

An Empirical Study on the Application of Multi-modal Teaching Model on English Writing Teaching in China Senior High School

Min Guo¹ & Jiazhu Li¹

¹ School of Foreign Languages, Xinyang Normal University, China

Correspondence: Jiazhu Li. School of Foreign Languages, Xinyang Normal University, China.

Received: July 15, 2023

Accepted: July 24, 2023

Online Published: August 21, 2023

doi:10.5539/ass.v19n5p1

URL: <https://doi.org/10.5539/ass.v19n5p1>

Abstract

Recently, Multi-modal teaching has attracted much attention in the field of second-language writing. Previous studies paid great attention to the pedagogical effects of this teaching model on the writing competence of college students in China. Less investigation focused on the writing performance of Chinese senior high school students. This study aims to investigate the influence of Multi-modal teaching model on English writing competence in terms of writing score, language performance, and students' writing attitudes. The research instruments consist of two English writing tests, questionnaires and an interview. The research results showed that Multi-modal teaching model can significantly improve learners' writing competence. Meanwhile, the attitudinal survey indicated that Multi-modal teaching model has a positive influence on senior high school English learners' writing competence and writing interest.

Keywords: Multi-modal teaching model, English in senior high school, English writing

1. Introduction

According to the English Curriculum Standards for Senior High School of China (2020 revision), English writing is a productive skill, which can be improved by the combination of multi-modal and input skills to enhance students' understanding skills. English writing has been further reinforced by the increase in writing scores as the reform of the College Entrance Examination. Some experts have found that many teachers paid much attention to oral expression, neglecting non-language expression. It brings much negative influence on students, such as low interest and language accuracy, simple words and sentences, and low writing competence (Wang, 2019).

As Zhang (2010) pointed out, Multi-modal teaching model can motivate students' initiative by stimulating students' visual, auditory, and other senses, and improving teaching effects. So far, the field of multi-modal teaching has obtained certain achievements, such as the combination and creation of Multi-modal teaching model (Zhang, 2009, 2012). They all laid a solid foundation for subsequent quantitative research on the pedagogical effects of Multi-modal teaching model. However, previous research focused on the effects of this teaching model on college students' writing scores, with less emphasis on their writing performance, and even less on senior high school students. Therefore, this study attempts to fill the research gap. This present study applies Multi-modal teaching model in senior high writing teaching classrooms, to investigate the influence of the writing teaching model on senior high school learners' writing competence. This study contributes to promoting the development of English writing teaching and broadening the research scope of the multi-modal writing teaching model.

2. Literature Review

Previous research on Multi-modal writing teaching is mainly about the creation of Multi-modal teaching model and verification of the pedagogical effects of this teaching model on students writing. As Stein (2009) said, Multi-modal teaching model refers to a teaching method involving a variety of modes to mobilize students' hearing, touch and other senses. The concept of multi-modal teaching originated from the 'multiliteracy' proposed by the New London Group (Cazden, 1996). They came up with four teaching procedures based on their concept of design, which are overt instruction, situated practice, transformed practice and critical framing. Moreover, they believed that there is no fixed order among those four teaching steps, which needs to be adjusted according to the real situation. Zhang (2012) developed a multi-modal teaching model on the basis of the New

London Group's study. Besides, Zhang (2010) pointed out the principles of multi-modal combination, which consist of the general principle of optimal effect, and three interrelated principles of effectiveness, adaptation and economy. The above studies provide a theoretical premise for following empirical research.

The researchers on empirical research on the influence of Multi-modal teaching model on students' writing, mainly concentrate on writing competence, writing motivation and writing interests. Xu & Xia (2013) and Liu et. al (2015) investigated the relationship between Multi-modal teaching model and the writing competence of college students majoring in business English. The result showed that multi-modal design has a positive influence on students' writing proficiency as reflected by the increased writing scores. Xu & Liu (2018) explored the influence of multi-modal teaching on students' writing motivation by creating 'current affairs interview' experimental projects and found that students' writing motivation is enhanced. Xu (2021) and Wang & Tian (2020) discussed the influence of Multi-modal teaching model on college students' writing ability and interest. The results indicated that this model can alleviate students' writing anxiety and improve their writing scores.

According to previous studies, we can find that most of them are targeted at college students, and select writing scores as the only indicator of writing competence. Thus, this study attempts to explore the influence of Multi-modal teaching model on senior high school students' writing competence considering their writing scores, and language complexity, accuracy and fluency.

3. Research Design

3.1 Research Questions

This study tries to answer the following two research questions:

- (1) What effect does Multi-modal teaching model have on students' English writing competence in senior high school?
- (2) What effect does Multi-modal teaching model have on students' English writing attitude in senior high school?

3.2 Assessment Measures

The combination of holistic and objective assessment measures was employed to examine the influence of Multi-modal teaching model on students' English writing competence. Holistic assessment data were obtained by averaging the scores from the *ivrite* system and the teachers' scoring. As for objective assessment measures, T-unit was utilized to measure language complexity, accuracy, and fluency. T-unit is the smallest separable unit with a primary clause and all supplementary and embedded subordinate and non-subordinate structures (Hunt, 1966). Complexity can be divided into syntactic complexity and lexical complexity (Wolfequintero et. al, 1998). The number of clauses per T-unit (C/T) was chosen as the indicator of syntactic complexity. A higher C/T value demonstrates a higher syntactic complexity level. The ratio of type and token (TTR) was the indicator of lexical complexity. A higher TTR value reveals a higher lexical complexity level. Accuracy means the error-free rate of the output language (Skehan, 1999). The total number of errors (TE) was the indicator of accuracy. A lower TE value indicates a higher accuracy level. The number of words per clause (W/C) was the indicator of fluency. A higher W/C value indicates a higher language fluency level. The following table below shows the assessment indicators of writing competence.

Table 1. Assessment indicators of writing competence

	Dimensions	Assessment indicators
Holistic assessment	Writing scores	Average scores of the <i>ivrite</i> system and the teacher scoring
Objective assessment	Complexity	Clauses per T-unit (Clauses/T-unit, C/T) Type-Token Ratio (Type/Token, TTR)
	Accuracy	Total Number of Errors (the Total Errors, TE)
	Fluency	Words per Clause (Words/Clause, W/C)

3.3 Participants

The research subjects were 90 students from two Grade 1 classes at the Qixian Senior High School in Kaifeng. All students were assigned to either the experimental class (N=45) and the control class (N=45). The diagnostic test was developed by the researcher to check the English writing scores of students before the experiment. And the questionnaires were also sent out to all the participants to investigate the current status of the writing attitude.

The test was developed according to the requirements of the English Curriculum Standards for Senior High School (2020 revision) by the researcher and reviewed by two colleagues who have a Master’s degree in English education. As the following two tables indicated, the p values of writing score, TTR, C/T, TE and W/C are higher than 0.05. The statistical results show that there is no significant difference in students’ writing competence and writing attitude between the EC and CC before the experiment.

Table 2. The statistical results of writing competence in the experiment

Dimensions	Grade	N	Mean	Std. Deviation	t (88)	Sig. (2-tailed)
Writing scores	EC	45	6.88	1.394	-0.585	.560
	CC	45	7.05	1.416		
TTR	EC	45	0.69	0.044	-1.163	.248
	CC	45	0.71	0.124		
C/T	EC	45	0.53	0.121	-0.043	.667
	CC	45	0.54	0.160		
TE	EC	45	6.49	3.647	0.249	.804
	CC	45	6.31	3.103		
W/C	EC	45	9.51	1.094	-1.777	.079
	CC	45	9.93	1.110		

Table 3. The statistical results of writing attitude in the experiment

Dimensions	Grade	N	Mean	Std. Deviation	t (88)	Sig. (2-tailed)
Writing preference	EC	45	24.02	3.237	0.210	.834
	CC	45	23.87	3.776		
Writing perception	EC	45	20.91	2.285	1.612	.111
	CC	45	20.13	2.292		
Writing process	EC	45	28.93	5.101	0.559	.577
	CC	45	28.36	4.691		

3.4 Research Design

This teaching experiment lasted for almost four months from September 2022 to January 2023. The researcher followed the multi-modal combination principles (Zhang, 2009, 2010) and applied Zhang’s (2012) Multi-modal teaching model (see Figure 1) in English writing teaching in senior high school.

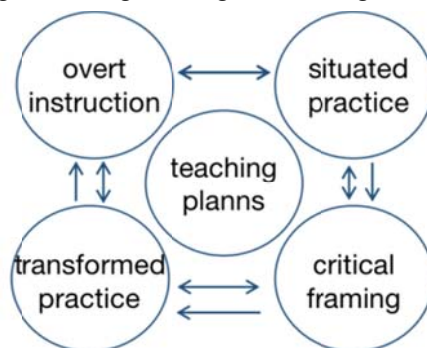


Figure 1. Multi-modal teaching model

3.4.1 Multi-modal Combination Design

This teaching design is kept in line with the general principle of optimal effects. According to Zhang (2010), teachers can use various effective methods to achieve a better teaching effect. Oral explanation and students’ practice activities were both utilized in the writing teaching process. This multi-modal design was based on the

principle of effectiveness. When the teacher made some explanations to students, images, gestures, and facial expressions were employed except for oral expression to help them obtain more information. The teacher's spoken language expression was the main mode to motivate students' auditory senses, and the non-language expressions were intensified modes to stimulate students' visual senses. This design was in accordance with the principle of adaptation. When the students were required to do some writing practice, the teacher observed their discussion and provided them with some timely guidance. The teacher's visual sense was the main mode other than the oral expression. As the students were having the group discussion, their auditory sense was the main mode. Finally, this design was in step with the principle of economy. From the perspective of the economic principle, the simpler the modes are, the multi-modal combination design is, under the premise of optimum effects. In this experiment, the teacher only used images to present teaching materials instead of selecting all the images, videos and blackboard together.

3.4.2 The Implementation Procedures of Multi-modal Teaching Model

(1) The same teacher carried out two different teaching models independently in the two classes, Multi-modal teaching model in the EC and the traditional writing model in the CC. Teaching progress and materials were consistent in the two different classes.

(2) In the EC, the teacher carried out the teaching design based on the following four teaching steps, including overt instruction, situated practice, transformed practice and critical framing. Since the participants were senior-one students, their knowledge was insufficient and they were not familiar multi-modal teaching model. The teacher first needed to offer them some instructions before their practice. After they completed their writing, they were required to conduct self-evaluation and peer-evaluation activities. Then, the teacher assigned other writing tasks to prompt them to internalize what they had learned.

(3) In the CC, the teacher guided students to appreciate excellent compositions and accumulate some beautiful and advanced expressions. After that, all students were required to finish another writing task.

3.5 Data Collection

3.5.1 Writing Tests

The pre-test and post-test examinations were conducted in the *iwrite* program in this study. Before the experiment, the teacher checked the students' writing proficiency in both classes. The first writing type was an advice letter, and the writing topic was giving some suggestions to your friend who was going through a lonely time. After the experiment, the teacher gave the students another writing assignment which was an advice letter for a friend who was being tempted by an online game. Taking into account that various types and genres of writing may have an impact on students' writing competence (Zhang & Liu, 2021), the researcher chose a similar writing type and topic to make this research more objective. To make ensure the validity of the scoring, all students' writings were assessed by the researcher and one of her colleagues, who was an experienced teacher. The final scores of the participants were obtained by averaging the writing scores from the *iwrite* program and the teachers. Students were given 30 minutes to write each writing task, with a total score of 15, and the word count was set between 100 and 120.

3.5.2 Questionnaires

The purpose of the questionnaires on writing attitude was developed to investigate students' English writing attitudes both before and after the experiment. To develop the question items, previous research and established questionnaires were reviewed thoroughly. Yin's (2020) items and Emig & King's (1979) taxonomy of students' writing attitudes were used to develop the items in this study. According to Emig & King, the classification of students' attitudes towards English writing is as follows: (1) writing preference, (2) writing perception, and (3) writing process. Writing preference relates to how frequently students use writing in their daily lives. Writing perception is the understanding of the writing process, the content and the outcomes of the writing. The writing process refers to students' initiative and motivation to write. Five-point Likert scale is used for the questionnaires, completely conformed (representing a score of 1), and not at all conform (representing a score of 5).

The pilot study for the questionnaires was carried out with 90 participants to explore whether the respondents answered the items in the way predicted. The KMO value of the questionnaires is 0.927, which means the questionnaires are suitable for factor analysis. Moreover, Bartlett's Test value is 0.000 ($p < 0.05$), indicating that there is a correlation among variables and factor analysis is effective. Given that, the questionnaires are valid. Besides, the reliability of questionnaires is shown by Cronbach's Alpha. And the values of the overall questionnaires and three dimensions are 0.936, 0.876, 0.876, and 0.873, which indicates the questionnaires are reliable.

The questionnaires were distributed to a total of 90 students in the two classes before and after the experiment.

3.5.3 Interview

After the experiment, the teacher conducted an interview with three students to further analyze their writing attitudes.

4. Results and Discussion

4.1 Multi-modal Teaching Model and Writing Competence

The statistical results after the experiment in the two classes indicate that Multi-modal teaching model has a significant influence on students' writing competence at senior high school as reflected by the increase in writing scores ($p = .000 < 0.05$), TTR value ($p = .012 < 0.05$), W/C value ($p = .001 < 0.05$) and the reduction in the TE value ($p = .037 < 0.05$). That's to say, Multi-modal teaching model is beneficial to enhance students' language lexical complexity, accuracy and fluency. However, there is no significant change in the C/T value ($p = .584 > 0.05$), which demonstrates that this teaching model has no positive effect on students' syntactic complexity.

Table 4. The statistical results of writing competence in the two classes after the experiment

Dimensions	Grade	N	Mean	Std. Deviation	t (88)	Sig. (2-tailed)
Writing scores	EC	45	8.78	1.350	5.322	.000
	CC	45	7.18	1.510		
TTR	EC	45	0.76	0.065	2.567	.012
	CC	45	0.72	0.078		
C/T	EC	45	0.56	0.100	0.550	.584
	CC	45	0.55	0.080		
TE	EC	45	5.09	2.255	-2.114	.037
	CC	45	6.20	2.710		
W/C	EC	45	11.18	1.015	3.554	.001
	CC	45	10.32	1.256		

It can be seen that multi-modal input is conducive to improving students' writing scores, and lexical complexity, accuracy and fluency by motivating their multiple senses. This current teaching experiment is carried out based on Zhang's multi-modal teaching model. During the overt instruction stage, the teacher offered concrete guidance to students through oral expression, gestures, facial expressions and other modes, which can make them a good command of abundant knowledge so that they can transform and output what they have learned. In the critical framing stage, students are asked to think critically and reorganize the obtained knowledge. The above process moves in circles, which assists students to consolidate what they have learned and sorting out their ideas (Zhang, 2012, p. 14). This is the reason why their scores, lexical complexity and language accuracy and fluency have been greatly enhanced. However, they tend to adopt the risk-avoidance strategy, using a few complex sentence structures to reduce the grammatical error rate in their English writing (Zhang, 2013, p. 64).

4.2 Multi-modal Teaching Model and Writing Attitude

Based on the results in Table 5, the means of three dimensions in the EC are lower than that of CC and the p values are all lower than 0.05 ($p = 0.000 < 0.05$). Students' higher writing attitude is indicated by lower means. It indicates that Multi-modal teaching model is popular with students and helps to motivate their writing interests. Effective multi-modal combination design can alleviate students' writing anxiety, enrich their writing experience and improve their writing attitude (Xu, 2021; Wang & Tian, 2020).

Table 5. The statistical results of writing attitude in the two classes after the experiment

Dimensions	Grade	N	Mean	Std. Deviation	t (88)	Sig. (2-tailed)
Writing preference	EC	45	12.04	2.153	-25.690	.000
	CC	45	22.82	1.813		
Writing perception	EC	45	11.71	2.252	-15.969	.000
	CC	45	19.44	2.341		
Writing process	EC	45	16.42	4.048	-15.006	.000
	CC	45	27.31	2.704		

To further confirm the reliability of the results of the questionnaire on writing attitude, the teacher interviewed three students in the experimental class after the experiment. The interview records are as follows:

S1: I didn't think English writing was very important before. But after the teacher showed us the video in class, I find so many office workers needed to write English emails. So, I come to realize the importance of writing and begin to accumulate writing expression. And I also discovered that my thinking become more active, my writing thoughts become smoother, and I memorize my notes faster. I like the way that the teachers utilized and I think our classroom atmosphere is relaxed.

S2: I'm enjoying my writing classes now, and I'm not afraid of it. I think writing and reading are closely related. Recently, I often write down some expressions that can be used in writing and recite them. I usually had no idea what to write about in the past. Writing is not so difficult for me now, which makes me rather like writing. However, I still don't dare to use complex sentence structures. When I'm not sure whether it's right, I won't use them.

S3: I think the videos and images in the class can attract my attention, and I'm seldom distracted now. I used to dislike writing classes. And I thought it was boring. I gradually enjoy writing classes and am less scared of writing assignments. However, I am still not good at using advanced sentences so I choose some simple ones to avoid making mistakes.

Through the interview records, we can see that it is crucial for teachers to engage students' multi-modal senses in the classroom. In contrast to one single model, multi-modal interaction allows the students to gain access to information through a variety of channels, making it easier for them to comprehend and remember what they have obtained (Zhang, 2009). This is in accordance with the statistical results of the questionnaires. It should be noted that two interviewees talked that they often select some simple sentences to replace complex ones to avoid mistakes, which stays in line with the statistical results of the previous section.

In conclusion, Multi-modal teaching model has a positive influence on senior high school students writing competence and attitude. After the experiment, students' writing scores, lexical complexity and language accuracy and fluency are enhanced. But their syntactic complexity has no positive change. Besides, Multi-modal teaching model is conducive to creating a lively learning environment and improving students' writing experience feelings.

5. Research Implications

Based on the above results and discussion of writing competence and attitude, it is found that Multi-modal teaching model is generally effective. This model also brings much inspiration and guidance to language teaching.

(1) Teachers can be equipped with certain basic knowledge and skills to implement Multi-modal teaching model, which involves multimedia technology utilization. Therefore, teachers not only know how to operate multimedia technologies but also preferably have the ability to cope with technical emergency situations. Students can gain language knowledge and their technological skills and overall literacy are also boosted.

(2) Teachers can combine oral and non-language expressions to prompt students' full understanding of learning content. Multi-modal information contributes to the understanding and memory of learning materials. Thus, when students study on their own, they can mobilize their visual, auditory, touch and other senses to strengthen their memory.

(3) Teachers can utilize appropriate multi-modal design to encourage students' imagination, help them consider critically, and enable them to form their own independent viewpoints. This is because Multi-modal teaching model is comprehensive, reflective, externally motivated, critical, and creative. Moreover, students can learn that learning is a kind of performing individual initiative.

6. Limitations and Suggestions

This study has obtained some meaningful results, but some limitations remain. For instance, sample size and experimental duration are insufficient. A greater duration of the teaching experiment can better demonstrate the pedagogical effect of Multi-modal teaching model. Besides, since students' characteristics and teaching conditions vary in different areas, it is also necessary to conduct experimental research on students from various areas. Lastly, limited representative language performance assessment indicators are selected for this study, other valid indicators should be employed for further related studies.

References

Cazden, C., Cope, B., Fairclough, N., & Gee, J. (1996). A pedagogy of multiliteracies: Designing social futures.

- Harvard educational review*, (1), 60-92. <https://doi.org/10.17763/haer.66.1.17370n67v22j160u>
- Chen, C. H., & Xiao, W. (2012). An Experimental Study on the L2 Listening & Speaking-to-Write Approach Based on Memetics. *Foreign Language World*, (6), 66-73, 89.
- Chen, M. Y. (2022). Research on Multi-modal Teaching of Graduate Students Academic English Writing Based on Information Technology. *MATEC Web of Conferences*, (359), 1-5. <https://doi.org/10.1051/mateconf/202235901002>
- Johnson, R. B., & Christensen, L. (2020). *Educational Research: Quantitative, Qualitative, and Mixed Approaches*. Boston: Allyn and Bacon.
- Li, B., & Yin, P. A. (2012). An Empirical Study on New Model of College English Teaching under the Context of Multimodality. *Media in Foreign Language Instruction*, (6), 72-75. <https://doi.org/10.3969/j.issn.1001-5795.2012.06.012>
- Liu, X., Si, B. Y., & Yang, F. (2015). Multimoding Framework Construction and Empirical Study of ESP Teaching. *Heilongjiang Researches on Higher Education*, (6), 173-176. <https://doi.org/10.3969/j.issn.1003-2614.2015.06.049>
- Ministry of Education of the People's Republic of China. *English Language Curriculum Standards for General Senior Secondary Schools (published in 2017 for revision in 2020)*. Beijing: People's Education Press, 2020.
- Skehan, P. (1999). *A cognitive approach to language learning*. Shanghai: Shanghai Foreign Language Education Press.
- Stein, P. (2000) Rethinking resources: Multimodal pedagogies in the ESL classroom. *TESOL Quarterly*, (34), 333-336. <https://doi.org/10.2307/3587958>
- Tan, X. (2023). Stories behind the scenes: L2 students' cognitive processes of multimodal composing and traditional writing. *Journal of Second Language Writing*, (59), 1-14. <https://doi.org/10.1016/j.jslw.2022.100958>
- Wang, D. M. (2019). A Survey on the Current Situation of High School Students' English Writing and Discussion on Strategies. *Basic Education Curriculum*, (10), 43-48.
- Wang, J. P. (2013). A Study on the Effect of Task Complexity Along Resource-directing on Second-language Written Linguistic Performance. *Foreign Language Education*, (4), 65-68+104. <https://doi.org/10.16362/j.cnki.cn61-1023/h.2013.04.006>
- Wang, X. M., & Tian, Y. (2020). An Empirical Study on Multimodal Interactive College English Teaching. *Heilongjiang Researches on Higher Education*, (1), 152-156. <https://doi.org/10.19903/j.cnki.cn23-1074/g.2020.01.031>
- Wolfequintero, K., Inagaki, S., & Kim, H. Y. (1998). *Second Language Development in Writing: Measures of Fluency, Accuracy, & Complexity*. Honolulu: University of Hawai'i, Second Language Teaching and Curriculum Center.
- Xu, J., & Xia, R. (2013). An empirical study of multimodal design for business English writing. *Foreign Language World*, (4), 32-39.
- Xu, T. S., Zhang, L. J., & Gaffney, J. S. (2022). Examining the Relating Effects of Task Complexity and Cognitive Demands on Students' Writing in a Second Language. *Studies in Second Language Acquisition*, (2), 483-506. <https://doi.org/10.1017/S0272263121000310>
- Xu, X., & Liu, Y. M. (2018). A Case Study of Cultivating Pre-Writing Motivation Based on Multimodality Theory. *Media in Foreign Language Instruction*, (1), 25-31.
- Xu, Y. Q. (2023). Investigating the effects of digital multimodal composing on Chinese EFL learners' writing performance: A quasi-experimental study. *Computer Assisted Language Learning*, (4), 785-805. <https://doi.org/10.1080/09588221.2021.1945635>
- Zhang, D. L. (2009). The Application of Multimodal Discourse Theory and Media Technology in Foreign Language Teaching and Learning. *Foreign Language Education*, (4), 15-20. <https://doi.org/10.16362/j.cnki.cn61-1023/h.2009.04.006>
- Zhang, D. L. (2010). Preliminary Investigation into the Concept of Design and the Selection of Modalities in Multimodal Foreign Language Teaching. *Foreign Languages in China*, (3), 48-53+75.

<https://doi.org/10.16362/j.cnki.cn61-1023/h.2009.04.006>

Zhang, D. L. (2012). The Exploration of Multimodal Learning Competency Cultivation Model. *Foreign Language Research*, (2), 9-14. <https://doi.org/10.13978/j.cnki.wyyj.2012.02.015>

Zhang, D. L., & Ding, Z. F. (2013). The Exploration of Multimodal Choice Framework for Foreign Language Teaching. *Foreign Language World*, (3), 39-46+56.

Zhang, L. L., & Liu, H. T. (2021). Genre Effect on L2 Syntactic Complexity and Holistic Rating for Writing Quality of Intermediate EFL Learners. *Chinese Journal of Applied Linguistics*, (4), 451-469+589. <https://doi.org/10.1515/CJAL-2021-0029>

Acknowledgments

Not applicable

Authors contributions

Not applicable

Funding

This work was supported by The Philosophy and Social Science Innovation Talents Program in Henan Universities [project number 2024-CXRC-28].

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

Open access

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.