to incorporate input) account for more than half of the outcomes following a NE. The percentage ratio of no uptake decreased slightly from Task 1 to Task 2 and increased again slightly in Task 3 (Task 1, 72.0%; Task 2, 57.5%; Task 3, 60.0%). Table 5 shows the results of the percentage of NNS uptake across the three jigsaw tasks.

Table 5. *Percentage Ratio of Uptake by NNSs across Tasks*

	Task 1		Task 2		Task 3	
	n	%	n	%	n	%
Successful	6	17.0	11	27.5	6	20.0
Unsuccessful	4	11.0	6	15.0	6	20.0
No Uptake	26	72.0	23	57.5	18	60.0
Total NEs	36	100.0	40	100.0	30	100.0

The target lexis, which had been purposely integrated into the tasks, was either overlooked or not incorporated by the NNSs even when they had received feedback from their partners. Only two or three target items were successfully incorporated into their written output by some of the NNS across the three tasks. However, additional words, which were not targeted in the vocabulary tests, also became the focus of NEs, some of which were then used by the NNSs. This was the case of lexis related to actions and descriptions of the main characters in the picture story in Task 1 and Task 2 (i.e., speaking, sitting, sleeping, sunbathe, wet) or the weather in Task 3 (i.e., cloudy, rain, storm). The lexis that resulted in uptake from negotiation during task performance is included in Appendix E. Further analysis of the chat scripts also revealed incidental uptake by the NNS children of a number of words that had not been actively negotiated, but that were used by NSs during the exchange. These included words and expressions that were especially useful for identifying the picture their partners were describing. They included concrete references to the time of day in Task 1 (e.g., moon, stars), location in Task 2 (e.g., beach, sea, castle), and monuments in Task 3 (e.g., Big Ben, London Eye). The individual written narratives that the NNSs wrote immediately after finishing each task included such words (see Appendix F).

Results of the Vocabulary Tests

The second research question also addressed the potential acquisition of target lexis by the NNS children. A Friedman test showed that there were statistically significant changes in the children's acquisition of the target vocabulary x^2 (2, $n = 16$) = 33.15, $p < .000$ across the five time periods covered by the pre- and post-tests. A comparison of the mean ranks for the five sets of scores indicated that from the original pre-test (2.28), there was a peak after Task 2 (3.50), a drop after Task 3 (2.41), and a final increase on the delayed post-test (4.16). Further comparative analysis of the lexical scores between the pre-test and (a) each of the immediate post-tests and (b) the delayed post-test using Wilcoxon signed rank tests revealed statistically significant improvement in the children's vocabulary scores from the pre-test to Task 2 ($z = -2.807$, $p = .005$), and from pre-test to delayed post-test ($z = -2.816$, $p = .005$). However, the scores did not improve significantly from the pre-test to Task 1 ($z = -1.732$, $p = .083$) and from the pre-test to Task 3 ($z = -1.000$, $p = .317$). The mean and median scores obtained by the children before and after carrying out the jigsaw tasks are shown in Table 6.

Table 6. *Lexical Scores by NNS across the Jigsaw Tasks*

Vocabulary scores (n = 16)				
Pre-test	Post-test 1	Post-test 2	Post-test 3	Delayed post-test

Mean	0.000	0.187	0.750	0.625	1.750
Median	0.000	0.000	1.000	0.000	1.500
SD	0.000	0.403	0.856	0.250	1.732

Discussion

The aim of the present study was to explore the interactional strategies, uptake, and lexical acquisition of young EFL learners working with age- and proficiency-matched peers on task-based SCMC tasks. The principal findings can be summarized as follows: (a) The children willingly negotiated for meaning when communication difficulties arose during online interaction. (b) Interactional strategies were used similarly despite differences in proficiency levels, which affected only a limited number of negotiation strategies. (c) Codeswitching was widely used by both groups of children to avoid communication breakdown. (d) Semiotic resources including emoticons, capital letters, and punctuation were implemented translinguistically to convey attitudes and emotions in the virtual environment. (e) Successful uptake of target lexis by NNS children occurred infrequently, despite high rates of negotiation. (f) The NNS children acquired incidental vocabulary after socially interacting with their NS partners. And (g) the NNS children's lexical acquisition improved after participating in text-based SCMC. These findings suggest that text-based SCMC would seem to be a potentially useful site for SLA with young language learners.

Children's Interactional Strategies and Negotiation of Meaning

The negotiation strategies that the EFL children most resorted to in order to overcome communication difficulties were self-repetitions and clarification requests. These findings are in consonance with earlier studies of FtF communication with both younger (5–7 years) and older (8–12 years) children (Oliver, 2002, 2009). The high proportion of self-repetition strategies in the present study (16.0%) is slightly lower than in Oliver's (2009) data (24.0%). However, the percentage of clarification requests (10.7%), doubles that found by Oliver (2009), which accounted for 6.0% of the negotiation moves in oral interaction tasks. Despite slight variation, the overall coincidences between children's strategy use in FtF and SCMC are striking. This might be explained by younger children's lower levels of L2 competence. When faced with having to clarify a meaning for their NS partners, the NNSs' limited L2 competence meant that they were largely unable to modify their output and so tended to re-state the original message. Exact self-repetition was more characteristic of children's SCMC than either partial or expanded repetitions, which are found in oral data. Interestingly, self-repetition was not found in online interaction with older learners (Kötter, 2003; Lee, 2002), yet it was used frequently by adults in FtF situations (Oliver, 1998), particularly in NS–NNS dyads. This might be attributed to the increased processing time afforded by the online environment that would enable more competent adult learners to rethink and modify their problematic or incomprehensible output.

The high proportion of clarification requests found in children's interaction in both online and FtF modes suggests, as pointed out by Oliver (2009), that children's egocentricity influences their interactional behavior, leading them to be less concerned with making meanings clear for their partners and more concerned with focusing on their own needs. This would also account for the less frequent use of strategies that involved helping their partners, such as ensuring that messages were understood (comprehension checks) or helping partners use language more accurately by reformulating or explicitly correcting their output (recasts and explicit corrections). In text-based SCMC, the need for learners to make meanings clear for themselves is even more accentuated since they cannot see their interlocutor and lack the paralinguistic input that oral communication entails. Without this crucial support, learners were forced to ask their partners to continually explain or rephrase the original messages. The high percentage of clarification requests in our data coincides with findings from SCMC studies with adults (Kötter, 2003; Lee 2002). However, unlike Kötter´s (2003) dual nationality learners who spent equal amounts of time communicating in both languages, it was mostly the Spanish EFL learners who used clarification requests to access the meaning of

input that was beyond their comprehension.

Seeking lexical assistance and self-correction were also prominent in the children's text-based interaction. Yet, while neither of these strategies are documented in children's FtF communication, Lee (2002) identifies both as among the most characteristic features of the peer interaction in her SCMC research and Kötter (2003) points out that the majority of the appeals for assistance in his research were made by the less-advanced American learners. The prominence of these particular strategies would also seem to be linked to low levels of linguistic competence, as well as to the characteristics of the online environment. It should be recalled that the children in Oliver's (2002, 2009) studies were second (rather than foreign) language learners, acquiring the language in a naturalistic context. Hence, their additional exposure to the L2 meant that they almost certainly had greater lexical knowledge than the EFL children in this study, whose competence was very low. In order to formulate written output in the FL, the NNS children sought help from their partners to compensate for gaps in their lexical knowledge. Many such requests frequently involved the use of intra-sentential code switching, whereby the children stated the L1 equivalent of single items or phrases they needed to produce in the L2. On other occasions, the NNSs borrowed explicitly from the L1 when describing their pictures. NS learners were also found to codeswitch into Spanish in order to sustain negotiation when attempts at communicating in English had broken down. As in Kötter's (2003) study, codeswitching was used here by the NNS children to compensate for their lexical shortcomings and by the NSs to scaffold and assist their partner's task performance. Self-correction may also be more important in online communication because of the visibility of the written language on the screen, which facilitated the NS children's detection of errors and subsequent editing of their output.

An additional feature of the children's SCMC was their frequent use of emoticons, capital letters, exclamation marks, and question marks to express their feelings during the negotiation tasks. Interestingly, these young learners had no inhibitions about openly showing their anger, frustration, or confusion, especially when their partners failed to respond to requests for help. By the same token, more positive attitudes including apologies, encouragement, and smiley faces served to establish and improve rapport between partners. These distinguishing features of SCMC seem to have played a central role not only in signaling interaction problems in the absence of prosodic and paralinguistic markers, but also in establishing social bonds between learners. As noted by Ortega (2009), it is still an open question as to how exactly such features might contribute to opportunities for L2 learning.

Proficiency Level and Strategy Use

Proficiency affected the use of four strategies: clarification requests, requests for a response, the provision of lexis in the L2, and the provision of lexis as an L1 translation. While all the NNSs used clarification requests in order to obtain comprehensible input, higher-proficiency learners did so significantly more than their lower-proficiency peers. This suggests that learners with higher proficiency levels are better prepared for negotiating meanings during communication breakdowns. As Pinter (2007) has suggested, since children, unlike adults, are unashamed of not knowing or misunderstanding meanings in the L2, they are willing to seek help in order to clarify L2 input. The provision of lexis by the NS children, both in the L2 and in the L1, was also determined by proficiency, since the more linguistically competent NS children provided ample assistance to meet the demands of their high proficiency NNS partners. Thus, the proficiency levels of young NS learners in their interactional partner's first language could be an important factor to take into consideration when pairing learners during CMC. Had the pairing been made in such a way that more-competent children were placed with less-linguistically-proficient partners, the less-competent NS children may have had greater difficulty in providing feedback, especially when doing so in their partner's L1.

Negotiation, Uptake, and Lexical Acquisition

Online jigsaw tasks provided the young EFL learners with a site for the negotiation of meaning in the L2. Lexical NEs corresponded to 9.5% of all turns across the three tasks. Judging by Ortega's (2009) comparison of SCMC studies with adult learners, these levels are fairly high. Although falling well below

the results of Pellettieri (2000) and Smith (2005) who reported negotiation rates of 31.0% and 42.0%, respectively, the amount of negotiation the children engaged in was comparable to Kötter's (2003) tandem learners (12.0%) and Tudini's (2003, 2007) analyses of public chat rooms (9.0% and 11.0%, respectively). The high rate of negotiation found in our research was largely determined by the task type, which, as a bi-directional information-gap activity, was specifically designed to encourage the exchange of information held by each of the partners. Other studies of pairs (Blake, 2000), small groups (Lee, 2002), and whole classes (Sotillo, 2005) have reported lower negotiation rates of between 3.0% and 7.5%. Those studies that have compared negotiation rates in SCMC and FtF communication (e.g., Fernandez & Martinez, 2002; Lai & Zhao, 2006) have come out in favor of the latter. This conflicting evidence suggests that the possible benefits of SCMC as a medium for fostering negotiation is largely dependent on who the participants are, the tasks they engage in, and the learning context (Ortega, 2009). The differences identified in negotiation rates by learners of different proficiency levels, with higher proficiency children negotiating twice as much as their lower proficiency peers (6.0% and 3.5%), a variable that was not reported by any of the above studies, would suggest that proficiency may also influence the potential of online interaction for meaning negotiation.

The variability identified in the amount of negotiation across tasks is worth careful consideration. NEs increased from Task 1 to Task 2 before dropping in Task 3. This finding would initially appear to be in conflict with research on oral task repetition in adults (Bygate, 2001). Such studies have shown that when learners repeat a series of identical tasks in short succession, they generally improve their performance as the task becomes more familiar. This, in turn, can enhance the accuracy of language output. The first time learners engage in a task, they are likely to be focused on meaning. On subsequent occasions, they may improve their performance and focus more on language form (Adams, 2003). The lower number of NEs found in the final jigsaw task suggests that the children may have improved in terms of language comprehension, since clarification requests were used half as often as in the previous tasks (Task 1, 15.0%; Task 2, 12.0%; Task, 3.5%). However, this improvement did not carry over to productive lexical knowledge, since requests for assistance with writing unknown words doubled in Task 3 (Task 1, 3.8%; Task 2, 5.6%; Task 3, 10.0%), as did the use of emoticons (Task 1, 8.0%; Task 2, 7.7%; Task 3, 20.0%). The results of immediate post-test 3 also show no significant improvement in the retention of target lexis. A linguistic analysis of the chat scripts using comprehensibility, accuracy, and fluency measures was beyond the scope of the present study, yet there are some indicators that practicing with the jigsaw task may have led to improved performance. For instance, more children successfully completed the task within the given time limit than before, and some progression was evident in the length of learner turns in the final task, especially with the higher-proficiency learners (see Appendix G). These findings are in line with Pinter's (2006) study of the benefits of oral task repetition with young EFL learners. Hence, the gains from practicing with task-based SCMC may reside in terms of increasing younger learners' understanding of the task, as well as their confidence and fluency in exchanges with NS partners.

Regarding uptake and lexical acquisition, the findings of this study are not straightforward. Despite engaging in negotiation with their NS peers, successful uptake did not occur frequently. Even when opportunities were provided, the learners often failed to integrate the target lexis into their ongoing interaction. Smith (2005) has argued that the pressure to respond quickly to partners' incoming messages and complete the task may distract learners' attention away from the target lexis. It is also true that many of the target items embedded within the tasks were not actually the focus of the children's negotiations, and that additional vocabulary, which they perceived as more essential to successful task performance, was noticed and incorporated into their subsequent written texts. This suggests that the NNSs did, in fact, acquire incidental lexis while interacting with their NS peers. Surprisingly, they also improved their knowledge of target items significantly from the pre-test to immediate post-test 2 and on the delayed post-test. This is important because Task 2 had, in fact, produced the highest rate of NEs among pairs, thus suggesting a possible link between negotiation and lexical acquisition. While in the initial task, the EFL learners may have been overwhelmed by competing demands on their attention from having to type, read, and draw simultaneously. By the final task, greater familiarity with the task format and with their partners may have

reduced the level of challenge involved, as well as their motivation, thus lowering negotiation rates. The second task, then, appeared to be the most operative in terms of striking a balance between challenge and performance outcomes. The children's interview data also contributed a further explanation to account for improvements in lexical scores, since some of the learners acknowledged that engaging in the tasks with NS partners had raised their awareness of gaps in their lexical knowledge. This led them to search for unknown words in dictionaries, in textbooks, and on the internet and to consult with their NNS peers outside of class. It is clear that the learners' post-task searches for target vocabulary also contributed to improvements in their performance on the delayed post-test.

Conclusions

The present study is an attempt to explore the language-learning potential of task-based CMC with young foreign language learners. In doing so, it broadens the empirical database on SCMC by extending it to an under-studied population in SLA research. Evidence has been provided that SCMC can facilitate children's second language learning in several ways. First, the NNS children's progress in terms of lexical knowledge can be traced, in part, to episodes of meaning negotiation and uptake within the context of the online tasks. Second, their participation in SCMC played an important role in raising awareness of gaps in their lexical knowledge and in stimulating subsequent endeavors to fill those gaps. As such, this study also contributes theoretically to the debate within SLA concerning the potential of writing to foster noticing and second language learning. Finally, some support is also provided for related research that emphasizes the translingual nature of communication (Canagarajah, 2013). In this sense, the children's dynamic mixing of language codes and deployment of additional semiotic systems during SCMC actively worked together as strategic resources to support the development of their second language competence.

The pedagogical implications of the study are important. The NNS children's low levels of competence in EFL and their initial inability to formulate even simple questions points to a need for language teachers to train young learners in the use of basic formulae which would foster more fluent communication. Regarding task sequencing, while jigsaw tasks were found to be useful for encouraging interaction, the learners' investment in negotiation was lower in the third task, possibly due to their loss of interest. Teachers might introduce alternative task types (e.g., spot-the-difference or decision-making) and vary their order so as to maintain suitable levels of pressure and challenge on learners to promote optimum levels of negotiation. Finally, learners could be given access to their chat scripts after task completion to encourage class discussion of grammatical, lexical, and social aspects of the second language that were largely overlooked during meaning-based interaction.

The study has several limitations that should be considered for future research. The lack of time for children to complete the tasks was a clear handicap. While this was largely dependent on the availability of the partner school, raising teachers' awareness of the learning potential of SCMC could be a first step to ensuring that sufficient class time is set aside for online interaction. Implementing SCMC tasks with partners alternatively in both foreign languages is also likely to increase interest from all parties involved. Regarding the data, the coding of the children's interaction and the uptake categories would also benefit from a more fine-grained analysis. One of the most frequently identified strategies in the NNS discourse was seeking lexical assistance. However, we did not distinguish between those occasions when learners requested an L1 or an L2 equivalent for unknown vocabulary, and whether this was influenced by proficiency level. Similarly, the category of no uptake could be analyzed further to separate no opportunities for uptake from opportunities that were simply missed by the learners. This would give a subtler picture of the relationship between negotiation and uptake. Future research might continue to examine the online interactions of young learners in real time since there is much that we do not know. Issues such as the impact of different task types, learner groupings, individual personality traits, and nationality could all be analyzed, as well as the potential of SCMC to improve different aspects of language competence including oral and written skills.

Acknowledgements

Notes

1. SCMC is used in this study to refer to written communication. Any allusion to non-text-based SCMC will be specified.

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Appendix A. Sample Jigsaw Task
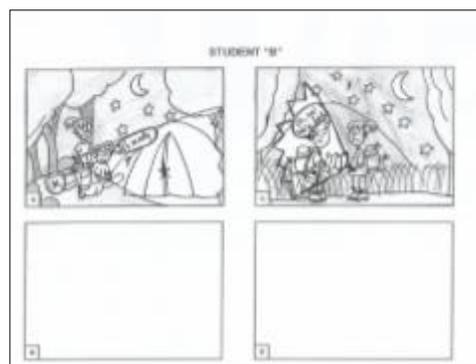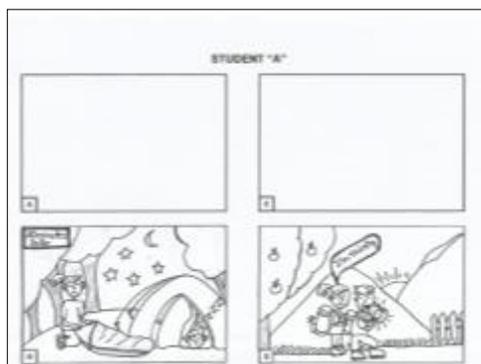
Appendix B. **Sample Slides and Lexis from the Pre- and Post-Tests**

Lexical items	Target lexis	Distractor
1. Tent	X	
2. Sunshade		X
3. Wellies	X	
4. Sleeping bag	X	
5. Umbrella	X	
6. Bucket		X
7. Torchlight		X
8. Swimsuit	X	
9. Scarf		X
10. Torch	X	
11. Flip flops	X	
12. Rain coat	X	
13. Flask	X	
14. Sun cream		X
15. Gloves	X	
16. Rope		X
17. Towel	X	
18. Woolen hat		X
19. Beach mat	X	
20. Ear muffs		X

Appendix C. **Coding of Children's Text-based Interactional Strategies**

Interactional Feature	Description	Example
Asking for information on the picture task	Requesting genuine information on the task content	NNS: what is in picture B?
Describing the picture	Giving genuine information on the task content	NS: in picture D there is a boy watching tv a girl getting glue and scissors from a shelf
Providing unknown lexis in L2	Explaining the meaning of unknown words in English	NNS: wath llorar in ingles NS: crying
Providing unknown lexis in L1	Using Spanish to explain the meaning of unknown words	NNS: the clock marca the seven o'clock
Requesting a response	Insisting that one's partner respond to a previous question or demand	NS: What happens in picture E 🧐 NS: please answer
Self-correction	Correcting one's own mistakes	NNS: the mates NNS: maths

Interactional Feature	Description	Example
Social interaction	Interacting on non-task-related items including greetings, personal questions, and so forth	NS: Oh, and I am sorry that I kept you waiting for SO long. Do you have any siblings?
Clarification request	Clarifying an incomprehensible message (because it was ill-formed), including *I don't understand*, wh-questions, tag questions, and yes/no questions	NNS: in picture a is a girl crying y el niño ayudandole NS: pardon? what does y el nino ayudandole mean?
Confirmation check	Checking by the speaker that he or she had correctly understood the message	NNS: in picture it´s quarter past eight NS: Quarter past 8 on the clock, you mean?
Comprehension check	Checking that the message was understood by the listener	NS: are you stuck
Self-repetition	Repeating by the speaker of the same utterance (partially or expanded) within five turns	NS: NOT ORDER NNS: 1 c 2 e NS: I KNOW, WHAT IS IN PICTURE E NOT THE ORDER!
Seeking assistance	Requesting help on how to produce an unknown word or expression in the L2	NNS: what pintar in engish
Recast	Reformulating all or part of the speaker's utterance	NNS: and the boy making homework NS: doing homework, right.
Explicit correction	Correcting the L2 explicitly	NNS: there a mamy, cryner girl and liring-roon (3 turns later) NS: you write it mummy, crying and living-room

Appendix D. Sample Chat Scripts from Task 2

High Proficiency Pair

NS: hello
NNS: hello
NS: hi
NNS: what´s in the picture a?
NNS: what´s toalla in english
NS: towel
NS: in picture a, a girl in the rush matting, flip-flops and a girl in the sea
NS: the girl wears a hat
NNS: I do not understand
NS: what is in picture b??
NNS: what´s rush in español
NS: rush matting is esterilla in spanish

NS: come on!

NS: 🙂

NS: minerva? are you ok?

NNS: in the picture b,

NS: hello

NS: ?????????????????????

NNS: swiminng girl atras rush y al lado a girl

NNS: there a hat

NS: I don´t understand

NNS: what´s bolso in english

NS: bag

NNS: what´s flip -flops in español

NS: in picture c, there are two girls, swimsuit, a bag, a hat and it s sunny. They are walking in the street and go to the beach.

NS: flip-flops are shoes to go to the beach

NS: what is in d?

NS: hello

NS: are you there??

NNS: inthe picture d girl rush shoes y a girl in the towel

NS: i dont understand rush shoes

NS: do you mean flip flops?

NNS: what´s swimsuit inespañol

NS: bañador I have got to go

NS: bye bye

Low Proficiency Pair

NS: hi

NNS: b and girl sad and girl suimmin

NNS: hello

NS: ok

NS: wait

NS: in picture a, two girls, a girl in the sea and rush matting

NNS: what is on picture a?

NS: i told uo

NS: in picture a, two girls, a girl in the sea and rush matting

NS: 😫😫😫

NS: 🙂

NS: whats i b??

NS: dddd?

NS: please

NS: 😕

NNS: b and girl sad and girl suimmin

NS: in pcture c, tow girls, its sunny, a hat, and a bag.

NS: ok

NNS: whaa
NNS: what hat a bat en Spain?
NS: bye bye
NS: 😋
NNS: bey bey 😀 😵 😋

Appendix E. Uptake by NNSs from NEs during Task Performance

NNS	Task 1	Task 2	Task 3
1	0	Sunbathe	0
2	Speaks	0	0
3	0	0	0
4	0	Flip flops, wet	Raincoat
5	0	Rush matting, wet	Boots, says
6	Tent, rucksack, tree, sitting	Towel, hat, rush	Rain
7	Sleeping bag, skate, ready to sleep	Flip flops	Pocket, waterproof boots, raincoat
8	Sleeping bag	Rush matting	Waterproof boots
9	0	Other, wet, mummy	0
10	0	Rush matting	0
11	0	Flip flops	Cloudy, raincoat
12	0	0	0
13	0	0	0
14	0	Beach	Cloudy, storm
15	Walking	0	0
16	0	Rush matting	0

Appendix F. Lexical Uptake in the Individual Written Texts of EFL Learners

NNS	Written Narrative 1	Written Narrative 2	Written Narrative 3
1	Stars, moon, sky	0	0
2	Night time	Sand, wet	London Eye, Big Ben
3	Left, right, stars, speaking	Sunbathe	London Eye, Big Ben
4	Forest, torch, shining	Sea, walking, wet	0
5	0	wet	Big Ben, London Eye
6	Stars, moon, rucksack	Sea, bag	0
7	Sleeping bag, moon	0	Big Ben
8	Moon, stars	Beach	Big Ben, London Eye
9	Moon	Wet	Big Ben, London Eye
10	0	Beach	London Eye
11	Tent, stars, moon	Sea	Big Ben, London Eye, boats

NNS	Written Narrative 1	Written Narrative 2	Written Narrative 3
12	0	0	Big Ben
13	Angry	0	0
14	0	Beach	Big Ben, storm
15	Lost, walking	Castle	Big Ben
16	Moon	0	Big Ben, London Eye

Appendix G. A Sample of the Development of EFL Children's Writing across Tasks

Pair 14 (low proficiency)	
Task 1	NNS: the boy is seelp
Task 2	NNS: in picture b is beach and girl bañandose
Task 3	NNS: in picture D is storm boy and girl Big Ben
Pair 2 (high proficiency)	
Task 1	NNS: the girl is sad and the boy is sleep
Task 2	NNS: in picture B the chancls is in the beach and the girl is swimming
Task 3	NNS: in picture b is claudy is watching a London Eye and the Big Ben the boy speking "wow I LIKE THEM