

Parental Involvement Influences the Relationship between Children's L2 Chinese Reading Motivation and Reading Performance: A Longitudinal Person-Centered Moderation Analysis

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Abstract

Despite acknowledging the importance of parental factors and children's reading motivation in early childhood reading development, the scholarly focus has been primarily on traditional variable-centered approaches and has neglected their heterogeneity. This longitudinal study tracked 317 Hong Kong L2 Chinese first-graders and their parents, using a person-centered approach to analyze parental involvement patterns in children's L2 reading. It also explored how these patterns influence the relationships between children's motivation and their L2 reading performance. Latent profile analysis results revealed three distinct groups of L2 Chinese parents' reading involvement with their children: ambivalent, balanced, and enthusiastic parents. Wald chi-square analysis showed that students with enthusiastic parents exhibited the strongest reading motivation, compared with the other two groups. Mixture regression results indicated that reading motivation had a significantly stronger impact on the reading performance of students with parents in the balanced parents' group than it did on the performance of students with parents in the enthusiastic parents' group, whereas no such predictive relationship existed with the ambivalent parents' group. This study highlights the

significance of parental involvement in children's reading and elucidates the complex relationship between motivation and reading performance.

Keywords: Parental Involvement, L2 Chinese Reading Performance, Reading Motivation, Person-Centered Moderation Analysis

Introduction

As a cosmopolitan city, Hong Kong boasts a significant international population, with immigrants accounting for nearly 10% of its total population (Loh et al., 2018). With the introduction of the city's biliteracy (i.e., Chinese and English) and trilingualism (i.e., Cantonese, Mandarin, and English) policy in 1997, immigrant students in Hong Kong have encountered significant difficulties in acquiring Chinese as a second language (L2) in order to meet the requirement to complete the Chinese language subject and to enter local colleges (Zhu et al., 2023). Among the various difficulties faced by L2 Chinese learners, developing Chinese reading skills is the most prominent challenge (Leung, 2019; Wong, 2018). The sources of Chinese reading difficulties stem from the complexity of the Chinese writing system (Chan et al., 2021; Loh et al., 2018), the disconnect between spoken Cantonese and standard written Chinese (Bhowmik & Kennedy, 2016; Li et al., 2020; Ullah, 2012), and limited support available from their parents (Lone & Chow, 2021). Whereas existing research has widely investigated students' L2 Chinese ability from the perspectives of the Chinese writing system's complexity and the written-spoken-Chinese disconnect (Chan et al., 2021;

Ke & Xiao, 2015; Loh et al., 2018; Zhou et al., 2018), parental effects have been relatively ignored (Zhu et al., 2022), despite a realistic and pressing need to address this aspect.

In view of the known significant role of parental involvement in reading motivation (e.g., Kanonire et al., 2022; Miyamoto et al., 2018; Schaffner & Schiefele, 2016; Stutz et al., 2016) and reading development (e.g., Baker et al., 1997; Guo et al., 2018; J. Huang et al., 2020) of young children, this longitudinal study sought to explore the relationship between students' motivation and their L2 Chinese reading performance, while considering the varying levels of parental involvement (i.e., parental attitudes, expectations, and engagement) toward L2 Chinese reading. To achieve this objective, the study adopted person-centered approaches known as latent profile analysis (LPA) and mixture regression for its data analyses.

Literature Review

Motivation and Its Relationship with Reading Achievement

Motivation, which encompasses a person's beliefs, goals, and values, is a crucial construct that profoundly influences individuals' activity choices (Kavanagh, 2019; Wigfield, 1997). Within the self-determination theory (SDT) framework, intrinsic and extrinsic motivations are two distinctive but related components (Deci & Ryan, 1985; Ryan & Deci, 2000). Specifically, intrinsic motivation involves engaging in an activity for its inherent satisfaction, whereas extrinsic motivation is driven by external factors (Ryan & Deci, 2000). In the context of reading, intrinsic motivation arises from positive experiences, such as enjoyment of books, interest in their content, and feelings of a personal significance (Becker

et al., 2010), while extrinsic motivations can stem from desires for good grades or recognition from teachers and parents (Wigfield & Guthrie, 1997). The SDT has been widely applied in primary and secondary school research, because scholars have found that even first-grade students demonstrate the ability to differentiate between activities they enjoy and those they consider important (Baker et al., 1997; Q. Wang & Coddington, 2014).

Guided by the SDT, extensive empirical research has consistently affirmed the significant role of reading motivation in the advancement of reading proficiency in the early stages of schooling (e.g., Kanonire et al., 2022; Miyamoto et al., 2018; Schaffner & Schiefele, 2016; Stutz et al., 2016). Despite the recognized importance of motivation in early reading development, however, most of the existing literature on this topic has focused on studies conducted in Western countries (e.g., The United States, Russia, Germany), where alphabetical writing systems are used. It is also worth noting that reading motivation varies across different ethnicities (Wigfield et al., 2016). Therefore, it is necessary to advance the research by investigating additional language learning contexts—for example, the relationship between younger students' motivation and Chinese reading, which involves a pictographic writing system. Whereas a handful of empirical studies on this topic are available in the literature, they have primarily reported on reading Chinese as a first language (L1) (e.g., J. Huang et al., 2020; Q. Wang & Coddington, 2014) or investigated the learning of L2 Chinese reading from a cross-sectional perspective (e.g., Zhu et al., 2022, 2023).

Furthermore, because of the challenges associated with recognizing Chinese characters, current studies on L2 Chinese reading have largely concentrated on metalinguistic skills

pertaining to the Chinese writing system. These skills include orthographic features (e.g., Chan et al., 2021; Loh et al., 2018), morphological awareness (e.g., Ke & Xiao, 2015; McBride-Chang et al., 2003), and phonological awareness (e.g., H. S. Huang & Hanley, 1997; Zhou et al., 2018). Consequently, there has been a dearth of research examining the role of motivation among L2 Chinese learners during the initial years of their education.

Parental Involvement in Reading Development

Children's school-age period is a critical stage for their reading development (Kieffer, 2012; Y. Liu et al., 2016; Palardy, 2010), and parents play an indispensable role during this phase. To comprehend the development of reading skills, it is essential to examine the various salient contexts and their interplay, including the family, and such an examination entails considering the beliefs, values, and behaviors of the adults who shape the reading environment of younger children (Sonnenschein et al., 1996). Within this framework, most children are exposed from infancy to cultural practices that promote reading (Morrow, 1989), and their acquisition of competence in these skills takes place within a social context that includes interactions with more knowledgeable individuals (Vygotsky, 1978). In other words, it is believed that an important factor for instilling reading motivation is the "experiences children have at home that may set the stage for positive attitudes toward reading, that signal emerging interest in reading and learning to read, and that relate directly to the development of motivation" (Baker et al., 1997, p. 69).

Specifically, scholars have observed that parental factors, including parents' attitudes toward reading, their reading expectations for their children, and their engagement in reading

activities with their children, have a demonstrable impact on the children's reading motivation and achievement (Fan & Williams, 2010; McCarthy & Moje, 2002; Zhu et al., 2022). For instance, Rowe (1991) studied 5,000 Australian students aged 5 to 14 years and found that parents' reading attitudes and parent-child reading activities at home significantly influenced the children's reading attitudes and reading achievement across four age groups (5–6, 7–8, 9–11, and 12–14 years). Similar findings were also observed in J. Huang et al.'s (2020) research conducted in an L1 Chinese context. Moreover, Guo et al. (2018) revealed that parental expectations have a direct impact on Chinese primary school students' reading performance and can moderate the effects of parents' educational level and socioeconomic status on their children's reading development. In the context of learning L2 Chinese, Zhu et al. (2022) discovered that parental support (e.g., parents' reading attitudes and reading engagement) significantly influenced the future motivation (i.e., the ideal L2 Chinese self) of first-grade L2 Chinese students. Considering those previous results, it is reasonable to assume that parents who exhibit enthusiasm and hold positive attitudes and expectations toward reading are more likely to participate in diverse reading activities at home. This, in turn, can promote their children's reading motivation and performance (Bracken & Fischel, 2008; Weigel et al., 2006).

The current research on the interplay between motivation, parental involvement, and reading performance often has employed cross-sectional designs centered on variables, utilizing methods such as ANOVA, structural equation models (SEM), or linear regression analyses to investigate these relationships. However, that approach frequently neglects the

diversity of factors within family contexts. In addition, previous studies have focused primarily on individual associations between family factors, student motivation, and reading skills, as well as between students' motivation and their reading skills, without considering the intricate relationship between motivation and reading skills among lower-grade students within varying family environments (e.g., varying levels of parental involvement). Therefore, a significant research gap exists that necessitates longitudinal investigations to unveil the nuanced motivational characteristics and reading skills exhibited by students. As discussed in the following session, this would require an alternative approach to the traditional variable-centered approach.

Moderation Analysis with a Latent Variable in Education Research

The variable-centered approaches assume that all participants within a sample have similar characteristics and are homogeneous, and they focus on the average effects across the entire sample (Zhu et al., 2022). However, such an assumption is often challenged and overly simplistic when applied to real-world situations (Wu et al., 2021). Indeed, a report released by Hong Kong's Equal Opportunities Commission (EOC) in 2020 emphasized the significant diversity in family resources among L2 Chinese families in Hong Kong. Given the intricate nature of the background of that immigrant group (Ushioda, 2009), it is appropriate to employ person-centered approaches to examine the nuances of individuals' attitudinal and behavioral responses in the context of L2 Chinese learning in Hong Kong.

Latent Profile Analysis is a person-centered approach that divides participants into distinct categories on the basis of their diverse psychological or behavioral characteristics,

thus providing a comprehensive understanding of the research sample being analyzed (Collins & Lanza, 2010). By incorporating different profiles, additional regression analyses can be conducted. This methodological development allows an exploration of the heterogeneity between variables that would otherwise be treated as being the same, and it is referred to as a mixture regression (McLarnon & O'Neill, 2018). As is shown in Figure 1, the latent categorical variable (C) represents group memberships, and the squares above the circle (i.e., U_1, U_2, \dots, U_n) are the indicators. The arrows, from the latent categorical variable to the indicators, illustrate that participants' responses to the indicators determine their group memberships. Figure 2 presents the mixture regression model. The latent categorical variable (C) serves as the moderator to explore the relationships between exogenous (the predictor or covariate, i.e., x) variables and endogenous (distal outcome, i.e., y) variables across different categories of the latent categorical variable (C) (Asparouhov & Muthén, 2014).

Some recent research has attempted to use the latent profile analysis method in studies of language learning, either using LPA independently or employing it to predict or be predicted by external variables (e.g., Kangasvieri, 2019; M. Liu & Oga-Baldwin, 2022; Y. Wang et al., 2021; Zhu et al., 2021; Zhu et al., 2022). Mixture regression is a relatively new approach in the context of language learning, and its use is currently limited. To our knowledge, only one study, by Wu et al. (2021), has utilized mixture regression to investigate the relationship between motivation and mathematical performance across different learning strategy categories. In our study, mixture regression enables us to gain a deeper understanding of how different types of parental involvement affect the relationships between students' motivation

and their L2 Chinese reading performance, and consequently helps us to further comprehend the role that parents play in the development of their children's reading skills.

Rationale and Aims of the Current Study

Judging by the literature reviewed above, two notable research gaps exist. First, limited attention has been given to exploring the longitudinal relationships between parental involvement, student motivation, and reading performance in the context of L2 Chinese learning at the school-entry level, particularly among minority populations. Second, the impact of different categories of parental involvement on children's reading skills is underexplored because of the limitations of variable-centered approaches in capturing the unique characteristics of diverse forms of parental involvement. As a result, investigations into the relationship between student motivation and reading performance within different categories of parental involvement have been hindered.

Because the concept of motivation as defined by the SDT applies to lower-grade students and may influence their reading development (e.g., Kanonire et al., 2022; Miyamoto et al., 2018; Stutz et al., 2016), and knowing that parental involvement plays a crucial role in shaping children's motivation to read and in enhancing their reading performance during the early stages of schooling (e.g., Fan & Williams, 2010; McCarthy & Moje, 2002; Zhu et al., 2022), this study was guided by three research questions:

- (1) What are the different patterns of parental involvement in L2 Chinese reading among low-grade primary school students within immigrant families?

- (2) How do the different categories of parental involvement relate to their students' reading motivation and reading performance?
- (3) How do the relationships between students' reading motivation and reading performance differ on the basis of the different categories of parental involvement?

Data and Methods

Context and Participants

Using the opportunity sampling method, at the first sampling point (T1) the current study initially involved 385 first grade L2 Chinese students from 10 primary schools in Hong Kong. By the second sampling point (T2), there had been some attrition, and only 342 students participated in the tests and questionnaires. Out of these 342 students, only 317 students' parents completed the parent questionnaires, so the final sample size for this study was 317 ($M_{\text{age}} = 6.78$, $SD = 0.74$) students and 317 parents. The students in this study exhibited a diverse range of native languages, with Asian languages (such as Urdu, Hindi, Tagalog, and Indonesian) being the most prevalent, while English, African, and European languages were less commonly spoken. Due to differences in Chinese proficiency levels, L2 Chinese students were typically segregated from their Chinese-speaking counterparts during Chinese classes in school. Participants in this study volunteered to take part and did not receive compensation. Written consent was obtained from the students' parents.

Instruments

The instruments utilized in this study included Chinese reading tests and questionnaires for both the students and their parents. The Chinese reading test drew upon the List of Chinese Lexical Items and List of Chinese Grammatical Usage Items (Chan, 2007) as its foundational resources. The tests comprised various item types, including true-false and matching questions, that were designed to evaluate students' comprehension and application of Chinese vocabulary, phrases, and sentences. Originally, the first (T1) test comprised 30 items. However, during an initial evaluation of that test's reliability and validity, five items

were eliminated due to low values in the item information function within the item response theory framework. The second (T2) test maintained the same structure but retained a total of 30 items. Each correct response earned students one point, and their Chinese reading skills were represented by the total score obtained from the remaining respective 25 items and 30 items, ranging from zero to 25 or 30, respectively.

The student questionnaire employed a four-point Likert scale ranging from one (never) to four (always) to assess their motivation, while encompassing both intrinsic and extrinsic aspects. The questionnaire was adapted from the 2011 Progress in International Reading Literacy Study (PIRLS) (https://timssandpirls.bc.edu/methods/pdf/p11_r_scales_smr.pdf). To accommodate the young age of the participants, three items were developed for each construct. Illustrative statements included: “I learn a lot from reading Chinese” (intrinsic motivation) and “I need to read Chinese well for my future” (extrinsic motivation).

The items included in the parent questionnaire were modified from the 2006 PIRLS (https://timssandpirls.bc.edu/PDF/P06_Home.pdf). Our study focused on assessing three specific dimensions of parental involvement: parental expectations regarding their children’s Chinese-reading proficiency, parental positive attitudes toward Chinese reading, and parental engagement in their children’s Chinese reading activities. The measurement of parental expectations (consisting of three items), parents’ attitudes (four items), and parental engagement (four items) were conducted using a four-point Likert scale, ranging from one (indicating “never”) to four (“always”). Illustrative statements included: “I expect that my child can be as proficient in listening and speaking as Chinese [can]” (parental expectations);

“I like to spend my spare time reading Chinese” (parental attitudes); and “I discuss with my child about the Chinese books that he/she has read” (parental engagement).

All questionnaire items were presented in both Chinese and English.

Data Collection

Data were collected in collaboration with classroom teachers and research assistants, and two sampling points were implemented. The first sampling point (T1) occurred at the commencement of the first semester, and the students completed a 30-minute T1 Chinese reading test, followed by a 10-minute questionnaire. The parents’ questionnaire was provided to the students for their guardians to fill out, with a collection period of one week. Each child was provided with a single questionnaire to be completed at home by either their father or mother. Classroom teachers ensured the collection of the parent questionnaires within the designated timeframe. The second sampling point (T2) occurred at the end of the second semester and consisted of a 30-minute Chinese reading test.

Data Analysis

Descriptive statistics, Cronbach’s alpha, and bivariate correlations were first computed using SPSS 22.0. Then, confirmatory factor analysis (CFA) was performed, using Mplus 8.3, to assess the construct validity of the instruments measuring the students’ motivation and their parent’s level of involvement. To evaluate model fit, we checked fit indices, including chi-square (χ^2), comparative fit index (CFI; good > 0.95), root-mean-square error of approximation (RMSEA; good < 0.06), and standardized root-mean-square residual (SRMR; good < 0.05).

For the first research question, LPA was conducted in Mplus 8.3 using three indicators for parental involvement to classify the parents into distinct categories. The optimal number of categories was determined by using fit indices such as loglikelihood (LL), Akaike information criterion (AIC), Bayesian information criterion (BIC), sample-size adjusted BIC (ABIC), Lo-Mendell-Rubin likelihood ratio test (LMRT), and bootstrap likelihood ratio test (BLRT). Lower values of LL, AIC, BIC, and ABIC indicate better model fit, while significant p -values for LMRT and BLRT (<0.05) suggest that the current model fits the data better than the alternative model (Zhu et al., 2021). For the second research question, Wald chi-square tests were employed to assess categorical differences in the three grouping indicators: the students' motivation, and their first and second-time Chinese reading performance.

Finally, a mixture regression analysis was conducted to solve the third question, using the multilevel (ML) three-step manual approach (Asparouhov & Muthén, 2014). The analysis aimed to determine whether the latent class variable—parental involvement at T1—moderated the relationship between the students' T1 motivation (the predictor variable) and their T2 Chinese reading performance (the outcome variable) while we controlled for T1 Chinese reading performance.

Results

Table 1 presents an overview of the study's descriptive statistics, Cronbach's alpha values, and bivariate correlations. Specifically, the results obtained from the CFA provide evidence supporting both the construct validity of student motivation and the parental

involvement. The fit indices for student motivation indicated a satisfactory fit, as depicted in Figure 3: $\chi^2(8) = 11.047, p = 0.1990$; RMSEA = 0.035 [0.000, 0.079], CFI = 0.989, TLI = 0.979, SRMR = 0.025. It is noteworthy that extrinsic and intrinsic motivations each showed a strong positive correlation ($r = 0.841, p < .001$). In addition, the fit indices for parental involvement (Figure 4) demonstrated a satisfactory model fit: $\chi^2(41) = 57.681, p = 0.0058$; RMSEA = 0.036 [0.006, 0.056], CFI = 0.968, TLI = 0.957, SRMR = 0.043). Figure 4 illustrates that parental expectations displayed a weak correlation with parental engagement ($r = 0.251, p < .001$) and a moderate correlation ($r = 0.440, p < .001$) with parental attitudes, while parental attitudes exhibited a strong positive association with parental engagement ($r = 0.653, p < .001$).

Group Memberships by Parental Involvement

Using LPA, we categorized the parents into different groups according to the diverse levels of parental involvement, using three indicators: parental attitudes, parental expectations, and parental engagement. The one-to-four group solutions were examined sequentially, and the model fit indices are detailed in Table 2. Consistently with our expectations, the absolute values of LL, AIC, BIC, and ABIC demonstrated a downward trend as the number of groups increased. However, this decrease became considerably smaller when the number of groups reached three, indicating that the addition of further groups to the model offered minimal incremental information regarding group membership. For the three-group model, the p -values of the LMRT, ALMR, and BLRT were statistically significant. This implies that the three-group model outperformed the two-group model. The

entropy of the three-group model was 0.844, indicating that the accuracy of the classification exceeded 90% (Lubke & Muthén, 2007). After considering the characteristics of mean values within each group and the class size per profile, the decision was made to partition the data into three groups for subsequent analyses.

Figure 5 presents the estimated means of the three indicators across the three groups. To facilitate our understanding, the first group (G1) (N = 96, 30.3% of the total sample) was labeled as “ambivalent parents,” because their mean scores on parental attitudes and engagement were the lowest, whereas their expectations toward their children’s Chinese reading skills were the second highest. The second group (G2) (N = 41, 12.9%) was designated as “balanced parents,” on the basis of their moderate levels of parental attitudes and engagement, and interestingly, they had the lowest expectations regarding their children’s Chinese reading skills, albeit with a mean value still exceeding 2.5. The third group (G3) consisted of “enthusiastic parents” (N = 180, 56.8%), and they displayed the highest mean scores for all three indicators.

Wald chi-square tests were conducted (see Table 3) to examine the variations in students’ motivation, three indicators of parental involvement, and the Chinese reading performance at both T1 and T2, for groups 1, 2, and 3. Significant differences were observed in student motivation, and in the three parental variables in the comparison between G2 (balanced parents) and G3 (enthusiastic parents), as well as that between G1(ambivalent parents) and G3 (enthusiastic parents). However, there was no significant difference in student motivation and parental engagement between the G1 (ambivalent parents) and G2 (balanced parents).

Notably, whereas no significant differences were found in the children's Chinese reading performance among the three groups during the first assessment, the second assessment revealed significantly higher scores for the students whose parents were in the G3 group (enthusiastic parents) than for those whose parents were in the G2 group (balanced parents).

Mixture Regression Results

As is presented in Figure 6, T1 Chinese reading performance was a significant covariate in predicting the students' T2 Chinese reading performance, with $b = .743, p < 0.01$. Table 4 is an organized table of slope and intercept values across the parental involvement categories. The regression coefficients indicate that no significant predictive relationship existed between the students' T1 motivation and their T2 reading performance for the ambivalent parent's group (G1). However, for the balanced parents group (G2) and the enthusiastic parents group (G3), the relationship between students' T1 motivation and their T2 reading performance was found to be significant, with $bs = .246$ and $.037$, respectively. Moreover, the significance of the Wald test for slope differences ($\chi^2(2) = 10.251, p = .0059$) prompted further examination of pairwise differences. The results revealed a significant slope difference between G2 (balanced parents) and G3 (enthusiastic parents) ($G2_{\text{slope}} - G3_{\text{slope}} = 0.209, p = 0.002$). This suggests that the impact of the students' motivation on their Chinese reading performance was significantly stronger in G2 than in G3.

To establish measurement identification, the mean of the distal outcome factor, T2 reading performance, was set to zero for G3 (enthusiastic parents), which served as the

reference class for comparison. The results showed that the students whose parents were in the balanced parents' group (G2) displayed a significantly lower average score in Chinese reading ($M = -0.914$) than the students whose parents were in the enthusiastic parents' group (G3) did. Collectively, these results represented a form of moderating effect, indicating that the relationship between students' reading performance and their motivation was contingent upon the students' parental involvement categories.

Discussion

This study used latent profile analysis to specifically pinpoint three categories of parental involvement, thus shedding light on those three levels of distinct impacts by the parents on their students' reading achievement, and on the different relationships between reading motivation and reading performance. The findings are examined in this discussion, with connections drawn to the existing literature on the subject.

The Features of L2 Chinese Parental Involvement

The LPA results align with the finding of prior investigations (e.g., Lone & Chow, 2021) and theoretical hypotheses (Ushioda, 2009), thus highlighting the varying degrees of support that L2 parents in Hong Kong provide for their children's education. Parental expectations concerning their children's reading, in general, were positive, with the highest values observed across all three indicators within each category. This corresponds with findings from a previous government survey (Hong Kong Unison, 2012) indicating that L2 Chinese parents are more inclined to enroll their children in local schools. This outcome can further be

supported by the understanding that, as a minority group, possessing strong Chinese reading skills enhances children's educational success and opens up better employment opportunities for those children in the local context (Zhu et al., 2023; Lone & Chow, 2021). Moreover, the findings revealed that parental engagement in students' Chinese reading activities continues to be at a low level, even among the G3 group of relatively enthusiastic parents. This may be attributed to the L2 parents having provided insufficient participation due to their busy working schedules (Lone & Chow, 2021) or perhaps to their limited Chinese literacy (Shum et al., 2011). The balanced parents (G2) group shared similarities with the enthusiastic parents (G3) group regarding parental involvement characteristics, but they were less positive than the G3 parents were for all three indicators.

Furthermore, although both the G1 (ambivalent parents) and G2 (balanced parents) groups demonstrated similar levels of parental expectations and engagement, there were noticeable differences in terms of parental attitudes. The inconsistency between parents' negative attitudes toward reading and their high expectations for their children's performance, as demonstrated by the ambivalent parents (G1), is indicative of an authoritative parenting style (Pinquart, 2016). Compared with parenting in the context of Western societies, ambivalent parenting may be more common in East Asian societies (Mainland China, Hong Kong, Taiwan, Japan, Korea, Singapore) (Chyu & Chen, 2022; Jhang & Lee, 2018). That prevalence is likely due to the influence of Confucian ideology, which regards academic success not only as a means of personal accomplishment but also as a way of fulfilling familial obligations (Sue & Okazaki, 2009). Although many immigrants in Hong

Kong come from Southeast Asia, for their children, mastering Chinese remains a critical challenge that must be overcome in order to integrate successfully into Hong Kong society (Bhowmik & Kennedy, 2016; Leung, 2019). This means that the high expectations that immigrant groups have for their children's Chinese reading performance stem from the strong emphasis on academic success in Hong Kong's societal atmosphere coupled with the language ability that these immigrant groups must possess to integrate into Hong Kong society. Similar findings have been observed in studies on children of Southeast Asian immigrants in Taiwan by Jhang & Lee (2018). Because immigrant parents are often constrained by their own limited Chinese language abilities (Shum et al., 2011), and perhaps due to a lack of intrinsic interest in Chinese, their low level of engagement in Chinese L2 reading activities is also understandable. These factors contribute collectively to the ambivalent level of parental involvement.

Parental Effects on Children's Reading Motivation and Reading Performance

The positive associations between L2 Chinese parental involvement and student reading motivation were consistent with the Zhu et al.' (2022) study, because the results indicated a significantly stronger motivation toward reading among students whose parents were in the enthusiastic parents' group (G3) compared with the other two groups. This implies that positive parental involvement is more likely to stimulate students' motivation to read.

Another possible explanation for the lack of a significant difference in student motivation between the students with the ambivalent group (G1) of parents and those with the balanced group (G2) of parents may be the similar levels of parental engagement among the parents.

Although there were minor differences in two other factors, they were not substantial enough to impact the student motivation levels significantly. This observation underscores the role of parental engagement in shaping student motivation.

When considering the impact of parental factors on reading performance, our results partially confirm the earlier demonstration that first grade is a period of rapid development in reading skills (Y. Liu et al., 2016). This is because, at the beginning of first grade (T1), there were no significant differences in the students' Chinese L2 reading levels, but by the end of first grade, differences between groups had begun to emerge. This also reflects the significant role played by the type of parental involvement in the development of children's reading abilities (Fan & Williams, 2010; McCarthy & Moje, 2002; Zhu et al., 2022). Specifically, parents who have a positive attitude toward reading and high expectations for their children's L2 reading skills, and who actively participate in reading activities with their children have been shown to be more likely to cultivate stronger reading skills in their children (e.g., Baker et al., 1997; Fan & Williams, 2010; J. Huang et al., 2020; Q. Wang & Coddington, 2014). That is supported in this study by the superior T2 performance of the students with enthusiastic parents (G3) compared with those with balanced parents (G2). However, it is important to note that the impact of parental factors on students' reading development may not be universally applicable, and even when it does have an effect, the extent of that effect may vary depending on factors such as the type of family involvement and the language context. Therefore, it is worth noting that the difference in T2 reading performance between students with ambivalent parents (G1 group) and those with enthusiastic parents (G3 group)

did not reach statistical significance. This highlights the need for further investigation and discussion.

One possible reason for the lack of significant difference in the students' T2 performance between those with parents in G1(ambivalent parents) and those with parents in G3 (enthusiastic parents) could be that ambivalent parents may employ a more authoritative parenting style that is characterized by a high degree of responsiveness and of being demanding (as discussed in the previous section). This is further supported by Pinquart's (2016) meta-analysis, which demonstrated that an authoritative parenting style is associated with better academic performance both concurrently and longitudinally. Furthermore, the influence of the authoritative parenting style on students' academic development has been found to be moderated by age—that is, the relationship between parenting style and academic performance is stronger in younger age groups of children, and the effect of authoritative parenting style diminishes as children grow older and spend less time with their parents (Pinquart, 2016). These findings may collectively explain why the ambivalent parents in G1 did not have a negative impact on their children's reading performance during the first grade, and instead, these children achieved satisfactory results without significant differences, compared with the students nurtured by G3 enthusiastic parents.

The Moderating Role of Parental Involvement: Varied Relationships between Reading Motivation and Reading Performance

In line with our expectations, the results of the mixture regression analysis revealed that parental involvement had a moderating effect on the relationship between the students'

motivation and their reading proficiency, while we controlled for their T1 reading performance. This extends beyond the results of previous variable-centered research (e.g., Fan & Williams, 2010; J. Huang et al., 2020; Q. Wang & Coddington, 2014). Specifically, we found that the relationship between motivation and reading performance was not always evident, and the degree of their relationships varied across different categories of parental involvement.

The study found no significant relationship between the motivation and reading performance of G1 students (with ambivalent parents), which may be attributed to the lack of parental role models (J. Huang et al., 2020). Previous research has shown that parents have a significant impact on their children's attitudes, preferences, and habits through their own behavior and example (Pfoest et al., 2016; Wilhelm et al., 2008), and this influence underscores the importance of parental modeling in promoting positive attitudes and behaviors in children (J. Huang et al., 2020). However, in the case of ambivalent parents, their own negative attitudes toward reading Chinese and their high expectations for their children's Chinese reading skills may have hindered their own ability to serve as effective role models. In addition, previous research has indicated that the authoritative parenting style is linked to adaptive achievement strategies, including lower failure expectations, task-irrelevant behavior, and passivity (Aunola et al., 2000). These findings suggest that students with authoritative parents are more likely to enhance their performance through a repertoire of strategies rather than relying only on reading motivation.

In addition, the study observed that the regression coefficient for the relationship between motivation and reading performance was significantly higher for the students whose parents were in G2 (balanced parents) compared with those whose parents were in G3 (enthusiastic parents). This finding supports previous research by Logan et al. (2011), which found that motivation plays a more significant role in the reading performance of children with weaker reading skills relative to their peers. Motivated children with weaker reading skills are more likely to persist with challenging reading materials due to their interest, satisfaction, or desire to improve their abilities (Logan et al., 2011; McGeown et al., 2012). This underscores the potential for significant progress in students whose parents were in the balanced parents group (G2) if their motivation was effectively stimulated. Moreover, it is worth noting that high levels of motivation may lead to ceiling effects (Dörnyei & Ushioda, 2011), wherein additional motivation does not result in substantial improvements beyond the already high level of achievement. This was particularly relevant for students whose parents were in the enthusiastic parents group (G3), who exhibited high motivation and had already attained high scores on assessments, as they may have relied more on their reading skills to overcome challenges rather than on motivation alone. In such cases, other factors, such as instructional strategies and task design, may become more crucial considerations for further enhancing student learning and academic performance.

Practical Implications

This study's findings affirm the role that parents play in L2 Chinese learning in their school-age children. However, the heterogeneity of family environments results in different

learning characteristics among students, thus necessitating further individualized instruction and practices. First, because L2 parents generally lack proficiency in Chinese (Shum et al., 2011) and have limited knowledge of language teaching, their participation in children's Chinese reading activities is relatively low. The government and schools can consider organizing regular lectures for L2 parents, providing language support and imparting reading strategies to enhance the effectiveness of their involvement. Indeed, some practices in this regard have already been implemented in Hong Kong (Lone & Chow, 2021). In addition, students who have relatively weaker academic performance but possess a certain level of motivation demonstrate considerable malleability, meaning that teachers and parents can enhance those children's reading performance through interventions that target motivation, such as providing positive feedback (Fong et al., 2019; Wisniewski et al., 2020) and instilling a sense of competence and autonomy (Deci & Ryan, 1985; Ryan & Deci, 2000). As for the high-performing students whose parents were in G1 (ambivalent parents) and G3 (enthusiastic parents), other factors, such as instructional strategies and task design, may become crucial considerations for further enhancing student learning and academic performance.

Furthermore, in this era of burgeoning electronic technology, the integration of artificial intelligence (AI) into family education is emerging as a promising trend. Notably, parent-child shared reading has garnered wide recognition as a highly effective method for facilitating children's reading development (Noble et al., 2019). Leveraging advancements in AI, conversational agents can now serve as valuable scaffolding tools, offering prompts and

guidance tailored to story-related questions to support language-minority parents in facilitating their children's comprehension of the second language (Yang et al., 2022). In light of these possibilities, the present study puts forth the recommendation that governments and researchers explore the implementation of AI technology to deliver bilingual interactive learning materials, such as shared-reading e-books, to L2 parents and their children. Such innovative approaches can effectively address the limitations posed by parents' constrained proficiency in the second language and their lack of expertise in language learning, thereby establishing a fruitful parent-child shared-reading approach to foster the children's development of a second language.

Conclusions

This longitudinal research used a person-centered approach to explore the impact of different categories of parental involvement on the reading development of L2 Chinese school-age children. Two significant findings were produced, and they complement previous research on family factors, motivation, and reading performance in younger children. First, the study focused specifically on the development of L2 Chinese language abilities in ethnic minority children in Hong Kong. This focus addressed the practical significance of Hong Kong's multicultural society and filled a literature gap, in that previous studies were mainly conducted in Western or L1 Chinese contexts. Second, the study used a person-centered approach to delve deeper into the relationship between students' motivation and their reading performance. This perspective enhances our understanding of the diverse nature of parental

involvement and its impact on students' learning processes, thus extending the existing literature and offering practical implications for L2 education.

However, it is also important to acknowledge the limitations of this study. Both the reliance on self-report measures, which can be influenced by biases, and the potential impact of the young age of the participants on data collection, should be considered (Kanonire et al., 2022). In addition, it is noteworthy that significant demographic factors, such as the gender of students (e.g., You et al., 2016), gender of the parents (e.g., Curenton & Justice, 2008), and the family's socioeconomic status (e.g., Kavanagh, 2019), which are known to have an influence on learners' motivation and reading performance, were not considered. To address these limitations, future research should adopt a mixed-methods approach, incorporating qualitative methods such as interviews and observations, to better understand the diverse cultural backgrounds of the immigrant population. Moreover, in future research the forms of parental involvement could be more varied than those assessed in this study. Additional variables, such as parental encouragement, should be considered, in order to capture a broader scope of parental involvement. Furthermore, it is highly recommended that future studies explore the integration of AI technology as an intervention method. This approach can effectively develop strategies to support parents with limited L2 language proficiency and insufficient knowledge of language learning (Yang et al., 2022). Such efforts would empower these parents to actively participate in their children's L2 learning process.

References

- Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, 21(3), 329–341. <https://doi.org/10.1080/10705511.2014.915181>
- Aunola, K., Stattin, H., & Nurmi, J.-E. (2000). Parenting styles and adolescents' achievement strategies. *Journal of Adolescence*, 23(2), 205–222. <https://doi.org/10.1006/jado.2000.0308>
- Baker, L., Scher, D., & Mackler, K. (1997). Home and family influences on motivations for reading. *Educational Psychologist*, 32(2), 69–82. https://doi.org/10.1207/s15326985ep3202_2
- Becker, M., McElvany, N., & Kortenbruck, M. (2010). Intrinsic and extrinsic reading motivation as predictors of reading literacy: A longitudinal study. *Journal of Educational Psychology*, 102(4), 773–785. <https://doi.org/10.1037/a0020084>
- Bhowmik, M. K., & Kennedy, K. J. (2016). 'Out of school' ethnic minority young people in Hong Kong. Education in the Asia-Pacific Region: Issues, concerns and prospects series, Vol. 32. Springer Singapore. <https://doi.org/10.1007/978-981-10-0327-1>
- Bracken, S. S., & Fischel, J. E. (2008). Family reading behavior and early literacy skills in preschool children from low-income backgrounds. *Early Education and Development*, 19(1), 45–67. <https://doi.org/10.1080/10409280701838835>

- Chan, S. D. (2007). *Character and lexical list for Hong Kong primary education*. (香港小學學習字詞表). Education Bureau, HKSAR.
- Chan, T. S. P., Loh, E. K. Y., & Hung, C. O. Y. (2021). A longitudinal study of Chinese as a second language kindergarteners' orthographic awareness and its association with their lexical learning performance. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*. Advance online publication.
<https://doi.org/10.1007/s12144-021-01797-2>
- Chyu, E. P. Y., & Chen, J.-K. (2022). The correlates of academic stress in Hong Kong. *International Journal of Environmental Research and Public Health*, 19(7), 4009.
<https://doi.org/10.3390/ijerph19074009>
- Collins, L. M., & Lanza, S. T. (2010). *Latent class and latent transition analysis with applications in the social, behavioral, and health sciences*. John Wiley & Sons.
- Curenton, S. M., & Justice, L. M. (2008). Children's preliteracy skills: Influence of mothers' education and beliefs about shared-reading interactions. *Early Education & Development*, 19(2), 261–283. <https://doi.org/10.1080/10409280801963939>
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum.
- Dörnyei, Z., & Ushioda, E. (2011). *Teaching and researching: Motivation* (2nd ed.). Pearson Education.
- Equal Opportunities Commission. (2020). *A Study on Education and Career Pathways of Ethnic Minority Youth in Hong Kong*. Hong Kong Equal Opportunities Commission.

https://www.eoc.org.hk/Upload/files/ResearchReport/Education%20and%20Career%20Pathways%20of%20Ethnic%20Minority%20Youth_202210.pdf

Fan, W., & Williams, C. M. (2010). The effects of parental involvement on students' academic self-efficacy, engagement and intrinsic motivation. *Educational Psychology*, 30(1), 53–74. <https://doi.org/10.1080/01443410903353302>

Fong, C. J., Patall, E. A., Vasquez, A. C., & Stautberg, S. (2019). A meta-analysis of negative feedback on intrinsic motivation. *Educational Psychology Review*, 31(1), 121–162. <https://doi.org/10.1007/s10648-018-9446-6>

Guo, X., Lv, B., Zhou, H., Liu, C., Liu, J., Jiang, K., & Luo, L. (2018). Gender differences in how family income and parental education relate to reading achievement in China: The mediating role of parental expectation and parental involvement. *Frontiers in Psychology*, 9. <https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00783>

Hong Kong Unison. (2012). *Report: Survey on kindergarten education for ethnic minority students in Hong Kong*. Hong Kong Unison. <https://www.unison.org.hk/DocumentDownload/Researches/R201204%20Kindergarten%20Survey%20Report.pdf>. <https://bibliography.lib.eduhk.hk/en/bibs/582a2b1b> https://www.eoc.org.hk/EOC/upload/ResearchReport/20200619_em.pdf.

Huang, H. S., & Hanley, J. R. (1997). A longitudinal study of phonological awareness, visual skills, and Chinese reading acquisition among first-graders in Taiwan. *International*

Journal of Behavioral Development, 20(2), 249–268.

<https://doi.org/10.1080/016502597385324>

Huang, J., Lee, C.-K. J., & Yeung, S. S. (2020). Predicting reading motivation and achievement: The role of family and classroom environments in Greater China.

International Journal of Educational Research, 103, 101642.

<https://doi.org/10.1016/j.ijer.2020.101642>

Jhang, F.-H., & Lee, Y.-T. (2018). The role of parental involvement in academic achievement trajectories of elementary school children with Southeast Asian and Taiwanese mothers.

International Journal of Educational Research, 89, 68–79.

<https://doi.org/10.1016/j.ijer.2017.09.003>

Kangasvieri, T. (2019). L2 motivation in focus: The case of Finnish comprehensive school students. *The Language Learning Journal*, 47(2), 188–203.

<https://doi.org/10.1080/09571736.2016.1258719>

Kanonire, T., Lubenko, J., & Kuzmina, Y. (2022). The effects of intrinsic and extrinsic reading motivation on reading performance in elementary school. *Journal of Research in Childhood Education*, 36(1), 1–13. <https://doi.org/10.1080/02568543.2020.1822961>

Childhood Education, 36(1), 1–13. <https://doi.org/10.1080/02568543.2020.1822961>

Kavanagh, L. (2019). Relations between children's reading motivation, activity and performance at the end of primary school. *Journal of Research in Reading*, 42(3–4),

562–582. <https://doi.org/10.1111/1467-9817.12284>

- Ke, S., & Xiao, F. (2015). Cross-linguistic transfer of morphological awareness between Chinese and English. *Language Awareness, 24*(4), 355–380.
<https://doi.org/10.1080/09658416.2015.1114624>
- Kieffer, M. J. (2012). Before and after third grade: Longitudinal evidence for the shifting role of socioeconomic status in reading growth. *Reading and Writing, 25*(7), 1725–1746.
<https://doi.org/10.1007/s11145-011-9339-2>
- Leung, R. (2019). Ethnic minority students in Hong Kong only understand 70 percent of class syllabus because of weak Chinese language foundation: Survey. *South China Morning Post*. <https://www.scmp.com/news/hong-kong/education/article/2189413/ethnic-minority-students-hong-kong-only-understand-70-cent>
- Li, B., Li, Y. N., & Hua, C. (2020). Early experience and later multilingual attainments by ethnic minority students in Hong Kong. *Asia Pacific Journal of Education, 42*(2), 196–210. <https://doi.org/10.1080/02188791.2020.1820312>
- Liu, M., & Oga-Baldwin, W. L. Q. (2022). Motivational profiles of learners of multiple foreign languages: A self-determination theory perspective. *System, 106*, 102762.
<https://doi.org/10.1016/j.system.2022.102762>
- Liu, Y., Liu, H., & Hau, K.-T. (2016). Reading ability development from kindergarten to junior secondary: Latent transition analyses with growth mixture modeling. *Frontiers in Psychology, 7*. <https://doi.org/10.3389/fpsyg.2016.01659>

- Logan, S., Medford, E., & Hughes, N. (2011). The importance of intrinsic motivation for high and low ability readers' reading comprehension performance. *Learning and Individual Differences, 21*(1), 124–128. <https://doi.org/10.1016/j.lindif.2010.09.011>
- Loh, E. K. Y., Liao, X., & Leung, S. O. (2018). Acquisition of orthographic knowledge: Developmental difference among learners with Chinese as a second language (CSL). *System, 74*, 206–216. <https://doi.org/10.1016/j.system.2018.03.018>
- Lone, F. N., & Chow, B. W.-Y. (2021). Pre-primary education and Chinese language acquisition of ethnic minority students in Hong Kong: A multidisciplinary critical evaluation. *Asian Education and Development Studies*, (ahead-of-print). <https://doi.org/10.1108/AEDS-04-2021-0081>
- Lubke, G., & Muthén, B. O. (2007). Performance of factor mixture models as a function of model size, covariate effects, and class-specific parameters. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(1), 26-47. <https://doi.org/10.1080/10705510709336735>
- McBride-Chang, C., Shu, H., Zhou, A., Wat, C. P., & Wagner, R. K. (2003). Morphological awareness uniquely predicts young children's Chinese character recognition. *Journal of Educational Psychology, 95*(4), 743–751. <https://doi.org/10.1037/0022-0663.95.4.743>
- McCarthy, S. J., & Moje, E. B. (2002). Identity matters. *Reading Research Quarterly, 37*(2), 228–238. <https://doi.org/10.1598/RRQ.37.2.6>

- McGeown, S. P., Norgate, R., & Warhurst, A. (2012). Exploring intrinsic and extrinsic reading motivation among very good and very poor readers. *Educational Research*, 54(3), 309–322. <https://doi.org/10.1080/00131881.2012.710089>
- McLarnon, M. J. W., & O’Neill, T. A. (2018). Extensions of auxiliary variable approaches for the investigation of mediation, moderation, and conditional effects in mixture models. *Organizational Research Methods*, 21(4), 955–982. <https://doi.org/10.1177/1094428118770731>
- Miyamoto, A., Pfof, M., & Artelt, C. (2018). Reciprocal relations between intrinsic reading motivation and reading competence: A comparison between native and immigrant students in Germany. *Journal of Research in Reading*, 41(1), 176–196. <https://doi.org/10.1111/1467-9817.12113>
- Morrow, L. M. (1989). Home and school correlates of early interest in literature. *Journal of Educational Research*, 76(4), 221–230.
- Noble, C., Sala, G., Peter, M., Lingwood, J., Rowland, C., Gobet, F., & Pine, J. (2019). The impact of shared book reading on children’s language skills: A meta-analysis. *Educational Research Review*, 28, 100290. <https://doi.org/10.1016/j.edurev.2019.100290>
- Palardy, G. J. (2010). The multilevel crossed random effects growth model for estimating teacher and school effects: Issues and extensions. *Educational and Psychological Measurement*, 70(3), 401–419. <https://doi.org/10.1177/0013164409355693>

- Pfost, M., Schiefer, I. M., & Artelt, C. (2016). Intergenerational continuity in attitudes toward reading and reading behavior. *Learning and Individual Differences, 51*, 179–188.
<https://doi.org/10.1016/j.lindif.2016.09.002>
- Pinquart, M. (2016). Associations of parenting styles and dimensions with academic achievement in children and adolescents: A meta-analysis. *Educational Psychology Review, 28*(3), 475–493. <https://doi.org/10.1007/s10648-015-9338-y>
- Rowe, K. J. (1991). The influence of reading activity at home on students' attitudes towards reading, classroom attentiveness and reading achievement: An application of structural equation modelling. *British Journal of Educational Psychology, 61*(1), 19–35.
<https://doi.org/10.1111/j.2044-8279.1991.tb00958.x>
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54–67.
<https://doi.org/10.1006/ceps.1999.1020>
- Schaffner, E., & Schiefele, U. (2016). The contributions of intrinsic and extrinsic reading motivation to the development of reading competence over summer vacation. *Reading Psychology, 37*(6), 917–941. <https://doi.org/10.1080/02702711.2015.1133465>
- Shum, M. S. K., Gao, F., Tsung, L., & Ki, W. W. (2011). South Asian students' Chinese language learning in Hong Kong: Motivations and strategies. *Journal of Multilingual and Multicultural Development, 32*(3), 285–297.
<https://doi.org/10.1080/01434632.2010.539693>

- Sonnenschein, S., Brody, G., & Munstennan, K. (1996). The influence of family beliefs and practices on children's early reading development. In L. Baker, P. Afflerbach, & D. Reinking (Eds.), *Developing engaged readers in school and home communities* (pp. 1–20). Lawrence Erlbaum Associates, Inc.
- Stutz, F., Schaffner, E., & Schiefele, U. (2016). Relations among reading motivation, reading amount, and reading comprehension in the early elementary grades. *Learning and Individual Differences, 45*, 101–113. <https://doi.org/10.1016/j.lindif.2015.11.022>
- Sue, S., & Okazaki, S. (2009). Asian-American educational achievements: A phenomenon in search of an explanation. *Asian American Journal of Psychology, 5*(1), 45–55. <https://doi.org/10.1037/1948-1985.S.1.45>
- Ullah, R. (2012). *A critical review on the provision of Chinese language education for NCSS in Hong Kong*. (HKU Library item ID: b48329976) [PhD thesis, The University of Hong Kong]. Retrieved from https://doi.org/10.5353/th_b4832997
- Ushioda, E. (2009). A person-in context relational view of emergent motivation, self and identity. In Z. Dörnyei & E. Ushioda (Eds.), *Motivation, language identity and the L2 self* (pp. 215–228). Multilingual Matters.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. (M. Cole, V. Jolm-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard University Press. <https://doi.org/10.2307/j.ctvjf9vz4>
- Wang, Q., & Coddington, C. (2014). Exploring the relationship of parental influences, motivation for reading and reading achievement in Chinese first graders. In X. Chen, Q.

- Wang, & Y. C. Luo (Eds.), *Reading development and difficulties in monolingual and bilingual Chinese children* (Vol. 8). Springer Netherlands. <https://doi.org/10.1007/978-94-007-7380-6>
- Wang, Y., Shen, B., & Yu, X. (2021). A latent profile analysis of EFL learners' self-efficacy: Associations with academic emotions and language proficiency. *System, 103*, 102633. <https://doi.org/10.1016/j.system.2021.102633>
- Weigel, D. J., Martin, S. S., & Bennett, K. K. (2006). Mothers' literacy beliefs: Connections with the home literacy environment and pre-school children's literacy development. *Journal of Early Childhood Literacy, 6*(2), 191–211. <https://doi.org/10.1177/1468798406066444>
- Wigfield, A. (1997). Reading motivation: A domain-specific approach to motivation. *Educational Psychologist, 32*(2), 59–68. https://doi.org/10.1207/s15326985ep3202_1
- Wigfield, A., & Guthrie, J. T. (1997). Relations of children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology, 89*(3), 420–432.
- Wigfield, A., Gladstone, J. R., & Turci, L. (2016). Beyond cognition: Reading motivation and reading comprehension. *Child Development Perspectives, 10*(3), 190–195. <https://doi.org/10.1111/cdep.12184>
- Wilhelm, M. O., Brown, E., Rooney, P. M., & Steinberg, R. (2008). The intergenerational transmission of generosity. *Journal of Public Economics, 92*(10–11), 2146–2156. <https://doi.org/10.1016/j.jpubeco.2008.04.004>

- Wisniewski, B., Zierer, K., & Hattie, J. (2020). The power of feedback revisited: A meta-analysis of educational feedback research. *Frontiers in Psychology, 10*, 3087.
<https://doi.org/10.3389/fpsyg.2019.03087>
- Wong, Y. K. (2018). Structural relationships between second-language future self-image and the reading achievement of young Chinese language learners in Hong Kong. *System, 72*, 201–214. <https://doi.org/10.1016/j.system.2017.12.003>
- Wu, Y.-J., Chen, Y.-H., Kiefer, S. M., & Carstensen, C. H. (2021). Learning strategies as moderators between motivation and mathematics performance in East Asian students: Latent class analysis. *SAGE Open, 11*(4), 215824402110613.
<https://doi.org/10.1177/21582440211061382>
- Yang, D., Xia, C., Collins, P., & Warschauer, M. (2022). The role of bilingual discussion prompts in shared E-book reading. *Computers & Education, 190*, 104622.
<https://doi.org/10.1016/j.compedu.2022.104622>
- You, C. J., Dörnyei, Z., & Csizér, K. (2016). Motivation, vision, and gender: A survey of learners of English in China. *Language Learning, 66*(1), 94–123.
<https://doi.org/10.1111/lang.12140>
- Zhou, Y., McBride, C., Leung, J. S. M., Wang, Y., Joshi, M., & Farver, J. (2018). Chinese and English reading-related skills in L1 and L2 Chinese-speaking children in Hong Kong. *Language, Cognition and Neuroscience, 33*(3), 300–312.
<https://doi.org/10.1080/23273798.2017.1342848>

Zhu, X., Chan, S. D., & Yao, Y. (2022). The associations of parental support with first-grade primary school L2 Chinese learners' ideal selves, motivation, engagement, and reading test performance in Hong Kong: A person-centered approach. *Early Education and Development*, 1–18. <https://doi.org/10.1080/10409289.2022.2139544>

Zhu, X., Chan, S. D., Yao, Y., & Zhu, S. (2023). The different effects of the ideal L2 self and intrinsic motivation on reading performance via engagement among young Chinese second-language learners. *International Review of Applied Linguistics in Language Teaching*, 0(0). <https://doi.org/10.1515/iral-2022-0189>

Appendix

Table 1

Descriptive Statistics, Cronbach's Alpha Values, and Bivariate Correlations among Key Variables

	1	2	3	4	5	6	7
1 Student extrinsic motivation	-						
2 Student intrinsic motivation	.423**	-					
3 Parental expectations	.055	.143*	-				
4 Parental attitudes	.021	.126*	.214**	-			
5 Parental engagement	.073	.228**	.301**	.380**	-		
6 T1 Reading performance	-.023	.083	.092	.078	.099	-	
7 T2 Reading performance	.117*	.221**	.229**	.053	.148**	.545**	-
Mean	3.11	3.04	3.12	2.49	2.25	10.35	18.39
SD	.76	.83	.68	.60	.61	4.42	6.13
Skewness	-.63	-.58	-.50	-1.03	.16	.55	-.01
Kurtosis	-.25	-.52	-.49	.87	-.48	-.06	-.75
α	.661	.698	.832	.785	.762	-	-

Table 2*Comparisons of the Models in the Latent Profile Analysis*

Model	Loglikelihood (LL)	df	Entropy	AIC	BIC	ABIC	LMRT p-value	ALMR p-value	BLRT p-value	Class size per profile
1-class	-907.667	6	-	1827.333	1849.887	1830.856	-	-	-	317
2-class	-833.761	10	.812	1687.522	1725.111	1693.393	.0000	.0000	.0000	45/272
3-class	-811.750	14	.844	1651.500	1704.124	1659.719	0.0211	.0245	.0000	96/41/180
4-class	-789.487	18	.823	1632.974	1700.635	1643.543	.00012	.0015	.0000	12/31/195/79

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; ABIC = sample size adjusted BIC; LMRT = Lo-Mendell-Rubin likelihood ratio test; ALMRLR= Lo-Mendell-Rubin adjusted likelihood ratio test; BLRT = bootstrap likelihood ratio test.

Table 3*Comparisons of the Means between Profiles*

Indicator	G1	G2	G3	Wald chi-square test results		
	Mean (SE)	Mean (SE)	Mean (SE)	G1 vs. G2	G2 vs. G3	G3 vs. G1
Student motivation	2.887 (0.127)	2.886 (0.092)	3.186 (0.059)	Not sig.	G2<G3*	G1<G3*
Parental attitudes	1.243 (0.069)	2.502 (0.093)	2.787 (0.041)	G1<G2**	G2<G3**	G1<G3**
Parental expectations	2.890 (0.139)	2.742 (0.215)	3.412 (0.073)	G1>G2**	G2<G3**	G1<G3**
Parental engagement	1.719 (0.077)	1.922 (0.092)	2.579 (0.128)	Not sig.	G2<G3**	G1<G3**
T1 reading performance	9.568 (0.611)	9.753 (0.587)	10.926 (0.173)	Not sig.	Not sig.	Not sig.
T2 reading performance	18.044 (1.101)	16.497 (0.851)	19.661 (0.567)	Not sig.	G2<G3**	Not sig.

Table 4*Slope and Intercept Values across Comprehensive Parental Involvement*

Group	Motivation		→	Reading Performance	
	<i>Slope</i>			<i>Intercept</i>	
	Estimate (<i>se</i>)	Sig. Group Differences		Estimate (<i>SE</i>)	Sig. Group Differences
G1	0.095 (0.097)	None		-0.243 (0.314)	None
G2	0.246 (0.065)***	Group 3		-0.914 (0.218)***	G3
G3	0.037 (0.015)***	Group 2		0†	G2

Note. *** $p < .001$, † Intercept and *SE* for Group 3 were not estimated because the mean was fixed to zero for identification of the factor.

Figure 1

LPA Model

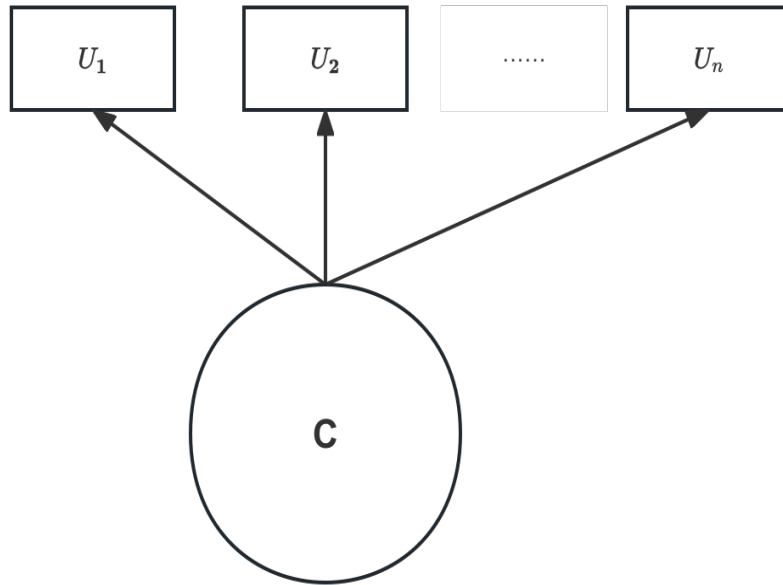


Figure 2

Mixture Regression Model

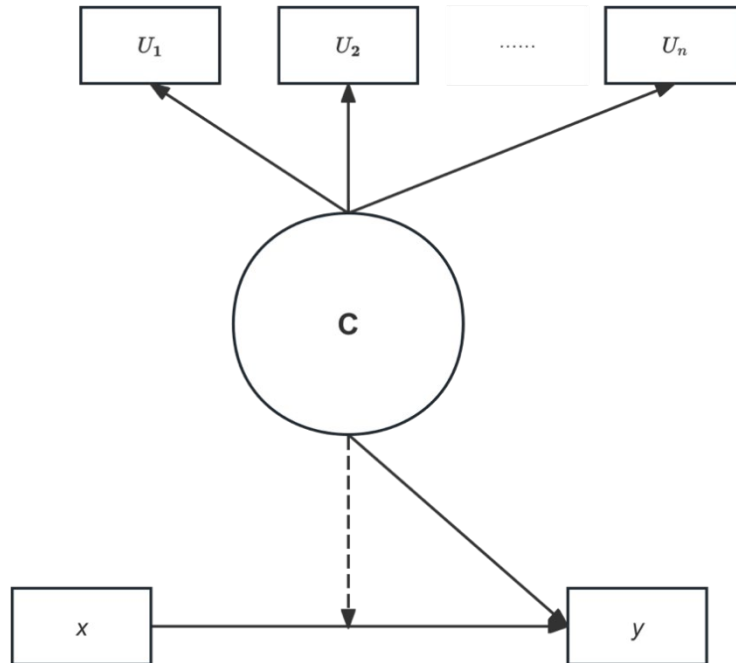


Figure 3

CFA Results for Students' Motivation

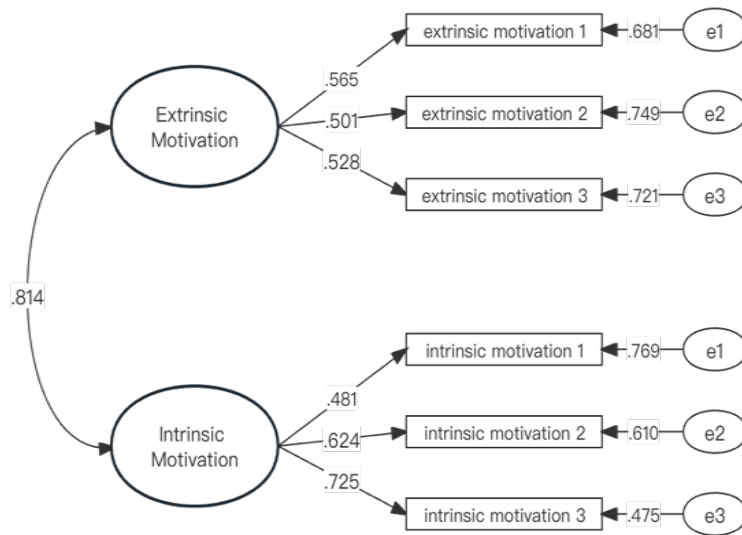


Figure 4

CFA Results for Comprehensive Parental Involvement

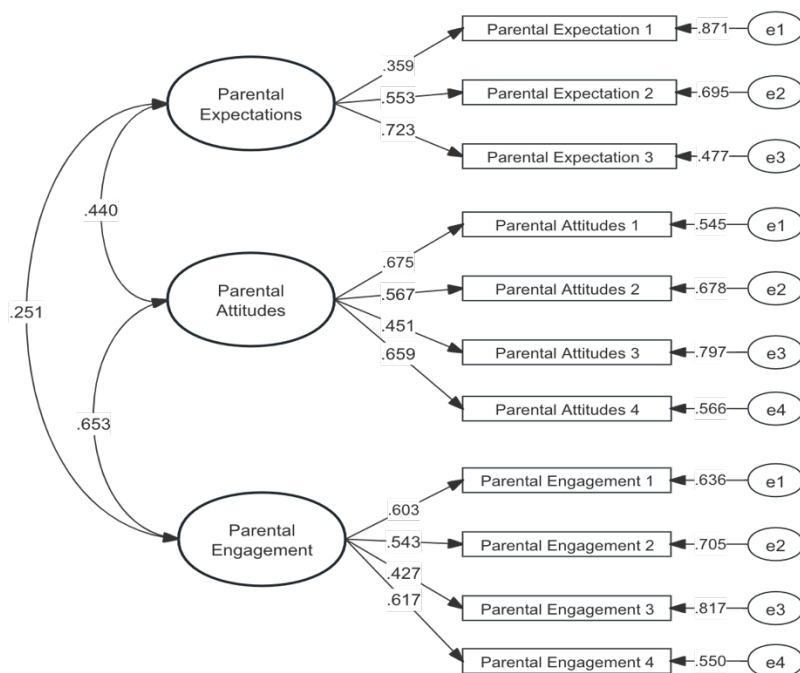
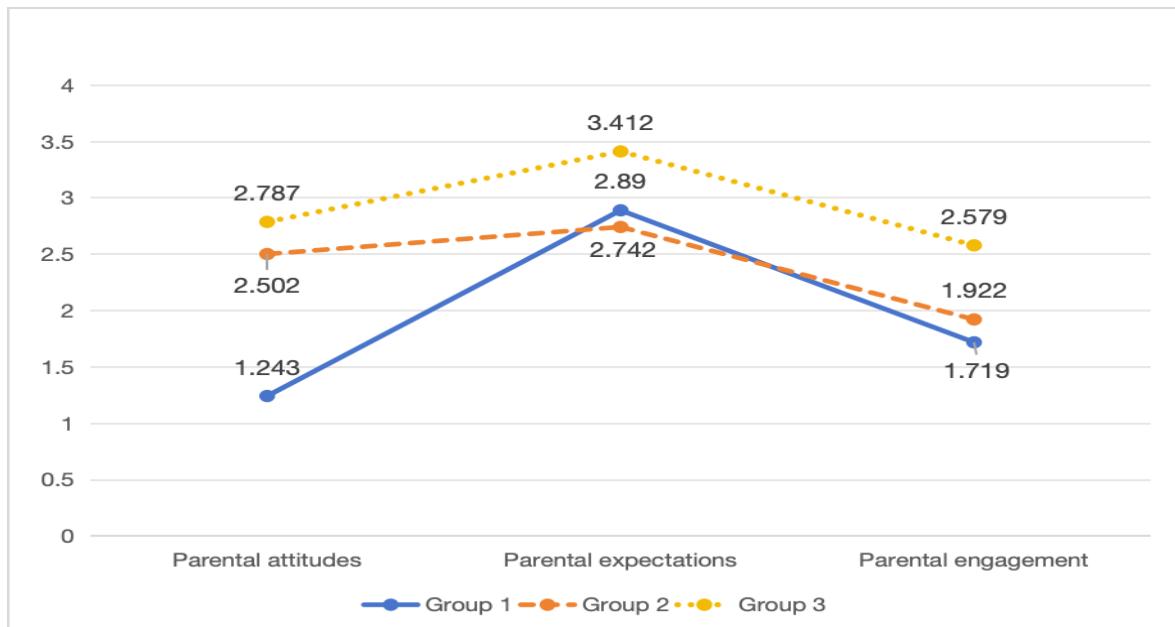


Figure 5

The Estimated Means of Parental Attitudes, Parental Expectations, and Parental Engagement



Note. Group 1 = ambivalent parents, Group 2 = balanced parents, Group 3 = enthusiastic parents.

Figure 6

Mixture Regression Model Results

