ReCALL (2023), 35: 1, 122–138
doi:10.1017/S0958344022000210

RESEARCH ARTICLE

Communication strategy use of EFL learners in videoconferencing, virtual world and face-to-face environments

Nazlı Ceren Cirit-Işıklıgil
İstanbul University-Cerrahpaşa, Turkey (cerencirit@gmail.com)

Randall W. Sadler
University of Illinois at Urbana-Champaign, USA (rsadler@illinois.edu)

Elif Arıca-Akkök
Ankara University, Turkey (eakkok@ankara.edu.tr)

Abstract

This study investigates the communication strategy (CS) use of English as a foreign language (EFL) learners in videoconferencing (VC), virtual world (VW), and face-to-face environments. The study was conducted with 30 senior Turkish undergraduate EFL students. The data were collected via video and audio recordings of three opinion-exchange tasks, a background and post-task questionnaire, and an interview that includes a retrospective think-aloud protocol. The participants worked in groups of five to complete the opinion-exchange tasks in each of the three environments. The findings indicated that the participants made use of a wide range of CSs, and although some of the CSs differed, mostly the same types were employed in all the environments. However, the results revealed that the frequency of CSs showed variance among environments, with the highest number in the VC environment and the lowest in the VW. It was possible to establish a connection between the differences in the frequency and the types of strategy use with the distinctive features of the environments, the proficiency level of the participants, and the type of the tasks that was utilized. Additively, 10 new strategy types were discovered.

Keywords: communication strategy; computer-mediated communication; virtual world; videoconferencing; English as a foreign language

1. Introduction

In this study, English as a foreign language (EFL) learners' communication strategy (CS) use was analyzed in three different environments, namely videoconferencing (VC), virtual world (VW), and face-to-face (F2F), from a psycholinguistic perspective. Specifically, the study was conducted to reveal the distribution and frequency of participants' CS use in the three different environments and to find out whether they used any other strategies that were not included in the taxonomies presented so far in the literature. The motives for the participants' CS use were investigated by taking Levelt's (1989) L1 speech production model (SPM) and de Bot's (1992) bilingual SPM as

Cite this article: Cirit-Işıklıgil, N.C., Sadler, R.W. & Arıca-Akkök, E. (2023). Communication strategy use of EFL learners in videoconferencing, virtual world and face-to-face environments. *ReCALL* 35(1): 122–138. https://doi.org/10.1017/S0958344022000210

© The Author(s), 2022. Published by Cambridge University Press on behalf of European Association for Computer Assisted Language Learning. This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted re-use, distribution and reproduction, provided the original article is properly cited.

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

the basis and the CSs were identified accordingly. Therefore, the study was guided by the following research questions:

1. What CSs were used by the participants in VC, VW and F2F environments?
2. What is the frequency of CS use by the participants in VC, VW and F2F environments?

Even though many CS studies have been conducted from the interactionist perspective (both in computer-mediated communication [CMC] and F2F environments), as well as studies conducted F2F adopting a psycholinguistic perspective in the literature, as yet (to the best of the researchers' knowledge) no other study has been conducted in CMC environments investigating the CS use of EFL learners from the psycholinguistic perspective. This is a critical gap because, according to the psycholinguistic perspective, understanding the underlying reasons for the use of CSs is crucial to accurately identify them. In this study, both in the F2F and CMC environments, the participants' CS use was investigated from the psycholinguistic perspective.

2. Literature review

2.1 Theoretical perspectives

As followers of one of the two theoretical perspectives, interactionist researchers define and classify CSs only by observing the outputs of the speakers, while psycholinguist researchers take into account the cognitive processes the speakers have undertaken while using CSs and define CSs by focusing on the communicative problems underlying their use. The L1 SPM (Levelt, 1989) has been the most widely accepted theoretical framework among psycholinguists and has served as the foundation for numerous experimental studies (Dörnyei & Kormos, 1998; Poulisse, 1993). It covers the time frame from conceptualizing the communicative intention of the speaker into a preverbal message and on to the articulation of the overt speech. In the model, there are three monitor loops (for the representation of Levelt's model, see Dörnyei & Kormos, 1998: 352) whose functions are to check if anything is amiss with the speaker's outputs at various levels of the speech production process. When the speaker detects something wrong with their output after or before articulation, they could start over in coding their message, change some or all of their message or repair it. The speaker could also repair it when they cannot negotiate with their interlocutor. Since Levelt's model was originally designed for L1 speakers, in this study it was necessary to adopt an L2 SPM. De Bot (1992) designed his L2 SPM by adapting it from Levelt's L1 SPM; therefore, this study was based on both Levelt's and de Bot's SPMs. Poulisse and Bongaerts (1994) claim that de Bot's model is the only one that fully describes the L2 speech production process. In contrast to Levelt's model, in de Bot's model, the L2 speaker has two conceptualizers (by which the language of the message is specified) and two formulators (by which the syntactic, morphological, and phonological processes of the language to be used are determined). Since there is an interaction between the languages of an L2 speaker, the CSs such as *tip-of-the-tongue phenomenon*, *code-switching*, *use of similar-sounding words* and many other CSs could be explained via de Bot's model.

As Dörnyei and Kormos (1998) based their study on Levelt's L1 SPM from the psycholinguistic perspective, their CS taxonomy was adopted here. In compliance with their theoretical view, they designed a comprehensive CS taxonomy by associating the L2 communication problems and the means used to address those problems (i.e. communication strategies) with the speech production process. To properly identify and classify the CSs, Dörnyei and Scott (1997) identified four main problem sources (resource deficit, processing time pressure, perceived deficiency in one's own language output, perceived deficiency in the interlocutor's performance), which Dörnyei and Kormos integrated into their taxonomy. Moreover, Dörnyei and Kormos integrated each problem-solving mechanism (PSM) into their taxonomy by matching them with the relevant speech production phase in Levelt's model. Using Levelt's model as the foundation, Dörnyei and Kormos aimed to investigate at what stage and why the speakers may have encountered a

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

communicative problem during speech production, which in return led to the accurate identification and classification of communication strategies.

2.2 Previous communication strategy research

Considerable research has been conducted to investigate CS use, which can be categorized according to the context in which CSs were studied.

2.2.1 CS research in F2F environments

Most of the CS research in F2F environments has focused on either defining/classifying the CS (Dörnyei & Kormos, 1998; Færch & Kasper, 1983) or on the factors affecting the CS use, such as the influence of task type (Ghout-Khenoune, 2012; Rosas, 2018), language proficiency level (Rosas Maldonado, 2016; Ugla, Abidin & Abdullah, 2019; Uztosun & Erten, 2014), the relationship between CS use in L1 and L2 (Bialystok, 1983; Fernández Dobao, 2001), effect of communication context (Bialystok & Fröhlich, 1980), effectiveness of different types of CS (Bialystok & Fröhlich, 1980), as well as teachability of CSs (Bejarano, Levine, Olshtain & Steiner, 1997; Dörnyei, 1995; Lam, 2006; Teng, 2012). The effect of communicative context on CSs has also been investigated in CMC environments (Hung, 2012; Hung & Higgins, 2016; Shih, 2014; Zhao, 2010). Consequently, the majority of the CS studies examining the task type effect (Ghout-Khenoune, 2012; Rosas, 2018; Smith, 2003) have so far concluded that open-ended, free discussion tasks promoted increased and diverse CS usage.

2.2.2 CS research in CMC environments

Even less numerous than in F2F, the majority of CS research in CMC environments have focused on text-based interaction in foreign language teaching contexts, such as Khamis (2010), Kost (2008), Lee (2001, 2002), Omar, Embi and Yunus (2012), and Smith (2001, 2003). Smith (2003), for instance, as one of the few prominent researchers of CS use in CMC environments, focused on text-based interaction and concluded that synchronous CMC (SCMC) environments may result in differences in participants' CS use. Some CS studies have also investigated video-based and voice-based interaction. Hung (2012), who comparatively analyzed the CS use of EFL learners in text-based (MSN Messenger) and video-based (Skype) interactions, showed that these two environments demanded the use of different types of CSs. However, Hung also indicated that video-based interactions are similar to F2F environments in presenting opportunities for visibility of gestures and mimics. However, it still remains unknown whether this resemblance between F2F and video-based environments has any impact on the use of CS in these two settings. Moreover, a limited number of CS studies have been conducted in VC environments (Hung, 2012; Zhao, 2010) and in VWs – Chen (2018) in Second Life, Peterson (2006) in Active Worlds and Shih (2014) in VEC3D. Peterson (2006) compared the CS use in F2F and VW environments with the use of different types of tasks and found that mostly the participants used the same types of CSs, with differences being caused by the task type and the environments' affordances. However, to our knowledge, there is no study in the literature that compares F2F, VC, and VW environments in terms of the EFL learners' CS use based on audiovisual data from a psycholinguistic perspective.

3. Methods

3.1 Setting and participants

The study was conducted at the ELT department of a Turkish state university. The data were gathered from the 30 seniors (fourth and final year of study) who took the course "Materials Evaluation and Design" in the 2019–2020 fall term. The participants' mean score on the

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

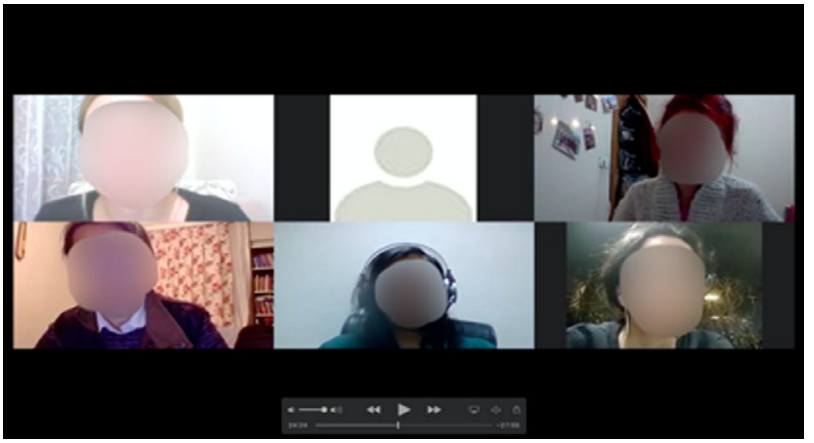


Figure 1. A screenshot of Task 1 in Zoom

Foreign Language Test (YDS) administered in Turkey was 86 out of 100, which corresponds to 103 points on the TOEFL IBT and C1 CEFR proficiency level, according to the Turkish student selection and placement center's equivalency table (Türkiye Cumhuriyeti ÖSYM Başkanlığı, 2017). The background questionnaire revealed that the majority of participants were familiar with SCMC environments: 90% of them used VC tools and 86.7% used VWs prior to the study.

Neither gender nor age was examined as factors since the age range of the participants was quite narrow (from 21 to 22 years old) and because a large majority were female, making a comparison between males and females unrealistic given the relatively small sample size.

3.2 Data collection instruments

The data were collected via audio and video recordings of three opinion-exchange tasks (see Appendix E, in the supplementary material, for example task), a background and post-task questionnaire, and interviews consisting of retrospective think-aloud (RTA) protocols. In the background questionnaire, there were 34 questions (18 multiple choice, nine open ended, six demographic, and one matrix). In the post-task questionnaire, there were 16 questions (14 open ended and two multiple choice). The data obtained from the VC, VW, and F2F environments include only the audio and video chat recordings, not the text chat recordings. In order to maintain the parallel nature of the communication across the three modes, the participants in VC and VW were instructed not to make use of text chat during their communication. While the role of text chat in VC and VW modes has been examined by a number of scholars such as Hung (2012) and Zhao (2010) in VC mode and Peterson (2006) in VW mode, no other study has examined audio- and video-based interaction comparatively in VC and VW.

3.3 Data collection procedures

The data collection tools were first piloted with seven participants in the 2018–2019 spring semester. After revisions, Zoom was selected as the VC tool (Figure 1) for the main study, and Second Life was selected as the VW tool (Figure 2). For the F2F environment, a quiet room at the ELT department was used (Figure 3).

The 30 participants were divided into six groups of five individuals, with each group choosing its own members. Each group completed one task per week, with each task taking place in a different environment (Task 1 in VC, Task 2 in VW, and Task 3 in F2F). In total, each group completed three tasks in three different environments (Table 1). All tasks were designed as

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

Table 1. Data collection process

Stage	Duration	Phase
1	1 week	• Introducing the study and the data collection process • Collecting consent forms
2	1 week	• Collecting background questionnaires • Lab hour (introducing Second Life and Zoom)
3	3 weeks	• Task 1 (VC) • Task 2 (VW) • Task 3 (F2F)
4	1 week	• Collecting post-task questionnaires
5	2 weeks	• Conducting interviews

Total duration: 8 weeks



Figure 2. A screenshot of Task 2 in Second Life



Figure 3. A screenshot of Task 3 in F2F environment

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

opinion-exchange tasks so as not to add the task type effect as a variable. The content of the tasks was consistent with the "Materials Evaluation and Design" course, with each task referring to a different topic in the course syllabus and including open-ended questions to enable free exchange of opinions. In total, 18 audiovisual recordings (six per environment) were obtained from the discussion tasks. Therefore, every group spent around 45 minutes on each task and, overall, of all the six groups in three environments, 14 almost hour-long recordings were included in total. One researcher from the researcher team attended all discussion tasks as a non-participant observer (Creswell, 2013). To minimize the researcher's impact, the researcher turned off video and audio in the VC, used an invisible avatar in the VW and left the F2F room with video cameras on. While Task 1 (in Zoom) was recorded using Zoom's own recording feature, Task 2 (in Second Life EduNation III[1]) was recorded using an external screen recording tool, Camtasia, and Task 3 (F2F) was recorded with two video cameras, one main camera and one backup camera.

The post-task questionnaire investigated the participants' perceptions toward the three environments and whether their perceptions influenced how they dealt with communication problems. Therefore, the post-task questionnaire was used to better understand the reasons behind their CS use, which in return helped to more clearly identify the CSs in the data.

During the one-to-one interviews conducted with each participant ($N = 30$), one researcher from the researcher team showed preselected video and audio recordings of the tasks in which the participants used CSs. The researcher then asked the participants to describe the communication problems they encountered and how they addressed them. The RTA protocol is utilized to comprehend the reasons behind the participants' CS use in order to accurately identify the CSs. RTA protocols have been employed in numerous CS studies and are recommended for use in CS research (Dörnyei & Scott, 1995; Færch & Kasper, 1983).

3.4 Data analysis methods

The video recordings of the tasks were transcribed and analyzed using the qualitative data analysis software MAXQDA 2020. The transcriptions included not just the verbal language but also the prosodic features likely to affect or change the meaning. In order to represent the verbal and nonverbal behaviors with precision, Jefferson's (1979) transcription conventions were used when necessary to identify the CSs clearly. To code the CSs, Dörnyei and Kormos's (1998) taxonomy was used and when CSs not included in their taxonomy were discovered in the data, they were coded utilizing other researchers' taxonomies (Bejarano *et al.*, 1997; Chen, 1990; Dörnyei & Scott, 1995, 1997; Færch & Kasper, 1983; Smith, 2001; Tarone, Cohen & Dumas, 1976). In addition, the CSs that were revealed in the data but did not exist in any of the aforementioned literature were also included in the codings (Appendix B). A code was assigned to each CS identified and was introduced into the MAXQDA system. The coding procedure was repeated for the data obtained from each environment (VC, VW, and F2F). Then, the frequency of CS occurrence in each environment was calculated, and the values were compared to determine if the participants' use of CS varied between environments. To ensure the coding reliability, the CS coding taxonomy and a random sample of 20% of the data were independently coded by two experts in the field. The intercoder reliability was calculated via Cohen's kappa statistics to be .81, indicating almost perfect agreement (Cohen, 1960).

[1]EduNation is a language education focused island in Second Life owned by Randall Sadler and Heike Philp. For more information on the islands, please visit http://edunationislands.pbworks.com/.

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

Table 2. Frequency of communication strategy (CS) use in three environments

	Zoom		Second Life		Face to face		Total	
	n	%	*n*	%	*n*	%	*N*	%
CS	3,401	38.34	2,368	26.69	3,102	34.97	8,870	100

For each of the communication problems that occurred in the data, several key steps were undertaken:

1. One of four *sources* for each *problem* was identified based on Dörnyei and Kormos (1998).
2. The *strategy* (or sometimes multiple strategies) used to resolve each of these problems was determined based on the taxonomies from the aforementioned literature, resulting in the identification of 67 *varieties* (e.g. umming and erring, restructuring, error repair, etc.) of strategies utilized (Appendix A2).
3. The *frequency* of strategies was calculated, with 8,870 instances found overall (Table 2).

The data obtained from the open-ended questions in the background and post-task questionnaires were analyzed using the constant comparison method (Glaser & Strauss, 1967), while the closed-ended questions were calculated via frequency analysis. The interview data were audio recorded and analyzed via MAXQDA after transcription.

4. Results and discussion

4.1 CSs in VC, VW, and F2F environments

As shown in Table 2, the highest number of strategies used was in VC (Zoom: 3,401 times, 38.34%) followed by F2F (3,102 times, 34.97%), while the least number used was in the VW (Second Life: 2,368 times, 26.69%).

As seen in the distribution pattern across environments in Appendix A2, a wide variety of strategies were used in each of the three environments. This finding is consistent with previous studies (Hung, 2012; Kost, 2008; Smith, 2003) conducted to determine the CSs used by language learners in CMC environments.

Among the 67 strategies used, 61 were used at least once in VC, 60 in F2F and 56 in VW. Of the 67 strategies on the strategy coding list, the *emojis and gestures strategy* is not applicable in F2F and VC, and *nonverbal strategy markers* are not applicable in VW.

One of the most striking findings was that *umming and erring* and *self-repetition* strategies were the two most frequently used strategies in all three environments (Appendix A1). According to Dörnyei and Kormos (1998), the most frequently used strategies including these two are mainly caused by the same problem source: "processing time pressure" (VC: 1,870; VW: 1,190; F2F: 1,555). This shows that the participants needed to gain time while planning their speech or when they encountered a communication problem. Dörnyei (1995) indicated that the most basic reason behind this problem source is that during speech production, processing time is not adequate for L2 learners. This could be because the L2 language production process is not as automatized as L1 (de Bot, 1992). As suggested by Uztosun and Erten (2014), even though the participants in this study were proficient English language learners, they may have had difficulties with fluency during the discussion tasks due to the limited opportunities to speak English outside of the classroom in their daily lives.

In addition, Hung (2012) noted that participants may experience "processing time pressure" in SCMC and F2F environments due to reasons such as feeling the need to respond to their interlocutors or plan their speech instantly. Therefore, due to these possible pressures, the speakers may have used time-gaining strategies (unfilled pauses, fillers, or self-repetition) more than any other strategy types in these environments (Appendix A1).

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

The reason why the participants used the strategies related to "perceived deficiencies in the interlocutor's performance," also known as "meaning negotiation strategies," most infrequently (VC: 52; VW: 47; F2F: 48) is that they mostly attempted to solve their communication problems without expecting any assistance from their interlocutors. This confirms the view of the researchers (Bialystok, 1990; Kellerman, 1991; Poulisse, 1993) that the speaker's role in CS use is also important and that speakers can use CSs without collaborating with their interlocutors. Stating that their findings highlighted the non-interactional aspect of CSs, Yarmohammadi and Seif (1992) also encountered the same issue in their own study.

In addition, there were some factors affecting the CS use of the participants: proficiency level, task type, and the study context. Many researchers such as Ghout-Khenoune (2012), Rosas (2018), and Smith (2003) argue that free discussion tasks encourage a wide variety of CSs, while more guided tasks like jigsaw demand less variety of CS use. In this study, the opinion-exchange task was used, a type of free discussion task, and it was seen that the participants relied on various CS types. Consequently, it seems that opinion-exchange tasks might be influential in the participants' wide variety of strategy use. Further, the intense use of strategies related to "processing time pressure" confirms that the participants mostly had communicative problems in terms of fluency rather than accuracy, which shows that their proficiency level in English might have been one of the factors affecting their CS use. Also supporting the probable connection between proficiency level and CS use, various researchers (e.g. Bialystok, 1983; Bialystok & Fröhlich, 1980; Fernández Dobao, 2001; Hsieh, 2014; Rosas Maldonado, 2016) suggest that proficient learners use more cognitively challenging strategies such as *self-repair* (i.e. error repair, appropriacy repair, different repair, and rephrasing repair). In addition, it was observed that the use of three different environments might have influenced the frequency and types of CS, as also found by Zhao (2010). Presented below is a participant response from the post-task questionnaire that highlights the various affordances of the environments:

> There is almost no use of gestures in Second Life. It was more challenging for me to solve communication problems in Second Life.

This issue carries over to facial expressions. The heads-up display (HUD) did include facial expressions such as SURPRISE, but those choices were limited. In addition, in VC and F2F, the participants could see the full nuance of facial expressions, which are simply not available in VW at this time (although virtual environments are beginning to use webcams to express the facial expressions and gestures of their users for their avatar forms). Therefore, even though, as noted in Figure 4 and also in Appendix A1, *emojis and gestures* was one the 10 most common CSs, some participants still did not feel that this was the case:

> When I see the face of the person that is talking, I can instantly understand even the slightest communication problem and help him/her. It takes a little longer to understand this in Second Life.

Although there are similarities in strategy use across all environments, the findings indicate there are also differences (Figure 4). Among the 10 most frequent strategies overall, seven (*umming and erring*, *self-repetition*, *error repair*, *use of all-purpose words*, *appropriacy repair*, *different repair*, *fillers*) were common in all three environments. However, it is noteworthy that although the participants can see each other's faces in VC, *nonverbal strategy markers* were not among the top 10 frequent strategies in this environment. In addition, although *stuttering strategy* can be used with or without seeing each other's faces, it is another notable finding that the *stuttering strategy* was among the most frequent strategies in F2F discussions, whereas it was not as prevalent in the other environments.

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

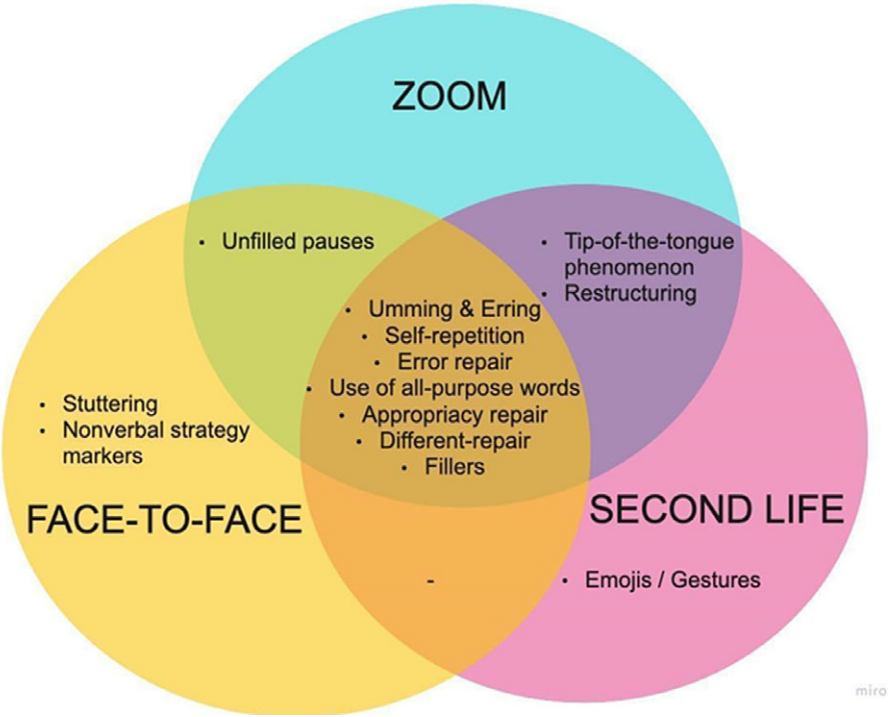


Figure 4. Ten most frequent communication strategies in three environments

The frequent use of some repair strategies, such as *error repair*, *appropriacy repair*, *and different repair*, across all environments is likely associated with the participants' higher proficiency level in English. As Levelt (1989) indicated, to utilize repair strategies, the speaker's monitor mechanism should be competent enough to realize that there is a communication problem waiting to be fixed so that a signal can be sent to the conceptualizer. In this way, the conceptualizer could start over the speech production process to fix the communication problem. Therefore, as Rosas Maldonado (2016) notes, repair strategies are more cognitively challenging and proficient learners employ these strategies more, so it is no surprise that the participants in this study used repair strategies so frequently. As a result, the findings are consistent with others (Bialystok, 1983; Bialystok & Fröhlich 1980; Fernández Dobao, 2001; Hsieh, 2014), revealing that language proficiency level has an effect on the types of strategies employed. In line with our findings, studies conducted in CMC environments (Hung, 2012; Kost, 2008; Lee, 2001, 2002) also showed that repair strategies were frequently used. Consequently, it seems that not just F2F but also CMC environments encouraged the use of repair strategies. As Jepson (2005) revealed, speaking encourages more negotiation and repair moves, which is one of the affordances of the two CMC environments in this study. This explains why the participants frequently used the repair strategies in CMC environments as well. It is important that these three environments encourage the use of repair strategies because according to Swain's (1985) output hypothesis, for the learners to produce meaningful output, they need to be able to monitor their production, realize their errors, and revise their output by repairing it.

Also, it is essential to discuss the strategies whose use varied across environments to determine the impact of the environments on strategy use. Strategies that differed across environments include *indirect appeal for help*, *unfilled pauses*, *responding*, *nonverbal strategy markers*, *emojis and gestures*, *framing*, *giving assistance*, *lexical retrieval/word search*, *unasked-for help*, *and*

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

stuttering strategies. Most of the differences originated from the various affordances of the environments. In VW, for instance, participants are represented by avatars; therefore, their use of gestures and facial expression is limited compared to VC and F2F. Unlike in F2F or VC, where gestures may be more "automatic" in nature, participants in VW were required to click a button on their HUD, and were limited to 12 emojis and six gestures, such as hand up, nod, clap, LOL, and woo! (Figure 2).

Unfilled pauses were used less frequently in VW because it was observed that in some cases, whenever a participant used an unfilled pause, other participants assumed their interlocutor was having a technical problem and took the turn. The fact that in VW the speakers favored *umming and erring strategy* (605 times) more intensely than *unfilled pauses* (63 times) may support this. Smith (2001) also found that in a text-based CMC environment where participants cannot see each other as well, they showed intolerance toward *unfilled pauses* and preferred to use *fillers* instead. Another important finding was related to *indirect appeal for help* strategy. Even though the participants could see each other in VC as well as in F2F discussions, they used this strategy much less frequently in VC. Although gestures and facial expressions are visible in VC, it is hard for the participants to figure out who the speaker is making eye contact with and from which member specifically they are asking for indirect help. As nonverbal cues are crucial for the interlocutor to understand the signals of the speaker's indirect request for help, this might explain why the participants used this strategy less frequently.

4.2 New strategies found in this study

This study uncovered 10 new strategies (Appendix B) that did not previously exist in the literature: *stuttering*, *lexical retrieval/word search*, *unasked-for help*, *insertion*, *lexical substitution*, *managing the turns*, *phonological code-switching*, *recap of previous turns*, *use of synonyms*, and *lexical wavering*. Although only one of these (*stuttering*) was included in the top 10 strategies, each of them still had an impact during the group discussions. Below, each strategy is defined, along with the cause of the communication problem, and how the strategy may be inserted into Dörnyei and Kormos's (1998) taxonomy. Transcription samples for each strategy are given in Appendix C, and the strategy table along with definitions, problem sources, PSMs and example sentences from the data are given in Appendix B.

Although the theoretical framework of this study was mainly driven by the psycholinguistic perspective, CSs that enhanced communication were also included among the strategies found in this study in addition to the CSs that were discussed based on the problem sources introduced by Dörnyei and Kormos (1998). Although it is certainly the case that many studies that have focused on communication problems are both important and informative, strategies to enhance communication have often been ignored. However, as often shown by interactionist researchers, speakers do not always use CSs because they have a communication problem, but just to enhance communication and "act as better communicators" (Bejarano *et al*., 1997: 205).

4.2.1 Stuttering strategy

The *stuttering strategy* was the most frequent strategy (5.12%) not found in other studies and was utilized by the participants via involuntarily repeating the first one or more phones or syllables of that word until it was pronounced properly (Appendix C1).

Since the stuttering strategy activates "Phonological PSMs," this strategy was associated with the problem source "L2 resource deficits." The reason for this association is that in their framework, Dörnyei and Kormos (1998) indicated that the "Phonological PSMs" are activated to address one of the four problem sources, "L2 resource deficits." According to Dörnyei and Kormos (1998), "phonological PSMs help overcome difficulties in the phonological encoding and articulatory phases caused by the lack of phonological knowledge of a word or connected

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

speech" (p. 357). We positioned the *stuttering strategy* in the "phonological retrieval" subclass of phonological PSM (Appendix D1), because "phonological retrieval" is the mechanism used when the speaker tries to retrieve a lexeme, while attempting to reach the phonological information of that lexeme (Dörnyei & Kormos, 1998).

The *stuttering strategy* is in the same subclass and shows similarities with the strategy of the *tip-of-the-tongue phenomenon* (Appendix D1). This phenomenon occurs "in an attempt to retrieve and articulate a lexical item, saying a series of incomplete or wrong forms or structures before reaching the optimal form" (Dörnyei & Kormos, 1998: 361). In the *stuttering strategy*, however, there is no incomplete or wrong repetition of the forms or structures. The first phones or syllables of a word are repeated correctly and the repetition continues until the speaker manages to utter the whole word, as shown below in a participant utterance highlighted in yellow:

> Participant: So is there anyone to contribute to the qu- que- question?

4.2.2 Lexical retrieval/word search strategy

Lexical retrieval/word search strategy was used when the speaker could not retrieve the word they planned to use in their message or had trouble articulating it due to a lack of L2 resources. The speaker who is in search of a word can use *unfilled pauses*, *fillers* and/or *nonverbal strategy markers*, or a *direct/indirect appeal for help*. In their utterance starting with "we can print the . . . ", the participant made use of body language and fillers right after their use of the article *the*, which signaled a word search (Appendix C2). During the retrospective protocols, the participant confirmed that this strategy arose from a lack of L2 resources:

> Participant: What I'm trying to say here is that "rather than watching the input from a video uhhh . . . let's print . . . out," whatever it is I still don't know ahaha. The reason I am doing this is because I am trying to find the word there.

This strategy's problem source was defined as "L2 resource deficits" and, within Dörnyei and Kormos's (1998) taxonomy, it was associated with the Lexical PSM (Appendix D2). Here, the strategy "*word search*" was associated with Lexical PSMs under the subclass, *lexical retrieval/word search*. Among the Phonological PSMs, although there is a "Phonological retrieval" subclass to classify the CSs used by the speaker when there is a problem with the pronunciation of a word, among the Lexical PSMs there is no such subclass under the name of "Lexical retrieval." With the support of the data obtained from this study, the addition was necessary. It was seen that aside from the cases where the participants could not access the word simply because of its pronunciation, there were also cases where they could not retrieve the word at all. For this reason, the participants made an effort to retrieve the word via pausing, using body language or asking for help until it was accessible.

4.2.3 Unasked-for help strategy

Although there is a strategy called *giving assistance* in the literature, the *unasked-for help strategy* is different because *giving assistance* is used if the speaker requests help. However, the *unasked-for help strategy* is used by the interlocutor when the speaker has difficulty in expressing themselves in L2, even though the speaker does not request indirect or direct assistance. In some cases, even without noticing any problem, when the speaker pauses or speaks slowly, the interlocutor takes the opportunity to help the speaker.

To help participant A say the suitable word, participant B uttered the word *field*, when he/she heard participant A use the filler *uhh* (Appendix C3). The square brackets indicate the overlap in a conversation; accordingly, participant B spoke the word "[field]" when participant A said

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

"[I'd say]"; therefore, participant B was late because participant A already came up with the word *field*. This shows that participant A did not intend to ask for help in the first place and used the filler *uhh* there to give themselves time to retrieve the word *field*. During the RTA protocol, by asking the speakers whether they were waiting for help at a specific moment, the researchers were able to determine this strategy. A participant's use of this strategy highlighted in yellow is as follows:

> Participant A: I'm also like, I started to teach uhh children in at weekends in a language center. Uhh but since I'm so, you know, new in this uhh field [I'd say]–
>
> Participant B: [field].

According to Levelt's (1989) framework, when a problem originated from the deficiencies in the interlocutor's speech, the speaker activates meaning negotiation mechanisms. Therefore, we associated the *unasked-for help strategy* with the problem source "perceived deficiencies in the interlocutor's performance" since the current strategy is used when the speaker thinks the interlocutor has encountered a problem in their speech production and gets involved to deal with the problem.

4.2.4 Insertion

When using the *insertion strategy*, the speaker interrupts their speech and shares an additional piece of information that comes to mind at that moment related to the subject in order to express themselves better and/or to facilitate the listeners' understanding, then continues from where they interrupted their speech. The speaker can insert this additional information when they are in the middle of a sentence or between sentences. For example, the participant used the *insertion strategy* via adding subject-related information between two sentences (Appendix C4). The information added by the participant, which is highlighted in yellow below, is semantically linked to their original message and contains an expression describing the situation they were talking about:

> Participant: Even if they're able to speak like I'm talking about a good situation here, even if they are able to speak and understand, it's just mechanical, not natural.

Since the *insertion strategy* is used by the speaker to enhance communication and make themselves clear without the presence of any communicative problems, it was not associated with Dörnyei and Kormos's (1998) taxonomy. In this respect, the *insertion strategy* has similarities with Bejarano *et al.*'s (1997) "Social interaction strategies," which help speakers to communicate more effectively during conversations and are very important to ensure a consistent flow in intra-group interaction.

4.2.5 Lexical substitution

When using the *lexical substitution strategy*, because the speaker has linguistic difficulties with the word they are currently saying or retrieves a more appropriate alternative, they interrupt their speech and continue with the more appropriate one or the synonym of it that they are more linguistically confident about. This is not a repair strategy, as the speaker's reason for using this strategy is not based on any wrong or incomplete use. For example, even though the word *education* is compatible with the context of the sentence, the participant preferred to continue with another contextually suitable word, *learning* (Appendix C5).

This strategy was associated with the "L2 resource deficits," which activates Lexical PSM. In Dörnyei and Kormos's (1998) taxonomy, "content reduction," "substitution" and "substitution plus" strategies were used to solve lexical problems. Accordingly, the *lexical substitution strategy*

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

was placed under "substitution strategies" (Appendix D4). As a pioneer in the field, Poulisse (1993) indicated that no speaker would change the target word for no reason. Based on this statement, it was concluded that *lexical substitution strategy* must be related to a deficit in L2 resources.

4.2.6 Managing the turns

For the sake of effective conversation flow, the speaker uses the *managing the turns strategy* to give their interlocutor an opportunity to complete their unfinished turn that was interrupted before. For example, participant A prompted participant B to complete their utterance by saying "what were you saying?" and "you were also never in the top 10?" (Appendix C6). As this strategy is also used to facilitate communication, it was associated with Bejarano *et al.*'s (1997) "social interaction strategies."

4.2.7 Phonological code-switching

The *phonological code-switching strategy* is utilized when the speaker is actually speaking in L2 but uses a specific L2 word in a sentence with that word's L1 or L3 pronunciation. This strategy can be seen as a phonological version of the *code-switching strategy*. As seen in Appendix B, participants used English words such as *prototype* and *anonym* with their Turkish pronunciation in the English sentence. The use of this strategy could be explained via L1-L2 interference, which takes place during the formulator phase of L2 speech production (de Bot, 1992) and is caused by the lack of proficiency in determining the phonological label of the target word. This strategy is associated with the problem source "L2 resource deficits" just like the *code-switching strategy*. However, in order to cope with the problem, since *code-switching* requires changing the whole word, it activates "Lexical PSMs" while *phonological code-switching* activates "Phonological PSMs" because it only requires a change in the pronunciation of the word (Appendix D5).

4.2.8 Recap of previous turns

Recap of previous turns is used to summarize what has been said about the subject that has been discussed up to that point. There is a strategy called *interpretive summary* in Dörnyei and Kormos's (1998) taxonomy, which is "an extended paraphrase of the interlocutor's message to check that the speaker has understood correctly" (p. 375). However, as the *recap of previous turns strategy* does not arise from a communication problem but is just used to facilitate communication, it was not associated with Dörnyei and Kormos's taxonomy (Appendix C7).

During the retrospective protocol, about Example 7, the participant's statement below was helpful in clearly specifying this strategy:

> **Researcher:** What was the purpose of your sentence here?
>
> Participant: After my group mates expressed their opinions, I wanted to summarize what was said. Because there was silence. Instead of moving on to what comes next directly, it was like a small summary like "aha so you mean this," I mean to sum up the discussion about that question.
>
> **Researcher:** So your purpose there was not to actually see whether you understood what was said correctly? You have already understood and just wanted to summarize the subject.
>
> Participant: Yes.

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

4.2.9 Use of synonyms

The speaker uses this strategy to emphasize the word they use by repeating its synonym right after it. As seen in Appendix B, the words *real* and *quick* were succeeded by the words *actual* and *fast*, respectively, for the purpose of emphasis. Since this strategy does not originate from a communication problem but is used for enhancing communication and laying stress on the message, it was not positioned in Dörnyei and Kormos's (1998) taxonomy.

4.2.10 Lexical wavering

Due to L2 resource deficits or accidentally retrieving another word by mistake, the *lexical wavering strategy* causes the speaker to experience a hesitation between the improperly articulated word and the original target word until they can come up with the target word. Therefore, this strategy was associated with "L2 resource deficits" and positioned under "Lexical PSMs" (Appendix D6). For example, the participant experienced lexical wavering between the prepositions *for* and *in* until the appropriate preposition for the given context was chosen (Appendix C8). Instead of correcting the unintentionally uttered word via *error repair strategy*, the speaker's experiencing the hesitation between the target word and the wrong word indicates the L2 resource deficit of the speaker.

5. Limitations

As the findings of this study are limited to two SCMC tools (Second Life and Zoom), it is unclear whether similar results might be seen within other SCMC environments. To better understand the CS use in these environments, data should be obtained from other VC environments and VWs. Also, the RTA protocols that took place during the semi-structured interviews were conducted after all the tasks were completed in order to avoid bias. This situation meant some participants occasionally failed to remember the reasons for the communication problems they experienced when watching the preselected parts of the discussion tasks. Although this was not encountered frequently, to collect more precise data from the participants, the retrospective protocols could be conducted right after each task is completed.

Another limitation of this study is the sample size and participant demographics. Since this was a convenience sample, it was not possible to have a 50-50 breakdown between males and females, and the ages of the participants were also very similar. Future studies with a larger sample size and including a more diverse pool of participants might give additional insights into some of this study's findings. One additional possible limitation connects to the way in which the data were collected for the study. In the F2F setting, a camera was recording the participants, while in Zoom, one researcher from the research team was "present" with camera and audio off (Figure 1), and in the VW, the researcher was present in avatar form, albeit invisible. This could potentially lead to the observer's paradox, but in all cases, it was clear that the participants quickly ignored the camera/observer as they did not refer to the researcher or turn toward her, and their interaction was totally focused on their peers.

6. Conclusion

This study investigated the types and the frequency of CS use by EFL learners in VC, VW, and F2F environments. The strategies in Dörnyei and Kormos's (1998) taxonomy as well as other researchers' taxonomies were revealed in the data. In addition, 10 new strategies were found that did not exist in the literature. Therefore, it can be said that a wide variety of strategies were used and the types of the CSs used in the CMC and F2F environments mostly coincided except for a few such as *emojis and gestures* and *nonverbal strategy markers*. As a result, although the frequency of the use of some strategies varied across environments, all three environments encouraged the use of a variety of strategy types, and their use helped participants in resolving their communicative

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

problems. Further, the most frequent strategies used in this study were caused by the same problem source ("processing time pressure" and "perceived deficiency in one's own language output"), which was a prominent finding. In addition, it was seen that strategy use could have been affected by factors such as the environment, the language proficiency level, and the task type. The limits of gestures and facial expressions in VW, technical problems such as lagging in VC, and the physical proximity in F2F were observed as reasons behind the environment effect on CS use. Further research on other VC environments and VWs could expand on the variety of CS use and determine clearly the impact of the similar environment affordances. Furthermore, the study could be replicated with the use of different types of tasks and with less proficient EFL learners to better reveal the variety of CS use in CMC environments from a broader perspective. As CSs are essential for meaningful interaction to occur, it is of the utmost importance that instructors train their students on the affordances of the environments in which they will interact and design tasks that promote output and encourage students to exchange opinions.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/S0958344022000210

Ethical statement and competing interests. The authors declare no conflict of interest. This work is the authors' own original work. Institutional requirements were followed in data collection procedures, and informed consent was obtained from all participants. All sources used are appropriately cited in the article.

References

Bejarano, Y., Levine, T., Olshtain, E. & Steiner, J. (1997) The skilled use of interaction strategies: Creating a framework for improved small-group communicative interaction in the language classroom. *System*, 25(2): 203–214. https://doi.org/10.1016/S0346-251X(97)00009-2

Bialystok, E. (1983) Some factors in the selection and implementation of communication strategies. In Færch, C. & Kasper, G. (eds.), *Strategies in interlanguage communication*. London: Longman, 100–118.

Bialystok, E. (1990) *Communication strategies: A psychological analysis of second-language use*. Oxford: Blackwell.

Bialystok, E. & Fröhlich, M. (1980) Oral communication strategies for lexical difficulties. *Interlanguage Studies Bulletin*, 5(1): 3–30.

Chen, J. C. (2018) The interplay of tasks, strategies and negotiations in Second Life. *Computer Assisted Language Learning*, 31(8): 960–986. https://doi.org/10.1080/09588221.2018.1466810

Chen, S.-Q. (1990) A study of communication strategies in interlanguage production by Chinese EFL learners. *Language Learning*, 40(2): 155–187. https://doi.org/10.1111/j.1467-1770.1990.tb01332.x

Cohen, J. (1960) A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20(1): 37–46. https://doi.org/10.1177/001316446002000104

Creswell, J. W. (2013) *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks: SAGE.

de Bot, K. (1992) A bilingual production model: Levelt's 'speaking' model adapted. *Applied Linguistics*, 13(1): 1–24.

Dörnyei, Z. (1995) On the teachability of communication strategies. *TESOL Quarterly*, 29(1): 55–85. https://doi.org/10.2307/3587805

Dörnyei, Z. & Kormos, J. (1998) Problem-solving mechanisms in L2 communication: A psycholinguistic perspective. *Studies in Second Language Acquisition*, 20(3): 349–385. https://doi.org/10.1017/S0272263198003039

Dörnyei, Z. & Scott, M. L. (1995) Communication strategies: An empirical analysis with retrospection. In Turley, J. S. & Lusby, K. (eds.), *Selected papers from the proceedings of the 21st Annual Symposium of the Deseret Language and Linguistics Society*. Provo: Brigham Young University, 155–168.

Dörnyei, Z. & Scott, M. L. (1997) Communications strategies in a second language: Definitions and taxonomies. *Language Learning*, 47(1): 173–210. https://doi.org/10.1111/0023-8333.51997005

Færch, C. & Kasper, G. (eds.) (1983) *Strategies in interlanguage communication*. London: Longman.

Fernández Dobao, A. M. F. (2001) Communication strategies in the interlanguage of Galician students of English: The influence of learner- and task-related factors. *Atlantis*, 23(1): 41–62.

Ghout-Khenoune, L. (2012) The effects of task type on learners' use of communication strategies. *Procedia – Social and Behavioral Sciences*, 69: 770–779. https://doi.org/10.1016/j.sbspro.2012.11.472

Glaser, B. G. & Strauss, A. L. (1967) *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine.

Hsieh, A. F.-Y. (2014) The effect of cultural background and language proficiency on the use of oral communication strategies by second language learners of Chinese. *System*, 45: 1–16. https://doi.org/10.1016/j.system.2014.04.002

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

Hung, Y.-W. (2012) *The use of communication strategies by learners of English and learners of Chinese in text-based and video-based synchronous computer-mediated communication (SCMC)*. Durham University, doctoral dissertation.
Hung, Y.-W. & Higgins, S. (2016) Learners' use of communication strategies in text-based and video-based synchronous computer-mediated communication environments: Opportunities for language learning. *Computer Assisted Language Learning*, 29(5): 901–924. https://doi.org/10.1080/09588221.2015.1074589
Jefferson, G. (1979) A technique for inviting laughter and its subsequent acceptance/declination. In Psathas, G. (ed.), *Everyday language: Studies in ethnomethodology*. New York: Irvington, 79–96.
Jepson, K. (2005) Conversations – and negotiated interaction – in text and voice chat rooms. *Language Learning & Technology*, 9(3): 79–98. https://doi.org/10125/44033
Kellerman, E. (1991) Compensatory strategies in second language research: A critique, a revision, and some (non) implications for the classroom. In Phillipson, R., Kellerman, E., Selinker, L., Sharwood Smith, M. & Swain, M. (eds.), *Foreign/second language pedagogy research: A communicative volume for Clause Faerch*. Clevedon: Multilingual Matters, 142–161.
Khamis, H. (2010) Communication strategies in computer-mediated communication: An Egyptian EFL context. *CALICO Journal*, 28(1): 35–48.
Kost, C. R. (2008) Use of communication strategies in a synchronous CMC environment. In Magnan, S. S. (ed.), *Mediating discourse online*. Amsterdam: John Benjamins, 153–189. https://doi.org/10.1075/aals.3.11kos
Lam, W. Y. K. (2006) Gauging the effects of ESL oral communication strategy teaching: A multi-method approach. *Electronic Journal of Foreign Language Teaching*, 3(2): 142–157.
Lee, L. (2001) Online interaction: Negotiation of meaning and strategies used among learners of Spanish. *ReCALL*, 13(2): 232–244. https://doi.org/10.1017/S0958344001000829a
Lee, L. (2002) Synchronous online exchanges: A study of modification devices on non-native discourse. *System*, 30(3): 275–288. https://doi.org/10.1016/S0346-251X(02)00015-5
Levelt, W. J. M. (1989) *Speaking: From intention to articulation*. Cambridge, MA: Bradford Books/MIT Press.
Omar, H., Embi, M. A. & Yunus, M. M. (2012) Learners' use of communication strategies in an online discussion via Facebook. *Procedia – Social and Behavioral Sciences*, 64: 535–544. https://doi.org/10.1016/j.sbspro.2012.11.063
Peterson, M. (2006) Learner interaction management in an avatar and chat-based virtual world. *Computer Assisted Language Learning*, 19(1): 79–103. https://doi.org/10.1080/09588220600804087
Poulisse, N. (1993) A theoretical account of lexical communication strategies. In Schreuder, R. & Weltens, B. (eds.), *The bilingual lexicon*. Amsterdam: John Benjamins, 157–189. https://doi.org/10.1075/sibil.6.09pou
Poulisse, N. & Bongaerts, T. (1994) First language use in second language production. *Applied Linguistics*, 15(1): 36–57. https://doi.org/10.1093/applin/15.1.36
Rosas, M. (2018) L2 learners' use of communication strategies as affected by the task type. *Revista Signos*, 51(96): 107–131. https://doi.org/10.4067/S0718-09342018000100107
Rosas Maldonado, M. (2016) Communication strategies used by different level L2 English learners in oral interaction. *Revista Signos*, 49(90): 71–93. https://doi.org/10.4067/S0718-09342016000100004
Shih, Y.-C. (2014) Communication strategies in a multimodal virtual communication context. *System*, 42: 34–47. https://doi.org/10.1016/j.system.2013.10.016
Smith, B. (2003) The use of communication strategies in computer-mediated communication. *System*, 31(1): 29–53. https://doi.org/10.1016/S0346-251X(02)00072-6
Smith, D. B. (2001) *Taking students to task: Task-based computer-mediated communication and negotiated interaction in the ESL classroom*. The University of Arizona, doctoral dissertation.
Swain, M. (1985) Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In Gass, S. M. & Madden, C. G. (eds.), *Input in second language acquisition*. Rowley: Newbury House, 235–253.
Tarone, E., Cohen, A. D. & Dumas, G. (1976) *A closer look at some interlanguage terminology: A framework for communication strategies*. Toronto: Ontario Institute for Studies in Education.
Teng, H.-C. (2012) A study on the teach ability of EFL communication strategies. *Procedia – Social and Behavioral Sciences*, 46: 3566–3570. https://doi.org/10.1016/j.sbspro.2012.06.106
Türkiye Cumhuriyeti ÖSYM Başkanlığı (2017, October 2) *Yabancı Dil Sınavları Eş Değerlik Yönergesi*. https://www.osym.gov.tr/TR,13393/yabanci-dil-sinavlari-esdegerlik-yonergesi-02102017.html
Ugla, R. L., Abidin, M. J. Z. & Abdullah, M. N. (2019) The influence of proficiency level on the use and choice of L1/L2 communication strategies used by Iraqi EFL students. *International Journal of Evaluation and Research in Education*, 8(1): 127–137. https://doi.org/10.11591/ijere.v8i1.15179
Uztosun, M. S. & Erten, İ. H. (2014) The impact of English proficiency on the use of communication strategies: An interaction-based study in Turkish EFL context. *Journal of Language and Linguistic Studies*, 10(2): 169–182.
Yarmohammadi, L. & Seif, S. (1992) More on communication strategies: Classification, resources, frequency and underlying processes. *International Review of Applied Linguistics in Language Teaching*, 30(3): 223–232.
Zhao, Y. (2010) *Communication strategy use and negotiation of meaning in text chat and videoconferencing*. Cleveland State University, doctoral dissertation.

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press

About the authors

Nazlı Ceren Cirit-Işıklıgil holds a PhD from the program of foreign language teaching at Ankara University. Her research interests include computer-assisted language learning, CMC, virtual worlds and language learning (VWLL), and communication strategies in online environments.

Randall W. Sadler is an associate professor of linguistics at the University of Illinois at Urbana-Champaign, where he teaches courses on computer-mediated communication and language learning, VWLL, and the teaching of L2 reading and writing. He has published widely in these areas in journals, chapters, and books.

Elif Arıca-Akkök is an associate professor of linguistics at Ankara University, Turkey. Her research interests include cognitive linguistics, lexical semantics, and conceptual metaphor theory, and teaching figurative language and foreign language teaching. She has written several chapters in books about her research topics and published articles in national and international journals.

Author ORCiD. Nazlı Ceren Cirit-Işıklıgil, https://orcid.org/0000-0001-7422-2026
Author ORCiD. Randall W. Sadler, https://orcid.org/0000-0001-7743-7049
Author ORCiD. Elif Arıca-Akkök, https://orcid.org/0000-0002-5805-711X

https://doi.org/10.1017/S0958344022000210 Published online by Cambridge University Press