

ECOLOGICAL AFFORDANCE AND ANXIETY IN AN ORAL ASYNCHRONOUS COMPUTER-MEDIATED ENVIRONMENT

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Previous research suggests that the affordances (van Lier, 2000) of asynchronous computer-mediated communication (ACMC) environments help reduce foreign language anxiety (FLA). However, FLA is rarely the focus of these studies and research has not adequately addressed the relationship between FLA and the affordances that students use. This study explored sources of FLA in an oral ACMC environment, and how the affordances perceived by students in this environment correlated with FLA. One class of Korean EFL university students ($n = 15$) completed voiceboard tasks for eight weeks. Affordance data were collected with a questionnaire, and FLA was measured qualitatively and by employing an adapted version of the foreign language classroom anxiety scale (Horwitz, Horwitz, & Cope, 1986). The results suggest that students experience FLA in particular ways using the voice board, and that some sources of anxiety are similar to those reported in face-to-face contexts and others are unique to ACMC contexts. Additionally, this study found a moderate correlation between the total use of affordances and FLA, with some affordances being associated with reduced anxiety and some associated with higher anxiety. The study discusses these findings and identifies avenues for future research examining the interplay between the ACMC environment and FLA.

Key words: Affordance; Foreign Language Anxiety; Asynchronous CMC; Voiceboards; Ecological Linguistics.

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INTRODUCTION

Research from the past 20 years has consistently demonstrated an inverse relationship between foreign language anxiety (FLA) and second language (L2) achievement (see Horwitz, 2001 for an overview). Although anxiety can be conceptualized as a general personality trait exhibited across many situations (i.e., *trait anxiety*), or related to a particular moment in time (i.e., *state anxiety*), many view FLA as a *situation specific anxiety*, which occurs consistently over time within a well-defined situation (MacIntyre & Gardner, 1991). In this regard, FLA is the “feeling of tension and apprehension specifically associated with second language contexts” (MacIntyre & Gardner, 1994, p. 284) that some liken to public speaking (Horwitz, 2001), stage fright, or test anxiety (Horwitz, 2010). As a situation specific construct, FLA can be explored from ecological perspectives of language learning (van Lier, 2000, 2004) that examine the interconnectedness of human cognition and the environment.

While FLA disrupts cognitive processing (MacIntyre and Gardner, 1994) and potentially limits one meditational tool—oral collaboration with others (Baker & MacIntyre, 2000)—computer-mediated communication (CMC) environments are alternative mediating sources. CMC research suggests that these contexts play important roles in reducing FLA (e.g., Chun, 1994; Kern, 1995). However, as Baralt and Gurzynski-Weiss (2011) correctly point-out, many CMC studies fail to directly measure FLA. Additionally, studies examining voiceboards—asynchronous platforms that allow learners to record and review audio files and post them for private or group viewing and commenting—offer anecdotal evidence

that students experience decreased levels of FLA while communicating with them (Poza, 2011; Song, 2009; Sun, 2009). Yet, in these contexts we still know little about how anxiety functions and how aspects of these contexts perceived by learners relate to FLA.

The current descriptive study addressed these gaps by exploring student perceptions of anxiety and, by drawing from the concept of affordance within ecological linguistics, the relationship between student use of the asynchronous CMC (ACMC) environment and FLA. Before describing the methodology and discussing the results of this study, relevant literature is reviewed examining: (a) FLA, language learning, and affordance; and (b) studies of voiceboards in L2 classrooms.

LITERATURE REVIEW

FLA, Language Learning, and Affordance

A number of scholars focus on cognitive processing to illustrate the negative impact of FLA in language learning. For example, Krashen (1982) posits that high levels of anxiety block input from reaching “that part of the brain responsible for language acquisition” (p. 31). Others, such as MacIntyre and Gardner (1994), show that FLA can affect not only input, or encoding, but also language storage and retrieval processes. According to MacIntyre (1995), anxiety hinders these processes by creating scenarios in which anxious students divide their cognitive resources between the task at hand and worry, whereas “those who do not experience anxiety will be able to process the information more quickly, more effectively, or both compared to those who are distracted by task-irrelevant cognition” (p. 92). These cognitive views describe how FLA might interfere with information processing, but computational metaphors are criticized for, among other reasons, overlooking the context in which thinking occurs.

At this point in the evolution of SLA theory, arguments abound in the literature (e.g., Atkinson, 2011; Firth & Wagner, 1997, 2007) detailing the dangers of separating mind from situation. Instead of focusing only on the individual, an ecological perspective of language learning examines “the entire situation and asks, what is it in this environment that makes things happen as they do? (...) Ecology therefore involves the study of context” (van Lier, 2004, p. 11). This approach builds upon the tenets of sociocultural theory (Vygotsky, 1978). Sociocultural theory (SCT) explains how “all forms of human mental activity are mediated by culturally constructed auxiliary means” (Lantolf & Thorne, 2006, p. 59), which include physical, social, and mental forms of mediation (Lantolf, 2011). In SCT, language learning is a process of moving from other-regulation to self-regulation that co-occurs with changes in the quality and forms of assistance (Aljaafreh & Lantolf, 1994). In this process, dialogue serves as a major mediating source for cognitive development (e.g., McNeil, 2012; Swain & Lapkin, 1998). However, as demonstrated by studies investigating willingness to communicate, FLA can limit social interaction (Baker & MacIntyre, 2000; MacIntyre & Charos, 1996). From a SCT perspective, the lack of communication due to anxiety confines engagement in the co-construction of linguistic and content knowledge. In short, if students do not communicate, there exist limited opportunities to receive the assistance from others that supports language development.

While FLA potentially limits one mediational tool—collaborative dialogue—ecological approaches highlight the diverse meaning making sources in the immediate environment that may facilitate interaction in the face of FLA. By accounting for both mediated and immediate tools, ecological perspectives acknowledge a wider range of contextual supports than traditional SCT. This is accomplished by examining, “the totality of relationships of an organism with all other organisms with which it comes into contact” (van Lier, 2004, p. 3). These other organisms include not only people but also other symbolic and material objects in the physical and social world. In this way, “the linguistic environment immediately increases in complexity when we envisage a learner physically, socially, and mentally moving around a multidimensional semiotic space” (van Lier, p. 93). Greeno (1994) explains the underlying epistemological stance of ecological approaches:

The framing assumption of ecological psychology is that cognitive processes are analyzed as relations between agents and other systems. This theoretical shift does not imply a denial of individual cognition as a theoretically important process. It does, however, involve a shift of the level of primary focus of cognitive analyses from processes that can be attributed to individual agents to interactive processes in which agents participate, cooperatively, with other agents and with the physical systems that they interact with (...) Research in ecological psychology has focused mainly on relations of agents with physical systems and environments. (p. 337)

It follows, then, that language learning from an ecological perspective involves the intermixing of an individual's mind *and* the resources in the environment that support engagement in the learning process. As van Lier (2004) explains, language emerges from participation in the social world through a process that begins with the learner perceiving and using objects in the environment to create rudimentary meaning, which are then rendered into linguistic and symbolic meaning through further action. The environmentally available resources form the basis for the concept of *affordance*, which originated from Gibson (1979). He explains that, "affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill" (p. 127). In terms of language learning, these could include gestures, body movement, gaze, or other items in the physical classroom or online environment. Thus, affordances might, as van Lier argues, "best be seen as 'pre-signs,' that is, they may be the fuel that get sign-making going" (p. 93). Recognizing that the physical environment plays a vital role in language learning has important implications for CMC research.

The material affordances of online environments have not escaped the attention of the CMC community. For example, Lamy and Hampel (2007) discuss the affordances related to time and mode for different ACMC tools. They do not discuss voiceboards explicitly, but since voiceboards share qualities with both audio conferencing tools and asynchronous written forums, clear connections to the affordances of voiceboards can be made. These affordances include time to reflect, comprehend, construct responses, and use outside sources. In regards to mode, voiceboards promote learners' analytic and metacognitive skills and accuracy, while also allowing learners to use intonation, stress patterns, and expressive vocalization.

Situating the learner in an environment with tools at one's disposal casts FLA into a new light. Traditionally, FLA is linked to the struggles of expressing oneself with limited L2 linguistic and cultural resources (Horwitz, Horwitz, & Cope, 1986). Ecological approaches, however, extend the meaning making resources beyond just the learner's linguistic and cultural abilities to include resources in the context. Considering the potential affordances outlined above, voiceboards may offer students the possibilities of using dictionaries and writing scripts. Thus, FLA may be qualitatively different across contexts, depending on the potentiality for linguistic action presented by the local environment.

It is clear that the structural affordances of ACMC hold some potential in reducing FLA. However, the physical affordances of ACMC alone are not enough to determine its impact. The affordances of the environment must be perceived by the learner. Lamy and Hampel (2007) capture this idea:

Concerning affordances, user perceptions are more pertinent than the object itself. So it is not just the material affordances of CMC that play a role in enhancing or limiting communication, but also how people see them and the different practices that result from their different perspectives. (p. 43)

It is the learner's view that prompts Norman (1999) to offer the term *perceived affordance*. To him, perceived affordance more accurately reflects the notion of affordance. Norman posits that the issue is whether the *user*, not the designer or researcher, envisions the possibility of an action. In regards to the ACMC voiceboards then, while they provide particular time and mode affordances, which increase linguistic action potential, student perceptions of those affordances and how they are used to support

activity play important roles in adding or reducing feelings of anxiety. Studies examining the use of voiceboards in L2 classrooms present some evidence that students perceive the affordances available with this tool.

Voiceboard Studies in L2 Classrooms

Much of the voiceboard research focuses on development of speaking skills, although some data collected to measure students' overall perceptions of voiceboards help demonstrate a possible connection between this tool and anxiety.

Hsu, Wang, and Comac (2008) conducted their study at a university in the United States. The study aimed to help an instructor of an advanced English conversation course integrate voiceboards to extend student oral practice and to evaluate student listening and speaking skills. The researchers also collected qualitative data regarding the 22 students' perceptions of voiceboards. Each week, the instructor posted assignments, such as pronunciation practice and listening exercises with comprehension questions. The results showed that the instructor believed that the voiceboard helped meet her needs to evaluate students' oral skills. Additionally, both the instructor and students responded that the voiceboard was easy to use. Furthermore, in addition to enjoying voiceboard activities and reporting that their speaking abilities improved, students felt that they had more confidence in English after completing the voiceboard tasks. Since confidence is defined by some as the absence of anxiety, (i.e. Clement, 1987), this study indirectly relates voiceboard use and language anxiety.

In regards to students' speaking skills, Choi and Jung (2006) found that participating in voiceboard activities enhanced perceived oral competence, but that this effect may not be observed for all learners. In the study, nine Korean elementary EFL students were divided into three proficiency levels. Outside of class, the students recorded onto voiceboards either dialogues from the course book or created their own language output. Choi and Jung found that although the top two proficiency groups felt that they improved in their speaking performance, the lower group did not. Furthermore, the lower group occasionally avoided posting on the voice board, and when they did post, recorded dialogues directly from the book. A question that remains from this study is whether these low-proficiency learners perceived that they could use the affordance of extended time and the aid of other outside materials to construct responses in addition to the course book. Perhaps perceiving these affordances could have helped them complete the speaking tasks.

Sun (2009) reported more promising results. She investigated 46 Taiwanese university EFL students' processes of creating voiceboard posts and perceptions of voiceboards. Students completed 30 postings and 10 responses to classmates throughout the semester. The data showed that students go through a number of steps when constructing posts, including planning, rehearsing, and evaluating their potential posts. In addition to finding that most students believed that voiceboards helped enhance their communication and presentation skills, students expressed the anxiety-lowering potential of voiceboards. For example, one student stated that voiceboards, "really help me reduce speaking anxiety," and another participant added that, "unlike the classroom environment, blogs make me feel relaxed and thus speak more fluently. I feel that I perform better on the voice blog than in face-to-face situations" (p. 97). While the focus of the study was not to investigate anxiety, the findings document how students use the affordances of voiceboards and, peripherally, establish a relationship between this use and reduction in FLA for some students.

Song's (2009) study further suggests that voiceboards may help anxious students. Song investigated the impact of voiceboard use on student oral performance and collected data regarding student perceptions of voiceboards. Thirty female university EFL learners recorded five minute diary posts six days a week for 10 weeks. The results showed that students significantly improved their oral performance when post-tests were compared to pre-tests. Importantly, qualitative data indicate that these activities lowered anxiety. For example, Song stated that "students felt much more comfortable and natural speaking English" (p. 137).

In the study, one student commented, “I still cannot speak in English very fluently, but at least do not feel the anxiety towards speaking English that much” (p. 137). Although this study demonstrates at some level that voiceboards facilitate feelings of lower FLA, it neither includes a direct measure of FLA nor offers leads as to which affordance mediated these feelings.

The studies above provide smatterings of evidence to suggest a relationship between FLA and student activity on voiceboards. Aside from Sun’s (2009) study, however, it is still not known how and to what extent certain affordances are perceived in these contexts. Additionally, Baralt and Gurzynski-Weiss (2011) make the point that FLA is rarely measured directly. In their study they found that learners experience comparable levels of state anxiety when completing face-to-face (F2F) and synchronous CMC tasks. Since the focus of the study was state anxiety in synchronous CMC, there are obvious differences between their study and the current one. However, their observation regarding the limited number of studies assessing anxiety holds for most of the voiceboard studies, although one voiceboard study has measured FLA.

Poza (2011) aimed to compare anxiety in F2F and voiceboard contexts utilizing adapted versions of the foreign language classroom anxiety scale (FLCAS, Horwitz et al., 1986) that reflected both environments. English L1 speakers enrolled in two sections ($n = 48$) of the same Spanish course participated in the study. For six weeks, students completed discussion-based assignments that required them to respond to the instructor’s questions and reply to a classmate’s post. From the FLCAS data, Poza found that there were few differences between anxiety in the classroom and anxiety on the voiceboard. Interview data from four students, however, showed that they felt more relaxed in the online environment than the F2F classroom due to the extra time to construct and edit their responses. In regards to negative evaluation, the results showed that students perceived the two environments as mostly equal concerning anxiety related to making mistakes. There were some differences in favor of the voiceboard environment for items measuring anxiousness and feedback from the teacher and anxiety from comparisons to classmates’ L2 abilities. This study is important in that it directly measures FLA in an A-CMC context and explores qualitatively the students’ perceived affordances. However, this qualitative data came from only four students, which may not accurately show how the voiceboard was used by most students. Additionally, the study compared F2F to CMC environments, which often raises questions about validity due to the difficulties in controlling a wide range of variables (Blake, 2009; Garrett, 2009). Indeed, the study does not adequately detail the F2F tasks that were being compared to the voiceboard task. Instead of making comparisons between the two settings, we need to understand anxiety in the voiceboard context itself.

Studies in F2F contexts have explored the classroom environment to uncover the sources and causes of FLA. For example, Young (1991) identified six main causes of FLA. First, personal and interpersonal aspects strongly influence anxiety. This category includes low self-esteem, competitiveness among classmates, and social anxiety resulting from prospects of being evaluated by others during performance. Second, FLA is caused by learner beliefs about language learning. This involves the contrast between unrealistic language learning goals and the realities of language attainment within given timeframes (Horwitz, 1988). In addition, the instructor’s beliefs about language can increase anxiety. Here, intimidating students, not allowing them to work in smaller groups or pairs, and providing error correction in a strict manner heighten student tension. In a similar vein, classroom procedures that commonly require students to perform in front of the class or large groups of people facilitate anxiousness. Finally, language testing, particularly tests that fail to create a close relationship between what was taught in the course and what is included on tests, is a source of FLA. Yan and Horwitz’s (2008) study extends this list. They carried out a qualitative study that aimed to develop a grounded-theory model of the relationships among FLA and multiple factors. After interviewing 21 Chinese university EFL participants with differing levels of anxiety, Yan and Horwitz found that although anxiety is peripherally intertwined with a range of factors, such as parental influence, regional differences among students, teacher characteristics, and class arrangement, three directly influenced FLA: (a) learning

strategies, (b) comparison with peers, and (c) language learning motivation and interest. These studies raise questions regarding whether, how, and to what extent these sources operate in voiceboard contexts. Understanding how these situational causes of FLA function in APMC is important for teachers and researchers in order to better structure CMC tasks.

The voiceboard literature seems to suggest that this tool holds potential for lessening anxiety. Yet we still do not know the sources of anxiety in these contexts, what affordances learners' perceive, or how the affordances perceived directly relate to FLA. The current study aimed to address these issues, and it was guided by the following research questions:

1. How and from what sources do students experience FLA in a voiceboard environment?
2. What is the relationship between the affordances perceived in a voiceboard environment and FLA?

METHODS

Participants and Data Site

The participants in this study were second-semester university students enrolled in a required English communication course at a mid-sized university in Seoul, South Korea. The class consisted of 15 (nine female; six male) Korean EFL learners from different majors. These students had already completed one required English course the previous semester. The final exam from that course is used by the university to group students for second-semester English classes. This 'phone-pass' test is administered by an outside institution. To complete the test, students go to a computer lab on campus and participate in four activities: reading sentences, repeating sentences, responding to questions, and organizing groups of words into sentences. Responses are assessed for situation appropriateness, fluency, and grammatical accuracy. After the university compiles the results for all participants, the scores are rank-ordered, and students that score within 10 points of each other are assigned to groups and courses. In total, 219 students were assigned to 14 separate classes. The maximum score for the test is 80 and scores on the test ranged from 20 to 78. The scores for the participants in the current study ranged from 43 to 51.

The teacher of this course, Mr. O, has taught at the university for 12 years and described the students' English proficiency as "low-intermediate." The main goal of the course was to develop student conversational abilities. To accomplish this, the department selects a textbook, and instructors are required to follow the tasks in the textbook. According to Mr. O, these tasks consisted of both individual listening activities and conversational pair work such as structuring and performing dialogues and asking each other scripted questions.

The class met for two 75-minute sessions per week; one on Monday and one on Friday. There were two different types of homework assignments. The first was a department-required online assignment that consisted of listening comprehension and worksheet activities. These assignments were graded for course points. The second type of assignment was completed on a class voiceboard outside of class, which was integrated into the curriculum the last eight weeks of the semester. The voiceboard assignments were implemented by Mr. O to provide additional conversational activities for students in the course. Due to rigid structuring of the course syllabus at the institutional level, the completion of the voiceboard assignments could not be assessed for points.

Using the Voice Board

During the seventh week of the semester, Mr. O introduced the voiceboard, Voxopop (<http://www.Voxopop.com/>), in class. He demonstrated for students how to set up individual accounts that they would later use outside of class and how to connect to the class' private talk group. Voxopop allows users to record audio directly to the website with a microphone. Users first record their speech and

then have the option of reviewing it. When users are satisfied with the product, they publish the post. Thus, the affordances of Voxopop include time to replay posts to enhance comprehension and to monitor and revise language production, both of which can be supported by outside resources, such as dictionaries, thesauruses, and textbooks. Additionally, since posts are comprised of spoken language, users are afforded opportunities to utilize acoustic information (e.g., intonation, stress) to construct meaning.

Voxopop posts are displayed linearly in the discussion thread (see [Figure 1](#), which has been edited to protect participants' identities). The teacher modeled the process of recording, reviewing, publishing, and listening to other posts several times during class. After introducing the voiceboard, students were assigned a homework task (i.e., self-introduction) to demonstrate that they could use the technology. All students completed this assignment and reported no problems.



Figure 1. Screenshot of the Voxopop interface.

For the remaining eight weeks of the semester, students were assigned one weekly voiceboard assignment. The homework assignments followed a similar structure. For example, each encouraged students to state an opinion about a topic that was related to the one introduced in class. In-class and homework topics came from the course textbook. Units in the textbook were thematically organized and consisted of a main topic (e.g., changes in the modern workforce) and several related sub-topics (e.g., stay-at-home dads). The main topics and some sub-topics were discussed in the classroom. Sub-topics that were not discussed in class were considered for use as homework. The instructor then selected from the remaining sub-topics those that he felt would appeal to student interests. The homework assignments, then, were thematically similar, but not exactly the same, as those that took place earlier in the physical classroom. In addition to providing their own opinions, students were instructed to respond to a classmate's opinion. Commenting was an important part of the assignment because it supported some of the instructional goals of the course, such as constructing utterances for specific audiences and making contextually appropriate responses. There were no length requirements for the posts. However, the average length of student posts was 1 minute 14 seconds.

Data Collection and Analysis

Two sources of data were used in the study. The first was an adapted version of the FLCAS (Horwitz et al., 1986). The FLCAS is considered by many as “the standard measure of language anxiety” (Horwitz, 2010, p. 158), with valid and reliable psychometric properties (Horwitz, 1986). It includes 33 items with 5-point Likert-type response options for each item, and it is comprised of three sub-components: communication apprehension, fear of negative evaluation, and test anxiety. An adapted FLCAS (AFLCAS, see [Appendix A](#)) was employed in order to reflect the context and goals of the current study. The final nine items on the AFLCAS were the result of a two-step selection process, which began with eliminating items dealing with test anxiety since this was not related to the focus of the study. Then, among the remaining items pertaining to communication apprehension and fear of negative evaluation, those that were not responsive to either the speaking task the participants completed or the oral ACMC environment were eliminated. For example, excluded items were those that were too general (e.g., *It wouldn't bother me at all to take more language classes; I worry about the consequences of failing my foreign language class*), related only to in-class environments (e.g., *When I am on my way to language class I feel very sure and relaxed; During language class, I find myself thinking about things that have nothing to do with the course*), and did not reflect the situational use of the voiceboard (e.g., *I feel that my language teacher is ready to correct every language mistake I make; I would probably feel comfortable around native speakers of the foreign language*). The remaining items were then operationalized by changing the setting referred to within each item from “in class” to “on Voxopop.” All items were translated into Korean, and the AFLCAS was given to the students during the last week of the semester, immediately after students completed the eight voiceboard assignments.

The AFLCAS was scored by assigning a value to each of the five response options (e.g., 5 points for *Strongly Agree*; 1 point for *Strongly Disagree*). One statement, item 4, was reversed scored because it is stated in positive terms whereas the other items are negatively stated. Scores for each item were then input into SPSS 17. Mean scores for each AFLCAS item served as one data source to answer research question one. Additionally, AFLCAS data were used to compute a Spearman's rho (r_s) correlation coefficient to answer research question two—the relationship between affordances perceived and FLA. Spearman's rho is a non-parametric test that is recommended when data are at the ordinal level (Larson-Hall, 2010), such as the AFLCAS data in this study. Cronbach's alpha for the AFLCAS was .89.

The second data source was the voiceboard anxiety and affordance questionnaire (VAAQ, see [Appendix B](#)), which was given two days after the AFLCAS. The questionnaire consisted of nine open-ended questions and aimed to tap student perceptions of FLA in voiceboard environments (items 1, 9), and affordances perceived (items 2 - 8). Since initial analyses of the AFLCAS showed that each participant indicated elevated levels of FLA for at least one item (i.e., responses of *agree* or *strongly agree*), questions 1 and 9 invited students to elaborate and characterize these feelings. The affordances of voiceboards discussed in the literature (e.g., Lamy & Hampel, 2007; Sun, 2009) were consulted to create questions related to the affordances perceived. The resulting questions asked students how many times they used each affordance. While wording the questions in this way might give students the impression that using affordances frequently was expected of them, it is important to note that participants responded to the questions on the VAAQ anonymously. Responding anonymously provided at least some freedom to state that they did not use an affordance. Such responses were not uncommon, a point that is reflected in the relatively low use of some affordances which are presented and discussed later in the study. The VAAQ was provided to the students in Korean and they were allowed to write their answers in Korean. All responses were translated separately into English by two Korean-English bilinguals.

The VAAQ was analyzed in two ways. First, responses that elicited numbers from students (e.g., *On average, how many times per assignment did you use a dictionary or other source to help you understand a classmate's Voxopop post?*) were copied directly from the VAAQ to SPSS 17 for correlation analyses. On some occasions, students responded to these questions by providing a range of numbers, for example,

2-3. In these instances, the average of the two numbers was recorded (e.g., 2.5). The remaining items on the VAAQ were analyzed following Bogdan and Biklen's (2006) coding method in order to answer research question one. First, responses for each item on the questionnaire were read for open-coding, which produced salient categories that served as a primary framework for initial coding. These initial categories were revised during subsequent rounds of analyses so that they reliably accounted for the data. Once all responses could be codified, a final round of coding was completed.

RESULTS

Research Question 1—How and from what sources do students experience FLA in a voiceboard environment?

Data from the AFLCAS and VAAQ were collected to answer this question. Data from the AFLCAS show that, overall, the participants responded that they felt moderate levels of FLA in the ACMC environment. The highest possible AFLCAS score is 45, and the mean score on the AFLCAS for the participants was 22.85 ($SD = 4.14$). Dividing the mean score by the total number of items on the AFLCAS indicates that most responses fell between the options of *Disagree* and *Neutral*. The precise means for each AFLCAS item were calculated and are presented in Figure 2. The results show that responses for two items moved towards responses of *Agree*. Students felt most anxious when comparing themselves to other students (item 5), and they did not feel too confident when speaking English on the voiceboard (item 4).

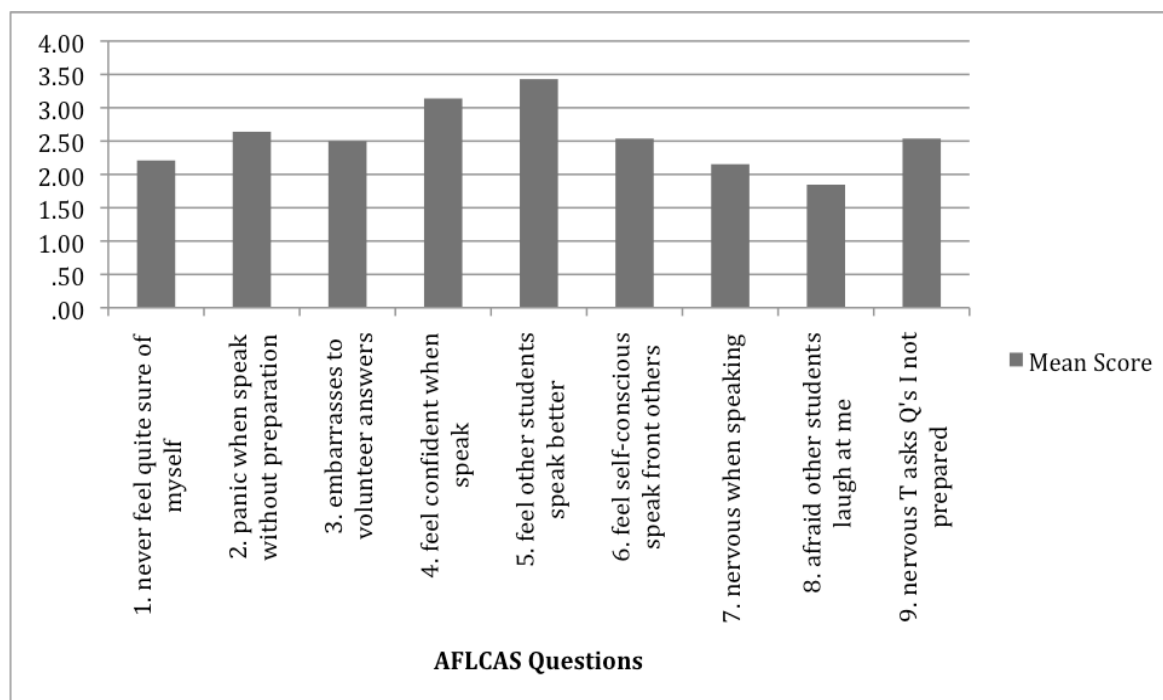


Figure 2. Mean scores for each AFLCAS item.

On the VAAQ, students responded to two questions that asked them about anxiety in the oral ACMC environment. The results for each question are shown in Table 1, which includes three columns. The first identifies the question to which students responded and the second presents the qualitative categories most frequently applied. The third column shows the number of responses coded for each category.

Table 1. *Qualitative Responses of Anxiety on the Voiceboard*

Question	Categories	Similar responses
What made you feel nervous / anxious / uncomfortable speaking English on Voxopop?	Pronunciation	6
	Lack of immediate feedback/non-verbal cues	5
	Classmate's negative evaluations	5
In what ways are the feelings of nervousness / anxiousness different between speaking English in class and speaking English on Voxopop?	Grammar	4
	Voxopop did not provide non-verbal cues	5
	Voxopop offered more chances to be negatively evaluated by classmates	4

The results for these questions indicate that pronunciation and grammar are sources of anxiety for students in the oral ALCM environment. For example, comments such as, “I am constantly concerned about grammar” and “I always worry about my non-native pronunciation” were common.

Other responses suggest that concerns about pronunciation relate to fears of being evaluated by classmates. Some students explicitly referenced anxiety related to pronunciation:

On Voxopop, I record after I hear others' recordings—their pronunciation is superior to mine and this makes me feel uncomfortable.

Others can listen to my recordings over and over. They probably don't care about the contents but care more about pronunciation just like I do.

These results support the finding from the AFLCAS that anxiety can result from students comparing themselves to each other (item 5). Although some participants did not specify precisely why they worried about what peers thought of their performance—“I always wonder what my classmates think of my recordings”—the statements above suggest that pronunciation was a key concern.

Additionally, responses to both questions on the VAAQ show that the lack of non-verbal cues was perceived as anxiety-inducing. Participants commented about the absence of non-verbal cues generally, “I feel more comfortable when speaking in class because non-verbal cues such as facial expressions or gestures help me understand the communication,” and when producing the target language:

In class I get facial expression clues to know whether they [classmates] are following what I am saying or not.

In class I can at least use gestures as an aid to make others understand what I attempt to say!

In sum, the results for research question 1 show that grammar, the absence of non-verbal cues, comparisons of oneself to other classmates, and pronunciation can be sources of anxiety. Data also suggest that pronunciation concerns are related to comparisons with classmates.

Research Question 2—What is the relationship between affordances perceived and FLA?

This question was answered by correlating data from the AFLCAS and data from the participants regarding the ways they used the affordances of the voiceboard. Table 2 presents the average number of times each affordance was used by the participants when completing one voiceboard task, with the exception of writing the response. For this question, students provided the number of times they wrote responses for the eight assignments.

The results in Table 2 show that students rarely used other sources to understand classmates' posts. On the other hand, using dictionaries or outside resources to construct responses was the affordance perceived most frequently, with students consulting these sources four times per assignment on average. Around three times per assignment, students re-recorded their responses before publishing them to the class discussion. When asked in what ways their post was revised when re-recording it (VAAQ question 7), the overwhelming response was pronunciation (10), followed by grammar (6), and fluency (5).

Table 2. *The Average Frequency of Affordances Perceived*

Affordance	Mean	SD
Replay to understand	2.54	1.32
Use source to understand	.54	.90
Use source for response	4.00	1.97
Re-record response	3.33	1.78
Write response	4.63	1.14

The frequencies of affordances perceived were then paired with the AFLCAS scores to compute correlation coefficients. Table 3 presents the correlation between FLA in the oral ACMC environment and the total affordances perceived, and FLA and each individual affordance. There exists a moderate ($r_s = -.380, p = .223$) inverse relationship between the total affordances perceived and FLA. This suggests that as the use of affordances increased, FLA decreased to a limited degree. Among the individual affordances perceived, the strongest relationship ($r_s = .550, p = .051$) is between using outside sources to understand classmates' posts and FLA. The positive direction of this relationship suggests that the more students used sources to help them understand, the higher their FLA was. Replaying to understand classmates' postings and using sources to produce responses had the strongest relationships associated with decreases in FLA, although these were moderate and not statistically significant.

Table 3. *Correlations Between FLA and Affordances Perceived*

	Total Affordances	Replay to Understand	Sources to Understand	Sources for Response	Re-record Response	Write Response
FLA	-.380	-.461	.550	-.359	-.008	-.061
Sig.	.223	.113	.051	.252	.979	.851

DISCUSSION, LIMITATIONS, AND IMPLICATIONS

The main goals of this study were to explore anxiety in an oral ACMC environment and to investigate the relationship between affordances perceived and FLA. In regards to anxiety-related experiences, data from the AFLCAS suggests, in a general way, that the students were not overly anxious when completing

voiceboard assignments. This finding supports previous oral ACMC studies that found that students performing in voiceboard environments experience low levels of FLA (Poza, 2011; Song, 2009; Sun, 2009). However, while this finding could be interpreted to suggest that voiceboards offer more relaxed environments than F2F classrooms, this interpretation is not warranted in the context of the current study. For instance, the voiceboard was integrated into the curriculum as an extension of the classroom, where the topics discussed were related to those already introduced in class. Furthermore, F2F data were not collected and the voiceboard task differed from many of the F2F tasks in marked ways; the online posts were not tied to course credit, which likely influenced both motivation and anxiety, and teacher feedback was not provided. Moreover, a closer look at the AFLCAS and VAAQ data provided evidence that students experienced FLA in particular ways. Data showed that pronunciation, grammar, the absence of non-verbal cues, and comparisons to, and evaluations of, classmates were sources of FLA.

Studies in F2F contexts have also found many of these sources of anxiety and primarily explain them as properties of the individual. For example, Yan and Horwitz (2008) and Young (1991) found that personal and interpersonal characteristics such as competitiveness among classmates and nervousness associated with evaluations from peers resulted in anxiety. Additionally, Young's finding that learners' beliefs about language and unrealistic language learning goals produce anxiety could explain the participants' preoccupation with pronunciation in the current study. Indeed, recent views of English pronunciation hold native-like models as an unrealistic language learning goal (e.g., Jenkins, 2002). Without dismissing the relevance of individual characteristics, ecological perspectives examine the relations between the learner and the context (Greeno, 1994), and the oral ACMC context in general, and its affordances in particular, help explain the findings of anxiety in this study.

The voiceboard context that students worked within to complete the discussions lacked non-verbal cues. These cues include facial expressions, gestures, and back-channels, and for lower proficiency students, such as the ones in this study, these are likely valuable compensatory resources commonly employed during the meaning making process. The absence of these resources in this environment led to feelings of anxiousness, which may also relate to the other ways participants in this study experienced anxiety. For instance, the lack of non-verbal communication cues may have further intensified the focus on pronunciation and grammar. While Lamy and Hampel (2007) explain that voice modalities offer the possibilities for intonation and inflection to amplify meaning, without the aid of non-verbal cues, this modality alone may have placed even greater emphasis on the articulatory aspects of speech and syntactic processing. In other words, without the broader semiotic resources of non-verbal cues to offer semantic support, learners operated in scenarios that required them to closely examine pronunciation and grammar. This explanation may be one reason why the participants used the replay function as often as they did. Replaying the posts helped to understand classmates, but it also provided multiple opportunities to make comparisons to others' language abilities. The implications of this finding extend to both research and practice. Researchers and teachers need to consider integrating and examining asynchronous video blogs (vlogs), which offer many of the same affordances as voiceboards, but with the added feature of non-verbal cues. Additionally, as Yan and Horwitz (2008) suggested, creating small, similar-ability groups may reduce anxieties related to comparisons to others, which could be done in online environments by making separate discussion threads for each small group.

The finding that students experienced anxiety when comparing themselves to others contrasts the findings in Poza (2011). In that study, students did not place importance on the fact that classmates would listen to their posts, a point illustrated by a student during an interview, "I didn't even think about it, honestly" (p. 50). The contrast in student perceptions between that study and the current one could be explained in a number of ways, such as differences in sociopolitical contexts. For example, since English often functions in Korea as a factor in determining university acceptance and job attainment, classmates in this context might view each others' L2 performances differently than native English speakers in the United States learning Spanish. Another explanation centers on the order in which the voiceboard tasks were completed

in conjunction with the classroom tasks. In Poza's study, students finished the voiceboard assignments before having similar discussions in class, whereas in the current study these were completed in the reverse order. While having the online discussions after the F2F in-class discussions offers students opportunities to incorporate language that might have been learned during class, it might also place more emphasis on this language. Future studies might address how the ordering of topically similar F2F and voiceboard tasks relate to anxiety.

The findings from the correlation results further illustrate the complex interplay between the environment and FLA. While anecdotal evidence reported in other studies links FLA with the ACMC environment, the current study established an empirical one by directly investigating the affordances perceived in these contexts. This study found that the relationship between the overall frequency of affordance use and FLA was moderate, and many of the correlations for particular affordances were moderate or weak. These findings can be explained in a number of ways.

First, it is important to recall that affordance includes both the good or ill offered by the environment (Gibson, 1979), or as van Lier (2004) explains, "the opportunity for or inhibition of action" (p. 4). Understanding this premise helps to explain the overall moderate correlation between FLA and the total affordances perceived, and the extremely weak correlation between FLA and re-recording posts. The environment afforded students a way to attend to pronunciation by revising their recordings, which they did often in comparison to other aspects, but, as mentioned earlier, the replay affordance enabled participants to make comparisons among each other. Likewise, although replaying classmates' postings provided opportunities for these comparisons, it also allowed students in this reduced cue context a way of understanding each other, which is why we see a stronger correlation for this affordance and FLA. These findings show that the affordances of oral ACMC environments relate to FLA in both positive and negative ways.

Additionally, the co-dependency between individual abilities and affordance explain how some affordances in this study related more strongly with FLA than others. As Greeno (1994) makes clear, the concept of affordance cannot be understood without accounting for both. He argues that an affordance "relates attributes of something in the environment to an interactive activity by an agent who has some ability, and an ability relates attributes of an agent to an interactive activity with something in the environment that has some affordance" (p. 338). Revisiting the perceived affordance of replaying others' posts demonstrates how affordance is intricately tied to ability. This affordance was moderately related with lower levels of FLA, while, conversely, the use of outside sources to understand classmates' postings corresponded strongly with higher levels of anxiety. When considering individual ability, it could be that the possibility for action provided by the environment—replaying others' posts—sufficiently melded with the students' comprehension abilities, thus leaving the option of using outside sources to understand unnecessary. This explanation is supported by a student's comment. After indicating that she never used outside resources when listening to her classmates, she explained that, "I just use my own knowledge to understand what they say." On the other hand, the affordance of using outside resources to construct responses seems to have benefited FLA. In light of the voiceboard task in this study, which prompted students to state their opinion to a question and respond to one classmate's opinion, participants relied upon their own abilities and replay to understand classmates. In order to respond, however, the affordance of using outside resources was needed, and this explains the moderate relationship between this affordance and decreases in FLA.

The findings are further accounted for in light of the methodological limitations of this study. For example, the overall moderate correlation between FLA and the total affordances perceived could be due to the difficulties in capturing a wide range of affordances. Some students noted that time and the physical absence of others when performing helped ease FLA:

I felt more confident using it [voice board] because I didn't have to do speaking in real-

time situations because I'm not good at improvising and correcting grammar and vocabulary.

I am not too nervous on Voxopop because I don't have an audience that is present right in front of me.

These affordances are challenging to capture quantitatively and underscore the importance of qualitative data in examining affordance, while also demonstrating the need for further research in this area.

Using items from the literature to present affordances to participants in a fixed way also limited this study. For example, the VAAQ did not illuminate how the environment where the technology was accessed related to FLA. Additionally, while studies have suggested that preparing written scripts eases FLA, which served as the basis for VAAQ item 8, it was not strongly correlated to FLA, and the question may not accurately reflect how scripts function to lower anxiety. Students noted, for example, that it was not writing the script that reduced FLA but *reading* it—"I don't feel nervous because I usually have a script that I can simply read off of." Opening the response format would help uncover more of the affordances perceived by the learners in these contexts and allow researchers to more accurately relate this use to FLA. In a similar vein, collecting self-reported questionnaire data operationalizing perceived affordances as the affordances used raises the question as to whether participants perceived certain affordances and chose not to use them, or if they did not recognize certain possibilities in the ACMC environment. Future studies collecting screen-capture and think-aloud data might help address this issue by showing which affordances were signaled from the environment, which were acted upon, and why. Findings from such data would assist teachers in knowing which functions of a tool need to be explicitly taught, and which can be perceived directly from the environment.

CONCLUSION

Previous studies show that FLA can disrupt cognitive processing (MacIntyre & Gardner, 1994) and limit social interaction (Baker & MacIntyre, 2000). Oral ACMC research has provided some evidence that this environment might play a role in reducing FLA (Poza, 2011; Song, 2009; Sun, 2009). The current study adopted the notion of affordance within ecological linguistics in order to examine in greater detail the interplay between FLA and the potential for action signaled within the ACMC context. In line with previous ACMC research, this study found that students are not overly anxious when completing speaking tasks in this environment. Importantly, however, this study also found that integrating voiceboards does not automatically eliminate foreign language anxiety. Instead, the environment and its affordances are related with decreased *and* increased FLA. To explain this finding, it was posited that the students' abilities, the task, and the environment worked in consort to produce or ease anxiety. If this explanation is accurate, it complicates the literature by suggesting that simply completing voiceboard tasks does not entirely rid all foreign language anxiety and underscores the need for more research framed by ecological perspectives. This study has pointed-out methodological concerns regarding how to more accurately elicit and capture affordance data, which might assist future researchers examining the affordances perceived by students in oral ACMC environments. Reliably accounting for the affordances perceived in voiceboard contexts will allow us to investigate how they relate to FLA and, ultimately, the ways in which they promote and impede language learning.

APPENDIX A. Adapted FLCAS

1. I never feel quite sure of myself when speaking English on Voxopop.
Strongly Disagree Disagree Neutral Agree Strongly Agree
2. I start to panic when I have to speak English without preparation on Voxopop.
Strongly Disagree Disagree Neutral Agree Strongly Agree
3. It embarrasses me to volunteer my answers in English on Voxopop.
Strongly Disagree Disagree Neutral Agree Strongly Agree
4. I feel confident when I speak English on Voxopop.
Strongly Disagree Disagree Neutral Agree Strongly Agree
5. I always feel that other students speak English better than I do on Voxopop.
Strongly Disagree Disagree Neutral Agree Strongly Agree
6. I feel very self-conscious about speaking English in front of other students on Voxopop.
Strongly Disagree Disagree Neutral Agree Strongly Agree
7. I get nervous and confused when I am speaking English on Voxopop.
Strongly Disagree Disagree Neutral Agree Strongly Agree
8. I am afraid that other students will laugh at me when I speak in English on Voxopop.
Strongly Disagree Disagree Neutral Agree Strongly Agree
9. I get nervous on Voxopop when the English teacher asks questions which I haven't prepared in advance.
Strongly Disagree Disagree Neutral Agree Strongly Agree

APPENDIX B. Voiceboard Anxiety and Affordance Questionnaire

Answers to the questions below will help me make the best possible English activities for students. Your honest feedback and suggestions are greatly appreciated. You may answer the questions in Korean. You are not required to write your name on this form; your responses will have no bearing for your score in this class.

1. What made you feel nervous/anxious/uncomfortable speaking English on Voxopop?
2. On average, how many classmates' postings did you listen to per assignment (1 Voxopop discussion)?
3. On average, how many times per assignment did you replay a classmate's Voxopop post in order to help you understand it?
4. On average, how many times per assignment did you use a dictionary or other source to help you understand a classmate's Voxopop post?
5. On average, how many times per assignment did you use a dictionary or other source to help you make your posting on Voxopop?
6. On average, how many times per assignment did you re-record your response on Voxopop before you posted it?
7. When you re-recorded you response, what aspects of your response did you change?
8. For how many of the 8 Voxopop assignments did you write your response before recording it?
9. In what ways are the feelings of nervousness/anxiousness different between speaking English in class and speaking English on Voxopop? Why do you think so?

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