The Influence of Cognitive Presence, Social Presence and Teaching Presence on Online Foreign Language Speaking Anxiety, L2 Motivational Self and Intended Effort-A Structural Equation Modeling Approach

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Keywords: Community of Inquiry, Cognitive Presence, Teaching Presence, Social Presence, L2 (Second Language) Motivational Self System, Ideal L2 Self, Ought-to L2 Self, General Self-Efficacy, Intended Effort.

Abstract: Although a large number of online foreign language oral learners has emerged, little is known about the interactive mechanism between online learning environmental factors and learners' self-relevant factors. Using the quantitative method, 466 questionnaires of Chinese young adult learners were collected to test the hypothesized relationships between cognitive presence (CP), teaching presence (TP), social presence (SP), L2(second language) motivational self (including Ideal L2 self (IL2) and Ought-to L2 self (OL2)), general self-efficacy (GSE), online foreign language speaking anxiety (AN) and intended efforts (IE) in a structural equation model. The findings illustrate: (1) Online foreign language speaking learners are in middle anxiety, high GSE and high IE level; (2) Online learning environment is an overall ecology in which CP, TP, SP, IL2, OL2, and GSE are highly correlated with each other; (3) In terms of causality, TP and OL2 enhance AN, GSE weakens AN, GSE and OL2 strengthen IE while AN reduces IE. To facilitate online oral foreign language learning, designers of online learning platforms should consider providing the choice of learning partners and more meta-cognition support to guide learners to deal with negative evaluations and manage learning recordings.

1 INTRODUCTION

Along with online international conferences have increased sharply, opportunities for online communication in foreign languages soar. In this case, the demand for online oral foreign language learning has continued to rise. It is reported that the annual growth rate of China's adult English training industry is as high as 25% (Lu et al., 2015). A large number of online foreign language learning platforms emerged, such as Duolingo, LingoDeer, Liulishuo, Shanbei vocabulary English. However, the negative experience impacted by anxiety reduces learners' interest and enthusiasm for learning (Dirkx, 2008).

Compared with other subjects, foreign language learners suffer more anxiety. The mismatch between the real self and the expressive self induces the anxiety of communicators (Horwitz, 1986). Learners who have high anxiety levels tend to escape from the foreign language communication scenario; on the other hand, less engagement in speaking activities reduces feedback about the progress of language performance, which may trigger learners' speaking anxiety in return. This means that self-relevant cognition and feedback from others influence the anxiety of foreign language learners.

Regarding self-relevant cognition in foreign language learning, Dörnyei's (2009) second language (L2) motivational self system integrates L2 learning motivation and identity, including Ideal L2 self (IL2) and Ought-to L2 self (IL2). Based on this system, Papi (2010) found that IL2 weakens English anxiety,

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and OL2 enhances English anxiety. Besides, self-efficacy is another important self- relevant factor in the L2 motivational self system (Ueki & Takeuchi, 2012).

Regarding the analysis of feedback from others in online foreign language speaking learning, Community of Inquiry (CoI) theory can be considered because this theory promotes researchers to explore the dynamic process of online learning experience through a collaborative constructivist perspective (Arbaugh et al., 2008), which includes three closely related online presences and one overlap section-cognitive presence (CP), teaching presence (TP), social presence (SP) and meaningful learning experience (Garrison et al., 1999). Using the CoI model to specify the learning experience involved in online foreign language oral learning environment can further reveal the interaction mechanism between online learning environment and self-relevant factors, and help improve the construction of online learning environments which require highly human-computer interaction. In this regard, three research questions were proposed:

1. How do cognitive presence (CP), teaching presence (TP) and social presence (SP) predict online foreign language speaking anxiety (AN) and intended efforts (IE)?
2. Whether CP, TP and SP influence L2 motivation (including IL2, OL2) and self-efficacy (especially general self-efficacy (GSE))?
3. How do L2 motivation and self-efficacy predict online foreign language speaking anxiety (AN) and intended efforts (IE)?

The next section proposes hypotheses based on a theoretical foundation; methodology is shown in section 3 and results in section 4. Section 5 gives more details in discussion, implications and limitations while section 6 gives conclusions and future directions.

2 VARIABLES AND HYPOTHESES

The following section provides a quick introduction about the used variables and describes hypotheses among variables.

2.1 Variables Used

The most widely used definition of foreign language anxiety is related to classroom language learning and originated from the unique complex self-awareness, concepts, emotions, and behaviors in the language learning process, which includes communication apprehension (CAN), fear of negative evaluation (FAN) and test anxiety (TAN) (Horwitz et al., 1986). Given the online language learning environment, this study refers to this definition and subcategories but in the online oral learning environment.

The L2 motivational self system proposed by Dörnyei (2014) contains three main components: IL2, OL2, and L2 learning experience, which has been applied to different languages and cultural environments (Ryan, 2009; Kong et al., 2018). According to Dörnyei (2014), IL2 represents the ideal image of L2 users that individuals hope to become in the L2 field while OL2 self is affected by duties, obligations or responsibilities, an attribute that others believe that an individual should possess. The L2 learning experience is a specific contextual motivation related to the immediate learning environment and experience, for which CP, TP and SP represent this factor in this study. Moreover, adding other affective variables would improve the prediction of the L2 motivational self framework, such as L2 anxiety and self-efficacy (Kormos et al., 2011; Dörnyei, 2014). By adding L2 anxiety and intended effort, Papi (2010) extended this system, which is one of the basic models of this research.

Referring to the definition of IE in the study of Papi (2010), this variable was considered in this study, which is defined as the time and energy that learners plan to spend on the online foreign language oral learning platform in the future. It is used as a variable to measure learners' willingness to learn oral foreign languages online.

GSE is defined as a personal belief, which refers to an individual's comprehensive view of their ability to perform in various situations (Judge et al., 1998). In this regard, GSE focuses on the individual's perception of the ability to meet task requirements in different situations. Because online foreign language oral learning involves multiple senses of self-efficacy, such as computer self-efficacy, foreign language oral self-efficacy, this study uses a wider range of GSE to represent personal positive inclinations and belief in the ability to complete tasks.

The experience process of CP is similar to the learning process of foreign languages. Tobias (2013) divided the language information processing process into three stages: input, processing, and output. Cleveland and Campbell (2012) pointed out that CP describes the extent to which learners can construct and confirm meaning through continuous reflection and discourse. Ideally, CP includes triggering events, exploring, integration and resolution. In this regard, CP of this research refers to the degree of learners'

knowledge understanding and construction in online foreign language oral learning, including these four subcategories.

Cleveland and Campbell (2012) emphasized that teaching labor is the central organizational element of online presence, which has the function of designing and promoting online learning. Garrison et al. (1999) determined three subcategories of TP from a large amount of literature and inquiries: instructional management, building understanding, and direct instruction. The three subcategories of teaching presence are highly similar to the comprehensible input hypothesis of Krashen (1982) in the traditional foreign language learning environment. Regarding the definition and subcategories, TP of this study refers to the guidance of the construction of foreign language knowledge and social relations that learners perceived during the online oral foreign language learning process, including these three subcategories.

Cleveland and Campbell (2012) described SP refers to the degree of social and emotional connection between learners and others in an online learning environment. Through a large number of documents, Garrison et al., (1999) summarized that SP includes three subcategories: emotional expression, open communication and group cohesion. These three factors are highly similar to the opposites of willingness to communicate, group cohesion, and fear of negative evaluation in the study of traditional foreign language anxiety influencing factors. Therefore, this study introduces SP into the online foreign language oral learning anxiety influencing factor model. It is defined as the strength of expressing themselves and the strength of connection with others that learners feel in the process of online foreign language oral learning, including these three subcategories.

2.2 Hypotheses

The CoI model regards online communities as places that support online learning through the interaction among CP, TP and SP (Thompson & MacDonald, 2005; Shea, 2006). The three factors were proved to be interrelated when the theory was created (Garrison et al., 1999), but additional empirical materials are needed to test it (Arbaugh et al., 2008). Therefore, in online foreign language oral learning, hypotheses were established in this study:

H1: CP and SP positively influence each other;
H2: CP and SP positively influence each other;
H3: SP and TP positively influence each other;

In the process of foreign language oral learning, learners are exposed to factors related to the possible successful experience of language learning, including courses, teachers, and peers. The path from foreign language learning experience to foreign language anxiety has been confirmed by many studies (Aida, 1994; Young, 1991). Here, hypotheses were proposed:

H4: CP reduces AN; H5: SP reduces AN;
H6: TP reduces AN; H7: CP increases IE;
H8: TP increases IE; H9: SP increases IE;

Tobias (2013) pointed out that increased effort can compensate for the negative effects of learner anxiety in the three language stages of input, processing, and output. However, in general, the speed of the L2 information exchange process is too fast to allow this kind of compensation. Therefore, a hypothesis was established:

H10: AN reduces IE;

Research by Ryan (2009) showed that IL2 is significantly related to immersive motivation and explains expected effort. Although IL2 and OL2 express learners' learning motivation from different sources internally and externally, both are motivations in essence and can promote the effort. Therefore, hypotheses were established:

H11: IL2 and OL2 influence each other;
H12: IL2 increases IE; H13: OL2 increase IE;

Research by Papi (2010), Ueki and Takeuchi (2012) showed similar results that IL2 has a weakening effect on L2 anxiety, and OL2 significantly increases L2 anxiety. Here, similar hypotheses were established:

H14: IL2 reduce AN; H15: OL2 increase AN;

MacIntyre et al. (1997) pointed out that students with low self-confidence in the L2 learning environment are more inclined to have negative expectations of their behavior and become more anxious when facing language learning tasks. A similar hypothesis was established:

H16: GSE reduces AN;

Bong and Skaalvik (2003) demonstrated that self-efficacy has an important motivational force. The empirical study by Kormos et al. (2011) verified that self-efficacy in L2 learning has a strong influence on L2 motivation. Nielsen's (2009) research has shown

that the stronger the self-efficacy of L2 learners, the greater the expected effort. Hence, hypothesized:

H17: GSE is positively correlated with IL2;
H18: GSE is positively correlated with OL2;
H19: GSE increases IE;

Many studies have pointed out that the environment has an important influence on the formation and maintenance of students' L2 learning motivation (Csizer & Dörnyei, 2005; Ryan, 2009). Kormos et al. (2011) illustrated that the surrounding environment of students: family, friends, peers, teachers, and guidance materials, all contribute to the learner's goal setting, attitude information, self-efficacy, and persistence in learning activities. Therefore, hypotheses were established:

H20a: CP is positively correlated with IL2;
H20b: TP is positively correlated with IL2;
H20c: SP is positively correlated with IL2;
H21a: CP is positively correlated with OL2;
H21b: TP is positively correlated with OL2;
H21c: SP is positively correlated with OL2;

Bandura (1977), Markus and Nurius (1986) found that mastering history, social comparison, attribution, and evaluation of important others are all important to learners' sense of self-efficacy. In this study, CP, TP and SP represent the knowledge exploration, knowledge-guided help, and emotion exchange with other participants experienced by learners on an online foreign language oral learning platform. Therefore, established hypotheses:

H22a: CP is positively correlated with GSE;
H22b: TP is positively correlated with GSE;
H22c: SP is positively correlated with GSE.

3 METHODOLOGIES

In this section, pedagogical design features are represented through Liulishuo (a popular foreign language oral learning APP) as an example. Then, the research procedure, participants and research instrument are displayed.

3.1 Pedagogical Design Features

For the description of the pedagogical design of foreign language oral learning platform, Liulishuo in China was chosen because this app has 120 million downloads, 4.9 points (5-point rating system), and employs intelligent speech recognition technology.

Based on the authors' learning experience in foreign language oral learning platforms, here are some common learning activities shared by platforms and represent in Liulishuo App. When the first loading on this app, learners are recommended to locate their English preference within several levels. Then, according to users' choice on preferred content (e.g., grammar, vocabulary), interests (e.g., English interview, daily conversation) and study schedule, a learning plan is created. And after daily tasks, a promotion can be clicked to share learning results on social media. Besides basic sentences and vocabulary, interesting topics can be added to a personalized learning plan. Then, following and combined with the voice recording of native English speakers, users practice the speaking skills of relevant vocabulary and sentences and obtain instrumental feedback on inaccurate pronunciation. After one task, learners gain a personalized radar chart of accuracy, rhythm, fluency and pronunciation and weakness analysis in pronunciation problems and sentence problems combining recommended learning materials.

3.2 Procedure

First, an online foreign language speaking anxiety questionnaire was organized based on the existing ones. Then the survey was hosted on Wenjuanxing (similar to SurveyMonkey) and was distributed in the foreign language learning groups and universities groups in the WeChat platform and QQ platform (similar to WhatsApp and Facebook). After data was collected, the reliability and validity of the questionnaire were evaluated and confirmatory factor analysis (CFA) of the hypotheses was verified.

3.3 Participants

The research mainly focused on Chinese young adult learners. There were 466 valid questionnaires. The average age is around 25 and the proportion of 18-30 years old is 89%. Males account for 38%, females account for 62%. Among them, 74% are undergraduate and postgraduate.

3.4 Research Instruments

Referring to existing questionnaires, mainly Community of Inquiry instrument (Arbaugh et al., 2008; Cleveland & Campbell, 2012), foreign language anxiety scale (Horwitz et al., 1986), general self-efficacy scale (Chen et al., 2001), L2 motivational self scale (Papi, 2010), online foreign language speaking anxiety scale was developed. All

questionnaire items were designed using a five-point Likert scale, ranging from 5=strongly agree, to 1=strongly disagree. Educational technology experts and English professionals were organized to translate English version's items into Chinese ones, and then back to English scale to check the ambiguity of the Chinese questionnaires. The Chinese questionnaires can be found at the link 在线英语口语焦虑及影响因素问卷 (wjx.cn).

4 RESULTS

In this article, reliability and validity were evaluated in SPSS 22. The Cronbach's Alpha coefficient of the overall questionnaire is 0.971, meaning that the reliability of the questionnaire is relatively high. The KMO (Kaiser-Meyer-Olkin) value of the overall questionnaire is 0.967, and the approximate variance of Bartlett's spherical test is 16397.127 ($p<0.001$), indicating that the sample data is suitable for factor analysis.

A confirmatory factor analysis (CFA) was performed in AMOS 26 to measure the fitness between the hypothesized model and observed data. Root mean square error of approximation (RMSEA)= 0.056, Goodness-of-fit index (GFI)= 0.904, Adjusted goodness-of-fit index (AGFI)= 0.874, Normed fit index (NFI)= 0.943, TLI=0.958, Comparative fit index (CFI)= 0.965, Parsimony normed fit index (PNFI)= 0.776, Those indexes is consistent with the goodness-of-fit indexes recommended by Hu and Bentler (1999) and Wu (2009), meaning a relatively good fit between the hypothesized model and the observed data. In other words, the final version of the online foreign language speaking anxiety model is a reasonable representation of the data collected. More detailed information about standardized factor loading of variables can be found in table 1 and the standard coefficient of paths in table 2.

4.1 Descriptive Statistics and Measurement Model

The online foreign language speaking anxiety model was tested, and measurement modeling results were summarized in table 1. For short, results of descriptive statistics were also combined in table 1.

The descriptive statistics results (details in Table 1) present that learners are in a state of moderate AN (M=3.48). Comparatively, learners are at a relatively high level of IE (M=3.91) and GSE (M=3.94). By contrast, IL2 (M=3.68) and OL2 (M=3.64) are at the mediate level. This displays that in the online environment, the motivation to learn English is not high though learners believe they can succeed in most tasks. CP(M=3.72), TP (M=3.72) and SP (M=3.67) also have similar levels, meaning that foreign language learners may not receive large information to promote content exploration, learning activities organization and group cohesion online.

Table 1: Summary of the measurement model.

Latent variables	Items	SFL
Cognitive Presence (CP)(M=3.72)	CP1	0.842***
	CP2	0.868***
	CP3	0.883***
	CP4	0.879***
Teaching Presence (TP)(M=3.72)	TP1	0.902***
	TP2	0.918***
	TP3	0.830***
Social Presence (SP)(M=3.67)	SP1	0.907***
	SP2	0.904***
	SP3	0.887***
Ideal L2 self (IL2) (M=3.68)	IL21	0.840***
	IL22	0.829***
	IL23	0.875***
Ought-to L2 self (OL2) (M=3.64)	OL21	0.757***
	OL22	0.829***
	OL23	0.851***
General self-efficacy (GSE)(M=3.94)	GSE1	0.824***
	GSE2	0.872***
	GSE3	0.819***
Online foreign language speaking anxiety (AN)(M=3.48)	CAN	0.858***
	NAN	0.916***
	TAN	0.781***
Intended Effort (IE)(M=3.91)	IE1	0.863***
	IE2	0.822***
	IE3	0.825***

Note: M=Mean, SFL=Standardized factor loading, ***P<0.001, CP1=Triggering Event, CP2=Exploration, CP3=Integration, CP4=Resolution, TP1=Instructional Management, TP2= Building Understanding, TP3= Direct Instruction, SP1=Emotional Expression, SP2=Open Communication, SP3=Group Cohesion, CAN= Communication Apprehension (CAN), NAN=Fear of Negative Evaluation, TAN=Test Anxiety.

4.2 Structural Equation Model

The conducted CFA's results were summarized in table 2. The results present that all the mutual influence relations have been proved (see table 2, H1-H3, H11, H17, H18, H20, H21 and H22). Only a small part of the causal relations has been proved (see table 2, H10, H13, H15, H16 and H19). More detailed analysis can be found in section 5.

Table 2: Summary of structural equation modeling.

Path	SC	Hypotheses
CP->AN (H4)	-0.379	Not
TP ->AN (H6)	0.88***	Not
SP ->AN (H5)	-0.145	Not
IL2->AN (H14)	-0.014	Not
OL2->AN(H15)	0.527***	Supported
GSE->AN(H16)	-0.145*	Supported
AN->IE (H10)	-0.129*	Supported
GSE->IE(H19)	0.284***	Supported
CP->IE (H7)	0.279	Not
IL2->IE (H12)	0.116	Not
OL2->IE(H13)	0.226**	Supported
TP->IE (H8)	0.344	Not
SP->IE (H9)	-0.192	Not
TP<->CP (H2)	0.954***	Supported
SP<->TP (H3)	0.928***	Supported
SP<->CP(H1)	0.936***	Supported
OL2<->IL2 (H11)	0.647***	Supported
OL2<->GSE(H18)	0.662***	Supported
IL2<->GSE(H17)	0.678***	Supported
IL2<->CP (H20a)	0.757***	Supported
IL2<->TP (H20b)	0.727***	Supported
IL2<->SP (H20c)	0.774***	Supported
OL2<->CP (H21a)	0.657***	Supported
OL2<->TP (H21b)	0.612***	Supported
OL2<->SP (H21c)	0.692***	Supported
GSE<->SP (H22c)	0.673***	Supported
GSE<->TP (H22b)	0.650***	Supported
GSE<->CP (H22a)	0.672***	Supported

Note: ***P<0.001, **P<0.01, *P<0.05, SC=Standard coefficient, "-" means negative relation, "->" means lead to, "<->" means mutual influence.

5 DISCUSSION AND IMPLICATION

Among the influencing factors of IE, the path coefficient of AN is -0.129 (see table 2). The research results show that the anxiety experienced by learners in the process of online foreign language speaking learning belongs to obstructive anxiety. This result is different from Shih (2019), in which AN has no significant impact on IE. This may be related to the sample. The sample of Shih (2019) are students from senior high school in Taiwan and English is a compulsory subject and an important subject of the entrance college examination.

The strong correlation between CP, TP and SP validates the close relationship described by Garrison et al. (1999) in online foreign language oral learning.

IL2, OL2 and GSE are highly positively correlated, which correlation coefficient is not less than 0.65(see table 2). This echoes personality psychology about the close connection between IL2 and OL2(Leary, 2007).

5.1 TP Enhances AN

The path coefficient of TP is 0.88 (see table 2), which rejects H6. The research results show that the sense of TP has the greatest impact on AN. It means that although the sense of TP may enhance learners' attention on online learning tasks, learners' sense of tension and even anxiety are increased. This may be related to the program setting of the online foreign language learning platform. The teaching management and direct guidance of the existing foreign language oral learning platform are mainly based on the procedure automatic response. Without considering personal learning characteristics, the repeated imitation process may increase the anxiety of learners. At the same time, this result also verifies the research results of Grant et al., (2013) about negative effects generated in the traditional foreign language learning environment may affect learners' online learning experiences.

CP and SP have no significant impact on AN and IE. The real-time interaction between learners is still low due to the technical reasons of the online foreign language learning platform and different individuals' learning schedules. According to the authors' experience in Liulishuo and Duolingo (two foreign language speaking learning Apps), there is no recommendation of learning partners to help individuals practice and reflect on what has been learned online.

5.2 IL2, OL2, GSE, CP, TP, SP Promote Each Other

The path coefficients data show that IL2, OL2, GSE are highly positively correlated with CP, TP, SP respectively, for which the correlation coefficient is not less than 0.61 (see table 2). The results of this study support the argument of Cohen and Norst (1989) about the close connection between language and self.

5.3 OL2 Increase AN, GSE Reduce AN, Both of Them Increase IE

The path coefficients from OL2 and GSE to AN are 0.527 and -0.145 respectively (see table 2), which implies that OL2 and GSE have a significant impact on AN. This indicates that external environmental pressure strongly affects learners' AN.

OL2 and GSE have a significant impact on IE, and the path coefficients are 0.226 and 0.284 respectively (see table 2). This result supports the view that instrumental motivation can increase learning behavior (Gardner & MacIntyre, 1991) and Bandura's (1977) view that people with low self-efficacy are more likely to give up.

5.4 Implications and Limitations

Based on the research results, here are some suggestions for the design of foreign language learning platforms.

Recommend learning partners to practice and reflect on how to use what has been learned online in real life. Although the platform collects a large amount of corpus and provides communication templates, flexibility is lacking when real practices are faced by real people in their lives.

Enrich the display forms of TP. In terms of course setting, the use of concept maps to show the internal connections between learning content and individuals' preferences can enhance learners' perception of the structure of learning content, help learners clarify their learning goals, and reduce additional cognitive load (Hwang et al., 2011).

Strengthen learners' real-time recognition of their anxiety, present different instructions according to the degree of anxiety, guide learners to reduce their sense of learning anxiety, and increase their attention to learning content. If permits, wearable devices can be used to identify the learner's heartbeat and other physiological information, roughly estimate the emotional intensity, and then propose different reminders to calm the mood.

Guide learners to correctly deal with negative evaluations. On the cognitive hand, learners need to summarize the causes of errors and find ways to solve them about specific tasks; on the meta-cognition hand, learners need chances to compare their current and previous learning results, and think about whether to improve study plan further. This means that the online platform should consider providing more learning analytics data to support meta-cognition processing.

Some limitations affect the generalization of the conclusions to a certain extent. First, there is no comparative study between different learning environments (e.g., online, face-to-face or blended) and different technologies used (e.g., AR/VR, voice chatbot). Then, this study also did not analyze the specific functional applications of each learning platform.

6 CONCLUSIONS

The descriptive statistics show that online foreign language speaking learners are in middle anxiety, high GSE and IE level. The structural equation modeling shows that TP, OL2 increase AN while GSE significantly reduces AN; GSE, OL2 increase IE while AN reduces IE. The high correlation between CP, TP, SP, IL2, OL2, and GSE proves that learners' internal state and online learning environment is a dynamic cyclic process. In this regard, personalized or adaptive learning both from cognition and emotion could improve the learning experience. Some suggestions about human-computer interaction in online learning platforms are recommended.

With the help of artificial intelligence and big data, online education pays more attention to individual learners. Smart tutors, smart teaching assistants, etc. enrich the virtual learning environment. Online learning at this stage and in the future has higher requirements for human-computer interaction and collaborative learning. But learning still happens in people, and people have both reason and emotional aspects. Therefore, online learning with a strong interactive nature should pay more attention to the emotional state of the learner, to explore which emotions have a positive effect on the learner of different features, and how to reduce the emotions which hurt the learning experience. Moreover, future studies are recommended to analyze the design elements in an online learning environment representing CP, TP, SP from a platform perspective. Comparative studies of CP, TP, SP (representatives and their relationships with learning performance and evaluation) between different disciplines and different difficulty levels are also good direction.

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