

# A Serial Mediation Analysis of the Effect of Growth Mindset and Self-Confidence on Willingness to Communicate Among Chinese as a Second Language Learners

Yao Qi

Department of Literature and Language Education, University of Malaya, Malaysia

Chew Fong Peng\*

Department of Literature and Language Education, University of Malaya, Malaysia

Norfariza Mohd Radzi

Department of Educational Management, Planning and Policy, University of Malaya, Malaysia

**Abstract**—Willingness to communicate (WTC) in a second language (L2) is influenced by individual factors. This study explores the effects of positive psychology variables—perseverance of effort, growth mindset, and L2 self-confidence—on WTC. The study examined L2-WTC among 364 international students learning Chinese as a second language in China. A hypothesized model involving perseverance of effort, L2 self-confidence, growth mindset, and L2-WTC was tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) with Smart PLS 4.0. The findings reveal a serial mediation model, in which L2 self-confidence, influenced by perseverance of effort, enhances growth mindset, which in turn leads to greater willingness to communicate. The data show that perseverance of effort directly predicts willingness to communicate. Furthermore, perseverance of effort was significantly associated with willingness to communicate through the mediating effect of L2 self-confidence. The study provides support for the serial mediation roles of L2 self-confidence and growth mindset in facilitating willingness to communicate.

**Index Terms**—perseverance of effort, growth mindset, L2 self-confidence, L2 willingness to communicate

## I. INTRODUCTION

In recent years, willingness to communicate (WTC) among English as a second language (ESL) learners has been extensively studied. With the introduction of positive psychology in second language acquisition (SLA) (Lake, 2013; MacIntyre & Gregersen, 2012; Mercer & MacIntyre, 2014) increasing attention has been paid to how affective factors influence learners' communicative behaviors. There is considerable evidence that L2 WTC is influenced by positive psychology variables, such as L2 grit, L2 self-confidence and language mindset (Clément et al., 2003; Ebn-Abbasi et al., 2022; Fallah, 2014; Ghanbarpour, 2016; Ghonsooly et al., 2012; Lee & Chen Hsieh, 2019; Y. Wang et al., 2021).

However, despite these advances, research on the influence of these variables on willingness to communicate among international students learning Chinese as a second language in China is limited. This study seeks to fill this gap by examining how positive psychology constructs relate to L2WTC in the context of Chinese language learning.

The framework of this study is based on three key theoretical foundations: positive psychology theory (Seligman & Csikszentmihalyi, 2000), the language mindset meaning system (Lou & Noels, 2019) and the pyramid model of willingness to communicate (Macintyre et al., 1998)). In the context of second language learning, individuals with a growth mindset believe that they can successfully learn a second language through sustained and persistent effort (Khajavy et al., 2021). Lou and Noels (2016) emphasize that teacher affirmation of students' efforts plays a crucial role in developing a growth mindset in students (Dweck & Yeager, 2019). Another key contribution of the present study is the mediating role of second language (L2) self-confidence in the relationships between effort persistence and willingness to communicate, as well as between effort persistence and growth mindset. Moreover, the study highlights a remarkable serial mediation chain, in which L2 self-confidence and growth mindset sequentially mediate the relationship between effort persistence and willingness to communicate.

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\* Corresponding Author. Email: [fpchew@um.edu.my](mailto:fpchew@um.edu.my)

## II. LITERATURE REVIEW

### A. *Positive Psychology in Second Language Acquisition (SLA)*

Positive psychology (PP) was introduced to the field of second language acquisition (SLA) by researchers such as MacIntyre and Gregersen (2012), Lake (2013), and MacIntyre et al. (2014). The emergence of positive psychology in second language teaching has shifted the field in a more optimistic and learner-centered direction. A growing number of studies have examined the influence of positive psychological variables on willingness to communicate (WTC), including grit (Cheng, 2021; Ebn-Abbasi et al., 2022; Lee, 2019; Teimouri et al., 2022), self-confidence (Khajavy et al., 2016; Lin, 2019; Peng & Woodrow, 2010; Yashima & Zenuk-nishide, 2004), and language mindsets (Hu et al., 2022; Khajavy et al., 2021; Lee & Taylor, 2022; Lou & Noels, 2020; Teimouri et al., 2022; H. Wang et al., 2021; Yao et al., 2021; Zarrinabadi & Mantou Lou, 2022; Zhang et al., 2022).

Grit in a second language refers to a student's perseverance and passion to achieve the long-term goal of language acquisition (Teimouri et al., 2022). Duckworth et al. (2007) initially conceptualized grit as composed of two dimensions: persistence of effort (POE) and consistency of interest (COI) (Duckworth & Quinn, 2009). Students with high levels of POE in their efforts despite challenges and setbacks, while those with high levels of COI maintain consistent interest over time. Individuals with high levels of grit tend to believe in their ability to succeed through effort and are less likely to give up when faced with obstacles in second language learning.

Some studies, such as that of Li and Dewaele (2021), have examined both POE and COI. However, the current study focuses specifically on persistence in effort, as only the effort component is directly linked to the growth mindset construct in the language mindset meaning system (Lou & Noels, 2019). Previous studies have also validated an independent POE analysis (Lee, 2022), supporting the separation of the two components of tenacity (Khajavy et al., 2021; Teimouri et al., 2022).

In recent years, researchers have increasingly focused on the role of grit in learning through speech. Previous studies have explored grit as a composite construct and its effect on WTC (Lee & Chen Hsieh, 2019). Cr  de et al. (2016) argued that both POE and COI are valid and meaningful when studied separately (Cr  de et al., 2016). Therefore, this study examines the effect of POE alone on students' WTC. Empirical evidence further supports that second language learners with a growth mindset tend to have high POE (Khajavy et al., 2021), and that grit, especially POE, significantly influences learners' WTC (Lee & Lee, 2020).

### B. *Willingness to Communicate Model (WTC)*

Communication readiness is defined as an individual's willingness to communicate, either in a specific context or in general (Macintyre et al., 1998). Initially explored in the context of first language (L1) communication, WTC was once considered a stable personality trait (e.g., Burgoon, 1976; McCroskey & Baer, 1985). However, more recent studies in second language (L2) contexts have highlighted its dynamic and situational nature (Kang, 2005; Macintyre et al., 1998). L2 WTC has been shown to be influenced by multiple psychological and affective variables, such as persistence (specifically, speaking ability), L2 self-confidence, and growth mindset (H. Wang et al., 2021; Zarrinabadi et al., 2021; Zhang et al., 2022). These factors are central determinants of students' willingness to communicate, which this study seeks to explore. MacIntyre et al. (1998) proposed the pyramid model of second language communication (WTC), which organizes the variables that influence WTC into six levels. At Level V, social and individual contextual factors, including personality traits, play a significant role. Traits such as persistence and growth mindset, being relatively stable, are located at this level. Level IV emphasizes the immediate effects of second language (L2) confidence on students' willingness to communicate.

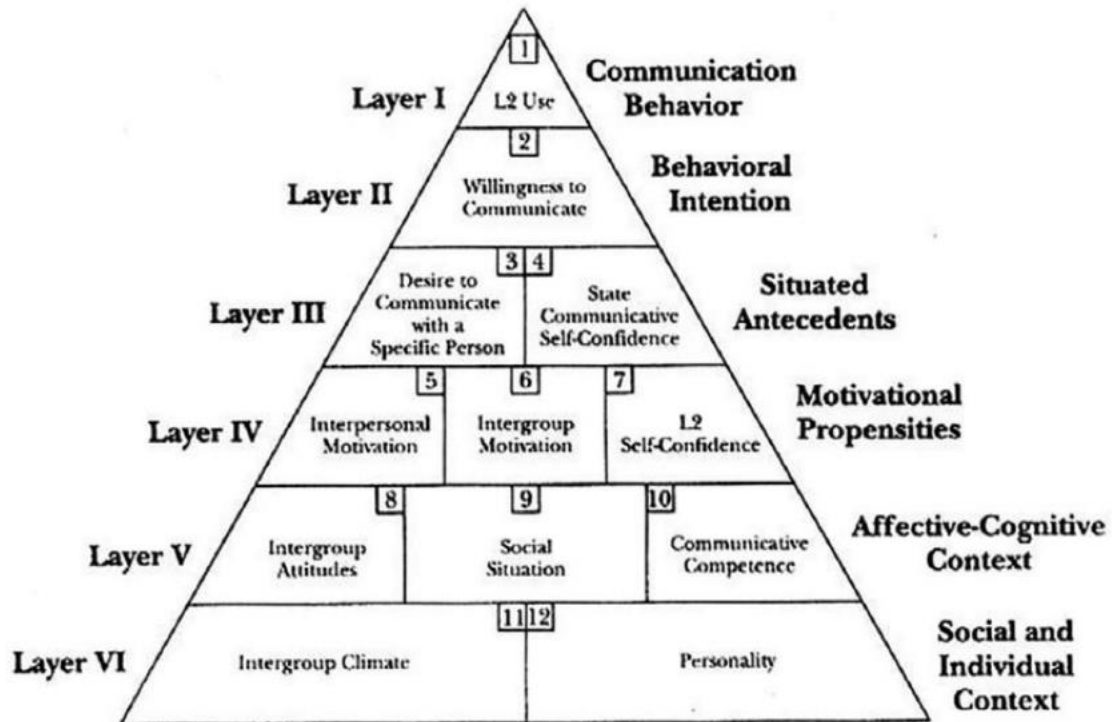


Figure 1. Pyramid Model of Willingness to Communicate (Macintyre et al., 1998)

### C. Linguistic Mindset Meaning System

Linguistic mindsets refer to students' beliefs about their own language competence during their learning, i.e., growth mindsets and fixed mindsets (Lou, 2022; Lou & Noels, 2016a, 2019; Mercer & Ryan, 2009). Students with a growth mindset believe that language skills can be developed and that they can achieve language proficiency through continuous effort. In contrast, students with a fixed mindset believe that language skills are innate, unchanging, and limited to specific periods of maturity.

The concept of "mindset" was initially introduced by Dweck (1999) as part of the theory of implicit intelligence. This concept was later extended to second language teaching, where researchers proposed the linguistic mindset framework (Mercer & Ryan, 2009). Lou and Noels (2019) proposed the Language Mindset Meaning System, divided into two subsystems: the fixation-oriented subsystem and the growth-oriented subsystem. The growth-oriented subsystem comprises two key components: effort (Blackwell & Trzesniewski, 2016; Lou & Noels, 2016b) and self-belief (Lou & Noels, 2019; Robins & Pals, 2002), both of which play a crucial role in promoting learners' confidence in their ability to succeed in language learning.

TABLE 1  
LANGUAGE-MINDSET MEANING SYSTEM (LOU & NOELS, 2019)

	Fixed-oriented subsystem	Growth-oriented subsystem	Examples of empirical evidence
<b>Attribution:</b> What causes different learning outcomes?	<b>Uncontrollable:</b> Interpret successes to one's own talent and failures to the lack of natural ability.	<b>Controllable:</b> Interpret success to hard work and challenges/mistakes to the insufficient effort and motivation.	Blackwell et al., 2007; <i>Hong et al., 1999</i> ; Robins & Pals, 2002;
<b>Effort beliefs:</b> What is the meaning of effort?	<b>Negative:</b> Exertion of effort reflects one's lack of natural talent; effort cannot compensate a lack of talent.	<b>Positive:</b> Effort is the key to improvement and a means to become talented.	Blackwell et al., 2007; <i>Lou &amp; Noels, 2016, 2017</i> ;
<b>Achievement goals:</b> What are your goals for your learning activities?	<b>Performance goals:</b> Aim to out-perform others and validate ability (when perceived competence is high) or avoid being seen as incompetent (when perceived competence is low).	<b>Mastery goals:</b> Aim to develop and improve language competence; focus on the learning process.	Blackwell et al., 2007; <i>Lou &amp; Noels, 2016, 2017</i> ; <i>Papi et al., 2019a</i> ; Grant & Dweck, 2003; Robins & Pals, 2002.
<b>Failure/mistake mindsets:</b> What does failure/mistake mean?	<b>Failure as debilitating:</b> Failure or making mistakes inhibits one's learning and debilitates one's performance; one should avoid failure or making mistakes in order to learn and perform well.	<b>Failure as enhancing:</b> Failure or mistakes provides opportunity to understand what is needed and to facilitate improvement; one should take advantage of failure to learn and grow.	<i>Lou &amp; Noels, 2016, 2017</i> ; Haimovitz & Dweck, 2016;
<b>Self-regulatory tendency in the face of adversity:</b> What do you tend to do when dealing with setbacks?	<b>Self-defensive (helpless) strategies:</b> Avoid similar situations (e.g., avoid using/learning the target language) and engage in downward comparisons (e.g., "many students got a worse grade than me") to protect self-esteem.	<b>Self-improvement (mastery-oriented) strategies:</b> Seek for better learning strategies and feedback to improve and to overcome setbacks.	Blackwell et al., 2007; <i>Bai et al., 2019</i> ; <i>Lou &amp; Noels, 2016, 2017, 2019a</i> ; <i>Hong et al., 1999</i> ; Nussbaum & Dweck, 2008; <i>Papi et al., 2019b</i> ; Robins & Pals, 2002;
<b>Competence-based emotional tendency in the face of adversity:</b> How do you feel in challenging tasks?	<b>Anxiety:</b> Afraid of challenges and failure; anxious to use the target language and fear of being judged/rejected.	<b>Confidence:</b> Enjoy challenging tasks; confidence to use the language and to develop and improve competence.	<i>Lou &amp; Noels, 2019a</i> ; Robins & Pals, 2002;

#### D. Perseverance of Effort (POE) and Willingness to Communicate

The literature on the role of grit in L2 willingness to communicate (L2WTC) presents mixed results across participants from different cultural and national contexts. Researchers have examined the predictive role of grit on communication readiness among students from Saudi Arabia, Morocco, Korea, Iran, and China. Some studies have shown that grit significantly predicts willingness to communicate in an L2WTC (Bensalem et al., 2023; Lan et al., 2021). Across different learning contexts, grit has been shown to significantly predict willingness to communicate in an L2WTC in classrooms, outside of classrooms, and in online environments (Lee & Lee, 2020). Furthermore, grit has been found to significantly predict the willingness to communicate in an L2WTC across different age groups, including middle school, high school, and college students. However, when examining the two dimensions of perseverance separately, several studies have found that perseverance of effort (POE) significantly predicts WTC, while consistency of interest (COI) does not show a statistically significant relationship with WTC (Cheng, 2021; Feng & Papi, 2020; Teimouri et al., 2022). In contrast, Cheng (2021) reported that both POE and COI significantly predict WTC. According to that the current study hypothesized that

- **H1: Perseverance of effort positively affects the willingness to communicate in a second language. POE and L2 Self-Confidence**

Previous studies have shown that tenacity is positively associated with self-confidence (Doorley et al., 2022). Across various student groups (middle school, high school, and university), tenacity has been positively correlated with varying levels of self-confidence. In the context of second language learning, Lee (2019) found that confident L2 learners are more likely to persevere when faced with challenging tasks and setbacks, indicating a strong relationship between persistence and confidence. Therefore the current study proposed that:

- **H2: L2 self-confidence mediates the relationship between persistence in effort and willingness to communicate in the L2.**

#### E. POE and Growth Mindset

Research on the relationship between courage and mindset has yielded mixed results. Some studies have shown a significant positive correlation between courage and mindsets (Doorley et al., 2022; Sigmundsson et al., 2020), particularly between courage and growth mindset (Hu et al., 2022; Lee, 2022; S. Wang et al., 2018). From a dimensional perspective, some researchers have found that both COI and POE are significantly correlated with growth mindset (Khajavy et al., 2020). However, other studies have reported that only grit (POE) is significantly associated with growth mindset, while the relationship between COI and growth mindset is not statistically significant (Tang et al., 2019).

Teimouri et al. (2020) further distinguished general grit and L2 grit from growth mindset, showing that only general grit (POE) was significantly related. L2 grit and its components (L2 grit-POE and L2 grit-COI) did not show a significant relationship with growth mindset. Accordingly, this study proposed the following hypotheses:

- **H3: Growth mindset mediates the relationship between persistence in effort and willingness to communicate in the L2.**

#### F. L2 Self-Confidence and Willingness to Communicate

L2 self-confidence is widely considered a strong predictor of WTC. Numerous studies have confirmed that self-confidence significantly predicts WTC in second language learners (Khajavy et al., 2016; Lee & Chen Hsieh, 2019; Peng & Woodrow, 2010; Pyun et al., 2014). However, results vary depending on the context. For example, Sharifi et al. (2021) found that academic self-confidence did not predict WTC in any context (in-person, extracurricular, or online). In contrast, Mulyono et al. (2021), supported by the findings of Mulyono et al. (2020) and Lee (2019), reported that self-confidence can predict WTC in all learning environments.

Interestingly, Lee (2019) found that self-confidence predicted WTC in extracurricular and virtual contexts, but not in the classroom. Furthermore, academic confidence significantly predicted WTC among university and language institute students, but not among upper secondary school students. Other studies in the field of SLA have also confirmed the positive relationship between L2 self-confidence and WTC (Fatima et al., 2020; Ghanbarpour, 2016). Consequently, the following hypotheses were formulated:

- **H4: L2 self-confidence mediates the relationship between effort persistence and growth mindset.**

#### G. Growth Mindset and Willingness to Communicate

In the context of learning English as a second language, the predictive role of mindset in WTC remains a topic of debate. Some studies have shown that linguistic mindset does not significantly predict WTC (Zarrinabadi et al., 2021). However, growth mindset has been found to significantly predict WTC among Iranian and Chinese students (Ebn-Abbasi et al., 2022). From a contextual perspective, growth mindset significantly predicted WTC outside the classroom, but not inside it (Lee & Taylor, 2022), a finding consistent with Wang et al. (2021). However, other studies have concluded that growth mindset does not directly predict WTC (Zhang et al., 2022). In light of these considerations, this study proposed that:

- **H5: L2 self-confidence and growth mindset sequentially mediate the relationship between persistence in effort and willingness to communicate in the L2.**

Based on the reviewed literature, this study proposes **L2 self-confidence and growth mindset as mediating variables** between perseverance of effort and L2 willingness to communicate.

### III. METHODOLOGY

#### A. Instrument

Willingness to communicate in the L2 was assessed using a 4-item scale developed by Lee and Hsieh (2019). For this study, items were selected from the face-to-face section of Lee et al. (2019)'s L2 WTC scale to measure international students' willingness to use Chinese to communicate in the classroom in China. The scale, adapted from Peng (2013), uses a five-point Likert scale ranging from 1 (completely unwilling) to 5 (completely willing).

Persistence of effort was measured using items from the Domain-Specific Persistence Scale developed by Teimouri (2020), designed for language learning contexts. Persistence of effort is a dimension of perseverance and refers to "an individual's persistent effort toward a long-term goal" (Duckworth et al., 2007).

L2 self-confidence was measured using an 8-item scale developed by Pyun et al. (2014). This scale assesses students' perceptions of their Chinese language proficiency and their confidence in communicating. It uses a five-point Likert scale and is adapted from previously validated instruments (Gardner et al., 1997; MacIntyre & Charos, 1996; McCroskey & McCroskey, 1988).

Growth mindset was assessed using nine items adapted from the Language Mindset Inventory developed by Lou and Noels (2019). The instrument includes three dimensions: general linguistic intelligence beliefs (GLB), second language proficiency beliefs (L2B), and age-related beliefs about language learning (ASB). The GLB and L2B Growth Mindset subscales assess students' beliefs about the malleability of their first and second language skills, while the ASB Growth Mindset subscale measures beliefs about the ability to acquire language beyond the so-called "critical period".

#### B. Participants and Procedure

The sample size was determined using two methods. A power analysis using G\*Power suggested a minimum sample size of 217 participants. According to Krejcie and Morgan (1970), a sample size of 364 participants was considered sufficient for this study. A cluster sampling technique was used.

364 international students ( $M = 0.20$ ,  $SD = .034$ ) from seven universities in a province in southwest China participated. Prior to data collection, the researcher contacted the international student administration via email to explain the purpose of the study and ensure the confidentiality of participants' personal information. After obtaining consent, data collection took place in April 2023 using both in-person.

A total of 415 responses were collected. Of these, 46 were excluded due to missing demographic information, such as gender and age. The final sample consisted of 364 valid responses. Participants completed a printed questionnaire in class. Participation was voluntary, and no compensation was offered.

Gender, included as a control variable, has previously been examined in relation to willingness to communicate. In this study, 36% of participants were female and 64% were male.

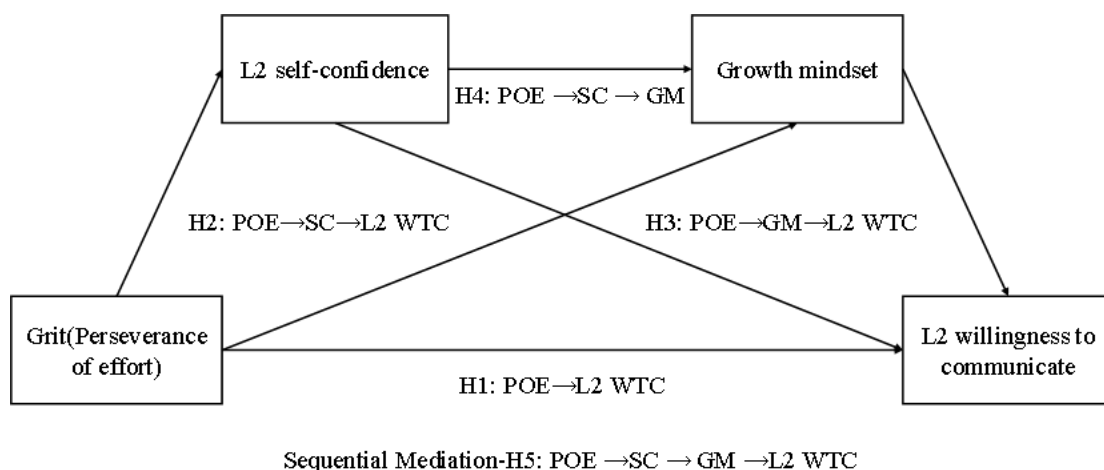


Figure 2. Research Framework

### C. Data Analysis

This study used the partial least squares (PLS) method to test the proposed hypotheses. As a causal-predictive approach, PLS was used to examine the effects of effort persistence, L2 self-confidence, and growth mindset on learners' willingness to communicate. In addition, the study examined the mediating role of L2 self-confidence and growth mindset in these relationships.

PLS-SEM is particularly suited for evaluating higher-order reflective models and complex research frameworks. One of its advantages is that it requires only a minimal number of orthogonal latent variables to estimate the model parameters, making it efficient for studies with moderate sample sizes and non-normal data distributions.

### D. Reflective Measurement Model Results

The evaluation of the reflective measurement model included assessments of internal consistency reliability and convergent validity. In this study, Cronbach's alpha and composite reliability values were greater than 0.70, and the average variance extracted (AVE) exceeded the recommended threshold of 0.50. These results are presented in Table 1.

To assess discriminant validity, the Hetero-Mono-Trait (HTMT) ratio was used. HTMT values were below the acceptable threshold of 0.85 (see Table 3A). According to Fornell and Larcker's criterion (see Table 3B), the square root of each construct's AVE was greater than its correlation with any other construct, further strengthening discriminant validity.

### E. Higher-Order Construct Results

In this study, growth mindset is modeled as a mediating variable composed of three endogenous variables: GL-GRO (general language beliefs), L2-GRO (second language aptitude beliefs), and AS-GRO (age sensitivity beliefs). It is hypothesized that the relationship between persistence in effort and willingness to communicate is mediated by growth mindset. Therefore, growth mindset is considered a higher-order construct (HOC) composed of three first-order reflective components. Therefore, the model is classified as a higher-order component model (HCM).

Growth mindset was modeled as a reflective-reflective construct. The variance inflation factor (VIF) values for the three dimensions of growth mindset were below the threshold of 3.3, indicating the absence of multicollinearity issues. Furthermore, all three dimensions made statistically significant contributions to the higher-order construct (see Table 2, Step II).

## IV. STRUCTURAL MODEL RESULTS

Figure 2 presents the structural model of the current study. The coefficient of determination ( $R^2$ ) was examined to assess the explanatory power of the constructs. Table 4 summarizes the results of the hypothesis tests:

H1: Effort persistence was significantly associated with willingness to communicate ( $\beta = 0.187$ ,  $p < 0.05$ ), confirming Hypothesis 1.

H2: L2 self-confidence significantly mediated the relationship between effort persistence and willingness to communicate ( $\beta = 0.163$ ,  $p < 0.05$ ).

H3: Growth mindset significantly mediated the indirect relationship between effort persistence and willingness to communicate ( $\beta = 0.071$ ,  $p < 0.05$ ).

H4: L2 self-confidence positively predicted growth mindset, indicating a significant mediation path ( $\beta = 0.197$ ,  $p < 0.05$ ).

H5: A serial mediation effect of self-confidence and L2 growth mindset was confirmed between persistence in effort and willingness to communicate ( $\beta = 0.051$ ,  $p < 0.05$ ).

Furthermore, gender had no significant effect on willingness to communicate ( $\beta = 0.115$ ,  $p = 0.197$ ).

Step I: The first-order reflective components were assessed.

Step II: The second-order reflective construct was assessed.

TABLE 2  
CONVERGENT VALIDITY AND INTERNAL CONSISTENCY

Constructs	Items	Loading	CA	Rho-A	CR	AVE
<b>Step I: First-order reflective components were evaluated.</b>						
Perseverance of effort			<b>0.802</b>	<b>0.813</b>	<b>0.864</b>	<b>0.561</b>
	POE1	0.675				
	POE2	0.795				
	POE3	0.790				
	POE4	0.813				
	POE5	0.657				
L2 self-confidence			<b>0.917</b>	<b>0.919</b>	<b>0.932</b>	<b>0.632</b>
	SC1	0.775				
	SC2	0.804				
	SC3	0.816				
	SC4	0.829				
	SC5	0.828				
	SC6	0.753				
	SC7	0.763				
	SC8	0.786				
GLB-growth mindset			<b>0.662</b>	<b>0.669</b>	<b>0.816</b>	<b>0.598</b>
	GM1	0.834				
	GM2	0.729				
	GM3	0.752				
L2B-growth mindset			<b>0.73</b>	<b>0.733</b>	<b>0.848</b>	<b>0.65</b>
	GM4	0.793				
	GM5	0.773				
	GM6	0.851				
ASB-growth mindset			<b>0.8</b>	<b>0.803</b>	<b>0.882</b>	<b>0.714</b>
	GM7	0.861				
	GM8	0.834				
	GM9	0.840				
L2 willingness to communicate			<b>0.852</b>	<b>0.856</b>	<b>0.9</b>	<b>0.693</b>
	WTC1	0.794				
	WTC2	0.847				
	WTC3	0.838				
	WTC4	0.85				
<b>Step II: The second-order reflective construct is presented.</b>						
growth mindset			<b>0.815</b>	<b>0.815</b>	<b>0.891</b>	<b>0.731</b>
GLB-growth mindset		0.815				
L2B-growth mindset		0.859				
ASB-growth mindset		0.889				

AVE, Average variance extracted; CA, Cronbach alpha; CR, Composite reliability.

TABLE 3A  
ASSESSMENT OF DISCRIMINANT VALIDITY

Constructs	1	2	3	4
1. Perseverance of effort	1			
2. L2 self-confidence	0.583	1		
3. Growth mindset	0.575	0.566	1	
4. L2 willingness to communicate	0.563	0.568	0.695	1

TABLE 3B  
FORNELL-LARCKER CRITERION

Constructs	1	2	3	4
1. Perseverance of effort	<b>0.855</b>			
2. L2 self-confidence	0.488	<b>0.833</b>		
3. Growth mindset	0.468	0.469	<b>0.749</b>	
4. L2 willingness to communicate	0.491	0.508	0.6	<b>0.795</b>

Bold values represent square root of AVE.

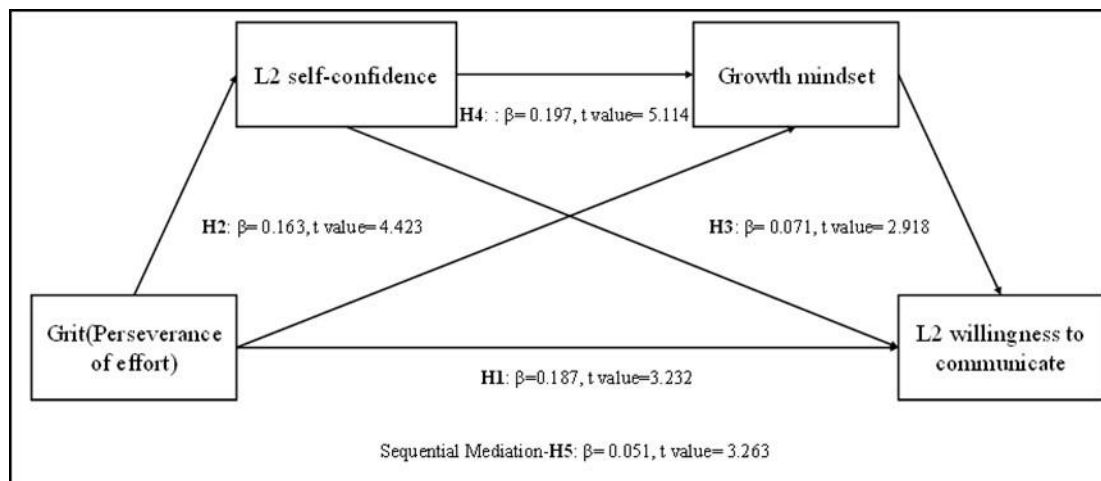


Figure 3. Structural Model

## V. DISCUSSION AND CONCLUSION

Overall, the results of this study reveal several important insights: First, the study provides evidence supporting the serial mediation of second language self-confidence and growth mindset in the relationship between persistence and willingness to communicate. The mediating role of second language self-confidence and growth mindset in this association was confirmed. Second, the direct effect of persistence in effort on willingness to communicate was also established. This finding is consistent with previous studies (Lee et al., 2020). While previous research has generally considered perseverance as a unidimensional construct, showing that it significantly predicted WTC (Bensalem et al., 2023; Lan et al., 2021; Sharifi et al., 2021; Cheng, 2021; Lee, 2020; Teimouri et al., 2020; Khajavy et al., 2021; Feng & Papi, 2020), this study took a more nuanced approach by analyzing perseverance as a multidimensional construct. Specifically, we examined persistence of effort (POE) as the independent variable, and the results demonstrate that POE significantly predicts L2WTC. Third, consistent with previous research, growth mindset was found to significantly predict WTC in the classroom (Lee et al., 2022; Wang et al., 2021). This suggests that students with a growth mindset are more likely to demonstrate a greater willingness to communicate in the target language in the classroom. Previous research has also demonstrated the predictive effect of growth mindset on WTC outside the classroom (Lee et al., 2022).

TABLE 4

### HYPOTHESIZED RESULTS

Relationship	$\beta$	SE	t-value	p	CI (2.5-97.5%)	Result
<b>Mediation analysis</b>						
POE→SC→WTC	0.163	0.037	4.423	0	(0.093;0.238)	Accepted
POE→GM→WTC	0.071	0.024	2.918	0.004	(0.03;0.126)	Accepted
POE→SC→GM	0.197	0.038	5.114	0	(0.124;0.277)	Accepted
<b>Direct Effect</b>						
POE→WTC	0.187	0.058	3.232	0.001	(0.073;0.298)	Accepted
<b>Serial mediation analysis</b>						
POE→SC→GM→WTC	0.051	0.016	3.263	0.001	(0.025;0.086)	Accepted
<b>Control variable</b>						
Gender	0.115	0.089	1.290	0.197	(-0.06;0.286)	Non-Sig

POE, perseverance of effort; SC, L2 self-confidence; GM, growth mindset; WTC, L2 willingness to communicate; CIs, Confidence intervals; SE, Standard error; p-value < 0.05; Non-Sig, Non-significant.

### A. Theoretical Implications

By investigating the effect of persistence in effort (perseverance in effort) on willingness to communicate (WTC), the current study responds to the call by Lee et al. (2020) and others who have promoted future research to examine persistence in effort as a multidimensional construct (Khajavy et al., 2020; Teimouri et al., 2020). This study demonstrates that students with a high level of perseverance in effort are more likely to exert more effort and show greater willingness to communicate in the target language. Furthermore, L2 self-confidence and growth mindset were found to play an important mediating role in the relationship between perseverance in effort and WTC. Furthermore, while most previous studies in the field of positive psychology in SLA have focused on English as a second language, the present study contributes to the literature by expanding the research context to learners of Chinese as a second language, thereby enriching both theoretical understanding and the diversity of study samples in this field.

### B. Practical Implications

The results suggest that positive psychological variables can improve students' willingness to communicate in a second

language. Language teachers can design interventions to foster students' self-confidence and growth mindset in their L2, which can, in turn, increase their communicative readiness. Creating a positive and supportive classroom environment that fosters emotional safety and encourages effort can lead to increased engagement and better communicative readiness among students (Lee et al., 2022).

### C. Future Directions and Research Limitations

This study has several limitations. First, it is a cross-sectional study, which limits the ability to draw causal inferences. The absence of experimental or qualitative data highlights a potential avenue for future research that could provide a deeper understanding of students' experiences and behavioral patterns over time.

Second, the sample consisted exclusively of international undergraduate and graduate students studying in China, which may limit the generalizability of the findings. The influence of tenacity (POE), L2 self-confidence, and growth mindset on willingness to communicate (WTC) may vary depending on variables such as country of origin, cultural background, age, and educational context.

Future researchers are encouraged to conduct comparative studies with diverse student populations, particularly those based on nationality or cultural region. Previous studies, for example, have shown that students from some Asian countries tend to report lower levels of WTC in English as a second language (Clément et al., 2003). Broadening the scope to include more diverse samples and longitudinal or experimental designs would significantly contribute to the robustness and applicability of future findings.

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**Qi Yao** is a PhD candidate in Language Education at the Faculty of Literature and Language Education, University of Malaya, Malaysia. She was born in China and obtained her Bachelor's and Master's degrees in Chinese Language and Literature from Yunnan Minzu University, respectively. Her research interests include teaching Chinese as a second language and curriculum design for language learners.

She is currently involved in research focusing on second language acquisition in multilingual contexts. Her recent work has been presented at international conferences and published in peer-reviewed journals. Email: [qiyao18787064307@gmail.com](mailto:qiyao18787064307@gmail.com) ORCID iD: <https://orcid.org/0009-0000-4415-6507>



**Chew Fong Peng** is the Chair for Hub of Language, Innovation and Teaching, Department of Language and Literacy Education, Faculty of Education, University of Malaya, Malaysia. She received her PhD in Education from the University of Malaya. Her areas of teaching include Malay Language Education, Chinese Language Education, and Early Childhood Education.

She has authored over 150 journal articles, 9 books, 67 conference proceedings, 36 book chapters, 10 edited books, and 20 translated works. Her research spans multilingual education, language policy, and literacy development.

Assoc. Prof. Dr. Chew is a prominent figure in language education research in Southeast Asia. She is a member of various academic committees and serves as reviewer for indexed journals. Email: [fpchew@um.edu.my](mailto:fpchew@um.edu.my) ORCID iD: <https://orcid.org/0000-0002-7876-7979>



**Norfariza Mohd Radzi** is a committee member of Quality Management at the Faculty of Education, University of Malaya, Malaysia. She received her PhD in Education Policy and Administration from the University of Malaya. Her research specialization includes education policy, school leadership, and institutional management. She has published extensively in Scopus and non-Scopus indexed journals, as well as in edited book volumes and conference proceedings. She is actively involved in institutional quality assurance initiatives and supervises postgraduate students in education management.

Dr. Norfariza is a member of the Malaysian Educational Management Society and regularly contributes to national dialogues on education reform. Email: [norfariza@um.edu.my](mailto:norfariza@um.edu.my) ORCID iD: <https://orcid.org/0000-0002-9188-2082>