

December 2018

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Recommended Citation

Zhang, L., & Zhang, Y. (2018). Pilot study of the influence of social anxiousness on students' classroom interactions among Chinese undergraduates. *Journal of Global Education and Research*, 2(2), 127-137. <https://www.doi.org/10.5038/2577-509X.2.2.1046>

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Revisions

Submission date: Sep. 30, 2018; 1st Revision: Nov. 3, 2018; 2nd Revision: Dec. 4, 2018; 3rd Revision: Dec. 30, 2018; Acceptance: Dec. 30, 2018

Pilot Study of the Influence of Social Anxiousness on Students' Classroom Interactions among Chinese Undergraduates

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Abstract

Although most people acknowledge the importance of interactions in class, it is commonly seen some students still rarely actively participate in face-to-face interactions, especially those from a Confucian cultural background. Previous research focused on many factors to understand this phenomenon, yet social anxiousness has not been given enough attention as a possible reason. This correlational study on 93 Chinese undergraduates attempted to investigate the influences of social anxiousness on students' interactions in class, using Interaction Anxiousness Scale (IAS) by Leary (1983), and a self-reported measure of students' interaction in class developed by the researchers. Results indicated that both students' social anxiousness and negative attitudes toward the needs of interactions in class significantly influenced their classroom interactions.

Keywords: student interaction, interaction anxiousness, attitude of interaction

Introduction

Factors That Influence Chinese Students' Interactions in Class

Constructivism emphasizes the role of the social context in the knowledge construction process, as well as advocates students' interaction (Piaget, 1926; Vygotsky, 1978). How to improve students' interaction in class has long been a focus point in education. Meanwhile, Chinese as well as many East Asian students' reluctance to interactions in class has been frequently addressed in research studies. Many factors which inhibited Chinese students' interactions in class have been explored, such as peer student influence (Li & Jia, 2006), pedagogical factors (Lee, 2014; Li & Jia, 2006; Zhang, 2011), classroom environment or climate (Foster & Stapleton, 2002; Joe, Hiver, & Al-Hoorie, 2017; Zhu, 2006), classroom leadership/organization (Li & Jia, 2006; Ouyang, 2013), sociocultural factors (Chan, 1999; Li & Jia, 2006; Lu & Han, 2010), psychological factors (i.e., autonomy, competence, and relatedness) (Joe et al., 2017) and student personality (Li & Jia, 2006; Lu & Han, 2010), intrinsic motivation, etc. In addition, Chinese students' attitude and perception of classroom interaction also attracted many research interests. Foster and Stapleton's (2002) case study revealed Chinese students were not averse to participating in class. Li and Jia (2006) also found, that although what students expected was to

be good listeners in class and learn as much as they could, all the participants in their study expressed their likings in active participation and they believed it was good for their learning. Lu and Han (2010) pointed out in their self-study many Chinese students believed one could learn best and become wise when they listened to others, and thought deeply and well, because the more they talked, the less they could hear. Similarly, Zakrajsek (2017) also found a circumstance students saw the classroom as one in which you respected the professor and, therefore, would never say anything to question her or his authority. It is necessary to consider those various perspectives when investigating factors which influence Chinese students' interactions in class.

Social Anxiousness and Students' Interactions in Class

The barriers of students' interactions in class stem from many reasons. Previous research focused on many factors to understand this phenomenon, yet social anxiousness has not been given enough attention as a possible reason. Li and Jia (2006) found students were afraid of making mistakes or asking questions because they were afraid of being laughed at by the teacher or fellow students, which might be a possible indicator of social anxiety. Most definitions of social anxiety have included specific behavioral reaction as defining characteristics, such as avoidance of interaction, and it was mostly defined as an aversive, cognitive-affective reaction characterized by autonomic arousal and apprehension regarding impending potentially negative outcomes (Leary, 1983). It was also regarded as nervousness in social situations (Schneier, Blanco, Antia, & Liebowitz, 2002), fear of being negatively judged and evaluated by other people (Richards, 2012), fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others, fear of being embarrassing and humiliating (American Psychiatric Association, 2013). Since social anxiousness leads to avoidance and inhibition of interactions with other people, it could be assumed that students' social anxiousness would affect their interactions in class.

Understanding the relationship between students' social anxiousness and their interactions in class might enable instructor to better modify teaching methods to help students with different needs, such as to incorporate appropriate instructional strategies or methods which create a comfort zone for students with high level of social anxiousness and, in turn, increase their interactions in class. It might also benefit the inclusion of education.

Research Questions

The primary goal of this study was to investigate whether students' social anxiousness had any influence on their interactions in face-to-face class, after controlling for the effects of differences among teacher, pedagogy, classroom condition, school curriculum, and cultural background. Meanwhile, students' attitudes toward interaction in the class were also included, since their influence might probably overweight social anxiousness. Examining them together might elucidate the relationship between social anxiousness and students' interactions in class. Therefore, this research answered three questions:

- Is there a relationship between students' interactions in class and their opinions of Classroom interaction?
- Are students' interactions in face-to-face class related to their social anxiousness (IAS)?
- Are students' interactions in face-to-face class related to their negative attitudes toward the need of interactions in class (NNI)?

Methods

Research Design

A correlational posttest-only design was used. All criterion measures were self-reported by the participants through a written survey.

Sampling and Participants

The participants were 93 undergraduate students from a large urban public university in southwestern China, enrolling in an Organizational Behavior course. The participants were recruited for this study in the unit of a whole class for grade points. For the purpose of controlling for the effects of differences among teachers, classroom conditions, and school curriculum, altogether three classes taught by the same instructor were invited, each had around 30 students.

Instrumentation

Students' social anxiousness was measured using the Interaction Anxiousness Scale (IAS) created by Leary (1983). Trait rather than state, social anxiousness was measured because the researchers were interested in whether students' interactions in the class were influenced by their dispositional (trait) anxiety rather than transitory (state) anxiety. The IAS scale consists of 15 statements in which the respondents describe how they generally feel, for example, "I often worry that I will say or do the wrong things." Participants respond to each item by rating themselves on a 5-point Likert scale (1 = not at all, 2 = slightly, 3 = moderately, 4 = very, 5 = extremely). The scores range from 15 to 75 with high scores indicating a higher level of social anxiousness.

Measures of students' interactions in the class and attitudes toward interactions in class were designed by the researchers in the following manner: a pool of 20 potential questions was generated based on the literature. These questions were then reviewed by two members of the research team, resulting in a pilot test which was administrated to 10 undergraduates from the same university who were not involved in the study. Results and feedback from the pilot test were analyzed. Four items were eliminated to improve parsimony; six items were modified to increase the explicitness. The revised 16-item questionnaire was then administrated for the study. *Students' interactions in class (SIC)* were measured by a scale which consisted of eight items, rated on a 5-point scale, with scores ranging from 8 to 40. *Students' attitudes toward interaction in class (AI)* consisted of eight items, rated on a 5-point Likert scale, with scores ranging from 8 to 40.

Procedures

The researchers obtained permission to conduct the survey and obtained consent from all the participants. During the last class of a semester, the participants were informed it would take them up to 20 minutes to take the anonymous survey, with their confidentiality guaranteed. The researchers then collected, cleaned, and coded the data for later analysis.

Data Analysis

Factor analysis was conducted to validate the measures developed by the researchers. Multiple regression was conducted to examine the influence of social anxiousness on students' interactions in class, as well as to examine whether students' attitudes toward interaction in class moderate the influence of social anxiousness.

Findings

Construct Validation

Interaction Anxiousness Scale (IAS): The IAS was approximately normally distributed, with skewness of $-.512$, and kurtosis of $.102$. The Cronbach's alpha of IAS was $.843$; Most of the Corrected Item-Total Correlations were above $.40$, which indicated the 15 variables form a reliable scale.

Students' Interactions in Class (SIC): Principal components analysis with varimax rotation was conducted to assess how the eight SIC variables clustered, as shown in Table 1. The assumption of independent sampling was met. The assumptions of normality, linear relationships between pairs of variables, and the variables being correlated at a moderate level were checked. The determinant of the Correlation Matrix was $.143$, the Kaiser-Meyer-Olkin (KMO) was $.731$, indicating sufficient items for each factor. The Bartlett test was significant ($p < .001$), indicating the variables were correlated highly enough to provide a reasonable basis for factor analysis.

Two components were rotated, based on the eigenvalues over 1 criterion and the scree plot. After rotation, the first component accounted for 30.139% of the variance, and the second component accounted for 24.189% of the variance. Table 1 displays the items and component loadings for the rotated components, with loadings less than $.30$ omitted to improve clarity. Items loaded highly on factor 2 were reverse worded questions. As Zhang, Noor, and Savalei (2016) suggest, reverse worded items can contaminate the factor structure of the scale. Thus, the results suggested that despite the differences caused by the reverse worded items, all items could be aggregated to form a coherent component.

The Cronbach's alpha was $.757$. Most of the Corrected Item-Total Correlations were above $.40$, which indicated all eight variables which were summed to create the SIC score have a reasonable internal consistency reliability and could make a good component of this rating scale.

Table 1. Component Loadings for the Rotated Components of Students' Interactions in Class

Item	Component Loading		Communality
	1	2	
1. I often took the initiative to answer the questions raised by the teacher.	.852		.729
2. I would take the initiative to express my views and opinions.	.825		.703
3. This semester, my average interactions in this course were () times/per class.	.648		.495
4. I would speak on behalf of the group in Class.	.529		.294
5. When I was confused in Class, I would ask questions.	.486	.316	.335
6. Even if I knew the answer to the teacher's question, I would not answer it.		.733	.568
7. Even if I had my own opinions, I would not share with teacher or peers.		.747	.591
8. I rarely participated in any classroom interaction		.792	.631
Eigenvalues	2.411	1.935	
% of variance	30.139	24.189	

Note. $n = 92$. Loadings $< .30$ are omitted. Loadings $> .50$ are regarded as high loadings.

Students' Attitudes and Opinions of Interaction in Class

Principal axis factor analysis with varimax rotation was conducted to assess the underlying structure for the eight items of the students' attitudes and opinions of interaction in class. The determinant of the Correlation Matrix was .098, thus, the factor analysis could be conducted. The Kaiser-Meyer-Olkin (KMO) was .77, indicating sufficient items for each factor. Based on eigenvalues greater than 1, two factors were identified. After rotation, the first factor accounted for 24.647% of the variance, and the second factor accounted for 20.336%. Table 2 displays the items and factor loadings for the rotated factors, with loadings less than .30 omitted to improve clarity. Although the first factor had high loadings on five items, as those five items were conceptually different, those five items could not be summed up into one sub-scale. The second factor, which seems to index "negative attitudes toward the need of interactions in class" (NNI), had very high loadings on three items (14, 15, 16), a high loading on item 11 (.430) and a medium loading on item 12 (.364). Meanwhile, as item 11 and 12 were conceptually different from the other three items of factor two, they could not be summed into the sub-scale. The researchers then aggregated three items (14, 15, 16) to form a sub-scale "negative attitudes toward the need of interactions in class" (NNI), with a Cronbach's alpha of .71. All Corrected Item-Total Correlations were above .40.

Table 2. Factor Loadings From Principal Axis Factor Analysis With Varimax Rotation for a Two-Factor Solution for Students' Attitudes and Opinions of Classroom Interactions Questions

Item	Factor Loading		Communality
	1	2	
9. I do not want to be the "focus" of class because of asking or answering questions.	.673		.463
10. I do not want to be regarded ambitious and want to get high grades from interaction in class.	.598		.433
11. I think only good students interact in class; it is none of my business.	.561	.430	.461
12. I feel that there is no need to interact because classroom interaction has little effect on my grades.	.526	.364	.399
13. Rather than my real thoughts, I concern more about whether my answer is consistent with my classmates' answers.	.500		.262
14. Good teacher-student interaction in the classroom made me feel relaxed in class.		.671	.362
15. Effective classroom interaction can improve my class attention and deepen my understanding.		.666	.299
16. I do not think there is a need of classroom interactions in colleges.	.536	.575	.524
Eigenvalues	3.327	1.359	
% of variance	24.647	20.336	

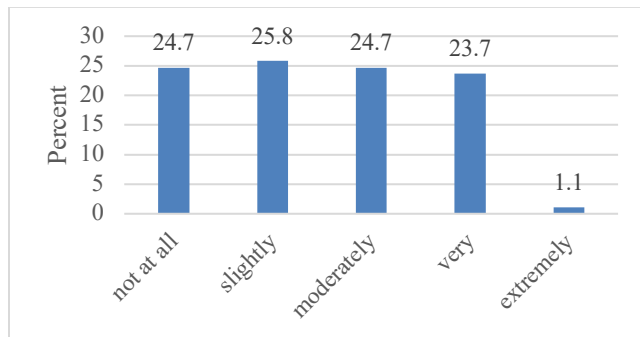
Note. $n = 89$. Loadings $< .30$ are omitted. Loadings $> .50$ are regarded as high loadings.

In addition, a descriptive analysis was also conducted. Item 9, 10, 12 and 13 all had five levels and skewness values between -1 and 1 . It could be assumed they were approximately normally distributed and could be used for inferential statistics. Among the five items, only item 11 was not normally distributed, with a skewness of 1.15 .

Students' Interactions in Class Are Significantly Related to Their Opinions of Interactions in Class

As shown in Figure 1, 24.7% of the participants clearly indicated *I do not want to be the 'focus' of class because of asking or answering questions*. Student's interaction in class was significantly negatively related to whether they did not want to be the *focus* of class through

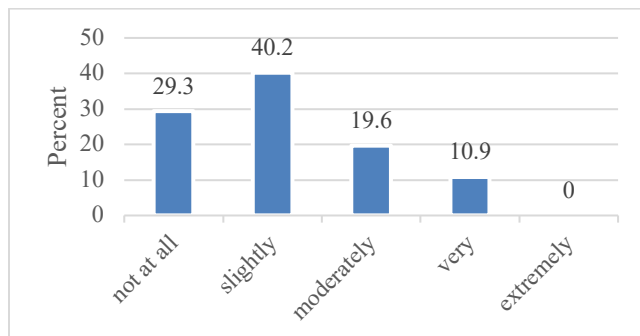
asking or answering questions ($r = -.223, p = .033, n = 92$). The less their inclination to be the *focus*, the less likely they would interact in class.



Note. $M = 2.50, SD = 1.14, N = 93$.

Figure 1. Students' responses to item 9

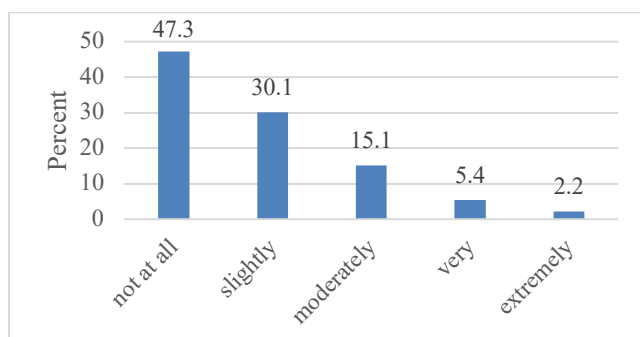
As shown in Figure 2, 10.9% of the participants agreed with the statement *I do not want to be regarded ambitious and want to get high grades from interaction in class*. Student's interaction in class was significantly negatively related to whether the student did not want to be regarded as ambitious and wanted to get high grades from interaction in class ($r = -.232, p = .027, n = 91$).



Note. $M = 2.12, SD = 0.96, n = 92$.

Figure 2. Students' responses to item 10

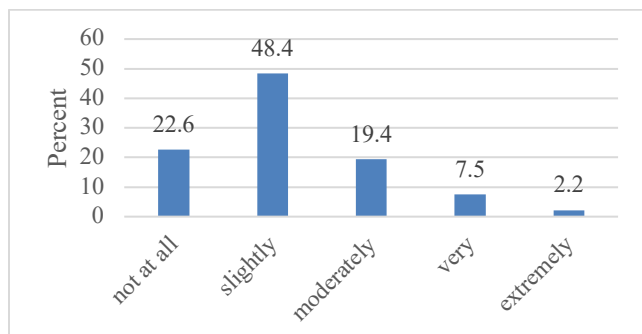
As shown in Figure 3, 7.6% of the participants agreed with item 11: *I think only good students interact in class; it is none of my business*. Student's interaction in class was significantly negatively related to whether the student believed only good students interacted in class ($r = -.311, p = .003, n = 92$).



Note. $M = 1.85, SD = 1.01, N = 93$.

Figure 3. Students' responses to item 11

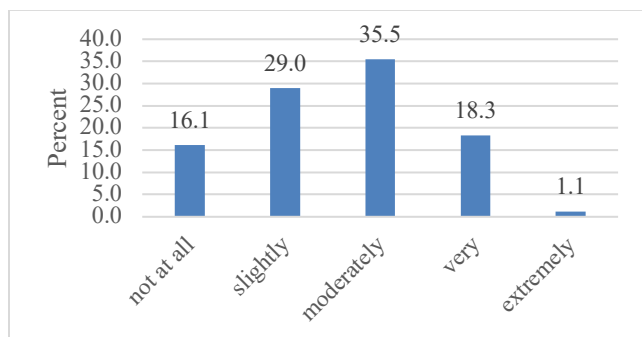
As shown in Figure 4, 9.7% of the participants held the opinion: *I feel that there is no need to interact because classroom interaction has little effect on my grades*. Student interaction in class was significantly negatively related to whether the student believed classroom interaction had little effect on her or his grades ($r = -.322, p = .002, n = 92$).



Note. $M = 2.18, SD = 0.94, N = 93$.

Figure 4. Students' responses to item 12

As shown in Figure 5, 19.4% of the participants were concerned more about whether their answers were consistent with their classmates', rather than about expressing their real thoughts. Student interaction in class was significantly negatively related to whether the student was concerned more about whether her or his answer was consistent with her or his classmates' ($r = -.255, p = .014, n = 92$).



Note. $M = 2.59, SD = 1.00, N = 93$.

Figure 5. Students' responses to item 13

Students' Interactions in Class Are Significantly Related to Their Social Anxiousness (IAS) and Negative Attitudes Toward the Need of Interactions in Class (NNI)

At the 0.01 level (2-tailed), Students' Interactions in Class (SIC) was significantly, negatively related to their level of social anxiousness, IAS ($r = -.335, p = .001, n = 91$), and negative attitudes toward the need of interaction in class, NNI ($r = -.454, p < .001, n = 89$). Meanwhile, there was no large correlation between sex and student's interaction in class (SIC) ($r = -.063, p = .553, n = 92$).

The majority of the participants thought there was a need for classroom interaction in some disciplines (60.2%); however, 23.7% did not think there was need for classroom interaction.

Controlling for Students' Negative Attitudes Towards the Needs of Interactions in Class (NNI), Students' Social Anxiousness (IAS) Significantly Influence Students' Interactions in Class

Simultaneous regression was conducted to determine the best linear combination of IAS, NNI, and item 9, 10, 12 and 13 for predicting student interactions in class. As shown in Table 3, This combination of six variables significantly predicted SIC, $F(6, 80) = 7.623, p < .001$, with Students' Social Anxiousness and Negative Attitudes towards the Needs of Interactions significantly contributing to the prediction. The adjusted R^2 value was .316, indicating that 31.6% of the variance in SIC was explained by the model. According to Cohen (1988), this is a large effect. The beta weights suggest that a lower level of NNI contributed most to predicting SIC and that a lower level of IAS contributed to this prediction. The effects of other variables were not significant.

Table 3. Simultaneous Multiple Regression Analysis Summary for Students' Social Anxiousness, Negative Attitudes Towards the Needs of Interactions, and Opinions of Interactions in Class Predicting Students' Interactions in Class

Variable	B	Std. Error	β
Students' Social Anxiousness (IAS)	-.162	.047	-.326*
Negative Attitudes towards the Needs of Interactions (NNI)	-.856	.204	-.445*
Item 9: I do not want to be the "focus" of class because of asking or answering questions.	-.384	.421	-.101
Item 10: I do not want to be regarded ambitious and want to get high grades from interaction in class	.514	.543	.112
Item 12: I feel that there is no need to interact because classroom interaction has little effect on my grades.	-.564	.483	-.123
Item 13: rather than my real thoughts, I concern more about whether my answer is consistent with my classmates'.	-.113	.439	-.026
Constant	36.462	2.398	

Note. $n = 87$. * $p < .001$.

In order to further investigate how well Students' Social Anxiousness predicts students' interactions in class, after controlling for Negative Attitudes towards the Needs of Interactions, a hierarchical linear regression was computed. Shown in Table 4, When NNI was entered alone, it significantly predicted SIC, $F(1, 86) = 23.755, p < .001$, adjusted $R^2 = .207$, indicating 20.7% of the variance in students' interactions in class could be predicted by knowing the student's negative attitudes towards the needs of interactions.

When Students' Social Anxiousness was added, it significantly improved the prediction, R^2 change = .121, F change (1, 85) = 15.498, $p < .001$. NNI remained a significant predictor. The combination of NNI and IAS significantly predicted SIC, $F(2, 85) = 21.629, p < .001$, adjusted $R^2 = .322$. This is a high effect according to Cohen (1988). With this combination of predictors, both NNI ($\beta = -.468$) and IAS ($\beta = -.348$) contributed significantly to predicting SIC. Thus, when controlling for students' negative attitudes toward the needs of interactions in class, the higher the level of student's social anxiousness, the less likely the student would actively interact in class.

Table 4. Hierarchical Regression Analysis Predicting Students' Interactions in Class From Students' Social Anxiousness, Controlling for Negative Attitudes Towards the Needs of Interactions

Predictor	<i>B</i>	<i>SEB</i>	β	<i>R</i> ²	ΔR^2
Step 1				.216	.207
Constant	27.545	1.111			
NNI	-.884	.181	-.465*		
Step 2				.337	.322
Constant	35.727	2.319			
NNI	-.889	.168	-.468*		
IAS	-.172	.044	-.348*		

Note. *n* = 88. **p* < .001.

Discussion

According to the results, students' social anxiousness and negative attitudes toward the need of interaction had significant influences on their interactions in face-to-face class, after controlling for the effects of differences among teachers, classroom conditions, school curriculum, culture background, and their opinions of interaction in class. To some extent, this research explained some of the phenomenon, described by many studies, why Chinese students are unwilling to interact in class.

Understanding the influence of students' social anxiousness could help the practitioners to better implement certain instructional strategies and learning activities to fit students' needs. For example, Foster and Stapleton (2002) suggested students were only passive when circumstances dictate; when they were prepared, they enjoyed participating, which collided with Li and Jia's (2006) finding students were used to making sure the answer was correct before they gave it. Therefore, providing students with sufficient time to think and prepare before starting a discussion might be a possible way to encourage students' interactions. Collaborative learning strategy such as Think-pair-share (TPS) could be useful, because it requires students to first think individually about a topic or answer a question and only then share ideas with classmates. To some extent, it may reduce social anxiousness, because students could prepare an answer before expressing their thinking in front of the whole class. Moreover, the Audience Response System (ARS) has been found beneficial in many studies in terms of increasing students' participation with peers to solve problems; interactions with peers to discuss ideas and misconceptions, etc. (Kay & LeSage, 2009). Tsuei's (2011) comparative study also demonstrated the peer-assisted learning strategy was more effective when applied in the context of online participation. It is reasonable to assume either ARS or other online method might create another communication channel for students, enabling them to freely express themselves, and interact with other more.

Meanwhile, Chen, Chen, Li, and Wang (2009) found, for Chinese children, behavioral inhibition was associated with greater peer liking, social interaction, positive school attitudes, and school competence and fewer later learning problems. These findings were confirmed by the results that student's interaction in class was significantly related to whether the student wanted to be the *focus* of class because of asking or answering questions; and whether the student wanted to be regarded as ambitious and want to get high grades from interaction in class, etc.

Some limitations of this study should also be noted. The relatively homogeneous sample might restrict the generalization of the study findings, and they might not be applicable for students from another cultural background. Further studies on more diverse and larger populations will be

needed. Meanwhile, although the specific research design helped to control for the context and environmental factors, instructor factors, and pedagogical factors, further studies are also encouraged to consider other factors such as classroom size, curriculum, instructional strategies, etc. Moreover, although the survey achieved a high reliability, the scale was developed by the researchers, and it calls for future work to validate the measures. Rather than self-reports, the observational checklist could also be applied to evaluate students' interactions in class.

Conclusions

This study revealed students' social anxiousness and negative attitudes toward the need for interaction had a significant influence on their interactions in a face-to-face class. Follow-up studies might take a closer look at how different instructional strategies and instructional technologies moderate the influence of social anxiousness on students' interactions in class. Besides, this study also pointed out students' negative attitudes toward the need of interactions in class significantly influenced their interactions, which called for further in-depth investigation about how students formed those negative attitudes.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.
- Chan, S. (1999). The Chinese learner – a question of style. *Education + Training*, 41(6/7), 294-305. <https://doi.org/10.1108/00400919910285345>
- Chen, X., Chen, H., Li, D., & Wang, L. (2009). Early childhood behavioral inhibition and social and school adjustment in Chinese children: A 5-year longitudinal study. *Child Development*, 80(6), 1692-1704.
- Foster, K. D., & Stapleton, D. M. (2002). Understanding Chinese students' learning needs in Western business classrooms. *International Journal of Teaching and Learning in Higher Education*, 24(3), 301-313.
- Joe, H., Hiver, P., & Al-Hoorie, A. H. (2017). Classroom social climate, self-determined motivation, willingness to communicate, and achievement: A study of structural relationships in instructed second language settings. *Learning and Individual Differences*, 53, 133–144.
- Kay, R. H., & LeSage, A. (2009). Examining the benefits and challenges of using audience response systems: A review of the literature. *Computers & Education*, 53(3), 819-827.
- Leary, M. R. (1983). Social anxiousness: The construct and its measurement. *Journal of Personality Assessment*, 47, 66-75.
- Lee, G. J. (2014). Why students don't participate in English medium instruction classes in a Korean university: A case study. *English Teaching*, 69(1), 91-117.
- Li, X., & Jia, X. (2006). Why don't you speak up East Asian students' participation patterns? *Intercultural Communication Studies*, 9(1), 192-206.
- Lu, C., & Han, W. (2010). Why don't they participate? A self-study of Chinese graduate students' classroom involvement in North America. *Brock Education*, 20(1), 80-96.
- Ouyang, H. (2013). *A study of college classroom interaction condition*. (Master's thesis, Hunan University, Hunan, China). Retrieved from <http://kns.cnki.net/kns/detail/detail.aspx?FileName=1014238063.nh&DbName=CMFD2014>
- Piaget, J. (1926). *Judgment and reasoning in the child*. New York, NY: Harcourt.
- Richards, T. A. (2012). Comprehensive cognitive-behavioral therapy. *Social Anxiety Institute*. Retrieved from <https://socialanxietyinstitute.org/what-is-social-anxiety>
- Schneier, F. R., Blanco, C., Antia, S. X., & Liebowitz, M. R. (2002). The social anxiety spectrum. *Psychiatric Clinics of North America*, 25(4), 757–774.
- Tsuei, M. (2011). Development of a peer-assisted learning strategy in computer-supported collaborative learning environments for elementary school students. *British Journal of Educational Technology*, 42(2), 214–232. <https://doi.org/10.1111/j.1467-8535.2009.01006.x>
- Vygotsky, L. S. (1978). *Mind in the society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

- Zakrajsek, T. (2017). Students who don't participate in class discussions: They are not all introverts [Web post]. Retrieved from <http://scholarlyteacher.com/2017/04/students-who-dont-participate-in-class-discussions-they-are-not-all-introverts/>
- Zhang, L. (2011). *Chinese college students' silence in English class and possible solution*. (Master's thesis, Jilin University, Jilin, China). Retrieved from <http://kns.cnki.net/kns/detail/detail.aspx?FileName=1011094097.nh&DbName=CMFD2011>
- Zhang, X., Noor, R., & Savalei, V. (2016). Examining the effect of reverse worded items on the factor structure of the need for cognition Scale. *PLOS ONE*, *11*(6). <http://doi.org/10.1371/journal.pone.0157795>
- Zhu, L. (2006). *Psychology research of college classroom interaction: Concept, current situation and factors*. (Master's thesis, Shanghai Normal University, Shanghai, China). Retrieved from <http://kns.cnki.net/kns/detail/detail.aspx?FileName=2006151643.nh&DbName=CMFD2006>

Acknowledgements

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

A sincere thank you to Yuri Pavlov for his diligent proofreading of this manuscript.