1. ABOUT THE DATASET

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Title: L2 listening development within an informal digital learning of English listening (IDLEL) context

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Organisation(s): University of Reading

Rights-holder(s): Huining Yang, University of Reading

Publication Year: 2025

Description: This dataset first includes questionnaire data collected from Chinese undergraduate EFL learners (aged 18-21) on self-regulated L2 listening (*N* = 523), listening anxiety (*N* = 427), and listening self-efficacy (*N* = 435). These data were used to conduct confirmatory factor analyses (CFA) to validate the latent constructs of the three questionnaires. Additionally, to explore the relationships among self-regulation, self-efficacy, listening anxiety, L2 listening proficiency, and IDLEL engagement, another group of English-major EFL learners (*N* = 130, aged 18-20)were recruited. The collected data includes: 1) participants’ L2 listening proficiency, assessed through listening comprehension tests administered at the pretest (Week 1, *N* = 130), post-test (Week 6, *N* = 91), and delayed post-test (Week 19, *N* = 60); 2) participants’ pretest (*N* = 130) and post-test (*N* = 91) responses to Likert-scale questionnaire items on listening self-regulation, listening anxiety, and listening self-efficacy; 3) participants’ weekly (*N* = 91)records in E-logs from Week 2 to Week 5, documenting their IDLEL engagement (i.e., frequency, duration, diversity, and strategy use).

Cite as: Yang, H., Graham, S. & Zhang, P.(2025): L2 listening development within an informal digital learning of English listening (IDLEL) context. University of Reading. Dataset.

Related publication:

Yang, Huining., Graham, Suzanne. & Zhang, Pengchong. Validating a Self-Regulated L2 Listening Model: Predictive Roles of SRL, Self-Efficacy, and Listening Anxiety. In progress.

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2. TERMS OF USE

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3. PROJECT AND FUNDING INFORMATION

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Title: The development of learners’ listening comprehension, self-efficacy, and anxiety within an informal digital learning of English listening (IDLEL) context: Examining the role of IDLEL engagement and self-regulation.

Dates: June 2025

Funding organisation: Self-funded PhD project

Grant no.:

4. CONTENTS

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File listing

**4.1 File name: CFA\_SRL.csv**

Number of variables: 47

Number of cases: 523

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable name** | **Description** | **Unit** | **Value labels** |
| ID | Participant ID | Numeric | N/A |
| S1 | Self-regulated Listening Item 1 | Numeric | 1-6 |
| S2 | Self-regulated Listening Item 2 | Numeric | 1-6 |
| S3 | Self-regulated Listening Item 3 | Numeric | 1-6 |
| S4 | Self-regulated Listening Item 4 | Numeric | 1-6 |
| S5 | Self-regulated Listening Item 5 | Numeric | 1-6 |
| S6 | Self-regulated Listening Item 6 | Numeric | 1-6 |
| S7 | Self-regulated Listening Item 7 | Numeric | 1-6 |
| S8 | Self-regulated Listening Item 8 | Numeric | 1-6 |
| S9 | Self-regulated Listening Item 9 | Numeric | 1-6 |
| S10 | Self-regulated Listening Item 10 | Numeric | 1-6 |
| S11 | Self-regulated Listening Item 11 | Numeric | 1-6 |
| S12 | Self-regulated Listening Item 12 | Numeric | 1-6 |
| S13 | Self-regulated Listening Item 13 | Numeric | 1-6 |
| S14 | Self-regulated Listening Item 14 | Numeric | 1-6 |
| S15 | Self-regulated Listening Item 15 | Numeric | 1-6 |
| S16 | Self-regulated Listening Item 16 | Numeric | 1-6 |
| S17 | Self-regulated Listening Item 17 | Numeric | 1-6 |
| S18 | Self-regulated Listening Item 18 | Numeric | 1-6 |
| S19 | Self-regulated Listening Item 19 | Numeric | 1-6 |
| S20 | Self-regulated Listening Item 20 | Numeric | 1-6 |
| S21 | Self-regulated Listening Item 21 | Numeric | 1-6 |
| S22 | Self-regulated Listening Item 22 | Numeric | 1-6 |
| S23 | Self-regulated Listening Item 23 | Numeric | 1-6 |
| S24 | Self-regulated Listening Item 24 | Numeric | 1-6 |
| S25 | Self-regulated Listening Item 25 | Numeric | 1-6 |
| S26 | Self-regulated Listening Item 26 | Numeric | 1-6 |
| S27 | Self-regulated Listening Item 27 | Numeric | 1-6 |
| S28 | Self-regulated Listening Item 28 | Numeric | 1-6 |
| S29 | Self-regulated Listening Item 29 | Numeric | 1-6 |
| S30 | Self-regulated Listening Item 30 | Numeric | 1-6 |
| S31 | Self-regulated Listening Item 31 | Numeric | 1-6 |
| S32 | Self-regulated Listening Item 32 | Numeric | 1-6 |
| S33 | Self-regulated Listening Item 33 | Numeric | 1-6 |
| S34 | Self-regulated Listening Item 34 | Numeric | 1-6 |
| S35 | Self-regulated Listening Item 35 | Numeric | 1-6 |
| S36 | Self-regulated Listening Item 36 | Numeric | 1-6 |
| S37 | Self-regulated Listening Item 37 | Numeric | 1-6 |
| S38 | Self-regulated Listening Item 38 | Numeric | 1-6 |
| S39 | Self-regulated Listening Item 39 | Numeric | 1-6 |
| S40 | Self-regulated Listening Item 40 | Numeric | 1-6 |
| S41 | Self-regulated Listening Item 41 | Numeric | 1-6 |
| S42 | Self-regulated Listening Item 42 | Numeric | 1-6 |
| S43 | Self-regulated Listening Item 43 | Numeric | 1-6 |
| S44 | Self-regulated Listening Item 44 | Numeric | 1-6 |
| S45 | Self-regulated Listening Item 45 | Numeric | 1-6 |
| S46 | Self-regulated Listening Item 46 | Numeric | 1-6 |

**4.2 File name:CFA\_Anxiety.csv**

Number of variables: 18

Number of cases: 427

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable name** | **Description** | **Unit** | **Value labels** |
| ID | Participant ID | Numeric | N/A |
| A1 | Listening Anxiety Item 1 | Numeric | 1-6 |
| A2 | Listening Anxiety Item 2 | Numeric | 1-6 |
| A3 | Listening Anxiety Item 3 | Numeric | 1-6 |
| A4 | Listening Anxiety Item 4 | Numeric | 1-6 |
| A5 | Listening Anxiety Item 5 | Numeric | 1-6 |
| A6 | Listening Anxiety Item 6 | Numeric | 1-6 |
| A7 | Listening Anxiety Item 7 | Numeric | 1-6 |
| A8 | Listening Anxiety Item 8 | Numeric | 1-6 |
| A9 | Listening Anxiety Item 9 | Numeric | 1-6 |
| A10 | Listening Anxiety Item 10 | Numeric | 1-6 |
| A11 | Listening Anxiety Item 11 | Numeric | 1-6 |
| A12 | Listening Anxiety Item 12 | Numeric | 1-6 |
| A13 | Listening Anxiety Item 13 | Numeric | 1-6 |
| A14 | Listening Anxiety Item 14 | Numeric | 1-6 |
| A15 | Listening Anxiety Item 15 | Numeric | 1-6 |
| A16 | Listening Anxiety Item 16 | Numeric | 1-6 |
| A17 | Listening Anxiety Item 17 | Numeric | 1-6 |

**4.3 File name: CFA\_Efficacy.csv**

Number of variables: 33

Number of cases: 435

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable name** | **Description** | **Unit** | **Value labels** |
| ID | Participant ID | Numeric | N/A |
| E1 | Listening Self-efficacy Item 1 | Numeric | 0-100 |
| E2 | Listening Self-efficacy Item 2 | Numeric | 0-100 |
| E3 | Listening Self-efficacy Item 3 | Numeric | 0-100 |
| E4 | Listening Self-efficacy Item 4 | Numeric | 0-100 |
| E5 | Listening Self-efficacy Item 5 | Numeric | 0-100 |
| E6 | Listening Self-efficacy Item 6 | Numeric | 0-100 |
| E7 | Listening Self-efficacy Item 7 | Numeric | 0-100 |
| E8 | Listening Self-efficacy Item 8 | Numeric | 0-100 |
| E9 | Listening Self-efficacy Item 9 | Numeric | 0-100 |
| E10 | Listening Self-efficacy Item 10 | Numeric | 0-100 |
| E11 | Listening Self-efficacy Item 11 | Numeric | 0-100 |
| E12 | Listening Self-efficacy Item 12 | Numeric | 0-100 |
| E13 | Listening Self-efficacy Item 13 | Numeric | 0-100 |
| E14 | Listening Self-efficacy Item 14 | Numeric | 0-100 |
| E15 | Listening Self-efficacy Item 15 | Numeric | 0-100 |
| E16 | Listening Self-efficacy Item 16 | Numeric | 0-100 |
| E17 | Listening Self-efficacy Item 17 | Numeric | 0-100 |
| E18 | Listening Self-efficacy Item 18 | Numeric | 0-100 |
| E19 | Listening Self-efficacy Item 19 | Numeric | 0-100 |
| E20 | Listening Self-efficacy Item 20 | Numeric | 0-100 |
| E21 | Listening Self-efficacy Item 21 | Numeric | 0-100 |
| E22 | Listening Self-efficacy Item 22 | Numeric | 0-100 |
| E23 | Listening Self-efficacy Item 23 | Numeric | 0-100 |
| E24 | Listening Self-efficacy Item 24 | Numeric | 0-100 |
| E25 | Listening Self-efficacy Item 25 | Numeric | 0-100 |
| E26 | Listening Self-efficacy Item 26 | Numeric | 0-100 |
| E27 | Listening Self-efficacy Item 27 | Numeric | 0-100 |
| E28 | Listening Self-efficacy Item 28 | Numeric | 0-100 |
| E29 | Listening Self-efficacy Item 29 | Numeric | 0-100 |
| E30 | Listening Self-efficacy Item 30 | Numeric | 0-100 |
| E31 | Listening Self-efficacy Item 31 | Numeric | 0-100 |
| E32 | Listening Self-efficacy Item 32 | Numeric | 0-100 |

**4.4 File name:Analysis\_SEM.csv**

Number of variables: 51

Number of cases: 130

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable name** | **Description** | **Unit** | **Value labels** |
| ID | Participant ID | Numeric | N/A |
| score\_T1 comprehension | Overall score for T1 (pre-test)listening comprehension tests | Numeric | N/A |
| mean\_T1 self-regulation | Mean score for T1 (pre-test)listening self-regulation | Numeric | N/A |
| srl\_construct1\_1 | Score for Item 1 of the first construct of self-regulation | Numeric | 1-6 |
| srl\_construct1\_2 | Score for Item 2 of the first construct of self-regulation | Numeric | 1-6 |
| srl\_construct1\_3 | Score for Item 3 of the first construct of self-regulation | Numeric | 1-6 |
| srl\_construct2\_1 | Score for Item 1 of the second construct of self-regulation | Numeric | 1-6 |
| srl\_construct2\_2 | Score for Item 2 of the second construct of self-regulation | Numeric | 1-6 |
| srl\_construct2\_3 | Score for Item 3 of the second construct of self-regulation | Numeric | 1-6 |
| srl\_construct2\_4 | Score for Item 4 of the second construct of self-regulation | Numeric | 1-6 |
| srl\_construct2\_5 | Score for Item 5 of the second construct of self-regulation | Numeric | 1-6 |
| srl\_construct2\_6 | Score for Item 6 of the second construct of self-regulation | Numeric | 1-6 |
| srl\_construct3\_1 | Score for Item 1 of the third construct of self-regulation | Numeric | 1-6 |
| srl\_construct3\_2 | Score for Item 2 of the third construct of self-regulation | Numeric | 1-6 |
| srl\_construct3\_3 | Score for Item 3 of the third construct of self-regulation | Numeric | 1-6 |
| srl\_construct3\_4 | Score for Item 4 of the third construct of self-regulation | Numeric | 1-6 |
| srl\_construct3\_5 | Score for Item 5 of the third construct of self-regulation | Numeric | 1-6 |
| srl\_construct3\_6 | Score for Item 6 of the third construct of self-regulation | Numeric | 1-6 |
| srl\_construct4\_1 | Score for Item 1 of the fourth construct of self-regulation | Numeric | 1-6 |
| srl\_construct4\_2 | Score for Item 2 of the fourth construct of self-regulation | Numeric | 1-6 |
| srl\_construct4\_3 | Score for Item 3 of the fourth construct of self-regulation | Numeric | 1-6 |
| srl\_construct4\_4 | Score for Item 4 of the fourth construct of self-regulation | Numeric | 1-6 |
| srl\_construct5\_1 | Score for Item 1 of the fifth construct of self-regulation | Numeric | 1-6 |
| srl\_construct5\_2 | Score for Item 2 of the fifth construct of self-regulation | Numeric | 1-6 |
| srl\_construct5\_3 | Score for Item 3 of the fifth construct of self-regulation | Numeric | 1-6 |
| srl\_construct5\_4 | Score for Item 4 of the fifth construct of self-regulation | Numeric | 1-6 |
| srl\_construct5\_5 | Score for Item 5 of the fifth construct of self-regulation | Numeric | 1-6 |
| srl\_construct5\_6 | Score for Item 6 of the fifth construct of self-regulation | Numeric | 1-6 |
| mean\_T1 efficacy | Mean score for T1 (pre-test)listening self-efficacy | Numeric | N/A |
| eff\_construct1\_1 | Score for Item 1 of the first construct of self-efficacy | Numeric | 0-100 |
| eff\_construct1\_2 | Score for Item 2 of the first construct of self-efficacy | Numeric | 0-100 |
| eff\_construct1\_3 | Score for Item 3 of the first construct of self-efficacy | Numeric | 0-100 |
| eff\_construct1\_4 | Score for Item 4 of the first construct of self-efficacy | Numeric | 0-100 |
| eff\_construct2\_1 | Score for Item 1 of the second construct of self-efficacy | Numeric | 0-100 |
| eff\_construct2\_2 | Score for Item 2 of the second construct of self-efficacy | Numeric | 0-100 |
| eff\_construct2\_3 | Score for Item 3 of the second construct of self-efficacy | Numeric | 0-100 |
| eff\_construct2\_4 | Score for Item 4 of the second construct of self-efficacy | Numeric | 0-100 |
| eff\_construct2\_5 | Score for Item 5 of the second construct of self-efficacy | Numeric | 0-100 |
| mean\_T1 anxiety | Mean score for T1 (pre-test) listening anxiety | Numeric | N/A |
| anx\_construct1\_1 | Score for Item 1 of the first construct of listening anxiety | Numeric | 1-6 |
| anx\_construct1\_2 | Score for Item 2 of the first construct of listening anxiety | Numeric | 1-6 |
| anx\_construct1\_3 | Score for Item 3 of the first construct of listening anxiety | Numeric | 1-6 |
| anx\_construct2\_1 | Score for Item 1 of the second construct of listening anxiety | Numeric | 1-6 |
| anx\_construct2\_2 | Score for Item 2 of the second construct of listening anxiety | Numeric | 1-6 |
| anx\_construct2\_3 | Score for Item 3 of the second construct of listening anxiety | Numeric | 1-6 |
| anx\_construct2\_4 | Score for Item 4 of the second construct of listening anxiety | Numeric | 1-6 |
| anx\_construct2\_5 | Score for Item 5 of the second construct of listening anxiety | Numeric | 1-6 |
| anx\_construct3\_1 | Score for Item 1 of the third construct of listening anxiety | Numeric | 1-6 |
| anx\_construct3\_2 | Score for Item 2 of the third construct of listening anxiety | Numeric | 1-6 |
| anx\_construct3\_3 | Score for Item 3 of the third construct of listening anxiety | Numeric | 1-6 |
| anx\_construct3\_4 | Score for Item 4 of the third construct of listening anxiety | Numeric | 1-6 |

**4.5 File name:IDLEL.csv**

Number of variables: 10

Number of cases: 273

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable name** | **Description** | **Unit** | **Value labels** |
| ID | Participant ID | Numeric | N/A |
| Time | Time of testing | Ternary | Pretest vs. Post-test vs. Delayed post-test |
| score\_comprehension | Overall score for listening comprehension tests | Numeric | N/A |
| mean\_self-regulation | Mean score for listening self-regulation | Numeric | N/A |
| mean\_self-efficacy | Mean score for listening self-efficacy | Numeric | N/A |
| mean\_anxiety | Mean score for listening anxiety | Numeric | N/A |
| aver\_frequency | The number of times of activity participation every week | Numeric | N/A |
| aver\_diversity | The number of types of activities participated in every week | Numeric | N/A |
| aver\_duration | The amount of time spent on activities every week | Numeric | N/A |
| aver\_strategy\_use | The number of types of SRL strategies used every week | Numeric | N/A |

**4.6 File name: Instruments.pdf**

5. METHODS

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**- Experimental procedures/protocols**

This study was conducted in two consecutive sections. The first section focused on validating the hypothesised self-regulated L2 listening model structure, while the second investigated the relationships among self-regulation, self-efficacy, listening anxiety, L2 listening proficiency, and IDLEL engagement (i.e., frequency, duration, diversity, and strategy use).

In the first part of the study, participants were required to complete electronic questionnaires investigating their self-regulation, self-efficacy, and anxiety in listening. Two weeks later, the second part of the study was conducted in four phases. In the first phase (week 1), a different cohort of participants from those in the first part of the study were first asked to complete a listening test in their English listening classes. Immediately after the listening test, participants were required to complete questionnaires capturing their immediate responses to factors (i.e., SRL strategies, self-efficacy, and anxiety) related to English listening. The questionnaires used in the second part of the study were the updated version based on the confirmatory factor analysis (CFA) results of the questionnaire data collected in the first part of the study.

In the second phase (week 2 to week 5), participants were asked to complete as many IDLEL activities as they wished in addition to the work set by their teachers and keep one English E-log a week in which they briefly described the way they engaged in IDLEL activities. In the third phase (Week 6), participants completed a second English listening test as the post-test and filled in the same questionnaire they had completed in Week One. In the fourth phase (Week 19), participants took a third English listening test as the delayed post-test.

**- Environmental/experimental conditions.**

The was designed as an observational study, which requires the researcher to refrain from intervening or making specific requests to ensure the data can reflect participants’ natural states and behaviours outside the research context.

**- Instruments used**

***English Listening Questionnaire***

***Self-Regulated L2 Listening Questionnaire (SRLLQ)***

The English listening questionnaire developed and used in the current research consisted of three sub-sections. The first sub-section was the Self-Regulated L2 Listening Questionnaire (SRLLQ), which firstly aimed to validate the self-regulated L2 listening model and secondly to investigate participants’ level of self-regulation in English listening. SRLLQ was specifically designed for the present study.

***L2 Listening Anxiety Scale (LLAS)***

The second sub-section was the L2 Listening Anxiety Scale (LLAS), designed to explore learners’ English listening anxiety. This scale was adapted from *Foreign Language Listening Anxiety Scale* (FLLAS)(Elkhafaifi, 2005). While the FLLAS was originally designed to measure foreign language listening anxiety among university-level Arabic learners, it has been widely adapted in various studies as a tool for measuring foreign language listening anxiety among university EFL learners in countries such as China (Liu & Xu, 2021), Saudi Arabia (Alshahrani & Almanea, 2023), Iran (Valizadeh & Alavinia, 2013). The adaptations include four aspects. Firstly,replacing the target language “Arabic” in FLLAS with “English”. Secondly, the original FLLAS uses a five-point Likert scale. However, the adapted questionnaire employed a six-point Likert scale, with higher scores indicating higher levels of anxiety. Thirdly, the FLLAS was adapted from the Foreign Language Reading Anxiety Scale (FLRAS) (Saito, et al., 1999). The adaptation was limited to replacing the word “reading” in the FLRAS with “listening” in the FLLAS and substituting the target languages “French, Russian, Japanese” with “Arabic”, while the number and content of the items were barely modified (Elkhafaifi, 2005). Upon evaluation by the researcher and two L2 experts, it was determined that 10 (i.e., Item 9 and Items 12 to 20) out of the 20 items in the FLLAS were inappropriate for understanding learners’ listening anxiety and thus were removed. Moreover, in the FLLAS, items 8 and 10, which were used to understand learners’ perceptions of specific listening difficulty, and item 4, which was used to understand learners’ difficulties in listening processing, were considered insufficient by the researcher and L2 experts to serve their intended purposes. Therefore, these three items were modified for greater clarity and precision, after reaching a consensus. Fourthly, anxiety can be situation-specific (Horwitz et al., 1986). Therefore, when assessing learners’ listening anxiety, situational factors should be considered. After discussions between the researcher and the two experts, items involving seven specific English listening situations were added to the questionnaire, including two in-class situations (i.e., English courses and tests) and five out-of-class situations (i.e., English radio, movies and TV, songs, social media platforms, and presentations). Additionally, the questionnaire included negatively worded items (e.g., “I do not feel nervous when listening to passages from my English textbook”) to prevent respondents from consistently scoring on one side of the scale (Vandergrift et al., 2006).

FLLAS can be found:Elkhafaifi, H. (2005). Listening comprehension and anxiety in the Arabic language classroom. The Modern Language Journal, 89(2), 206-220. <https://doi.org/10.1111/j.1540-4781.2005.00275.x>

FLRAS can be found: Saito, Y., Garza, T. J., & Horwitz, E. K. (1999). Foreign language reading anxiety. The Modern Language Journal, 83(2), 202-218. <https://doi.org/10.1111/0026-7902.00016>

***Listening Self-efficacy Questionnaire (LSEQ)***

The third sub-section was the Listening Self-efficacy Questionnaire (LSEQ), which aimed to examine participants’ English listening self-efficacy. Self-efficacy questionnaires often use a 0 to 100 scale, following Bandura’s (2006) lead. For instance, Graham and Macaro’s (2008) questionnaire, on which the Listening Self-Efficacy Questionnaire (LSEQ) used in this study was based, used a 0-100 scale to assess learners’ confidence in different aspects of listening, including understanding the main idea, understanding details, inferring the meaning of unknown or difficult words, and identifying opinions expressed in the text. Considering the task-specific nature of self-efficacy (Pintrich, 2000), the LSEQ retained the same items and scale format as Graham and Macaro’s (2008) questionnaire but was designed around eight specific types of English listening tasks relevant to both classroom (i.e, listening to textbooks and listening tests) and out-of-class contexts (i.e., English video, TV/movies, videos on social media platforms, presentation, audiobook, songs). Participants were asked to rate their confidence in relation to these eight types of listening tasks on a scale from 0 to 100 from two perspectives: understanding the gist of the listening input (i.e., comprehending the main idea and identifying the viewpoints expressed in the passage) and understanding detailed information (i.e., grasping details and inferring the meanings of unknown or difficult words).

Graham and Macaro’s (2008) questionnaire can be found: Graham, S., & Macaro, E. (2008). Strategy instruction in listening for lower‐intermediate learners of French. Language Learning, 58(4), 747-783. <https://doi.org/10.1111/j.1467-9922.2008.00478.x>

***Listening Comprehension Tests***

Three listening comprehension tests were conducted at the beginning and end of the IDLEL study (Week 1 and Week 6), and three months after the study ended (Week 19) to assess participants’ English listening proficiency. The listening tests were specifically designed for this study. The four sets of listening materials used in the listening comprehension tests comprised both authentic listening sources, such as TED Talks, BBC radio programmes and English films, and non-authentic or semi-authentic materials, such as passages from IELTS listening practice tests. Two types of tasks were included in each listening test: free-recall tasks and multiple-choice questions. Each listening comprehension test contained four free-recall tasks and eight multiple-choice questions.

***IDLEL E-Logs***

1. logs (electronic logs) were employed to collect data regarding participants’ IDLEL engagement. Participants recorded the frequency, diversity, and duration of their engagement in IDLEL activities as well as their strategy-use during activities.

**- Methods used for processing the data**

1. To validate the structure of the self-regulated L2 listening model and the underlying constructs of LLAS and LSEQ,we adopted ***CFA analysis*** in R (R Core Team, 2024)using the “semTools” package (Jorgensen et al., 2022).
2. To validate the hypothesised joint predictive mechanism of SRL, self-efficacy, and listening anxiety on listening comprehension, we adopted ***Structural Equation Modelling (SEM)*** in R using the “semTools” package.
3. To validate the multiple mediation pathways involved in the hypothesised joint predictive mechanisms, we adopted ***mediation analysis*** in R using the “semTools” package.
4. To explore the characteristics of participants’ engagement in IDLEL activities, namely frequency, diversity, duration, and strategy use, the E-log data were subjected to ***descriptive analysis, thematic analysis, and cluster analysis***.Both the descriptive analysis and cluster analysis in the current study were performed in R using the “NbClust” package (Charrad et al., 2014). The thematic analysis was conducted in Excel.
5. To identify potential predictors affecting the participants’ listening proficiency, listening self-efficacy, and listening anxiety, we adopted ***linear mixed-effects models (LMMs)*** in R using the “lmerTest” package (Kuznetsova et al., 2017).
6. To examine the moderation effects of SRL on the relationship between IDLEL engagement and listening proficiency, listening efficacy and listening anxiety, we adopted ***moderation analysis*** in R using the “lmerTest” package.

- **People involved in activities that contributed to the production, processing or analysis of the dataset.**

Huining Yang, Suzanne Graham, and Pengchong Anthony Zhang