The longitudinal effect of children's self-regulated learning on reading habits and well-being

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ABSTRACT

The sample included 1090 fourth graders from which we gathered data in four waves between the fall of 2010 and spring of 2012. The results of latent growth modeling (LGM) showed that the initial level of self-regulated learning had a significantly positive effect on the levels of later reading habits and well-being. Additionally, a faster rate of increase in self-regulated learning was associated with faster increases in levels of reading habits and well-being over time. These findings suggest that supporting children's development of self-regulated learning can be effective in helping children maintain regular reading habits and increase their level of well-being.

1. Introduction

A self-regulated learning perspective emphasizes children's learning abilities as an active and initiated learning process. According to Zimmerman (1990), self-regulated learners are characterized by their effectiveness to utilize self-regulated learning strategies, by their responsiveness to feedback about their effectiveness of learning, and by their motivation and perceptions of achievement. Self-regulated learners actively monitor and direct their learning without being passively affected by external factors such as praise or other external rewards (Chen & Sun, 2016). To promote children's reading behavior and well-being, we not only need to provide children external support, but also cultivate their self-regulatory ability through which they can self-direct, organize and manage their behaviors systematically throughout their lives.

Recent research has demonstrated that promoting self-regulated learning is an effective way to cultivate children's reading habits and promote their well-being (Arslan, 2018; Kumi-Yeboah, 2012; Lengua, 2003; Mattern & Bauer, 2014). However, most studies have been conducted to understand the short-term effects of different factors on child reading habits and well-being (Ku, Fox, & Chen, 2016; Lawler et al., 2018; Lee & Yoo, 2017), only limited study have focused on the relationship between self-regulated learning and reading habits, as well as well-being. To extend previous studies, we believe that the trajectory of child development as influenced by self-regulated learning can help us understand children's reading habits and well-being in a more comprehensive way.

This study not only explores the relationships between children's self-regulated learning, reading habits, and well-being, but also investigates how these relationships evolve over time. The interests of this paper are two-fold. First, we try to conceptualize how self-regulated learning is connected with reading habits and well-being. Second, we assess the importance of the role of self-regulated learning and examine whether children's reading habits and their well-being can in fact be promoted with the development of self-

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regulated learning. Understanding how the association between self-regulated learning and children's reading habits, as well as well-being from a long-term perspective is important so that better assistance can be provided to cultivate children's reading habits and increase their well-being.

1.1. Self-regulated learning

Self-regulated learning is defined as the degree to which children are *"metacognitively, motivationally, and behaviorally active participants in their own learning processes"* (Zimmerman, 1989; 2013, p. 137). Zimmerman proposed a model, the Cyclical Phase of SRL, based on social cognitive theory to explain the concept of self-regulated learning (Panadero, 2017). There are three cyclical phases of self-regulatory process, including forethought phase, performance phase, and self-reflection phase. Self-regulated learners can analyze the task in the forethought phase, then perform strategies and manage environment while controlling and observing themselves in the performance phase. In the self-reflection phase, proactive learners may feel satisfied because of the outcome. Additionally, the self-reflections may influence forethought processes regarding further efforts to learn, thus completing a self-regulatory cycle (Zimmerman, 2013). The three phases demonstrate that self-regulated learning involves individuals' motivation and metacognitive ability to analyze the task, and monitor and reflect their performance, as well as perform the plan behaviorally.

That is, self-regulated learning is a cyclical and proactive process in which a child actively utilizes academic skills, such as setting goals, selecting and deploying strategies and self-monitoring one's effectiveness during their learning processes to help themselves to learn (Zimmerman, 2008; Zimmerman & Schunk, 2001). Self-regulated learners tend to use strategies to regulate their learning process, continuous metacognitively monitor their learning outcomes, and have a sense of self-efficacy to evaluate the possible outcomes (Zimmerman, 1990). Children with self-regulated learning strategies are motivationally active participants in their learning process (Zimmerman, 1990). Thus, the present study proposed that self-regulated learning plays a crucial role in the development of children's reading habits and well-being.

1.2. Self-regulated learning in Chinese society

The learning environment in Taiwan is highly influenced by the Confucianism, which emphasizes self-control, harmony, and respect for teachers (Wanless, Scharphorn, Chiu, Chen, & Chen, 2015). That is, teachers are regarded as facilitators who may take a more teacher-directed approach to their teaching (Hsieh, 2004; Wanless et al., 2015). Teachers tend to serve as role models for demonstrating appropriate classroom behavior, as well as leading the main lecture and providing necessary information to students (Wanless et al., 2015). According to several researchers, teacher-centeredness approach in most Asia countries does not refer to teacher's authority or exclusive control; instead, this learning environment creates a respectful working relationship that induce active student engagement and cooperation, which is beneficial to the development of children's self-regulated learning (Lee, Yin, & Zhang, 2009; Zhou, Lam, & Chan, 2012). Further, as reading habits is believed to be reinforced by extrinsic reinforcement, a learning environment where teachers act as a positive role model and are more involved in teaching may help students cultivate their reading habits (Celik, 2020; Iftanti, 2015; Jaramillo-Ponton, Vargas-Saritama, Cabrera-Solano, Vivanco-Rios, & Zuniga, 2019). Similarly, children are expected to manage their behaviors and regulate their emotions to maintain group harmony as affected by the Confucianism (Liu & Chang, 2018; Wanless et al., 2015). Given the cultural context in Taiwan, it is important to understand the role of self-regulated learning in affecting the development of children's reading habits and well-being.

Self-regulated learning is highly valued in Taiwan (Liu & Chang, 2018). Asian parents have higher expectation with their children's academic achievement and are highly involved in children's learning; additionally, there are strict rules and pedagogy in order to cultivate children's self-regulated learning abilities (Jiang, 2015). Children are expected to monitor their learning, such as effectively do their assignment after school and actively review the contents they learn in school. Children who are self-directed and self-control of their learning are more likely to have better achievement and self-efficacy (Chao & Yu, 2012). Self-regulated learning is considered to be one of the key abilities in schools in Taiwan.

With the emphasis of self-regulated learning in Taiwan, self-regulated learnings skills children learn in school or at home may have an important influence on the development of their reading habits. To perform excellently in worldwide studies and surveys like the Programme for International Student Assessment (PISA) and the Progress in International Reading Literacy Study (PIRLS), schools in Taiwan have instituted some requirements such as a minimum number of books that children should read per academic year and designed reading programs to cultivate student's reading abilities (Chang, 2009). However, such standards focus on the amount or content of reading, ignoring the real purpose of reading pertaining to the children themselves. The discrepancy between reading for affective and cognitive reasons, such as reading for pleasure and enjoyment in contradistinction to reading for knowledge, might cause problems in the persistence of reading habits over time (Chua, 2008). In addition, children become passive and reluctant readers as they grow up and gain little pleasure or interest while reading (Bintz, 1993). Therefore, we reason that self-regulated learning, which emphasized children's active role in initiating and guiding their learning behaviors, may play a significant role in helping children maintain their reading habits through life.

In a Chinese culture where group harmony is greatly emphasized, children learn to control their emotion for the interests and benefits of other people (Liu & Chang, 2018). Children may have more opportunities to regulate and monitor their behaviors and emotions in response to the needs of the group (Wanless et al., 2013). Similarly, with the strict school pedagogy and high parental involvement in schools in Taiwan, children learn to regulate their learning since they enter schools. The skills children learn to regulate their learning behaviors may transfer to other areas, they may be more capable of regulating their emotions, resulting in meeting peer or parental expectation. Hence, we believe that it is noteworthy to understand how self-regulated learning affects children's well-being

in Taiwan.

1.3. Self-regulated learning and reading habits

According to Yusuf and Awoyemi (2018), reading is an action of an individual who reads, and habit is a product of this action as a person reads regularly. Children's reading habits embody their reading behaviors and the frequency they engaged in the reading behaviors. The more frequently children read, the more likely they are to develop regular reading habits and regard reading as a goal they want achieve. A reading habit is formed when individuals repeatedly enact a specific behavior in a stable context, and their habits gradually increase as their self-control in enacting the given behaviors increases (Carden & Wood, 2018). Self-regulated learners may have a better ability to self-control their learning behaviors in the performance phase, which may help them maintain certain behaviors in a stable context and establish their reading habits (Carden & Wood, 2018; Zimmerman, 2013).

Similarly, children's awareness of their learning outcomes in the self-reflection phase may motivate them to continue reading behaviors and gradually build their reading habits (Zimmerman, 1989). By making reading books a regular activity, children need to control themselves to read frequently and consistently, as well as feel satisfied while reading (Verplanken & Orbell, 2003). Without an internal factor that motivates children to read, it is hard for children to establish a reading habit and maintain the behavior as they grow. Metallidou and Vlachou (2007) suggest that children with more self-regulatory ability in learning have higher level of motivation. They are able to set reading as a goal and believe that they have the capabilities to achieve the goal regularly, which may, increase their motivation to read actively and enthusiastically. By maintaining this internal ability, children are able to utilize their internal abilities to motivate themselves to build their reading habits because they have confidence in their own abilities and the satisfaction to be gained by reading (Valenzuela, Vera, & Sotomayor, 2014). Hence, self-regulated learners have higher motivation and self-efficacy to maintain their reading behaviors, and therefore cultivate reading habits (Zimmerman, 1989).

1.4. Self-regulated learning and well-being

To date, studies of various domains have demonstrated that self-regulation is associated with individuals' well-being, but only relatively few studies have focused on self-regulated learning and well-being explicitly (Howell, Digdon, & Buro, 2010; Mattern & Bauer, 2014; Mikaeili & Barahmand, 2013). Self-regulation has been shown to contribute to children's well-being longitudinally (Lengua, 2003). Similarly, better self-regulated learning is related to higher well-being since children may use these self-regulated strategies to regulate their behavior and emotions, resulting in higher well-being (Housman, 2017).

Studies have shown that there is a positive relationship between self-regulated learning and well-being (Grunschel, Schwinger, Steinmayr, & Fries, 2016; Heikkilä, Lonka, Nieminen, & Niemivirta, 2012). Children who self-regulate their learning are assumed to actively engage in a process of learning that helps them adapt to given environments and control the thoughts associated with learning (Boekaerts & Corno, 2005). As children are able to control their learning, they may find themselves more likely to manage their learning strategies and find the learning activities themselves more enjoyable. The ability to control and manage the quality of learning experience may lead the children to higher well-being (Wills, 2011).

Better self-regulated learning skills may result in higher self-motivated and self-directed behaviors, leading to higher self-efficacy as well as higher well-being (Zimmerman, 1990). Self-regulated learning requires a motivational component that helps children direct their behaviors toward their goals, and attaining the goals will increase children's autonomy and thus increase their well-being (Van Genugten, Dusseldorp, Massey, & van Empelen, 2017; Zimmerman, 1990). A child's ability to control their cognition and learning helps them reallocate their attention to effectively engage in things they are working on and promote their well-being. According to the flow theory (Csikszentmihalyi & LeFevre, 1989), flow is a state of engagement that can be experienced while completing a task, and the experience is so enjoyable that the person wants to continue doing it. Individuals find an experience to be most positive when they perceive that what they are doing includes enough challenges proportionate to their abilities, making the given actions require some effort, but also providing satisfaction upon completion (Csikszentmihalyi & LeFevre, 1989). In such a case, children with better self-regulated learning are able to monitor their learning process and stretch themselves, enhance their skills and increase positive feelings associated with the activity.

From a developmental perspective, advances in self-regulated learning set the stage for the development of emotional processes (Ursache, Blair, & Raver, 2012). It is possible that as children develop self-regulatory abilities in terms of attention and learning, their abilities to regulate their emotions increase. Children who are able to regulate their learning have gained the internal ability to regulate their attention and behavior when performing a specific activity (Bater & Jordan, 2017; Zimmerman, 1990). They come to manage their own learning and learn to switch the focus of their attention and control their emotions. This ability to control their attention may in turn serves to guide them to a more positive state. Diener, Oishi, and Lucas (2003) also suggest that the way people process information, especially emotional information, may affect their well-being. Through the process of self-regulated learning, children may feel satisfied if they have positive feedback after performing their self-regulatory strategies successfully. Hence, we believe that self-regulatory strategies may help direct children's behavior to reach personally valued goals, increasing their feeling of autonomy and fulfillment, which may, in turn, increase children's well-being (Van Genugten et al., 2017).

1.5. Theoretical framework

The current study grounded in Zimmerman's model of the Cyclical Phase of SRL, positing that learning occurs through the cyclical phases between forethought, performance, and self-reflection phase of self-regulation. Although self-regulated learning was explored

pervasively in educational research to emphasize the relationship between self-regulated learning and students' academic performance and skills in the school setting (e.g. Mega, Ronconi, & De Beni, 2014; Rutherford, Buschkuehl, Jaeggi, & Farkas, 2018), it is worth considering the potential long-term spillover effect of self-regulated learning to students' daily lives, such as their reading habits and well-being. That is, when individuals experience forethought phase, they may go through the performance phase that allows them to try out their strategies and plan. As a result, in the self-reflection phase, they may feel a sense of satisfaction or try to adjust their thoughts which lead them to start another cycle of self-regulated learning (Zimmerman, 2013). Thus, in this long-term cyclical process, individuals' learning strategies and behavior may be developed and be experimented in school as well as other areas such as their daily reading habits. In addition, the level of well-being may increase or decrease according to this long-term development of self-regulated learning ability because through the phases of self-regulated learning, their satisfaction that related to the successful strategies they use may accumulate in this continuous cycle. Therefore, in the present study, we proposed that self-regulated learning has crucial impacts on the development of a child's reading habits and well-being. We hypothesized the following: (a) children with higher self-regulated learning in the beginning would display higher level of reading habits in sixth grade; (b) children who exhibit greater self-regulated learning would have higher levels of well-being in sixth grade; (c) children with higher rate of growth in self-regulated learning in the beginning would demonstrate faster growth of reading habits; (d) children with higher rate of growth in self-regulated learning in the beginning would have faster growth of well-being.

2. Method

2.1. Participants

The data of the current study is a subset of the longitudinal project conducted in Taiwan from 2010 to 2012. In the project, participants were collected from 54 classrooms of five primary schools in three cities in northern Taiwan. These schools follow similar curriculum which were approved by the Ministry of Education. These participants were selected based on purposive sampling. These five schools were chosen because they were among some of the largest elementary schools in northern Taiwan. Additionally, the diversity of the participants could better represent the demographic structure of northern Taiwan. This two-year longitudinal data traced fourth grade students to their sixth grade. Child's age was not collected; however, the average age of children attending fourth grade in Taiwan was around nine to ten years old and sixth grade was around eleven to twelve years old. Most fathers (85 %) and mothers (79 %) were born in Taiwan, while some parents were born in China, Vietnam, Thailand, Philippines and other countries. Education levels of parents varied, with 5 % of parents had 9 years of education, 14 % of fathers and 15 % of mothers graduated from high school, 20 % of fathers and 25 % of mothers holding a bachelor's degree, 7 % of fathers and 4 % of mothers holding a master degree, and around half of the parents did not report their education level.

A total of 1,090 fourth grade students were included in the study (499 males and 586 females, with 5 missing data). Children's self-regulated learning and reading habits were collected from time 0 to time 4; however, their well-being was only collected from time 1 to time 4. In this research, to explore children's well-being, only four waves of data which contains this variable (time 1 to time 4) was adapted. Response rates for each wave were 90 % in 2010 April (N = 1400), 88.67 % in 2010 November (N = 1378), 98.70 % in 2011 April (N = 1394), 91.96 % in 2011 November (N = 1429), and 92.08 % in 2012 April (N = 1431).

Students completed all four waves of questionnaires were compared with those missing data from any of the time points on their demographic information, including parental education and availability of electronic devices. Data on socioeconomic status was not obtained in the current study. The results of the t-test indicated that children with missing data did not differed significantly from those non-missing data on parental education, father (missingness, $M = 5.02$, $SD = 1.51$; non-missingness $M = 5.04$, $SD = 1.41$), $t(747) = $ -.11, $p = .91$, and mother (missingness, $M = 4.74$, $SD = 1.47$; non-missingness $M = 4.86$, $SD = 1.34$), $t(796) = -1.10$, $p = .27$. In addition, there was no significant difference between two groups on their availability of electronic devices (missingness, $M = 12.97$, $SD = 10.30$; non-missingness $M = 12.32$, $SD = 5.98$), $t(1363) = 1.47$, $p = .14$. Though the result showed that there was no difference between missingness and non-missingness on their parental education and availability of electronic devices, we still need to be cautious when generalizing the results to other population.

2.2. Procedure

The data was collected between 2010 to 2012. During the data collection period, children were assessed in the middle of every semester in the fall (early November through December) and in the spring (from mid-April to May). The first wave was conducted in April 2010 when they were in the fourth grade and the last wave was two years later when they were in the sixth grade, hereafter referred to as Time 0 to Time 4. After the schools agreed to allow the students to participate, questionnaires were sent to teachers and students who were invited to participate. Due to the ethical policy and regulation in Taiwan between 2010 and 2012, parental consent was not required, except one school in Taipei City. However, the researchers had received research ethics training to conduct the research and students were given an explanation of the study procedure.

2.3. Measures

2.3.1. Child Self-Regulated Learning Scale (CSLS)

Children's self-regulated learning abilities were assessed from 2010 to 2012, utilizing a questionnaire containing a total of ten items (Chao & Yu, 2012). Children responded to each item about how often they utilize each learning strategy based on a 4-point scale (1 =

Never; 2 = Sometimes; 3 = Often; 4 = Very Often). Items included self-evaluating, seeking information, planning and reviewing, such as "I check over my assignment", "I ask for help if I have problems with my assignment", and "I review important contents from class". Higher scores indicated that children had better self-regulated learning abilities. The CSLS has been shown to have good reliability and construct validity (Chao & Yu, 2012; Weng & Yu, 2016). In the present study, the measurement had shown high internal consistency over time, with Cronbach's alpha of .89, .89, .90, and .87 in each wave. In addition, a one-factor model with ten items loading onto one factor had acceptable fit, confirmatory factor analysis (CFA) indicated that CSLS had good validity across four waves ($\chi^2 = 3870.53$ ($df = 704$, $p < .001$), GFI = .82, AGFI = .79, NFI = .85, RMSEA = .06, and RMR = .05).

2.3.2. Reading Habits Scale (RHS)

The RHS is a six-item measure used to measure children's reading habits. Participants were asked to indicate the frequency with which they engaged in the reading behavior detailed by each item on a 4-point scale from 1 (Never) to 4 (Always). A total score of the six items was calculated to represent children's reading habits and higher score on this scale represented better reading habits. Examples of the items are "I arrange a period of time to read extracurricular books every day." and "I go to the bookstore and find books to read." The scale had good reliability in our longitudinal sample, with Cronbach's α of .86, .86, .89, and .90 in each wave. In addition, a one-factor model with six items loading onto reading habits has shown to have acceptable construct validity across four waves: $\chi^2 = 1605.23$ ($df = 228$, $p < .001$), GFI = .92, AGFI = .84, NFI = .90, RMSEA = .07, RMR = .04.

2.3.3. Well-Being Scale (WBS)

A Child Well-Being Scale based on Diener's (1984) concept of well-being was measured from 2010 to 2012, using six items, three of which assessed children's positive emotions and three of which assessed their degree of life satisfaction (Diener, 1984, Diener, Suh, Lucas, & Smith, 1999). Children were asked to rate each statement based on their current situation on a 4-point Likert scale ranging from 1= strongly disagree to 4= strongly agree. Examples of items are "I feel happy all the time", "I feel energetic", and "I feel satisfied with my way of living". Utilizing a total of six items, higher scores reflected higher levels of well-being. The WBS has shown good reliability and construct validity in the previous study (Cronbach's α = .90; Li, Chu, & Yu, 2017). In the present study, the scale had shown good reliability, with Cronbach's α score of .85, .85, .90, and .89 in each wave. A two-factor model with three items loading onto each factor had good fit across four waves: $\chi^2 = 1241.01$ ($df = 220$, $p < .001$), GFI = .90, AGFI = .87, NFI = .93, RMSEA = .07, RMR = .05.

2.4. Data analyses

In the present study, we used a latent growth model (LGM) to understand the trajectories of primary school students' self-regulated learning, reading habits, and the well-being, as well as the long-term relationships among these variables. LISREL 8.7 for Windows was used to fit our linear latent growth model. According to Kline (2011), there are three requirements to conduct analysis of a latent growth model in structural equation modeling (SEM): First, a continuous dependent variable should be measured on at least three different occasions; Second, scores should be recorded in the same unit and be available for measuring the same SEM construct across time; Third, the cases should be tested at regular intervals. We collected the data at the beginning of each semester from 2010 to 2012 since they were in fourth grade (that is, nine to ten years old). Then, equally spaced points of time were set and four waves of data were collected in the study.

To analyze the data, firstly, we use confirmatory factor analysis (CFA) to do the primary data analysis and confirm the factor structures of our four-wave data are consistent with theories of self-regulated learning, reading habits, and well-being. In the model that we employed, the intercept variable represents the differences in the scores of the school children in each of the variables, while the slope represents linear change over time. In the study, the factor loading for the intercept of self-regulated learning, reading habits,

Table 1
Descriptive statistics for observed variables (N = 1090).

	Mean	SD	Skewedness	Kurtosis
Self-regulated learning				
T1	29.01	6.62	−0.31	−0.48
T2	28.67	6.63	−0.24	−0.54
T3	29.07	6.82	−0.25	−0.47
T4	28.66	6.84	−0.31	−0.36
Reading habits				
T1	15.37	4.79	0.08	−0.81
T2	15.43	4.78	0.00	−0.79
T3	15.44	5.01	0.01	−0.87
T4	15.21	5.07	0.02	−0.83
Well-being				
T1	20.18	3.39	−0.88	0.88
T2	20.04	3.37	−0.89	1.10
T3	19.88	3.72	−1.01	1.47
T4	20.08	3.40	−0.83	1.28

Note. T1 = Time1; T2 = Time2; T3 = Time3; T4 = Time4; SD = standard deviation.

and well-being scores were fixed to 1. In addition, the loadings on the slope factor were set to 0, *, *, 1, and the second and third loadings were set to estimate freely in each variable.

To determine the model's goodness of fit, several indices were used according to the recommendations of Hu and Bentler (1999): the Normed fit index (NFI), Comparative fit index (CFI), Incremental fit index (IFI), Root mean square error of approximation (RMSEA), and Standardized RMR (SRMR). NFI, CFI and IFI close to .95, and RMSEA and SRMR lower than .08 indicated reasonably good fit (Hu & Bentler, 1999; Schreiber, Nora, Stage, Barlow, & King, 2006).

3. Results

The results of the present study are presented in the following sections: descriptive information across the waves of data, the latent growth model for self-regulated learning, and the relationships between reading habits and well-being.

The descriptive statistics of self-regulated learning, reading habits, and well-being in four waves and the correlations of all variables are shown in Tables 1 and 2 . To evaluate the feasibility of the longitudinal model, we first conducted 3 sets of CFA models of self-regulated learning ($\chi^2 = 11.46$, $df = 3$, $p = .01$, RMSEA = .05, IFI = 1.00, CFI = 1.00, NNFI = 0.99), reading habits ($\chi^2 = 0.79$, $df = 3$, $p = .85$, RMSEA = .000, IFI = 1.00, CFI = 1.00, NNFI = 1.00), and well-being ($\chi^2 = 2.22$, $df = 3$, $p = .53$, RMSEA = .00, IFI = 1.00, CFI = 1.00, NNFI = 1.00), respectively. The skewedness (- 1.01 to 0.08) and kurtosis (- 0.87 to 1.47) of the present data satisfied the assumption of normal distribution (Kline, 2011). We therefore used maximum likelihood estimation (MLE) in LISREL to estimate the parameters in the model (Table 3).

Fig. 1 illustrates how the model was specified. Children's self-regulated learning, reading habits, and well-being were each represented by two latent variables that represented the intercept and slope, with four observed indicators at four time points. According to Byrne (1994), χ^2 test was sensitive to a larger sample size, thereby increasing the chance that the χ^2 value rejects the model if the value is made larger. Therefore, other indices should also be considered to prove the model is acceptable (Bagozzi & Yi, 1988; Hair, Babin, Anderson, & Black, 2018). Finally, the overall fit statistics indicated that the model was acceptable, the values of the fit indices indicated a good fit of the model (Byrne, 1994), with $\chi^2 = 529.27$ (df = 54, $p < .001$), IFI = .93, CFI = .93 and NFI = .93, all exceed .90, and RMSEA = .09, SRMR = .04.

The intercepts reflect initial levels of self-regulated learning, reading habits, and well-being as the children entered second semester of fourth grade, and the slopes reflect the change over one year and a half, by which time the children finished their sixth grade. Results showed that there was a negative relationship between the self-regulated learning intercept and the self-regulated learning slope ($\beta = -.43$, $p < .001$), indicating that children with higher self-regulated learning in the beginning would have a slower rate of growth. In addition, the intercept of self-regulated learning in time 1 (T1) had a significantly positive effect on the intercept of reading-habit ($\beta = .75$, $p < .001$) and well-being ($\beta = .62$, $p < .001$). This indicated that children who had greater self-regulated learning abilities would have higher reading habit and well-being levels. In addition, the slope of self-regulated learning had a significantly positive effect on the slope of reading habits ($\beta = .82$, $p < .001$) and well-being ($\beta = .78$, $p < .001$). The implication is that the faster children's self-regulated learning grows, the faster their reading habits and well-being grow.

4. Discussion

The present research observed the development of primary school students and the results offered support for our longitudinal model of self-regulated learning, reading habits, and well-being. Overall, the results of the growth model demonstrated a good model fit. This study indicates that the initial level of self-regulated learning is associated with the initial level of reading habits and well-being. Moreover, as time goes by, the growth of self-regulated learning is related to the growth of reading-habits and well-being.

The present study found that the initial level of self-regulated learning is associated with the initial level of reading habits. Having self-regulated abilities allows children to deliberately monitor and evaluate their learning and reading behaviors. That is, a student

Table 2
Zero-Order Correlation Matrix.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Srl. T1	–											
2. Srl. T2	.66***	–										
3. Srl. T3	.60***	.64***	–									
4. Srl. T4	.55***	.60***	.67***	–								
5. Rh. T1	.62***	.47***	.42***	.43***	–							
6. Rh. T2	.43***	.55***	.41***	.41***	.65***	–						
7. Rh. T3	.46***	.45***	.57***	.48***	.63***	.65***	–					
8. Rh. T4	.38***	.39***	.42***	.55***	.57***	.59***	.71***	–				
9. Wb. T1	.41***	.31***	.27***	.30***	.30***	.22***	.20***	.15***	–			
10.Wb. T2	.30***	.39***	.35***	.29***	.22***	.25***	.23***	.19***	.45**	–		
11.Wb. T3	.25***	.26***	.42***	.29***	.21***	.17***	.27***	.17***	.42**	.50***	–	
12.Wb. T4	.26***	.25***	.31***	.37***	.17***	.14***	.21***	.21***	.43**	.50***	.53***	–

Note. N = 1090. Srl. = Self-regulated learning; Rh. = Reading habits; Wb. = Well-being; T1 = Time1; T2 = Time2; T3 = Time3; T4 = Time4.
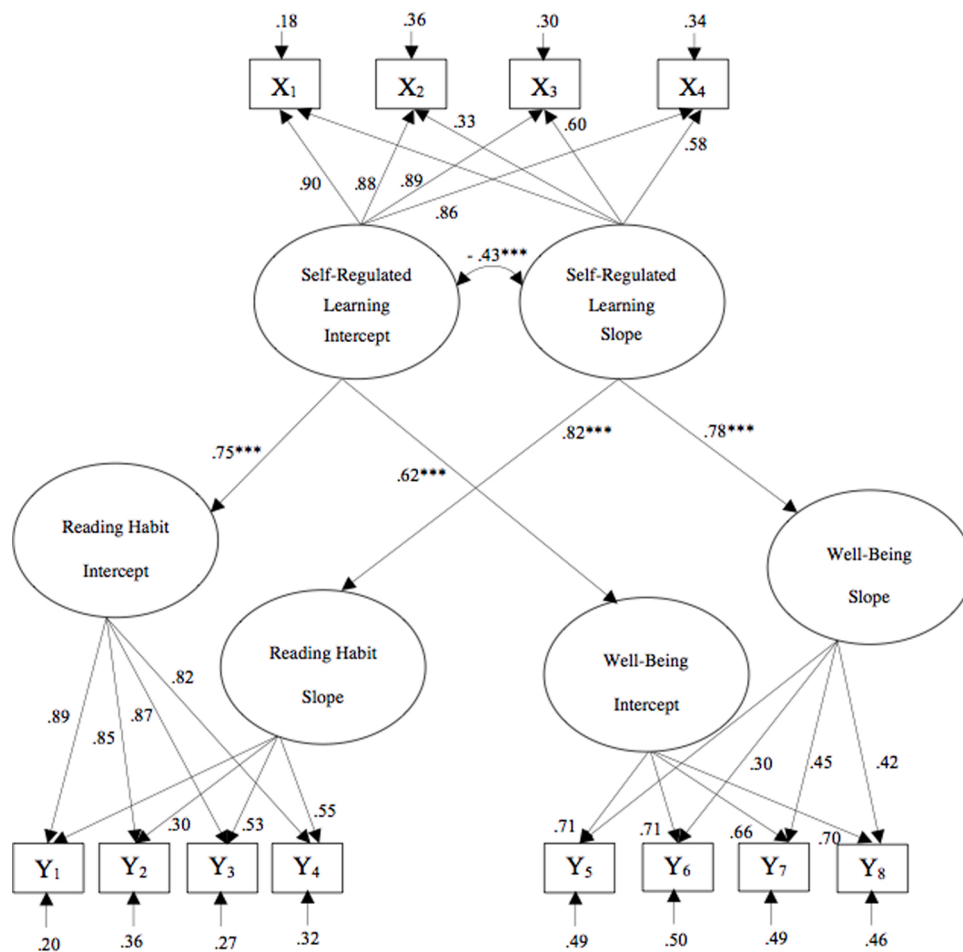** $p < .01$.
*** $p < .001$.

Table 3

Standardized Path Coefficients for the Latent Growth Models.

Variables		Path	S.E.	t-value
Initial Srl. ↔	Growth of Srl.	−0.43	1.32	−7.74***
Initial Srl. →	Initial Rh.	0.75	0.02	28.39***
Initial Srl. →	Initial Wb.	0.62	0.01	18.82***
Growth of Srl. →	Growth of Rh.	0.82	0.05	11.70***
Growth of Srl. →	Growth of Wb.	0.78	0.03	9.02***

Note. N = 1090. Srl. = Self-regulated learning; Rh. = Reading habits; Wb. = Well-being.
*** *p* < .001.

Fig. 1. Latent growth model of children's self-regulated learning, reading habits, and well-being. χ^2(df = 54, N = 1090) = 529.27, IFI = .93, CFI = .93 and NFI = .93, all exceed .90, and RMSEA = .090, SRMR = .04.

who has greater self-regulated learning skills will be likely to have better reading habits. According to the previous research, self-regulated learning processes not only help to increase individuals' reading behaviors but also promote their motivations and cognitive abilities (Kumi-Yeboah, 2012; Metallidou & Vlachou, 2007). Building habits require repetitive behaviors (Verplanken & Orbell, 2003), as well as continuous and deliberate practice for a long period of time. Higher self-regulated learning abilities imply that students have better self-regulated learning strategies and are more likely to self-monitor their learning. Hence, in our study, self-regulated learning played a role in directing individuals' reading behaviors and appeared to enhance the motivation to maintain regular reading habits.

In the present study, students who reported higher levels of self-regulated learning were found to have higher levels of well-being. With regard to the relationship between children's self-regulated learning and well-being, the finding corroborates those of previous studies that individuals' self-regulation was associated with their well-being (Mattern & Bauer, 2014; Nichollas, Levy, Carson, Thompson, & Perry, 2016). Self-regulated learners self-generate thoughts, feelings, and behaviors to attain their learning goals, and

these learners are able to monitor the effectiveness of their learning and respond to the feedback they receive to make change in their learning behaviors, resulting in their desired outcomes (Zimmerman & Schunk, 2001). In addition, as children enter elementary school, they have reached the developmental stage at which they are sufficiently capable to manage their own attention in ways that allow them to sustain their learning and regulate their emotions in some measure (Blair & Raver, 2015). Specifically, between eleven and fourteen years of age, there is a steady increase in children's higher-order cognitive abilities that helps them better regulate their behaviors to adjust to changing and complicated environments (Eccles, 1999). Students with higher levels of self-regulated learning may have a better ability to control their attention and actively engage in learning experiences, which, in turn, we suggest, promotes their well-being.

We found that while children's self-regulation in learning grows, their reading habits grow. One reason was that once children developed higher self-regulatory abilities and learning strategies, they were more willing to read and cultivate the habits of reading. Students who have higher rate of growth in self-regulated learning possess and utilize effective strategies to maintain their reading habits, so that as time goes by, higher self-regulated learning may help to increase the growth of their reading habits. Self-regulated learning is related to learning behaviors in a positive direction because it helps learners manage their learning process and adopt suitable behaviors. In addition, it plays a role in maintaining individuals' motivation to change their behaviors and then cultivate appropriate habits in the long run (Garrin, 2014; Yamada et al., 2016). Self-regulated learning helps children become more capable of making big-picture but nevertheless reasonable and reachable goals towards which they can work and regularly practice their skills. Once students achieve their daily and minimum goals, they find them controllable and may gradually come to enact a daily routine. Because of their ability to manage and select achievable strategies, their reading habits may establish.

We also found that students who exhibited a faster rate of increase in self-regulated learning also had a faster change of increase in well-being. That is, an individual's well-being was influenced by how he or she processed information (Diener et al., 2003), people who learned with self-regulation would promote their well-being by setting the appropriate goals and selecting better strategies that help them adapt to and cope with given learning environments. For example, children who are able to plan and monitor their learning tend to have better capacities of self-control and managing their learning. As their self-regulatory strategies mature and are continuously refined, students are more likely to effectively evaluate personal progress and take control of their learning, aiming to toward goals whose attainment brings fulfillment. In one longitudinal study, researchers found that self-regulation correlated with well-being. They found that setting clear goals, considered to be an important component for such self-regulation, serves to help individuals guide their behavior for selecting effective strategies to cope with difficulties they encounter (Elliot, Thrash, & Murayama, 2011). Children who are able to set clear goals and direct their behaviors toward the goals may be more effective in finding strategies to desire outcomes and have faster change of increase in well-being.

Our study therefore supports research accounting for the critical role of self-regulated learning on child development. It is indeed plausible that self-regulated learning is an important factor that explains the level and growth of both reading habits and well-being. Self-regulated learning may be fundamental for the improvement and growth of certain behaviors, such as cultivating reading habits and maintaining those habits, because it emphasizes the motivation and autonomy of children in being responsible for their own learning and behavior. Children who self-regulated in their learning could be characterized as highly motivated and actively engaging in the activities that pertain to the attainment of their goals, which, in turn, leads to fulfillment and satisfaction. Researchers also found that for children who have better support in developing their self-regulatory skills prior to school are more likely to have skills and strategies that support their engagement in learning, resulting in better academic performance (Daniel, Wang, & Berthelsen, 2016).

These findings substantially advance our understanding of the crucial role of self-regulated learning on reading habits and well-being. That is, behaviors like reading habits will be developed and well-being will be facilitated through cultivating self-regulatory abilities. It has been suggested that children with self-regulated learning abilities were able to prepare for their own learning and manage their learning schedule while maintaining their motivation in learning (Tur, Marĺn, Moreno, Gallardo, & Urbina, 2016). Again, studies have found that better self-regulation capacities help individuals cope with daily stress that comes from negative life events, such as embarrassing situation (Elliot et al., 2011; Philipp & Kunter, 2013). Because self-regulation encompasses abilities to manage individuals' cognition, emotions, and needs, developing self-regulation strategy means that people are more likely to manage their stress and promote their well-being (Singh & Sharma, 2018). Accordingly, children with higher levels of self-regulated learning might better utilize their self-regulatory abilities in solving problems they face in school and better control their learning, resulting in higher levels of satisfaction and well-being. By indicating the potential value in enhancing self-regulated learning abilities, parents and teachers can specially target these skills for improvement, creating opportunities to nurture and support their development.

However, to our knowledge, studies that have addressed the relationships between self-regulated learning, reading habits and well-being and employed a growth model have only addressedon adults or adolescents, not young children. Especially in the case of younger students, developmental aspects should be taken into consideration because these variables might change with time as children's behaviors themselves change—improving or worsening. Clearly, the growth trajectory of these variables and the influence of self-regulated learning on children's behaviors require more in-depth exploration.

5. Limitations

There are five limitations of the present study that must be acknowledged. The first limitation pertains to the sample loss in longitudinal data. It should be pointed out that participant drop-out is in fact common in longitudinal research (Wolke et al., 2009). The study analyzed data from a five-wave survey in Taiwan, which assessed elementary school students in various life dimensions every semester and included large sample sizes. In the present study, children's well-being was not collected in the first wave of the original study; therefore, we only included four waves of data in the current analysis. In addition, due to our limitation to use more

complex models and software to deal with the missingness, future longitudinal research in this area could consider using more complicated methods, such as multiple imputation procedure, to handle missingness to avoid potential selection bias.

The second limitation was that the present study only adopted 3-year longitudinal data, which might underestimate the relationship between self-regulated learning and reading habits, as well as well-being. In addition, the present study did not examine the association between reading habits and well-being. It has been suggested that intervening reading sessions reduces individuals' stress (Rizzolo, Zipp, Stiskal, & Simpkins, 2009) and therefore increases well-being (Brajša-Žganec, Merkaš, & Šverko, 2011). Also, internalizing self-regulation abilities and reading habits takes time. Future research could extend the time for investigation or adopt different analysis methods such as cross-lagged panel modeling to understand growth paths between these variables. Accordingly, this brought up another concern that there might be ceiling effects when conducting the latent growth model. According to Goedendorp and Steverink (2016), participants that have higher scores in the beginning tend to show less improvement over time, compared with those with lower scores. Future research that tests the growth of longitudinal data could help disentangle this issue by using more comprehensive design or methods.

Third, the data also restricted the possibility of examining the issue of arbitrary clustering of respondents. The study examined the relationship between the self-regulated learning, reading habits, and well-being of students in different schools and in different classrooms, but failed to consider how those factors are influenced by classroom environments, teaching methods and styles. Due to the lack of classroom or teacher level information, we are unable to make any assumption or provide more thorough information regarding the relationships of these variables across different learning environments. Self-regulated learning, which was claimed to have subject-area-specific characteristics, may in fact vary according to different learning environments (such as classrooms) (Metallidou & Vlachou, 2007). One ought, therefore, to consider the possibility that other factors could make differential gains in self-regulated learning, as well as reading habits and well-being. However, in the current study, only information at the student level was collected. Future studies are encouraged to take into account potential clustering effects when analyzing longitudinal data, as well as how classroom-level or teacher-level information may have effects on children's growth. Furthermore, to gain in-depth insights of the relationships between these variables, further research could consider using mixed methods approach to elicit more detailed information.

Another limitation was that the present study did not analyze the potential role of gender. This study focused on understanding the relationship between self-regulated learning, reading habits and well-being in the sense of general development of children for this is a relative innovative perspective. Although some previous studies have indicated that girls and boys do not have significant differences on their self-regulated learning, reading habit and well-being (Abu-Alruz, Khasawneh, Al-Zawahreh, & Bataineh, 2020; Chao, Yu, & Chang, 2011; Chen, Cai, He, & Fan, 2019; Jandrić, Boras, & Šimić, 2018; Joseph, 2018; Lloyd & Emerson, 2017; Løhre, Moksnes, & Lillefjell, 2014), this is not always the case. Thus, further research could adopt different analysis methods such as multi-group analysis to examine the role of gender plays in students' development of self-regulated learning, reading habits and well-being.

Finally, some background information such as age and social-economic status (SES), which are common covariates in most studies, was not obtained in the current study due to privacy and confidentiality. Therefore, we were not able to control this background information in the analysis. Given the fact that Taiwan is a small country and the data was collected from three cities located in the northern part of Taiwan, there is a relatively small variability across cities and students. Researchers need to be cautious when generalizing the results to other population. However, future studies should consider collecting more background information so that the relationships between these variables could be better understood. Furthermore, the results could be better generalized to and across other similar situations.

Declaration of Competing Interest

The authors report no declarations of interest.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ijer.2020.101673.

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