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Ecological understanding of foreign language speaking anxiety: emerging patterns and dynamic systems

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Abstract

Anxiety in speaking English is a critical affective reaction to second language acquisition. Moreover, language learning is an emotionally dynamic process which produces fluctuations in learners' speaking anxiety. Therefore, this case study was designed to investigate English as a foreign language (EFL) learners' speaking anxiety from an ecological perspective based on nested ecosystems model and complex dynamic system theory. Four intermediate level female students with an average age of 15 were selected and participated in this study. Data were collected via semi-structured interviews recorded by the researchers over five classroom sessions, non-participant classroom observation and Motometers to provide information regarding the dynamics of students' anxiety during these 5 sessions. The data were qualitatively content analyzed. Based on (Bronfenbrenner, The ecology of human development, 1979; Bronfenbrenner, The ecology of cognitive development: Research models and fugitive findings, 1993) nested ecosystems model, the emergence of learners' speaking anxiety were categorized and analyzed first at the level of microsystem in terms of learners' beliefs, motivation, cognitive factors, linguistic factors, affective factors, and classroom environment. Afterwards, the participants' anxiety within three ecosystems including meso-, exo-, and macrosystems were also discussed as they were offered by the collected data. Learners' anxiety was also analyzed based on the dynamic patterns of stability and variation in the participants' micro development. The findings contributed evidence to the ecological understanding of the patterns and variables involved in learners' speaking anxiety variation in light of the interaction of the individual and environmental factors.

Keywords: Speaking anxiety, Nested ecosystem model, Dynamic system theory, Microsystem

Introduction

In the process of learning a foreign language, individual cognitive and affective factors are both involved. Anxiety is one of the potentially affective issues under-investigation in the field of applied linguistics (e.g. Dewaele, Petrides & Furnham, 2008; Elkhafaifi, 2005; Gregersen, & Horwitz, 2002; Horwitz, 2010, Horwitz, Tallon & Luo, 2009; Horwitz, Horwitz, & Cope, 1986; Humphries, 2011; Liu & Jackson, 2008, MacIntyre & Gardner, 1994; Marwan, 2016, Onwuegbuzie, Bailey & Daley, 1999; Tran, Baldauf, & Moni, 2013). In earlier studies, it was addressed as a stable debilitating emotional reaction

(Horwitz, 2010; Horwitz, Horwitz & Cope 1986; MacIntyre & Gardner, 1991). Although learners of a foreign language may not be aware of affective reactions like those created by their anxiety in their process of language learning, they are unconsciously affected by the dynamics of these reactions (MacIntyre & Gregerson, 2012). Regarding this, the most anxiety-arousing situation that learners may face is when they speak a foreign language (Cheng, Horwitz, and Schallert, 1999). However, anxiety viewed as an emotional concept is, based on what Epstein (1993) suggested, a nuanced multifaceted approach to capture the issue within the multilayered system of language learning.

Reviewing the studies on foreign language anxiety (e.g. Aida, 1994, Gregersen, 2003; Kitano, 2001, Liu & Jackson, 2008; Steinberg & Horwitz, 1986, Young, 1990), We notice that they mainly held a trait-oriented side examining this affective facet of language learning through questionnaires that could not come across per-moment unpredictable changes of the learners' classroom anxiety (Mates & Joaquin, 2013). Thus, we need new methods to study dynamics of anxiety (de Bot, Lowie, & Verspoor, 2007; Larsen-Freeman & Cameron, 2008; MacIntyre & Gregersen, 2012). Relying on Diane Larsen-Freeman's suggestion (2007, 2016) of the multiple processes involved in second language acquisition (SLA), we maintain that the processes and patterns of speaking anxiety are not sequential; they might take place likewise or emerge differently for different learners in different timescales. Thus, we need to scrutinize language learning process from a state-oriented perspective (Gregerson, Macintyre, & Meza, 2014).

This study aimed to explore the crux of the dynamicity of EFL learners' speaking anxiety using the ecological dynamic system theory. This theory was utilized to study the interconnection between a language learner as an organism and all other organisms they are engaged in regarding emergence, quality, values, variability, diversity, and activity (Van Lier, 2004). Thus, this study is significant for several reasons. First, ecological understanding of a phenomenon concerns about the association between people and the world. In this regard, ecological approach deals with the relationship between the language learner and all the affective, cognitive, and linguistic variables within the classroom ecology (Halliday, 1993; Harris, 1996; Saussure, 1983). Thus, the ecological exploration of EFL learners' speaking anxiety in terms of the interconnection of EFL learners with their surrounding environment can provide us with new insights into uncovering the agents or affordances contributing to the emergence of their speaking anxiety.

Second, it sees the learners' surrounding context stimulating in learners' states of anxiety (Drew & Heritage, 1992). Explaining effective process of learning or teaching is not possible without considering the contexts in which they are embedded (Larsen-Freeman, 2016).

Recently, Larsen- Freeman (2016) asserted:

In the case of the classroom ecology, the components are not only the agents, that is, the teacher and the students (and all of their accompanying thoughts, embodied actions, emotions, behaviors, dispositions, identities, social capital, etc.), but they also include properties of the physical and temporal environment as well. For instance, the configuration of the desks, the size of the room, its orientation, its temperature, the time of the day/week/year at which the lesson is conducted, and so on, all potentially influence teaching and learning (p. 378).

Thus, applying an ecological perspective, we can explore the significant contextual factors, both human and non human, which play a pivotal role in the emergence of EFL learners' patterns of speaking anxiety.

Moreover, an ecological perspective sees language as patterns of patterns and systems of systems (Capra, 1996). Therefore, in exploring learners' speaking anxiety, we aim to explore the unpredictable patterns of anxiety within a nested interaction of ecosystems. Emergence is also emphasized because learning happens when simple elements are gathered together to form a higher system (Van Lier, 2004). In Larsen-Freeman's terms (2016, p.378), "emergence is the arising of something new, often unanticipated, from the interaction of components which comprise it". For example, agency in learners and teachers "emerges from the interaction between resources and contexts and the learners' [and teachers'] perceptions and use of them" (Mercer, 2012, p. 43). Thus, exploring EFL learners' anxiety from an ecological perspective shed more lights on how the interaction of different agents within different contextual levels can contribute to their emergence of anxiety.

Finally, variability or diversity means that teachers should not treat all students the same because they are different (Bourdieu, 1991; McLaren, 1998). Thus, as individuals' patterns of variability should be explored in the learning process (Rose, Rouhani, & Fischer, 2013), the ecological exploration of speaking anxiety in EFL learners provides better understanding of how patterns of speaking anxiety might occur differently for different learners.

In line with the principles of an ecological perspective and the postulated dynamic nature of anxiety (MacIntyre & Gregerson, 2012), the rationale for the application of nested ecosystems model and complex dynamic system theory (CDST) in this study were their emphasis on the mentioned ecological features (Van Lier, 2004) and operational considerations, contextual considerations as well as macro and micro system considerations (Hiver & Al-Hoorie, 2016). Both of these models regard classroom ecology (Larsen-Freeman, 2016) from a non-reductionist, non-linear, emergent, and emic perspective (Van Lier, 2004).

Research questions

1. What are the ecosystemic factors bringing about anxiety in EFL learners' speaking from the points of view of complex dynamic system and nested ecosystems theories?
2. To what extent can an ecological perspective to the underlying factors of learners' anxiety in English speaking practices provide us with a clear image of speaking anxiety as a complex system?

Review of literature

Language learning can be defined as an emotionally and psychologically dynamic process which produces moment-by-moment fluctuations in learners as well as changeable variables and vibes (MacIntyre & Gregersen, 2012). Based on what Reeve (2009) explained an emotion is a concordant reaction which comprises four branches: subjective feelings, biological/physical reactions, goal-directed behavior and a social component that guides emotional expression. On the other hand, Epstein (1993) describes vibes in this way: "a typical sequence of behavior is that an event occurs; the experiential system scans its memory banks for related events; and vibes from the past events are produced that influence conscious thoughts and behavior" (p. 323). In defending dynamic processes in SLA, Larsen-Freeman (2007) claimed that real-time language processing, developmental

change in learner language, and evolutionary change in language are all reflections of the same dynamic process of language usage" (p.783). Emotions have important impact on learners' here and now (Mates & Joaquin, 2013). Positive emotions cause making stable personal resources (Fredrickson, 2003), but negative emotions cause limitation in learners' focus and potential behavior. Both positive and negative emotions have significant patterns of behavior in learning process which mainly take place based on the power of the force. Language learners have initial vibes or emotional conditions (Larsen-Freeman & Cameron, 2008). The external and internal forces can produce change in these conditions. For example, the peers or teachers' reactions to the learners might lead to different emerging patterns of emotional response on the part of learners. Moreover, the butterfly effect can be produced based on the small changes in emotional situations. However the students impulse is small, it can have big effect on the net strengths (Gregerson, McIntyre, & Meza, 2014).

We can regard speaking anxiety as an important emotional reaction to second language acquisition. Outside the field of applied linguistics, speaking anxiety is defined as "the threat of unsatisfactory evaluations from audiences" (Schlenker & Leary, 1982, p. 646). Defining speaking anxiety as the fear of oral use of the language, Wilson (2006, Anxiety in learning English as a foreign language: Its associations with student variables, with oral proficiency, and with performance on an oral test, unpublished.) asserted that speaking is one of the main sources of anxiety in language learning. Although many researchers (e.g. Aida, 1994, Kitano, 2001, Liu & Jackson, 2008, Steinberg & Horwitz, 1986, Young, 1990) have tested the impact of speaking anxiety on second language learning, some important sources and effects of this variable as a dynamic, situation-based and emergent variable have not yet been established.

Replicating Horwitz et al.'s (1986) study holding a non-western language, Aida performed a factor analysis which led to four FLCAS factors introduced as speech anxiety and fear of negative evaluation, comfortableness in speaking with native Japanese, fear of failing, and negative attitudes toward Japanese class. Kitano's (2001) study aimed to look into individual students' fear of negative evaluation, and his or her self-perceived speaking ability considered as being two potential anxiety sources influencing college learners taking a Japanese oral practice. To do so, 212 students in Japanese courses of 2 major universities took a survey in favor of the study. Correlations and regression supported that an individuals' fear of negative evaluation, low perceived ability, and low perceived competency allay learners' anxiety; on the other hand, learners' fear of negative evaluation and the self-perceived speaking ability were supported as not influencing the students' anxiety level.

Liu and Jackson's (2008) study standing Chinese university students' WTC in English and FLA being considerably correlated submitted the probability of considering FLA and WTC complementing to understand learners' affective reactions to using language being fruitful.

Steinberg and Horwitz's (1986) study was conducted to investigate the content of stimulus-pictures oral descriptions, in second language, under the influence of induced anxiety. It was put forward that there is a difference between learners taking an anxiety treatment and the others taking a non-anxiety treatment in their description proportion of interpretive to denotative content as the anxiety group are likely to answer less interpretively. As the study sees to environmentally engineered anxiety, it referred to the atmosphere provided for student communication open to the classroom teacher's intervention.

Young's (1990) survey administered to over 200 university and high school Spanish students yielded their preference for small group rather than whole class oral activities in addition to what teacher factors were in correlation with lower anxiety.

Thus, we need more methods to study speaking anxiety dynamically consisting of variables that interact with each other (de Bot et al., 2007; Larsen-Freeman & Cameron, 2008; MacIntyre, 2012). Dynamic systems involve both change and stability without focusing on cause and effect relations (Waninge, Dörnyei, & De Bot, 2014). The changes in these systems may happen over time due to the influence of different factors such as assessment conditions, class activities, or learners' background experiences (Hotho, 2000). These factors as well the emerging patterns of speaking anxiety can be studied from an ecological perspective.

What is ecology?

Ecology is a scientific study coined about half past 19th century (Arndth & Janny, 1983) referring to the relationships one organism holds with the other organisms (Van Lier, 2004). Addressing ecology as a contextualized research style (Van Lier, 2004) to which we can approach in ways; there is shallow ecology and deep ecology. Approaching studies from shallow ecology, we utilize methods to eliminate environmental effects of human activity. On the other hand, taking a deep ecology perspective, we aim to pioneer new research methods that involve scrutiny of interrelated processes framing an environment. Two ecological models have been used in this study, nested ecosystems model and CDST. Both models consider classroom ecology (Larsen-Freeman, 2016) from non-reductionist, non-linear, emergent, and emic perspective (Van Lier, 2004).

Nested ecosystem model

Since an ecological perspective examines contextual interrelatedness of components, the effect of context on L2 learning is emphasized (Cao, 2009). Bronfenbrenner's (1979) ecological model looks into human development against a series of interrelated structures labeled ecosystems. Within nested ecosystem model, there are four systems of microsystem, mesosystem, exosystem and macrosystem. The inner-most layer consisting the developing person's immediate setting is called microsystem of which the language classroom is an example where individual and contextual factors cooperate to make developments take place (Bronfenbrenner, 1979). Microsystem also comments on the activity patterns, interpersonal relations, and roles encountered by the person developing in association with the persons and objects (Bronfenbrenner, 1993; Bronfenbrenner, 1979) Fig. 1.

The mesosystem surveys the developing person dealing with the situations outside the frame of immediate setting. It could be described as a net of microsystems (Bronfenbrenner, 1979). For instance, students' outside-of-the-language-classroom past experiences are studied at the level of mesosystem (Peng, 2012).

At the exosystem level, between-setting processes are being examined. At least one of the settings under study does not involve the developing person, yet indirectly influences the processes occur in the immediate setting (Bronfenbrenner, 1979). Curriculum design and course assessments are both viewed at this level (Peng, 2012). Macrosystem comprises micro-, meso-, and exosystem as an indication of a certain culture or subculture.

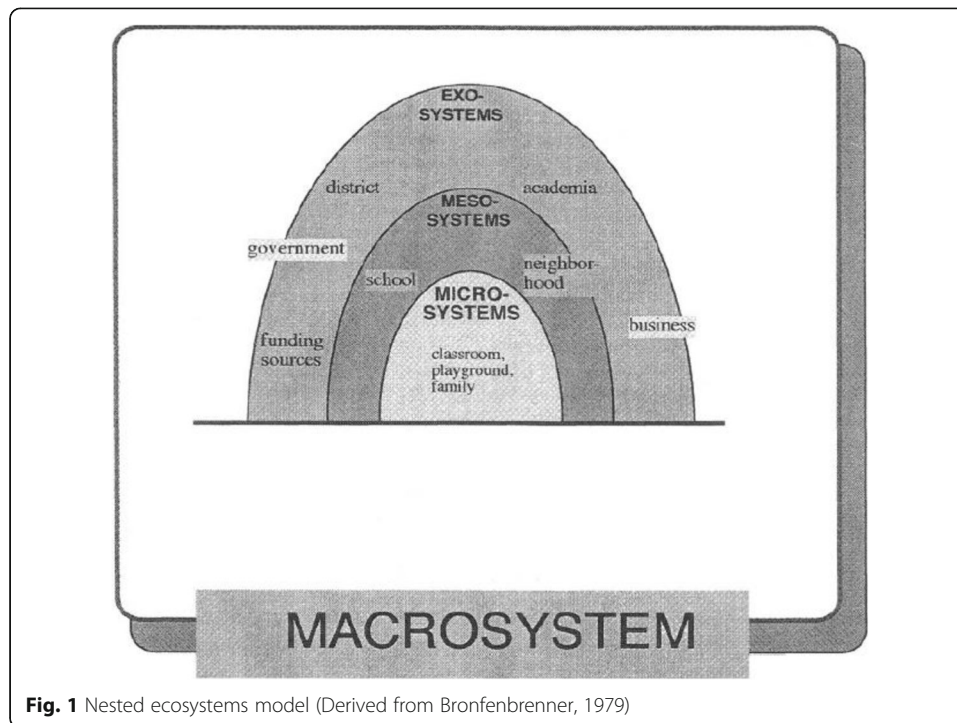


Fig. 1 Nested ecosystems model (Derived from Bronfenbrenner, 1979)

Complex dynamic systems theory

CDST provides another model serving the ecological research approach examining the dynamics of byzantine systems holding a process-oriented view (Larsen Freeman, 1997). Chaos is the haphazardness that is set up by complex systems. These systems are featured as dynamic, complex, nonlinear, chaotic, unpredictable, sensitive to initial conditions, open, self-organizing, feedback sensitive, and adaptive (Larsen Freeman, 2016). The dynamic systems fluctuate within time and include a large number of components or agents (Larsen Freeman 2007, 2016). The relationship between these agents and other systems is interactive (Waldrop, 1992, 145). CDST underpins the idea of nonlinearity which explains that cause-and-effect relations are not predictably linear (Larsen-Freeman, 2007). Since initially triggered fluctuations can affect future behavior, initial conditions are considered very important in making future predictions (Larsen-Freeman, 2007). The complex systems are open, adaptive, and spontaneous (Larsen Freeman 2007, 2016). CDST's functions such as being a frame of reference (Byrne, 2011), a habit of thought (Kuhn, 2008), a conceptual toolbox (Walby, 2007), a transdisciplinary discourse (Klein, 2004), and a worldview (Cilliers, 2001) have been stressed for its substantial role in knowledge-making in many disciplines. However, most scholars asserted that complexity has not been put into a regulatory framework yet. Thus, it cannot be labeled as being a method of practice (Overton, 2007). Our taking use of complexity is in line with Larsen-Freeman's term of meta-theory as it is a collection of knowing principles (i.e., epistemological ideas) and reality-consistent principles (i.e., ontological ideas) within what the object theories are put into practice in applied linguistics (de Bot et al., 2013). Relying on Overton's assertion (2013), complexity as a meta-theory is a collection of interactive principles consistent between multiple phenomena parts on the ride of dynamic processes emerging over-time patterns.

Method

Participants

In order to focus on a mixture of EFL learners with regard to their anxiety level, as the main selection criterion, and other general and learning characteristics, observing the class for three subsequent sessions as well as consulting with the teacher of the class, we selected four female participants with an average age of 15 from a group of sixteen adults who were from an Iranian English institute, enrolled in an intermediate EFL course in Mashhad. Four cases were sufficient for the ecological purpose of the study, as Van-Lier (2004. P. 194) asserted, because here a bounded case, an individual in our study, is “investigated over a period of time to characterize its workings and development”.

Student 1, Sarah, was a very active, smart, and calm student with low level of anxiety. Student 2, Yasaman, was a little more anxious and needed more explanation to understand the lessons. Student 3, Maryam, was less anxious than Yasaman and Sarah and she was a fast learner. Student 4, Parisa, was anxious in most cases. Table 1 represents these characterizations. All of the participants had just started their English course at the institute.

Instruments and data collection

The data was gathered via semi-structured interviews, non-participant classroom observation, and motometer from January to February 2016. First, semi-structured interviews were used immediately after each classroom session in order to understand each participant's insider view regarding their anxiety dynamics and provide evidence to clarify what was observed in the class. These interviews were recorded individually with the all 4 participants, carried out in Persian, digitally recorded, transcribed, and translated by the authors. The interview questions, providing prompts for the participants, were about students' past experiences of studying English, their reasons for learning English, their attitudes toward learning English, the reasons for anxiety while they are in the class, their ideas with regard to decrease and increase in their anxiety, their teacher' behavior, activities in the class, and the moments of their experiencing anxiety in speaking. The data gathered over five classroom sessions of 90 min. Not all the 90 min in each session were allocated to speaking activities. For example, the time spent for speaking in session 2 was from minute 10 to 90 but in session 3 the time allocated to speaking was from minute 10 to 60.

Table 1 Participants' profile

Student details	General characteristics	Learning characteristics
Sara Gender: F Age: 15	serious about learning English, very relaxed, highly confident, and smart	learns easily, has high grades in speaking
Yasaman Gender: F Age:15	serious about learning, smart and anxious	can learn after some tries
Maryam Gender: F Age:15	likes learning English seriously one of the smart students in the class not very anxious	learns easily, high grades of speaking
Parisa Gender: F Age:15	quite uncertain about what she says, anxious, easily distracted because she is stressful	put much effort for speaking, but feeling not able to take good speaking grades

Non-participants classroom observations were also conducted in order to gain contextual information of students' anxiety through note taking during the interviews in the class. The first three sessions were spent on the selection of the participants. An observation analysis was made by taking notes during each classroom session to record any specific scenarios concerning the students' fluctuations of speaking anxiety. The observations were mainly focused on the assigned activities in the class by the participants as well as the teacher's behaviors and the participants' both verbal and non-verbal behaviors indicating their speaking anxiety.

In addition, inspired by the longitudinal classroom study by Gardner, Masgoret, Tennant, & Mihic (2004), the motometer was used to take a series of information about the student's anxiety during 5 sessions of 90 min. Five A4 size sheets of paper including the motometers were given to each participant for these five sessions. In these motometers, figures "0" indicates the lowest and "100" indicates the highest point of anxiety. Participants were asked to demonstrate their level of anxiety by drawing a horizontal line on the motometer every 10 min. Their presentation of their level of anxiety between 0 and 100 was based on their own self-rating. On the bottom of each page, there was a comment part completed by the participants reporting on their anxiety self-rating reasons. At the end of each session, the papers were collected by the first researcher of the study. We also took notes during the actual speaking tasks, and about the participants' and other students' behavior.

Data analysis

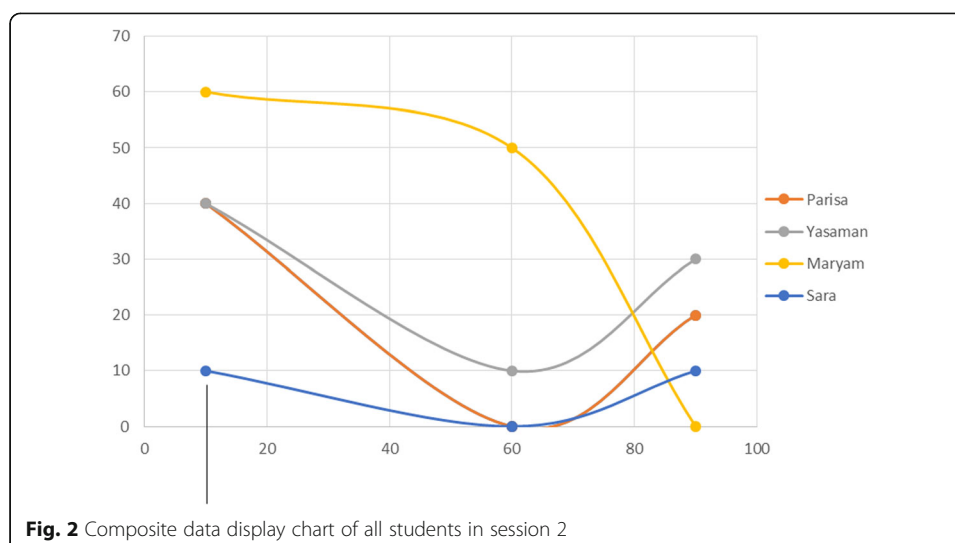
Qualitative analysis of the data was done in this study. The first parts of the data analysis included reading, coding and revising the codes via MAXQDA software program (Belous, 2012). The coding process started by careful reading of the data in order to identify the themes and sub-themes. Every word, sentence or paragraph was coded as one instance of integrative meaning. The categorization of the data and themes were based on Bronfenbrenner's (1993) ecosystem model as well as within-participant and between-participant variation and stability in light of CDST. The microsystem was the main focus of this study and the other three ecosystems were looked at by the offer of the data. The second part of the data analysis comprised the participants' motometers. The data was gathered through 5 sessions of an EFL course. Each-session data were listed and entered into graphs using EXCEL software program. The variable of time was shown on the horizontal axis of the graphs in steps of 10 min. On the other hand, the vertical axis represented the participants' level of anxiety. The observation-related data gathered by the researchers during each session were organized underneath the horizontal axis in the composite chart. Furthermore, the participants' comments and observation-related data provided information about the context of the motometer data. An example of composite chart, related to the second session, is shown in the findings session (see Fig. 2).

Results

At the microsystem level

Cognitive, linguistic, and affective factors

Cognitive, linguistics and affective factors identified in this study appeared to be linked more closely to the classroom activities. Cognitive factors focus on students' background knowledge or skills as they influence the students' speaking. Lack of topical



knowledge or interest was reported by Parisa to cause high speaking anxiety for she had no idea what to talk about and how to put it, but Maryam, Yasaman, and Sara mentioned that they were not anxious in such situations as they were supposed to encounter them someday (interview 5, February, 2016).

Linguistic factors such as lack of rich vocabulary box were reported in some cases to increase anxiety. On the other hand, Maryam and Sara believed that their anxiety would not increase committing linguistic mistakes while speaking English. They addressed that their mistakes would facilitate their progress as they received appropriate feedback form their teacher. Applying new expressions and words as another linguistic factor was reported to raise anxiety; Maryam, a low-anxious participant, called them speaking-improvement leaders but their use produces anxiety (Interview 4, January, 2016). However, Parisa, a highly anxious student, asserted that using non-repetitive expressions and ideas increases her self-confidence and; as a consequence, reduces her anxiety (Journal 4, January 2016). The other two participants had similar views.

Also, different kinds of affective factors were reported to have an impact on speaking, and may cause anxiety. The most prevalent one was speaking in public and peers' judgment. All four participants showed high anxiety in this case. Parisa stated: "While I'm talking and making mistakes, the other classmates always laugh, and it makes me feel highly anxious, but all of them may make mistakes someday!" In contrast, Yasaman who revealed no anxiety while observing, reported: "I don't care, let them laugh, I won't give up" (Journal 3, January 2016). In this regard, all participants expressed that holding good relationships with the teacher and other classmates will decrease their anxiety level and it has influence on their judgments.

Classroom environment

Classroom environment is one of the contextual factors expressed to impact upon the students' anxiety in class. Teachers' factor containing styles, methods, and classroom procedures were reported to have an influence on the classroom environment. The participants shared the same belief of criticality of their teacher's role in motivating

students to speak English without anxiety as Yasaman commented: “The teacher has an important role because she is the most important person in the class and a kind of model for the students” (Journal 1, January, 2016).

Sara also expressed: “the teacher can have an important role by having the creative and impressive teaching methods”. She also emphasized the teacher’s good manner as being motivating. Parisa also said: “she has to talk to her students to attract them to speaking” (Interview 1, January, 2016).

In addition, Parisa and Maryam explained that the teachers’ choice of method can encourage them to speak with no anxiety (Journal 5, February 2016). In this regard, the classroom atmosphere is prominent. It relates to the mood, emotions, or climate shared by the class group. The context which learners speak in seems to be very effective as reflected in Sara’s interview:

“The context and condition is important in learning and speaking. It should be attractive and give us positive energy.” (Interview 2, January, 2016).

Furthermore, learning tasks is another effective environmental factor. In this case, all the participants reported that their enjoyment during the tasks decrease their anxiety. Yasaman reported:

“I love and enjoy all the speaking tasks specially role plays because they tap into my interests helping me to talk without mistakes.” (Journal 3, January 2016).

Sara also mentioned; “if I like the speaking task, I prefer to participate in that activity.” In contrast, Maryam recorded that she did not like role plays calling them meaningless and pointless (interview 5, February, 2016). Besides, all the participants had positive views reported no anxiety in peer works.

At the mesosystem level

It was showed that students’ past learning experience and activities outside the classroom exerted a significant effect on their speaking anxiety at the microsystem level. For instance, Parisa expressed that her studying English at high school was a dissatisfying experience because her classmates made fun of her for making mistakes which made her highly anxious. She explained that, under the influence of her bitter school experiences, she was afraid and anxious to talk in the class. Similarly, their families’ pressure was reported to have significant impact on their speaking anxiety. For instance, Maryam and Parisa recorded that their family pressure was so high forcing them to study English (Journal 2, January, 2016).

However, Yasaman and Sara, understanding their family expectations of them, reported that they are learning English because they love it, so they experience lower levels of speaking anxiety in case of the family pressure.

At the exosystem level

The findings indicated that the exosystem comprises curriculum design and course assessment about which students always complain about. The learners expressed that speaking tests are the most anxiety raising activities every semester. They revealed that at the time of speaking tests, their mood changed and they were not able to talk as well as no-exam days. The institute held speaking tests at the end of each semester which were executed by the supervisor. Parisa reported: “When they say our teacher wouldn’t

give our test, I feel highly anxious, and I can't talk because I feel uncomfortable with our supervisor." The other participants also reported high anxiety for taking speaking tests by their supervisor. They all agreed in holding their tests by their own teacher (Journal 5, February, 2016).

Preventing students to speak in their L1 is another exosystem factor affecting speaking anxiety, yet it is one of the institute policies. Two of the participants liked to speak their L1 whenever they did not know what to say and they forgot a word, but since the regulations of the institute prevented them to speak in their native language, Persian, they felt anxious and afraid to lose mark. Parisa reported: "I feel highly anxious in this case because switching to Persian can affect my speaking point." (Interview 4, February, 2016).

At the macrosystem level

Iranian culture somehow has an influence on the participants' anxiety. Iranians have different goals to learn English among which the most important one is passing university entrance exam. To achieve in this exam does not require speaking English accurately and fluently but its concern is mostly grammar and vocabulary in written tests. Due to this reason, most students are anxious at the time of speaking since they have not had the opportunity to communicate competitively in their education system. Parisa asserted: "I'm only learning English to prepare for my university entrance exam for which I don't need to speak English. Therefore, I do not try to practice this skill." (Journal 3, January, 2016).

Maryam, on 3rd grade of high school, preparing for university entrance exam, also reported the same as Parisa. Besides, as education in Iranian school is competition based, the way that others think or judge a learner is very important and may have an impact on learners' anxiety. For example, Sarah said she was an active learner both in English class and at school since she reported: "When I'm so active in the class and I raise my hand voluntary for answering questions, my classmates suppose that I'm flattering!" Consequently, Sara indicated that she was afraid of her classmates' negative judgments; however, based on our observations, she could overcome her anxiety. (Observation 4, February, 2016).

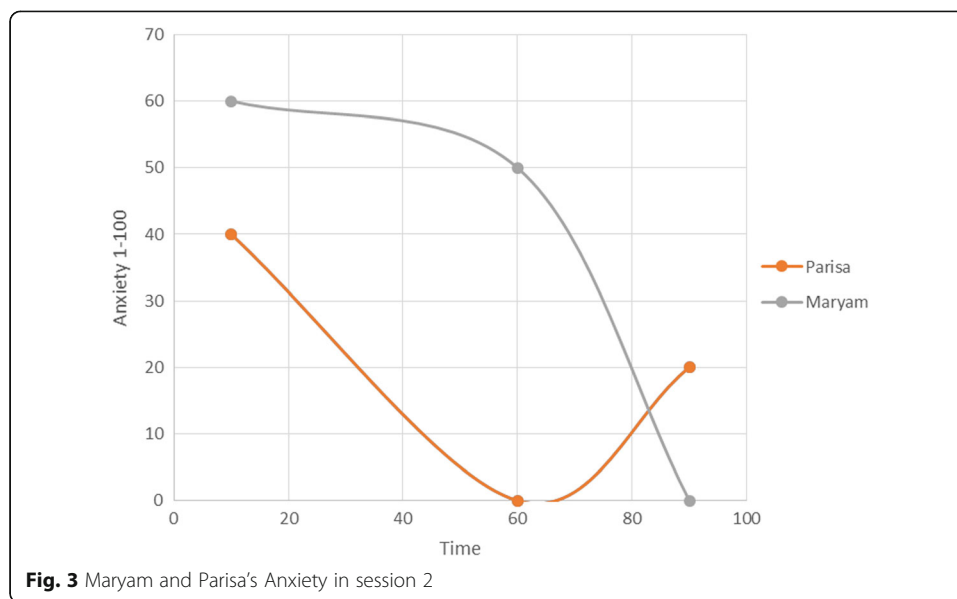
Composite charts

As mentioned before, there were five charts (one for each class) to trace the motometer data. As Fig. 2 displays, the horizontal axis represented time in steps of ten minutes, underneath the axis, and the vertical axis represents the level of anxiety each participant experienced in time intervals of each session based on the events forming the speaking activities in the class.

Change and variability

Between participants' change

The data showed the amount of individual differences among the four students. Figure 3 displays speaking anxiety of participants during the course. At the beginning, Parisa, and Maryam's anxiety was rather high because in first ten minutes the teacher started the class with some questions about the previous session which were anxiety provoking



for them because they were not familiar with the teacher's style. But, as the teacher started the new lesson, their anxiety decreased gradually. In minute 65, a sudden rise was observed in Parisa's anxiety as the teacher asked her some questions with regard to the new lesson which generated anxiety in her. But we can see a contrasting pattern for Maryam's anxiety.

Consistent with her low general anxiety, in this situation she experienced a falling trend of anxiety because as she commented she had learnt the new lesson well, so she had no problem answering the teacher's questions. In minute 90, the teacher asked them to work in pairs and she experienced zero level of anxiety.

In session 3 of classroom observation, Parisa and Maryam experienced almost similar patterns of anxiety. As seen in Fig. 4, the starting points for both participants are the same. First, the teacher, like the second session, started the class with a review of the previous session but since this time they were both familiar with the teacher's style of starting the class, they experienced zero level of anxiety. However, their anxiety level went up slightly during the session as they got involved in the activities of the lesson but this time, in contrast with the second session, the new lesson pivoted upon a new grammatical pattern not seen before, *the unreal conditional* sentences which was anxiety provoking for them. However, in minute 52, Maryam's rising anxiety suddenly fell due to her success in responding to the oral tasks of the class and the positive emotional feedback she received from the teacher.

As seen in Fig. 5, Sara and Yasaman experienced similar patterns of anxiety in session 2. While the starting point for Yasaman is anxiety producing, Sarah's starting point is not the same. The teacher again asked them about the previous session grammar. In this situation, Yasaman was anxious because the starting questions about the previous session seemed difficult but they were easy for Sara because she had good knowledge of the previous session content and she commented that this was her studying habit since elementary school and she always studied the content of the previous session in her other courses as well. Initiating the class with low levels of anxiety, she ended up the oral activities in this session with slight rise in anxiety. Similarly, Yasaman's anxiety

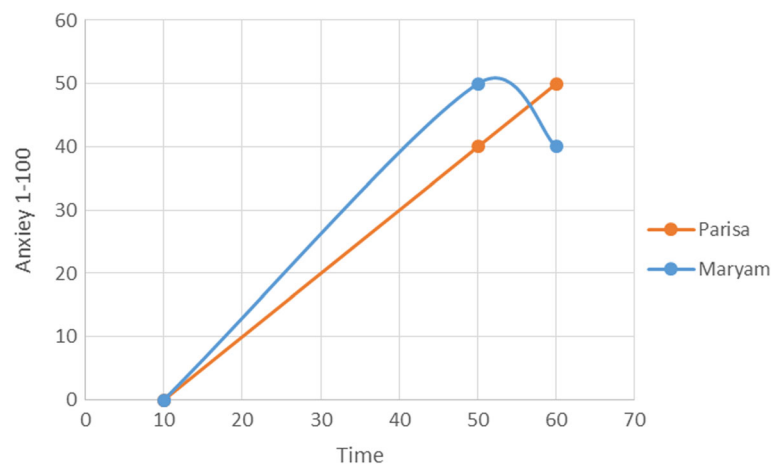


Fig. 4 Parisa and Maryam's anxiety in session 3

dropped up to the 65th minute as she was listening to the teachers' notes on the new lesson but went through a rising anxiety zone as she was to answer the teachers' questions.

Figure 6 also displays the same patterns of starting point in session 3 for Sarah and Yasaman. Both participant's anxiety is at the lowest level because they reviewed the previous session well. Sarah and Yasaman, like the other two participants, show an increase in their anxiety during the session due to the new grammatical topic presented in the class. Yasaman's anxiety lowered in minute 50 due to her partial mastery in the oral activities of the class using the new grammatical pattern.

Within participant variation

In addition to the between-participant variations, the data also showed within-participant variations. A good example of this type of variation is provided by Parisa's speaking anxiety in session 2 and 3. As seen in Fig. 7, session 2 starts with a high level of anxiety due to the

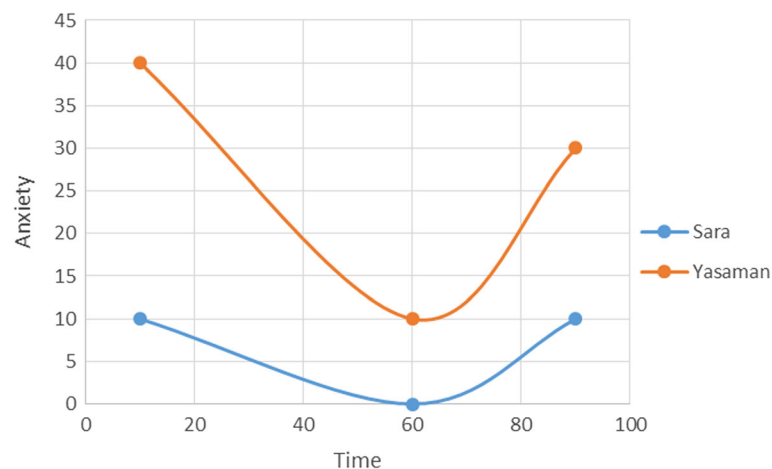
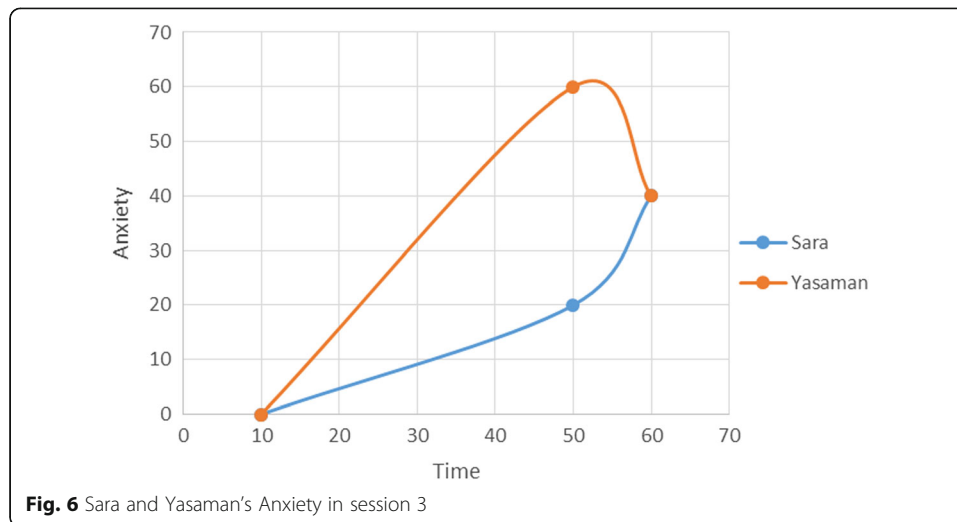


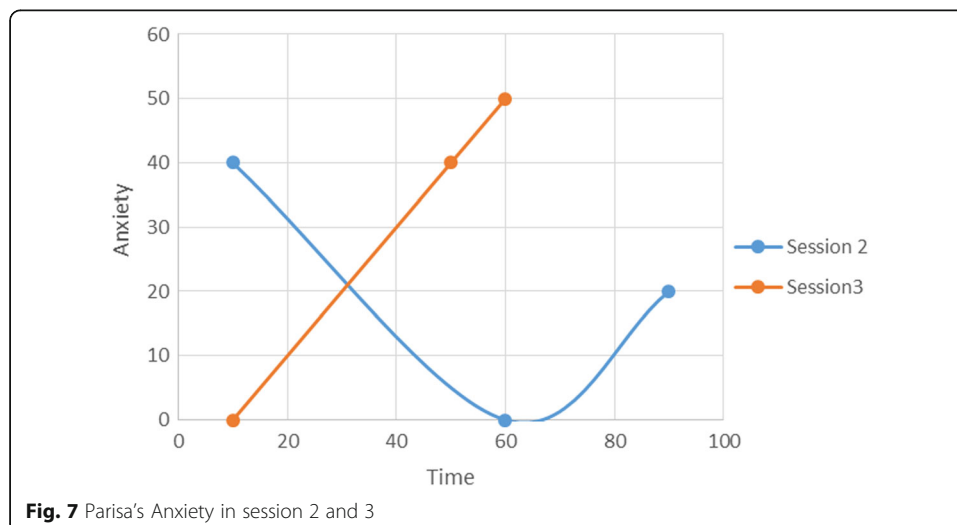
Fig. 5 Sarah and Yasaman's anxiety in session 2

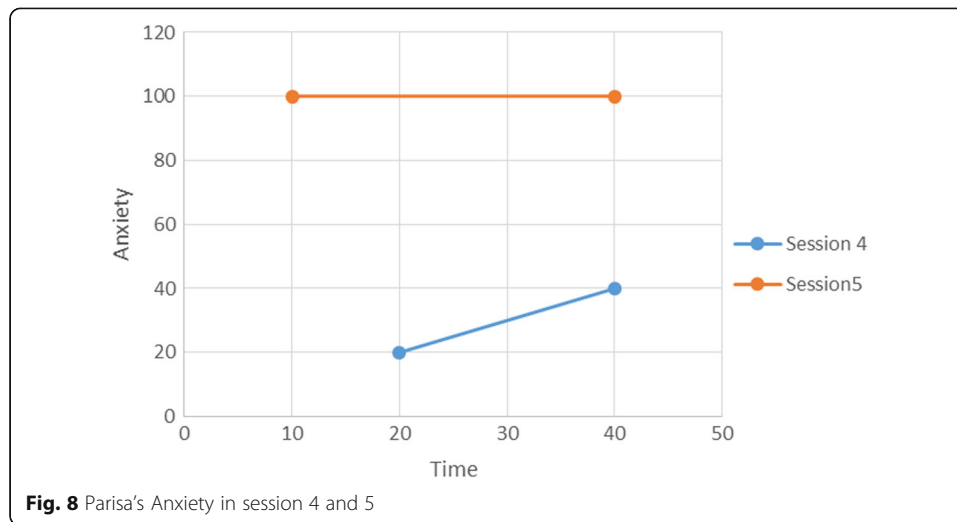


classroom questions about the previous session. Not able to answer 2 of the questions, she felt highly anxious and afraid of its consequences.

Up to minute 65, her anxiety gradually decreased as she was engaged in the new lesson activities. But again when it came to the teachers' questions, her anxiety increased sharply. On the other hand, her anxiety in session 3 showed a different trajectory, starting with very low level of anxiety due to her preparation to answer the teacher's question at the beginning of the class but experiencing anxiety provoking moments caused by their unfamiliarity with the grammatical topic of the new lesson.

Comparing her anxiety tends in the fourth and fifth sessions in Fig. 8, we observe no similarity in between. In session 4, she started the class with low levels of anxiety as she responded to the questions of the previous session. But when the teacher asked them to act out the conversation in minute 20, we observe a slight increase in her anxiety till minute 40. In contrast, she experienced a continuously high level of anxiety in session 5 due to a speaking test with the supervisor. She noted that most of the speaking tests in institutes are anxiety producing, especially the ones held by a person except their own teachers.

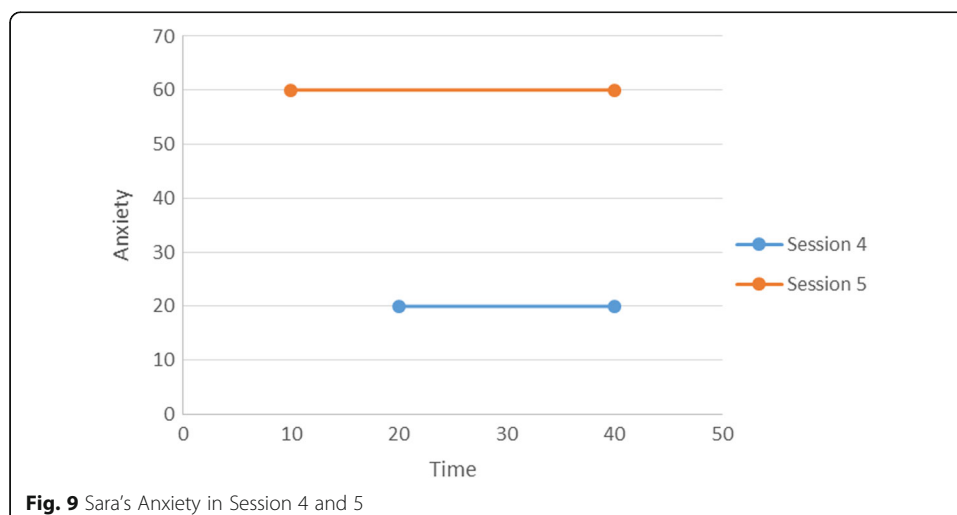




Comparing Sarah's fourth and fifth session, we observed varied patterns (see Fig. 9). The influence of attractor state, speaking test, is obvious even for Sarah who was a student with high levels of confidence. Speaking test caused a stable fairly high trend of anxiety. No significant change was observed in her low anxiety in session 4 as well. During the first 20 min, she was a little anxious as the teacher asked her 2 questions about the previous session based on what she commented. But her anxiety remained the same since the teacher asked them to act out the conversation (Fig. 9).

Stability

The data demonstrated that the variability is not always random or unpredictable. Based on CDST, the multicomponential system like language class showed the influence of an attractor. These fluctuations may result from the changes in classroom activities. As seen in Figs. 2, 3, and 5, at the beginning of session 2, all the participants' anxiety was high as the teacher started the class with review questions of the previous session. In addition, as seen in Figs. 4 and 6, the participants' anxiety in session 3 followed a stable trend up to



minute 55 due to the participants' unfamiliarity with the new grammatical pattern. When this activity finished, there remained no attractor state, thus participants started to display different patterns of anxiety. In session four, their anxiety had a stable pattern at the beginning of the class while experiencing slight moments of rising anxiety between minutes 20 and 40 (see Figs. 8 and 9).

As seen in Figs. 8 and 9, there are also stable trends in session five. The students in this session had a speaking test, an attractor state. All participants' anxiety was high at the beginning till the end of the test. The speaking test was the most anxiety producing factor for participants.

Despite the participants' anxiety variations in different situations, we can also find a certain amount of stability within students' own conditions. For example, Sarah's attitude toward learning English and also speaking is positive; thus, she experienced lower levels of anxiety than the other participants in most situations despite observed ups and downs in her anxiety trend.

Discussion

Since anxiety is a second-language-acquisition critical emotional reaction, it can be labeled as stable, debilitating and emotional (Horwitz 2010; Horwitz, Horwitz & Cope 1986; MacIntyre & Gardners, 1991). However, language learning, as an emotionally dynamic process, deals with gradual fluctuations passing through the conditional adaptations (Gregerson & MacIntyre, 2014). Based on what Diane Larsen-Freeman (2007) claimed in defining the dynamic processes in SLA, the dynamic processes of language are reflected by changes in language learners. (p.783). Regarding the CDST, if we study anxiety dynamically, the linear, cause-effect relationships are not working anymore. Therefore, we have to conduct our studies taking a process-oriented approach to look into the changes in learners which cannot be identified holding a trait oriented perspective (Scherer, 2001; Gregerson & MacIntyre, 2014). Considering the dynamics of speaking anxiety, based on the current findings, we observed the classroom speaking anxiety was influenced by some individual and environmental factors.

In addition, using new expressions and words is another linguistic factor which appeared progressive for low-anxious students and debilitating for the highly anxious ones. The teacher or peers' negative judgment can be one of the affective factors which may heighten learners' anxiety. Thus, having good relations with other students in the class mitigates negative judgments and contributes to decreasing learners' anxiety. Besides, pedagogical contextual factors and tools used for learning affect learners' anxiety. Teachers' negative reaction to the learners' mistakes make them feel embarrassed that they prefer not to talk in the class. The level of learners' self-confidence influences their level of anxiety since learners with low self-confidence feel anxious to talk. In contrast, confident learners are eager to speak and they learn from their mistakes. EFL learners' anxiety might be impressed by their self-perception of their English language. Besides, the background knowledge of students, and lack of topical knowledge affected their anxiety as familiarity with the topics of conversations decreases their anxiety. At the time of speaking, they have a lot of ideas to talk about in their mind in their native languages, but they have no idea how to put them; thus, they abstain to talk. This study suggested that cognitive, linguistic, and affective factors are important in the moment-by-moment rise and fall of learners' anxiety.

Furthermore, the role of classroom environment is important at the microsystemic level. The classroom atmosphere influencing learners' mood or emotion should be attractive. In addition, teachers play a pivotal role to change the students' level of anxiety under any condition. As reported in the interviews, the teacher plays an important role in building and attracting the students' interest in learning and speaking through creativity such as using the new teaching methods like positive emotional feedback also decreased the students' anxiety. Their styles, methods and classroom procedures impact on the classroom environment as observed in the teacher's questions and assessments in the class, while the learners were not ready, made them anxious. The role of learning tasks is also very significant. In order to reduce speaking anxiety, tasks such as role play can be impressive. Besides, learners' interest in speaking tasks causes active class participation. Face-to-face activities or group works are also enjoyable for learners and would decrease their anxiety. On the other hand, speaking tasks in which learners are to use of new and unfamiliar grammar are anxiety provokers. Also, based on the overall attitudes of the learners, most of the learners were serious about speaking and liked to talk in English which contributed to their lower levels of anxiety in some sessions or some specific moments in each session consequently. Acting in front of others is another element which may influence their anxiety. In this regard, negative judgments might cause high level of anxiety, and positive judgments cause low level of anxiety.

Utilizing Bronfenbrenner's ecosystems framework, the interconnection between the classroom and other settings shows that students' past learning experiences outside the classroom have a significant effect on their speaking anxiety inside the classroom. Considering mesosystem, the learners' inappropriate or unsatisfactory experiences in high schools may influence their anxiety in the other situations. Also, family pressure is another factor which may increase EFL anxiety in speaking. Moreover, the current study suggested that curriculum design and course assessment are among the factors influencing EFL anxiety. Preventing students from using their L1 is another important factor at the ecosystem level raising learners' anxiety. In addition, the findings indicated evidence for social, educational and cultural factors influencing learners' speaking anxiety. In Iran, the focus is mostly on grammar and vocabulary as the learners prominent priority is passing in entrance exam of universities in which speaking is not questioned.

Looking into within-participant variations, we gained further information about anxiety. Assessment of the course overshadows the learners' activities in the class to a large extent increasing their anxiety. So, exam days are the most anxiety provoking moments for the learners. In particular, the speaking tests taken by supervisor in the institute were the most anxiety producing agents acting like an attractor state within the dynamic system. Also, in line with the principles of dynamic systems, EFL learners' general or trait anxiety cannot always predict their level of anxiety patterns. For example, in session 2, in line with her low trait anxiety, Maryam ran through a falling trend of anxiety but in the third session, up to minute 52, she experienced a rising level of anxiety as Parisa did, who has a high general anxiety. Likewise, in the third session, Yasaman, having a higher general anxiety than Sara, felt a falling anxiety trend after minute 55 but Sara, having a low level of anxiety, continued his rising anxiety till the end of the oral activities of the session.

Conclusion

This study attempts to offer an ecological understanding of foreign language speaking anxiety based on nested ecosystem model and CDST. Regarding this purpose, using Bronfenbrenner (1979, 1993) nested ecosystem model analytically demonstrated that Iranian EFL students' classroom speaking anxiety based on individual interactions inside and outside the classroom are contextually constructed. These internal and external factors seemed to be important in causing change in the emergent patterns of anxiety experienced by the learners. In addition, in line with the principles of CDST, this study used the real-time assessment of classroom speaking anxiety based on progression of four participants at 10 min intervals during five sessions. We observed that there are fluctuations within the learners' speaking anxiety in a classroom session of 90 min. Our findings showed that the events within the dynamics of classroom ecology can affect the students' level of anxiety differently. Highly anxious students can be very relaxed even in situations where the others with low anxiety are highly anxious. Our findings also showed that all the participants represented similar patterns facing attractor states. Recognizing these attractors would help the teachers to understand the ways to reduce the speaking anxiety in the class. It was noteworthy that different situations were found to cause fluctuations in anxiety. Also, in some situations, the importance of context was realized and showed unexpected anxiety increase in some of the students. On the other hand, in some cases powerful forces like oral informal class assessments, teachers' questions, did not have an impact on all the participants in a similar way, which was in line with the CDST principles of nonlinearity in system behavior. Indeed, in all classroom situations, dynamic stability, attractor states, and individual variability were identified. Teachers should consider these mixed situations in class. They also should become aware of the forces changing the level of anxiety as repellents and those creating an attractor state. Regarding these factors, teachers should consider the students' different attitudes, characteristics, and their degree of self-confidence. The classroom atmosphere also has to be positive and interesting to decline the level of students' anxiety. Indeed, if the learners' performance are judged negatively by teachers or classmates, they may lose their confidence and consequently their anxiety will increase. Based on insight gained from the current findings, we hope we will choose a straightforward methodology in speaking based on CDST principles to uncover the dynamic processes influencing the students' speaking anxiety. It is important to note that this study aimed to provide an exploratory analysis of EFL learners' speaking anxiety from an emic perspective rather than a short-cut generalizable solution to reduce speaking anxiety in EFL classrooms.

Authors' contributions

Both SK and MES carried out the study. SK participated in the data collection of the study. Both authors participated in the data analysis and helped to draft the manuscript. Both authors read and approved final manuscript.

Competing interests

The authors declare that they have no competing interests.

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