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A Sustainability Lens on the Paradox of Chinese Learners: Four Studies on Chinese Students' Learning Concepts under Li's "Virtue–Mind" Framework

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Abstract: The paradox of Chinese learners refers to a contrast between poor learning approaches and high achievement in China, which reveals a lack of sustainability in Chinese education. In addressing this paradox, Jin Li stood out by studying culture-based learning concepts and providing a comprehensive theoretical framework of the Eastern virtue model versus the Western mind model. However, this framework has not been thoroughly tested in the age of global cultural exchange, and the best learning model for learners has not been determined. This paper used both qualitative (replicating Li's word association test) and quantitative methods to retest and enrich Li's theory in present-day China, using four empirical studies. Studies 1 and 2 revealed the influence of global cultural exchange in narrowing the gap between the two models, with appropriate modifications made to Li's theory. Studies 3 and 4 demonstrated that both of the two models were conducive to students' academic achievement and creativity, greatly enriching Li's theory. The implications of achieving a dynamic balance between the virtue model and the mind model to improve the sustainability of Chinese student development are discussed, which contributes to achieving the United Nations' Sustainable Development Goals.

Keywords: paradox of Chinese learners; learning concept; virtue model; mind model; Confucian culture

1. Introduction

The Chinese education system, the largest education system in the world, has attracted much research attention, with many studies focusing on the paradox of Chinese learners [1]. The Chinese education system is primarily characterized by old-fashioned teaching

and learning, featuring teachers' authoritarian pedagogy, centralized curricula, obedient students, rote learning, and exam-oriented motivation, which have been criticized in numerous articles, books, and media (see [1–3]). Yet Chinese learners constantly outperform their Western counterparts in large-scale international tests such as PISA, TIMSS, etc., and they continue to perform well when they attend Western universities for further education. From a sustainability perspective, the excellent academic performance of Chinese students comes at the expense of some of the valuable sustainable development goals (SDG) proposed by the United Nations. For example, China's exam-oriented education system is often criticized for putting students' mental health at risk [2], which is against SDG 3. In addition, a lack of intrinsic interest in learning results in limited creativity (against SDG 9) and a low willingness to continue learning after graduation (against SDG 4) [3]. These drawbacks raise the question of how to increase the sustainability of Chinese education, which is becoming increasingly important in a new era. Among all of the efforts made to address the paradox of Chinese learners, Jin Li's "virtue–mind" theoretical framework stands out by providing a comprehensive and insightful perspective for understanding the cultural beliefs behind this paradox and for re-examining the advantages and disadvantages of Chinese education, thus shedding light on how to improve its sustainability. However, Li's theory has not been thoroughly tested in this age of global cultural exchange, and the question as to which is more beneficial for learners between the Eastern virtue model and Western mind model has not been determined. Therefore, in this paper, we first critically analyze Li's virtue–mind framework and then present four empirical studies that modify and enrich Li's theory. Finally, we establish a sustainable learning model for Chinese learners based on our findings.

2. Elaboration of the Analytical Framework

2.1. Review of the Literature on the Paradox of Chinese Learners

Chinese learners' high level of achievement has attracted the attention of a number of international scholars since the 1970s, as it threatens the well-developed approaches to learning and teaching in the Western literature. Although numerous, studies aimed at unpacking this paradox have been largely fragmented.

One of the explanations on the paradox frequently cited concerns about Chinese learners' rote learning, which is a mechanical way of learning where thinking is absent. Chinese learners have been criticized for using repetition as a means of memorization. However, studies [4,5] have shown that repetition is also a tool used by Chinese learners to consolidate knowledge and strengthen understanding through the active deployment of the learned material, and that Chinese learners can consciously differentiate between mechanical memorization and memorization with understanding, resulting in modification of the equation between rote learning and repetitive learning.

Similarly, it has been argued that the perceptions of Chinese learners as silent and passive learners and of inadequate interactions with teachers in Chinese classrooms are biased. During lessons, Chinese students usually attentively absorb the knowledge imparted by the teacher, and they consider it rude to interrupt the lecture; instead, they wait until the end of the lesson to ask questions, so student–teacher interactions in China often occur when formal lessons are over, which shows learners' respect for teachers in traditional Chinese culture [6,7].

Consistent with the fresh impression of Chinese students, the image of Chinese teachers after class or outside the classroom is much less authoritarian as well, although they often appear austere during class to ensure discipline and teaching efficiency in large classes. Indeed, Chinese teachers generally encourage students to approach them to clarify what they did not understand in class to better grasp their students' needs and difficulties and to adjust their lesson the next day [8].

In addition to student–teacher relationships, peer relationships have also received a great deal of attention. Unlike Western classrooms, in which high achievers often face peer

harassment, Chinese students are much more united in large classes and often support and respect each other in achieving high scores [9].

Speaking of the large-size Chinese classes, scholars have shown interest in the curriculum design. A recent study revealed that compared with the U.S., the mathematics curriculum in China is more enriched in knowledge points, more specific in standard demands, deeper in terms of difficulty, and better sequenced according to the advancement of grades [10].

In addition to school education, researchers have noted differences in parenting styles. Chinese parents have higher expectations for their children's academic achievement (usually straight A's) than European and American parents, who on average are satisfied with A's and B's [11].

While the above discussion helps reduce the tension embedded in the Paradox of Chinese Learners to some degree, more convincing arguments come that Chinese learners possess an advantageous growth mindset [12], which tends to attribute success to effort rather than ability [13]. In addition, effort is a stable factor over time and across situations, which differs from the definition in the Western literature on motivation [14].

As a central axis, this line of research has induced a shift in research directions toward culture-based learning beliefs, and has identified the Confucian belief in the pursuit of self-perfection, especially in the moral aspect, as the primary goal of learning [15]. Li's work epitomizes this line of research on learning beliefs.

It should be noted that while Western scholars are enthusiastically learning from the Chinese approaches to education and learning [16], their Chinese counterparts are anxiously seeking to emulate the West to address the lack of sustainability in education, in particular students' high academic burdens [17] and low scientific creativity [18]. Chinese students' low scientific creativity is most unsettling, as China has already fallen behind in modern science and technology; therefore, the well-known Needham Question [19] requires some explanation. Some scholars have discussed the influence of traditional Confucian culture on limiting the creativity of people in ancient China (see [19]), but the specific link between culture-based learning beliefs and modern Chinese students' lack of creativity remains unclear. Empirical studies are therefore needed to answer this question.

In summary, although this field has generated a good amount of research and made significant progress, the body of accumulated knowledge remains quite separate and discrete, lacking a comprehensive picture of learners in China and the West.

2.2. Critical Analysis of Li's Virtue–Mind Framework

In view of the aforementioned advancements and limitations in the field, Li explored this topic by synthesizing the wisdom of predecessors into learning beliefs, as beliefs are the core conceptual frames that are shaped by and thus reflect cultural models.

According to Li, educational models in Europe and America are "mind-oriented," stemming from ancient Greek Socratic epistemology and viewing learning as mental development for exploring and understanding the outside world. In contrast, educational models in East Asia are "virtue-oriented," influenced by traditional Confucian teachings, which consider learning as socialized development for cultivating and perfecting a person's morality (see [20–30]). Li established the virtue–mind framework for education and learning by tracing the cultural origins of Eastern and Western models. According to Li's monograph *Cultural Foundations of Learning: East and West* [29] (Chapters 2–4) based on her series of empirical cross-cultural studies and other detailed, reliable, and fascinating materials, the philosophy of education and learning in China and East Asia is mainly influenced by Confucian culture (see [22]). Ancient Eastern learners read the books of sages (*sheng-xian-shu*), pursued self-improvement (*xiushen*), were determined to become men of noble character (*junzi*), emphasized maintaining their relationship with society, assumed social responsibilities, and applied moral principles to support the emperor's implementation of benevolent governance (*ping-tian-xia*), which was seen as the realization of one's life goal and life value. Confucian learners thus valued virtues such as earnestness, diligence,

endurance of hardship, concentration, and perseverance. These excellent learning virtues have been passed down to this day and still feature prominently in contemporary Chinese education. In contrast, the Western philosophy of education and learning is derived from the tradition of ancient Greek epistemology (see [31]). Ancient Greek thinkers such as Socrates and Aristotle were eager to understand the essence of things, the substance of the world, and the laws of the universe; they were curious and enthusiastic about the world and thus developed tools for mathematics and logic to pursue absolute knowledge and eternal truth. To understand the outside world and use knowledge about the world to meet people's needs, Western learners today still tend to value mental qualities, such as curiosity, an inquisitive mind, creativity, critical thinking, and self-expression. In her monograph [29], Li described, explored, and explained the virtue–mind cultural dichotomy from several angles, including learning tradition, emotional reaction, knowledge expression, peer interaction, and parental guidance, but according to Li, the core of the dichotomy lies in people's cultural beliefs about learning. Below, we present Li's two most representative and important studies to understand how she delved into this topic from the perspective of learning beliefs.

In Li's pioneering work [21], published in the *Journal of Educational Psychology* in 2003, she studied learning beliefs from an emic perspective, i.e., learning concepts (see [32]). She asked Chinese and American college students to provide free associations of the word "*xuexi*" or "learning/learn" and found striking differences in the learning vocabulary of the two groups (see Tables 3.1 & 3.2 in [29]). In terms of linguistic features, Chinese associative words mostly included multiple words and modifiers, many of which were presented in the form of proverbs and sayings, such as "it is never too late to learn" (*huo-dao-lao xue-dao-lao*) and "read extensively" (*bo-lan-qun-shu*); however, American associative words were single words, such as "study" and "thinking." With regard to conceptual features, many American associative words involved thoughts and psychological processes (31%), and some referred to external factors, such as resources, institutions, and teachers, which were rarely seen in Chinese associative words. However, the American college students seldom mentioned the concepts of diligence and lifelong learning, which were strongly emphasized by the Chinese students. Regarding emotional and behavioral characteristics, the Chinese terms expressed strong affect, showing desire, enthusiasm, and intensity of learning, as well as a clear call to action, none of which was evident in the English words. Li then used cluster analysis to map the relationships between the different concepts for each culture.

In her study [22] published in the *Journal of Developmental Psychology*, Li investigated the learning concepts of preschoolers in Chinese and American cultures. After hearing stories of a little bird that chose to learn to fly in the face of difficulty and a little bear that chose to give up learning to fish in the face of failure, Chinese and American children aged four to six were asked to continue the stories and evaluate the little bird and the little bear. Li found that almost all of the children in the two cultures expressed affection for the little bird; however, more than half of the children in China did not like the little bear because of its poor learning attitude, whereas only a small number of children in the U.S. did not like the little bear. Although the participants were not yet in primary school, they had already formed a basic cognitive framework for the meaning of learning. This finding thus reveals that the differences in learning concepts between the two cultures appears from an early age.

The two studies above that examine the two ends of the educational pathway demonstrate that the distinction in learning beliefs between the two cultures is pervasive. The two educational models are like two parallel paths that did not intersect until modern globalization, where the two models are manifesting their own merits and demerits, calling for learning from and integration with each other. We argue that what is valuable about Li's virtue–mind framework is that it adopts a neutral view of Eastern and Western models of education and learning without neglecting the contributions of both cultures.

Specifically, as far as we are concerned, Li's framework seems to unintentionally offer an explanation for the well-known Needham Question [19] from the perspective of learning beliefs. Here comes a bold assumption of ours: Could the neglect of the mind in Chinese learning concepts partly explain why China has fallen behind the West in modern science and technology? When the ancient Greeks debated whether the earth was round or flat, the ancient Chinese created the story of Qi, who was haunted by the fear that the sky might fall (*qi-ren-you-tian*), in order to make fun of those with unnecessary anxiety. Just come think about that: the question of whether the sky would fall or not would be so important a topic that the ancient Greek philosophers might like to discuss it. Seen in this light, the Western mind model that advocates truth, emphasizes the cultivation of individual abilities, and pays attention to the use of external resources and strategies is a perfect supplement to the Confucian virtue model, which promotes the sustainability of Chinese students' learning.

Dialectically, Li's virtue–mind theory is not without some deficiencies, which can be summarized as two main errors concerning the impact of culture on students' learning beliefs and the impact of learning beliefs on student performance. Regarding the first flaw, the basic hypothesis underlying all of Li's studies is that culture has a significant impact on people's learning beliefs, which she partly tested by considering the pervasive distinction in learning beliefs between the East (virtue) and the West (mind). However, Li seemed to fail to follow through on the same hypothesis to the end but instead fell into the limitation of self-inconsistency. For example, she believed that "variations remain despite deepening cultural exchange" and that "the basic patterns of cultural learning models are tenacious and unlikely to melt in grand unification" [29] (pp. 331–335), which, as Xiangming Chen pointed out, are contrary to popular beliefs [30] (p. 2 of the preface). It is also worth examining the patterns of virtue and mind learning beliefs that exist under the high level of cultural exchange in the era of globalization. With regard to the second flaw, although Li's original motivation for conducting a series of studies was to explain the Paradox of Chinese Learners, she only stayed on the phenomenological explanation of the distinction between Eastern and Western learning models and did not study the problem directly by determining which cultural learning model is better, despite that some of her recent studies [25–27] have partly addressed this question. Clearly, determining which learning model is more beneficial to student performance is a concern for every educational researcher and educator. Thus, based on the above discussion, the first job for this current paper was to re-examine Li's virtue–mind theory and make some amendments in order to enrich it, before a sustainable learning model could be established.

2.3. Presentation of the Current Studies

Four empirical studies were designed from the perspective of learning concepts (i.e., epistemological beliefs about learning studied from an emic perspective according to Li [20,21], [29] (p. 77), [32,33]).

First, most of Li's studies, which led to the development of her theory, were carried out around the turn of the century. Since then, there has been a rapid increase in globalization and an accelerated integration of world cultures. Thus, it is worth exploring whether the difference in learning concepts between the Eastern virtue model and the Western mind model is still significant today. Is it possible that the spread of Western cultures has caused today's Chinese students to also show a tendency to value mental qualities? Therefore, in Study 1, we explored the changes in Chinese students' learning concepts from a developmental perspective to see whether Li's finding [21] could be replicated.

Second, China is vast, and cultures vary greatly across areas. For example, Shandong province in the north was the cradle of Confucian culture, and Guangdong province in the south has a long history of opening up to the Western world. Does this mean that the virtue and mind learning concepts of students in these two provinces differ? If so, this finding would provide solid evidence to support Li's theory that culture exerts a powerful impact on education and learning. Thus, in Study 2, we compared the differences in students'

learning concepts between northern and southern China to see whether new evidence could be found.

Conducted from a vertical perspective and a horizontal perspective, respectively, Study 1 and Study 2 helped us form a more scientific and dialectical judgment on Li's "virtue–mind" theory.

Third, to study the Paradox of Chinese Learners directly, in Study 3 we examined the relationship between students' virtue and mind learning concepts and their academic achievement to better understand the advantages and disadvantages of Eastern and Western learning models and provide valuable insights for educational practice.

Finally, as the Needham Question, like the Paradox of Chinese Learners, has attracted the attention of scholars and educators, in Study 4 we investigated the correlation between students' virtue and mind learning concepts and their creative tendency and critical thinking to determine whether virtue learning concepts are indeed less conducive to or even stifle students' creativity in comparison to mind learning concepts.

Study 3 and Study 4 helped us establish a more sustainable learning model for Chinese students in light of the combination of Eastern virtue wisdom and Western mind ideology.

On the basis of these four studies, this paper discusses how to promote sustainability in education in today's Chinese context.

3. Study 1: The Development of Chinese Students' Virtue and Mind Learning Concepts

To investigate changes in Chinese students' virtue and mind learning concepts from a developmental perspective and replicate Li's finding [21], in Study 1 we adapted the word association test used by Li [21] to examine the learning concepts of students from Grade 1 in primary school to juniors in university [33].

3.1. Method

3.1.1. Participants

We recruited 2326 Chinese students in regular primary schools, middle schools, and universities in Guangdong province as participants, spanning Grades 1 to 15. The three adjacent grades were combined into one group, such that the participants were divided into five school phase groups: lower primary school (Grades 1–3) ($n = 460$, 225 boys), upper primary school (Grades 4–6) ($n = 520$, 277 boys), junior high school ($n = 472$, 267 male adolescents), senior high school ($n = 411$, 189 male adolescents), and university ($n = 463$, 106 men).

3.1.2. Procedure

Step 1: we collected learning-related vocabulary using a word association test. The participants in Grades 4 to 15 were asked to write down at least 20 words, phrases, idioms, or proverbs associated to the word "learn/learning." There was no requirement for the number of associative words for the participants in Grades 1 to 3, but the time limit was set to 10 min. The data for the university group were collected using online questionnaires, and those for the other groups were collected using printed questionnaires.

Step 2: Data cleansing and frequency counting. All of the associative words collected in Step 1 with the same semantic meaning were merged, and several that had little to do with learning were deleted. Next, the frequency of occurrence of the remaining associative words was counted.

Step 3: Classification of associative words. Three coders used NVivo 11.0 to classify the associative words in Step 2 (intercoder reliability = 0.69). All of the cluster levels of the two concept maps in Li's study [21] were taken as the basic categories of learning concepts, and all associative words with the same or similar meaning were classified into the corresponding category to increase the frequency of occurrence. If the independent coder deemed the associative word inappropriate for inclusion in any of the existing basic

categories, he/she could propose to add a new basic category, the naming of which was decided through discussion based on the clusters of learning concepts in Li's study [29].

Step 4: Construction of a hierarchical structure of Chinese students' learning concepts. The basic categories obtained in Step 3 were transformed into a hierarchical structure, and changes in the frequency of learning belief categories were illustrated in a figure to show the trend of development.

3.2. Results

3.2.1. Preliminary Analysis of the Collected Associative Words

The numbers of associative words were 2045 for the lower primary school group, 4068 for the upper primary school group, 9589 for the junior high school group, 8106 for the senior high school group, and 8394 for the university group, totaling 32,202 words. We present the top 10 associative words with the highest frequency in each school phase in Table 1.

Table 1 shows that as the age of the participants increased, the average length of the associative words decreased. In terms of linguistic features, the form of the terms changed from phrases with modifiers or idiomatic sentences containing proverbs to single words. In terms of conceptual characteristics, the degree of heterogeneity in the associative words increased. With regard to affective features, the emotions contained in the associative words were less distinct and weaker as age increased. For behavioral characteristics, the call for behavioral performance gradually weakened. According to Li's findings [29] (pp. 79–81), the above results generally reflected the development trend of Chinese students' learning concepts shifting from the virtue model to the mind model.

3.2.2. Classification of Associative Words and Construction of the Hierarchical Structure of Chinese Students' Learning Concepts

According to the definition of virtue and mind models in Li's studies (see [29]), 33 basic categories were formed and divided into three types: "virtue orientation" (13 categories), "mind orientation" (14 categories), and "negative orientation" (four categories). Then, the basic categories of "virtue orientation" and "mind orientation" were further divided into four sub-categories: "learning motivation," "learning ability and attitude," "learning strategy and support," and "learning content." The full hierarchical structure of Chinese students' learning concepts is shown in Figure 1, with the frequency of occurrence of the basic categories reported in brackets and the basic categories directly adopted from Li's study [21] marked with "*" (24 categories). Below, we analyze the differences in the basic categories between the virtue model and the mind model in the four sub-categories:

1. Learning motivation. The virtue-oriented learning concepts generally pointed inward and focused on the self, the most prominent being "perfection of oneself morally/socially," which is also Confucius's primary objective [29] (p. 35, p. 90). Next, "depth and breadth of knowledge," which represents the degree of mastery of knowledge, is believed to be the most important learning achievement that Chinese learners can hope to achieve [29] (p. 93). People's hope of "promoting their social status" is of great practical importance in realizing the primary goal of Confucianism: "contribution to society" [29] (p. 90). Thus, the meaning of individual learning is extended to the whole community, that is, taking the world as one's duty (*yi-tian-xia-wei-ji-ren*) [29] (p. 46). The mind-oriented learning concepts paid more attention to the outside world. To explore, understand, and control the world, people first need to "develop their abilities/skills" to enable them to become fully functioning members of society [29] (p. 85). In addition, learners in the mind model usually need to receive continuous affirmation to maintain their learning motivation [29] (p. 159). Therefore, feedback and positive reinforcement from or outside of the learning task, such as "praise and rewards," are often used by Western parents and teachers as strategies to strengthen children's learning motivation.

2. Learning ability and attitude. In general, learners in the virtue model focus more on their own attitudes toward learning, whereas those in the mind model pay more attention to their own learning abilities. Specifically, seven categories related to learning attitude in the virtue model were mentioned: "love and passion" [29] (p. 94), "diligence" [29] (p. 126), "cherishing time," "perseverance and endurance of hardship" [29] (pp. 139–144), "concentration" [29] (pp. 144–147), "humility" [29] (pp. 179–180), and "lifelong pursuit" [29] (p. 79, p. 83), all of which are core virtues that Confucian learners must cultivate and practice constantly to "morally/socially perfect themselves" [29] (pp. 49–52). In contrast, there was only one basic category in the mind model that concerned learning attitude: "active engagement" [29] (p. 87, p. 108). Finally, the concept of "cognitive ability" [29] (pp. 33–35, pp. 110–120), which includes inquiry, thinking, and innovation, only appeared in the mind model, whereas the virtue model did not involve any categories related to learning ability.

3. Learning strategy and support. In the virtue model, only one category, "practice and review," was related to learning strategy; the repeated practice of something over a long time is considered by Confucian learners as the only way to attain mastery of knowledge and is inseparable from "diligence," "endurance of hardship," "perseverance," and other virtues [29] (pp. 126–135). In contrast, the mind model included many such categories: "learning and self-management plan" [29] (p. 110), "learning approaches" [29] (p. 82), "exploration and experiment" [29] (pp. 110–116), "thinking and comprehension" [29] (pp. 116–120), and "cooperation and communication" [29] (pp. 120–123), all reflecting learners' agentic process of "active engagement." In addition, neutral categories such as "teaching methods," "learning experiences and environment," "resources, facilities, and tools for learning," and "life processes and stages" only appeared in the mind model, mainly reflecting external support for learning [29] (p. 82).

4. Learning content. "Daily code of conduct" was related to moral education, whereas "school curriculum and basic knowledge" [29] (p. 82) was related to intellectual education.
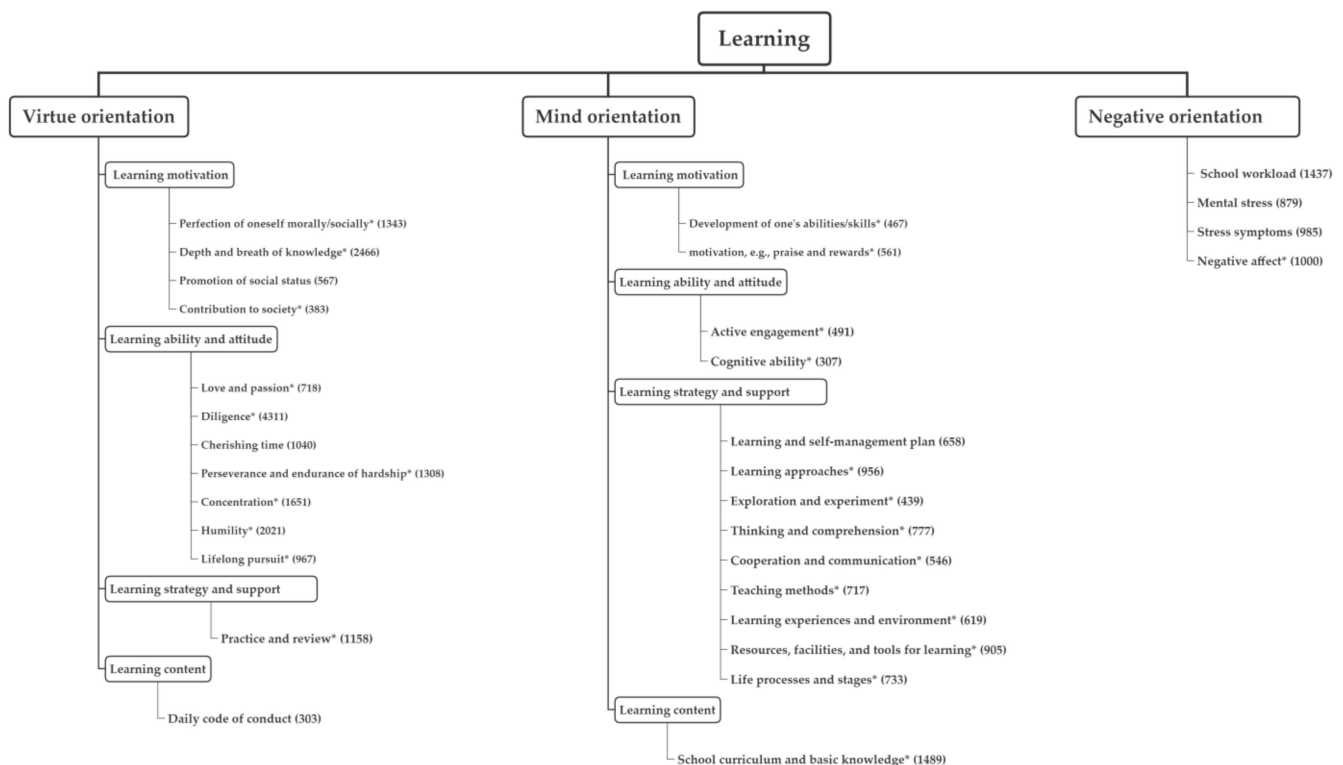

Figure 1. The hierarchical structure of Chinese students' learning concepts. 24 categories marked "*" are directly adopted from Li's study [21].

Table 1. Top 10 associative words with the highest frequency in the five groups of Chinese students and their frequencies in brackets.

Lower Primary School	Upper Primary School	Junior High School	Senior High School	University
1. Study hard and make progress every day (*hao-hao-xue-xi tian-tian-xiang-shang*) (251)	Study hard and make progress every day (*hao-hao-xue-xi tian-tian-xiang-shang*) (208)	There is no boundary to learning (*xue-wu-zhi-jing*) (126)	Learning without thinking is labor lost; thinking without learning is perilous (*xue-er-bu-si-ze-wang si-er-bu-xue-ze-dai*) (139)	Teacher (*laoshi*) (135)
2. Having pored over ten thousand volumes, one can write with godly power (*du-shu-po-wan-juan xia-bi-ru-you-shen*) (152)	Long-term diligence is the road to the mount of knowledge; endurance of hardship is the boat to the boundless sea of learning (*shu-shan-you-lu-qin-wei-jing xue-hai-wu-ya-ku-zuo-zhou*) (130)	Diligence (*qinfen*) (123)	Long-term diligence is the road to the mount of knowledge; endurance of hardship is the boat to the boundless sea of learning (*shu-shan-you-lu-qin-wei-jing xue-hai-wu-ya-ku-zuo-zhou*) (112)	Examination (*kaoshi*) (132)
3. When a book is read a hundred times, its meanings will naturally become clear (*du-shu-bai-bian qi-yi-zi-xian*) (107)	Having pored over ten thousand volumes, one can write with godly power (*du-shu-po-wan-juan xia-bi-ru-you-shen*) (127)	Hard work (*nuli*) (116)	It is never too late to learn (*huo-dao-lao xue-dao-lao*) (106)	Schoolwork (*zuoye*) (106)
4. One who does not study when young will regret it in the future (*du-shu-bu-chen-zao jiang-lai-tu-ao-hui*) (107)	Books are the ladder of human progress (*shu-ji-shi-ren-lei-jin-bu-de-jie-ti*) (123)	Study hard and make progress every day (*hao-hao-xue-xi tian-tian-xiang-shang*) (109)	There is no boundary to learning (*xue-wu-zhi-jing*) (92)	Library (*tu-shu-guan*) (87)
5. Reading a good book is like making a good friend (*du-le-yi-ben-hao-shu xiang-jiao-le-yi-ge-yi-you*) (89)	Laziness in youth spells regret in old age (*shao-zhuang-bu-nu-li lao-da-tu-shang-bei*) (114)	Learning without thinking is labor lost; thinking without learning is perilous (*xue-er-bu-si-ze-wang si-er-bu-xue-ze-dai*) (103)	One can not cease learning (*xue-bu-ke-yi-yi*) (82)	Hard work (*nuli*) (80)
6. Earnestness (*ren-ren-zhen-zhen*) (80)	Discard bedtimes and mealtimes (an idiom to describe one's diligence in learning, *fei-qin-wang-shi*) (111)	Long-term diligence is the road to the mount of knowledge; endurance of hardship is the boat to the boundless sea of learning (*shu-shan-you-lu-qin-wei-jing xue-hai-wu-ya-ku-zuo-zhou*) (88)	Diligence (*qinfen*) (77)	Grade (*chengji*) (75)

Table 1. *Cont.*

Lower Primary School	Upper Primary School	Junior High School	Senior High School	University
7. Stand in the snow to wait upon Master Cheng respectfully (an idiom used to describe someone eager to learn and respectful of his/her teacher; *Cheng-men-li-xue*) (72)	Devotion (*zhuan-xin-zhi-zhi*) (96)	Books are the ladder of human progress (*shu-ji-shi-ren-lei-jin-bu-de-jie-ti*) (84)	Study for the rise of China (*wei-zhong-hua-zhi-jue-qi-er-du-shu*) (75)	Review (*fuxi*) (73)
8. Le Yangzi's wife used the metaphor of cutting the cloth to persuade her husband not to give up learning halfway (*duan-zhi-quan-xue*) (53)	Concentration (*ju-jing-hui-shen*) (89)	One is never ashamed to learn from his/her subordinates (*bu-chi-xia-wen*) (83)	Examination (*kaoshi*) (70)	Mathematics (*shuxue*) (69)
9. Single-minded (*yi-xin-yi-yi*) (45)	Being smart and eager to learn, one is never ashamed to learn from his/her subordinates (*min-er-hao-xue bu-chi-xia-wen*) (86)	Be wealthy in knowledge (*xue-fu-wu-che*) (78)	Hard work (*nuli*) (69)	English (*yingyu*) (61)
10. Being smart and eager to learn, one is never ashamed to learn from his/her subordinates (*min-er-hao-xue bu-chi-xia-wen*) (43)	Diligence (*qinfen*) (85)	Earnestness (*renzhen*) (78)	Perseverance (*jianchi*) (58)	School (*xuexiao*) (61)

3.2.3. Development of Virtue and Mind Learning Concepts from Primary School to University

We summed the total frequency of all formally retained associative words in each basic category and divided it by the total number of associative words in each school phase group to obtain the frequency of occurrence of each category in each group, as shown in Table 2 and Figure 2. Figure 2 shows that the development of Chinese students' learning concepts exhibited an evolutionary trend from a dominance of the virtue model to a balance between the virtue model and the mind model, validating our hypothesis to some extent. Although the tradition of virtue-oriented learning is still rooted in China, the influence of global cultural exchange has narrowed the gap between the virtue model and the mind model, with a tendency toward full inclusion.
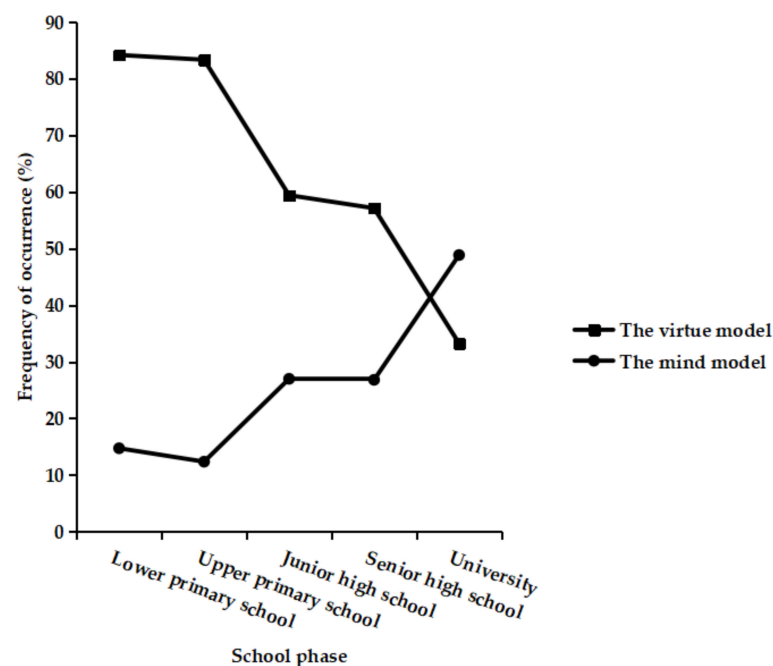

Figure 2. The development of Chinese students' virtue and mind learning concepts.

3.3. Discussion

As discussed in Section 2, the underlying assumption of Li's research is that culture has a significant impact on learners' learning beliefs and thus influences their performance. However, Li failed to fully validate this assumption in terms of the effect of global cultural exchange. Study 1 assessed this hypothesis from a developmental perspective, and the results indicate important changes that can be made to Li's virtue–mind theory. To replicate Li's study [21] conducted around 20 years ago, we conducted a large-scale survey of Chinese students' learning concepts from Grade 1 in primary school to juniors in university. The results showed that although the tradition of the Confucian virtue model was maintained to a large extent, as the age of the participants increased, they acted out more components of the mind model to the point of exceeding those of the virtue model, which means that learners' learning concepts are not immutable but will develop with educational experiences. Today's education in China has been fundamentally altered as a result of Western influence, from its system to curriculum content, which was acknowledged by Li [29] (pp. 63–64). Chinese students are constantly absorbing Western culture through education, so their learning concepts are also Westernized. The gap between the virtue model and the mind model is likely to be further narrowed and even eliminated in the future [33].

Table 2. The frequency (%) of occurrence of each basic category in each group.

Basic Categories	Lower Primary School	Upper Primary School	Junior High School	Senior High School	University
		Virtue Model			
Learning motivation					
Perfection of oneself morally/socially	7.29	2.58	4.85	4.05	3.53
Depth and breadth of knowledge	8.95	11.16	9.27	7.57	3.88
Promotion of social status	0.29	0.27	1.84	2.91	1.64
Contribution to society	1.76	2.56	1.14	1.31	0.33
Learning ability and attitude					
Love and passion	1.76	0.44	2.33	3.29	2.07
Diligence	18.09	28.29	13.58	11.89	6.24
Cherishing time	7.68	6.93	3.22	1.80	1.74
Perseverance and endurance of hardship	1.37	3.24	5.35	5.03	2.70
Concentration	16.14	12.51	3.89	3.03	2.30
Humility	14.13	11.28	5.92	5.90	2.70
Lifelong pursuit	1.61	1.28	3.06	5.17	2.03
Learning strategy and support					
Practice and review	1.96	2.51	3.79	4.13	3.79
Learning content					
Daily code of conduct	3.18	0.32	1.19	1.06	0.30
Total	84.21	83.37	59.43	57.14	33.25
		Mind Model			
Learning motivation					
Development of one's abilities/skills	0.05	0.12	1.36	1.71	2.29
External motivation, e.g., praise and rewards	0.44	0.25	2.12	1.54	2.55
Learning ability and attitude					
Active engagement	0.20	0.25	1.33	1.25	2.95
Cognitive ability	0.10	0.17	0.55	1.54	1.43
Learning strategy and support					
Learning and self-management plan	0.34	0.32	1.38	2.32	3.79
Learning approaches	9.68	3.54	2.00	1.79	3.30
Exploration and experiment	0.29	0.34	1.27	1.73	1.87
Thinking and comprehension	0.39	1.92	2.44	3.34	2.22
Cooperation and communication	0.15	0.76	1.84	1.51	2.55
Teaching methods	0.73	0.57	2.32	2.00	3.51
Learning experiences and environment	0.05	0.47	1.78	1.06	4.07
Resources, facilities, and tools for learning	0.88	2.29	1.26	1.63	6.45
Life processes and stages	0.39	0.22	1.80	2.26	4.29
Learning content					
School curriculum and basic knowledge	1.03	1.13	5.54	3.13	7.59
Total	14.72	12.35	26.99	26.81	48.86

However, due to a lack of resources, the difficulty of surveying primary school students, and the enormous workload of processing associative words, Study 1 only included participants from Guangdong province, which may have biased the results because of large regional cultural differences in China. And probing into the regional difference of learning concepts of Chinese students would be of great interest in accordance with Li's theory. Therefore, in Study 2, we used a different measurement method to investigate the virtue and mind learning concepts of students from Shandong, a culturally different province from Guangdong province, especially in terms of Confucian tradition.

4. Study 2: Regional Differences in Chinese College Students' Virtue and Mind Learning Concepts

To compare North–South regional differences in Chinese students' learning concepts, in Study 2, we selected key virtue and mind learning concepts from Study 1 and asked university students from Shandong province and Guangdong province to rate the correlations between these concepts and "learning" on a 7-point Likert scale.

4.1. Method
4.1.1. Participants

On the basis of Study 1, Chinese university students with both virtue and mind learning concepts were suitable for regional cultural comparison. Thus, 453 higher education students born and raised in Shandong province (northern China, cradle of Confucian culture) and Guangdong province (southern China, pioneer in openness to the outside world) were randomly recruited from the Internet. We obtained 368 valid questionnaires (222 in Guangdong and 146 in Shandong). Detailed information about the participants is presented in Table 3.

4.1.2. Procedure

Step 1: we selected key virtue and mind learning concepts. Eight experts familiar with Li's studies were asked to select 20 key concepts (10 for each model) from Study 1 through discussion. In this process, the frequency of occurrence of a concept in Study 1 was an important criterion for inclusion. The 10 key concepts of the virtue model selected were diligence (*qinfen*), earnestness (*renzhen*), endurance of hardship (*keku*), perseverance (*jianchi*), concentration (*zhuanzhu*), carefulness (*xizhi*), cherishing time (*xishi*), proficiency (*shulian*), recitation (*beisong*), and ambition (*zhixiang*); the 10 key concepts of the mind model were intelligence (*zhili*), talent (*tianfu*), smartness (*congming*), thinking (*siwei*), comprehension (*lijie*), exploration (*tansuo*), discovery (*faxian*), discussion (*taolun*), innovation (*chuangxin*), and interest (*xingqu*).

Step 2: Create a scale for rating the correlations between the chosen concepts and "learning." The 20 learning concepts were randomly presented on a 7-point Likert scale, ranging from 1 = "weak correlation with learning" to 7 = "strong correlated with learning." The principle of this assessment to measure the participants' learning concepts was similar to the word association test in Study 1. Both were used to examine Chinese students' learning concepts by reflecting the semantic distances between the virtue and mind concepts and learning; however, the rating scale was easier to implement and interpret.

Step 3: Data collection, processing, and analysis. The survey containing the 7-point Likert scale and questions about the participants' demographics was distributed through Wenjuanxing, a platform offering functions similar to Amazon Mechanical Turk. After cleaning the data to ensure that all of the participants were born and raised in Shandong province and Guangdong province, the mean correlations for the virtue model and the mind model were calculated separately. Then, an independent-samples *t*-test was used to analyze the differences in learning concepts between the North and the South.

Table 3. Detailed information about the participants in Study 2.

		Guangdong Province		Shandong Province	
		n	%	*n*	%
Gender	Male	67	30.2	21	14.4
	Female	155	69.8	125	85.6
Type of university	985/211 key universities	74	33.3	10	6.9
	General Type I universities	57	25.7	124	84.9
	Type II or III universities	67	30.2	11	7.5
	Technical or vocational colleges	24	10.8	1	0.7
Type of major	Sciences	132	59.5	46	31.5
	Liberal arts	90	40.5	100	68.5
Grade	Freshman	55	24.8	62	42.5
	Sophomore	62	27.9	38	26.0
	Junior	91	41.0	43	29.5
	Senior	14	6.3	3	2.0
Academic ranking	Top 25%	102	45.9	56	38.4
	Middle 25%–75%	107	48.2	79	54.1
	Bottom 25%	13	5.9	11	7.5
Course failure	Yes	39	17.6	23	15.8
	No	183	82.4	123	84.2
Ethnicity	Han	222	100	145	99.3
	Minority	0	0	1	0.7
Type of family	Urban	123	55.4	53	36.3
	Rural	99	44.6	93	63.7
Single child	Yes	61	27.5	52	35.6
	No	161	72.5	94	64.4
	Total	222	100	146	100

4.2. Results

The results of Study 2 are shown in Figure 3. In the mind model, there was no significant difference ($t = 0.798$, $df = 366$, $p = 0.425$) in the students' learning concepts between the North ($M = 56.35$, $SD = 9.349$) and the South ($M = 55.54$, $SD = 9.696$). In the virtue model, the scores of students in Shandong province ($M = 59.27$, $SD = 8.328$) were significantly higher ($t = 2.022$, $df = 366$, $p = 0.044$) than those in Guangdong province ($M = 57.25$, $SD = 9.968$). The scores for the virtue model were also higher than those for the mind model in both provinces.

4.3. Discussion

In Study 2, we further tested Li's bold hypothesis of the influence of culture on Chinese students' learning concepts proposed in her virtue–mind theory, and we provided direct and strong evidence supporting this hypothesis from the perspective of regional cultural differences. China has a vast territory with notable cultural differences between northern and southern China, which provides a favorable setting to explore the influence of regional cultural differences on students' learning concepts and thus verify Li's hypothesis. Study 2 used two representative provinces in northern and southern China, Shandong and Guangdong, respectively, that have extreme cultural differences. Located in northern China and close to the Central Plains, Shandong province was the hometown of Confucius and the cradle of Confucian culture. With the prolonged and profound influence of Confucian culture, the students in Shandong province tend to value the virtues of learning. In contrast, located in southern China and far from the center of ancient Chinese civilization, Guangdong province was one of the first places to open up and communicate with the outside world and therefore had more opportunities for contact with foreign cultures. Therefore,

it is reasonable to believe that students in Guangdong province are less influenced by China's traditional Confucian culture and more by Western cultures; thus, their learning concepts should display more elements of the mind model. The results of Study 2 partially supported our conjecture. In the virtue model, students in Shandong province did indeed score significantly higher than those in Guangdong province due to the longer and deeper influence of Confucian culture in history. However, in the mind model, there was no significant difference between the two provinces. The reason for this result may be that with China involved in the globalization process of globalization for more than 20 years, the tide of global cultural exchange has rolled Shandong and Guangdong into the baptism of Western cultures to nearly the same degree. However, in both Shandong and Guangdong provinces, the scores for the virtue model were higher than those for the mind model, indicating that the origin of China's Confucian tradition has not changed. The melting of the two cultural learning models amid deepening globalization with a deeper tradition of Confucian virtue model in China revealed in Study 2 further confirmed the conclusion of Study 1. Taken together, the results of Study 1 and Study 2 critically support Li's theory but enriched it with some modifications.
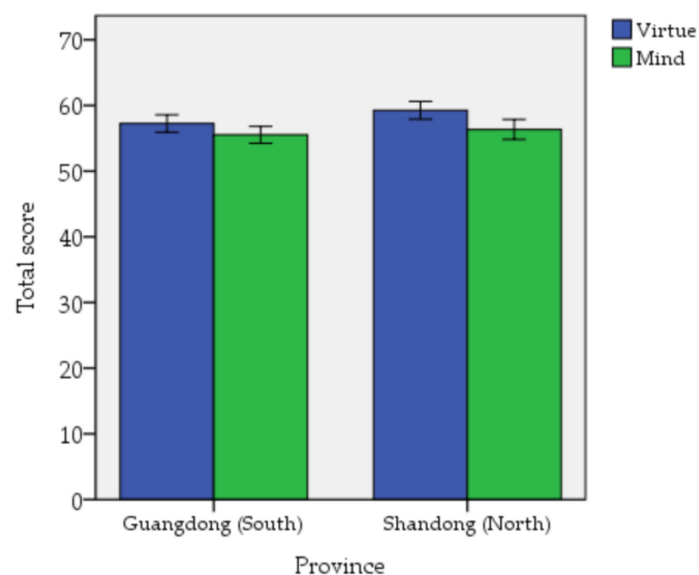

Figure 3. Regional differences in Chinese students' virtue and mind learning concepts.

5. Study 3: The Relationship between Virtue and Mind Learning Concepts and Students' Academic Achievement

To examine the influence of students' virtue and mind learning concepts on their academic performance, in Study 3, we divided the Study 2 participants into two groups according to their academic achievement and compared the differences in learning concepts between the two groups.

5.1. Method

The 368 participants in Study 2 were divided into three academic achievement groups based on three criteria: university quality, student GPA ranking, and course failure. Those who were in the top 25% of their majors, who studied at 985/211 universities (key universities in China), and had no course failure records were classified as high achievers (107 participants, around 30% of the sample); those who studied at Type II or III universities or technical or vocational colleges were classified as low achievers (103 participants, around 30% of the sample); the remaining 158 participants (around 40% of the sample) who ranked in the bottom had course failure records at 985/211 universities or who studied in other Type I universities were classified as mid-level achievers and excluded from the comparison. We grouped the participants in this way because in China, the top students

go to 985/211 key universities, while those with poor academic performance go to Type II or III universities or technical or vocational colleges. Therefore, there is a significant gap in academic achievement between high achievers in 985/211 universities with no course failures and students in Type II or III universities or technical or vocational colleges. Next, we used independent-sample *t*-tests to examine the differences between the two groups.

5.2. Results

As shown in Table 4, overall, high achievers scored significantly higher than low achievers on both the virtue model ($t = 3.736$, $df = 208$, $p < 0.001$) and the mind model ($t = 2.964$, $df = 208$, $p = 0.003$), suggesting that both models play an important role in learners' academic performance and should not be ignored.

Taking a closer look at each conception, we obtained the following interesting results. Among the 20 concepts, only five showed no statistically significant correlations with academic achievement: recitation, talent, intelligence, smartness, and interest; the first concept belonged to the virtue model and the others belonged to the mind model. In some sense, these results indicate that, first, the virtue learning concepts may be slightly more beneficial to students' academic performance than the mind concepts because only one virtue concept was not significant, compared with four in the mind model. Second, high achievers in China do not rely on rote learning, and it is more beneficial for students to better understand and flexibly use their knowledge, which confirms the conclusion of previous studies [4,5]. Third, Chinese students' academic performance is not affected by their interest (or lack thereof), which means that they are able to acquire knowledge from their courses even if they are not interested in their content, which differs from Western learners, as we discuss later. Fourth, Chinese students place great importance on acquired knowledge and do not believe that fixed innate factors such as talent, intelligence, and smartness have a direct effect on their academic achievement, reflecting a growth mindset [12], which we also discuss later.

5.3. Discussion

Determining the influence of learners' learning concepts on their academic achievement is an important topic that Li's series of studies did not address, which constitutes the main contribution of this paper and enriches Li's virtue–mind theory. Notwithstanding certain methodological limitations, the conclusion of Study 3 answers the question of which model is best for learners: the virtue model and the mind model are almost equally important for learners' academic development, so both models should be equally integrated.

The main advantage of virtue-oriented learning concepts lies in their ability to stimulate and fully mobilize learners' subjective initiatives. They provide learners with rich psychological resources in the face of setbacks in the learning process and help them actively cope with difficulties to excel academically [34]. This result is consistent with the findings of previous studies, among which the most notable contributions relate to the attribution of achievement (see [13]). Western children, parents, and teachers explain learners' achievement based on the notion of ability, which tends to be inborn, fixed, and unchanging, whereas their East Asian counterparts attribute learners' achievement to their effort, whose initiative can be completely grasped at hand. Therefore, learners with effort attribution adopt a growth mindset, an incremental motivational framework that promotes resilience (see [12]). Other studies (e.g., [14]) have also shown that unlike Westerners who perceive "effort" as an internal but unstable factor (i.e., whether a person makes an effort depends on the task at hand), Chinese students believe that they should make a constant effort in learning, regardless of setbacks, obstacles, boredom, or lack of natural ability. These findings are confirmed by Study 3, which showed that Chinese learners placed more emphasis on diligence and endurance of hardship and less on talent, intelligence, smartness, and interest.

Table 4. Differences in correlation scores between high and low achievers.

Concept	Group	n	M	SD	t	95% CI
			Virtue Model			
Diligence	High	107	6.16	1.038	2.644 **	[0.122, 0.837]
	Low	103	5.68	1.548		
Earnestness	High	107	6.45	0.73	4.018 ***	[0.313, 0.915]
	Low	103	5.83	1.394		
Endurance of hardship	High	107	6.05	1.067	2.124 *	[0.027, 0.727]
	Low	103	5.67	1.478		
Perseverance	High	107	6.5	0.925	3.748 ***	[0.29, 0.933]
	Low	103	5.89	1.4		
Concentration	High	107	6.17	0.947	2.884 **	[0.152, 0.806]
	Low	103	5.69	1.421		
Carefulness	High	107	5.98	0.971	2.836 **	[0.142, 0.791]
	Low	103	5.51	1.385		
Cherishing time	High	107	6.01	1.014	3.793 ***	[0.312, 0.988]
	Low	103	5.36	1.441		
Proficiency	High	107	6.08	1.011	3.656 ***	[0.289, 0.966]
	Low	103	5.46	1.447		
Recitation	High	107	5.04	1.324	1.783	[−0.037, 0.733]
	Low	103	4.69	1.502		
Ambition	High	107	5.79	1.108	2.068 *	[0.016, 0.68]
	Low	103	5.44	1.326		
Total	High	107	60.22	6.436	3.736 ***	[2.362, 7.64]
	Low	103	55.22	12.196		
			Mind Model			
Intelligence	High	107	5.2	1.377	0.389	[−0.285, 0.425]
	Low	103	5.13	1.226		
Talent	High	107	5.07	1.442	0.801	[−0.238, 0.563]
	Low	103	4.9	1.498		
Smartness	High	107	5.17	1.217	1.369	[−0.108, 0.6]
	Low	103	4.92	1.384		
Thinking	High	107	6.52	0.731	4.76 ***	[0.437, 1.056]
	Low	103	5.78	1.441		
Comprehension	High	107	6.53	0.705	4.198 ***	[0.334, 0.926]
	Low	103	5.9	1.376		
Exploration	High	107	6.08	1.02	3.292 ***	[0.232, 0.926]
	Low	103	5.5	1.494		
Discovery	High	107	5.85	1.026	2.584 **	[0.105, 0.78]
	Low	103	5.41	1.431		
Discussion	High	107	5.54	1.127	2.412 *	[0.081, 0.809]
	Low	103	5.1	1.524		
Innovation	High	107	5.78	1.176	2.252 *	[0.056, 0.836]
	Low	103	5.33	1.659		
Interest	High	107	5.99	1.068	1.564	[−0.068, 0.593]
	Low	103	5.73	1.352		
Total	High	107	57.73	7.484	2.964 **	[1.35, 6.71]
	Low	103	53.7	11.815		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; CI = confidence interval.

Nevertheless, the virtue model alone is not enough for contemporary knowledge learning. Indeed, the old-fashioned virtue approaches have their own flaws; as the results of Study 3 showed, traditional rote learning is not helpful for high academic achievement. In addition, with the changing times, people's need to explore and conquer the outside world is greater than ever. Thus, the concept of "mind" as the supreme human capacity to understand the world and obtain verified, objective, and reliable knowledge is prized in an unprecedented way; the intrinsic fascination, wonder, and passion for the truth, as well as the inquisitive and critical mind that characterizes a scientist, are always essential in the process of learning and education. As discussed above, with the enhancement of

cultural exchange, the virtue model and the mind model should be integrated. A balanced integration of the two models should be the ideal vision of education for Eastern and Western societies to learn from each other in the context of globalization.

However, our criteria for grouping high and low achievers in Study 3 might not be objective enough. We used several partitioning methods, such as grouping all participants from 985/211 universities as high achievers and those in the bottom 75% in other schools as low achievers, and we obtained almost the same results, which confirmed that our results in Study 3 were generally valid and robust. In Study 4, we used two new indicators of sustainable learning (creative tendency and critical thinking) and further examined the impact of Chinese students' virtue and mind learning concepts on their creativity to provide a preliminary answer to the Needham Question and enrich our research results.

6. Study 4: Correlations between the Virtue and Mind Learning Concepts and Students' Creativity

To explore the Needham Question from the perspective of learning concepts, in Study 4, we analyzed the correlations between Chinese students' virtue and mind learning concepts and their creativity, the latter of which was assessed from the two aspects of creative tendency and critical thinking which correspond to an ideal creative person's typical personality trait and mindset, respectively.

6.1. Method

6.1.1. Participants

Fifty college students (36 female students) across China were randomly recruited as participants through Wenjuanxing, and their characteristics (e.g., grades, majors, academic achievement) were balanced.

6.1.2. Tools

The participants' virtue and mind learning concepts were measured using the same 7-point Likert scale as in Studies 2 and 3. Their creative tendency and critical thinking were measured using two well-designed and widely applied survey instruments: the Chinese versions of Williams Prefer Measurement Forms [35] and the Critical Thinking Disposition Inventory [36], both using a 5-point Likert scale, with 5 indicating the best. The first instrument included 50 items and had a Cronbach's α of 0.871. The second instrument included 70 items and had a Cronbach's α of 0.829.

6.2. Results

As shown in Table 5, the virtue and mind learning concepts were strongly correlated with creative tendency and critical thinking, with the correlation coefficients for the mind learning concepts being significantly higher than those for the virtue concepts.

Table 5. Descriptive statistics and Pearson's correlation coefficients between the virtue and mind learning concepts, creative tendency, and critical thinking.

	M	*SD*	**Virtue**	**Mind**	**Creative Tendency**	**Critical Thinking**
Virtue	5.754	0.486	1			
Mind	5.624	0.495	0.443 **	1		
Creative tendency	3.541	0.38	0.352 *	0.468 **	1	
Critical thinking	3.544	0.273	0.346 *	0.441**	0.639 **	1

* $p < 0.05$, ** $p < 0.01$.

6.3. Discussion

The results of Study 4 showed that both cultural learning models play an important role in fostering students' creativity, consolidating the conclusion of Study 3 that the Western mind model is a crucial and indispensable complement to the development of

Chinese students. Despite a not so rigorous research method, the finding that the mind model contributes slightly more to students' creativity than the virtue model partly answers the Needham Question, as the lack of emphasis on the mind model in Chinese education may somehow hold China back in terms of modern science and technology from a global perspective. Combining the results of Studies 3 and 4, we suggest that the virtue model creates more favorable characteristics for knowledge acquisition, which relies more on effort, whereas the mind model is more advantageous for knowledge application, which requires more mental ability. As knowledge import and export are both important for learning and development, the virtue model and the mind model should be combined to ensure sustainability in Chinese education.

7. General Discussion: Establishing a Sustainable Learning Model for Chinese Students by Dynamically Balancing Virtue and Mind

The call for sustainability covers all areas of life and has become crucial in education and learning. Though without an accurate definition, it is generally accepted that a sustainable learning model should focus on (1) individual holistic growth, fostering both intellectual and non-intellectual abilities; (2) lifelong development, stimulating not only short-term motivation, such as passing a high-stakes exam, but also long-term initiatives, such as cultivating a keen interest in a particular area; and (3) balancing the weight of knowledge acquisition and creative problem-solving. However, the sustainability of Chinese education has long raised controversial issues, as indicated by the well-known paradox of Chinese learners. Typical problems include high mental health risk, limited creativity, and an unwillingness to continue learning after graduation, which respectively go against SDGs 3, 9, and 4.

In light of Jin Li's insightful virtue–mind framework, which attempts to address this paradox, this paper presents four empirical studies conducted in China under the backdrop of sharp global cultural blending and collision. The results make important modifications and enrich Li's theory, helping us to develop an ideal model of education and learning that combines virtue and mind. Notwithstanding certain methodological limitations, the following two conclusions can be drawn. First, according to the results of Studies 1 and 2, global cultural integration today requires a combination of virtue and mind learning concepts to bridge the gap between the two models. Second, according to the results of Studies 3 and 4, the virtue model and the mind model are essential to student growth, and neither should be ignored. Consequently, for a future in which the distinction between virtue and mind is eliminated, a visionary model of education and learning integrating Eastern and Western wisdom should be developed [33].

Therefore, the key to building a sustainable learning model that promotes students' all-round and long-term development lies in the balance between the Eastern virtue model and the Western mind model. Traditionally, the Chinese virtue model focuses too much on learners' learning attitudes, pushing students to work too hard, which leads to high academic performance in exams but forces students to be docile, numb, unthinking, uncritical, uncreative, and highly stressed [34,37], resulting in the Paradox of Chinese Learners [34]. In contrast, the Western mind model advocates cultivating students' abilities and interest in exploring the world. However, because of a lack of expectations from teachers and parents regarding perseverance through adversity, Western students are more likely to slack off and make little progress, which does not build a solid foundation of basic knowledge and skills. Today, Western educational researchers have acknowledged the merits of the Eastern virtue model [16] and proposed a "grit" movement in education [38]. Meanwhile, Chinese education is expected to absorb the advantages of the Western mind model to boost student creativity and improve the sustainability of China's education system. Below, we offer some suggestions for achieving a dynamic balance between virtue and mind [33] in Chinese education. The schematic diagram is shown in Figure 4.
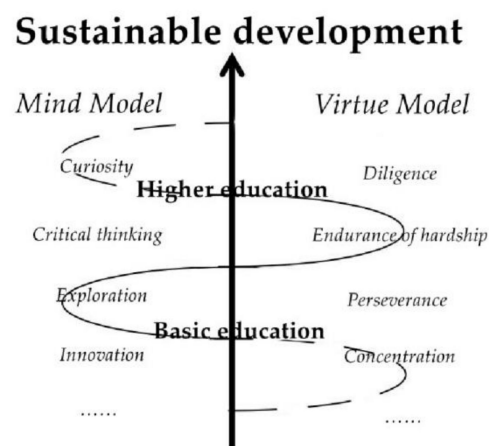
Figure 4. Schematic diagram of a sustainable learning model dynamically balancing virtue and mind for Chinese education. The solid lines in the helix indicate that the mind model in basic education and the virtue model in higher education should be promoted.

In K-12 education, more attention should be paid to the development of children's minds. Every child is a natural learner and spontaneous explorer, full of curiosity about the world and a desire for knowledge, which are among their most precious traits. Therefore, all we need to do is provide children with enough space and freedom to experience, question, try, and learn with a little guidance. Limiting children to the classroom and strict instruction will only stifle their enthusiasm for the unknown, making them passive and self-limiting. Especially in primary education, with more emphasis on protecting and encouraging children's curiosity, interest, and thirst for learning, we can eliminate some of the bad names attached to our education system by Westerners, such as "utilitarian" [39]. In secondary education, we should facilitate students' use of learning methods and strategies. We argue that focusing on various learning methods and strategies is a compromise between the virtue model and the mind model because the use of learning methods and strategies is a way not only to mobilize students' subjective initiatives but also to increase their problem-solving skills, such as critical and scientific thinking, team cooperation, and oral expression, to integrate learning virtues and intellectual abilities [34]. In addition, teaching various learning methods and strategies is conducive to empowering students with lifelong independent learning competence, which is undoubtedly necessary in the era of rapid knowledge renewal from a sustainability perspective. Moreover, among many intellectual abilities, the development of students' thinking abilities should be central in secondary education [40], which is the critical period for the development of students' thinking, as emphasized by developmental psychology [41].

In higher education, although students' intellectual abilities need to be further improved, the tradition of the virtue model should not be forgotten, especially in view of the sharp decline in the learning concepts of the virtue model in Study 1. At a time when the Ministry of Education of China plans to increase (reasonably) the academic burden of university students to reverse the phenomenon of "a desperate high school, a happy university" [17,42], which is specific to China, value education re-equipping university students with traditional Chinese virtues such as assidity, conscientiousness, and aspiration should be reinforced to retain and adhere to Confucian learning culture. However, special attention should be paid to the mental health of university students. There are notable differences in almost every aspect of basic education and higher education in China. After passing their college entrance examination, which is closest to China's traditional Confucian learning culture, high school graduates usually experience sudden changes in life and learning, which may trigger self-doubt and the denial of their past belief system, weakening their virtue learning concepts [43]. First-year university students are particularly at risk. Whether they manage to get through this period of maladjustment in the first year will be decisive for their academic success in higher education. To deal with this problem,

proper freshmen education should be offered during the summer break after high school graduation to better prepare students for university by providing them with a fulfilling rather than empty post-entrance exam life.

8. Conclusions

This paper presents four empirical studies investigating Chinese students' learning concepts in accordance with Jin Li's virtue–mind framework. The results of our four studies make important modifications and enrich Li's theory. The main findings and theoretical contributions of this paper are summarized as follows.

First, from a vertical perspective, Study 1 revealed a developmental trend in Chinese students' learning concepts (i.e., an increase in mind learning concepts and a decline in virtue learning concepts) in the era of global cultural exchange, amending Li's viewpoint of "despite today's accelerated cultural exchange, these learning models do not diminish but endure" [29] (abstract).

Second, from a horizontal perspective, Study 2 demonstrated North–South regional differences in students' virtue and mind learning concepts in China (i.e., a higher proportion of virtue learning concepts in Shandong province, northern China, than in Guangdong province, southern China), providing direct evidence for Li's basic hypothesis that culture has a significant effect on people's fundamental learning beliefs.

Third, after Li's theory was retested in Studies 1 and 2, Studies 3 and 4 examined the key question regarding which cultural learning concepts are more beneficial for students' sustainable development (academic achievement and creativity), a key contribution of our paper, as Li did not directly address this question. Our results indicated that both virtue and mind learning concepts are important and require a reasonable balance, thereby enriching Li's theory and verifying the findings of previous studies related to Chinese learners' memorization with understanding [4,5] and growth mindset [12–14].

Fourth, based on Studies 3 and 4, we developed a sustainable learning model that dynamically balances virtue and mind for Chinese education, thus deepening the academic value of Li's theory to achieve the SDGs set by the United Nations, such as promoting mental health and well-being (SDG 3), fostering innovation (SDG 9), and ensuring lifelong learning (SDG 4).

In summary, under Li's virtue–mind framework, this paper provides a comprehensive picture of the advantages and disadvantages of Chinese education from a sustainability lens on the Paradox of Chinese Learners.

9. Limitations and Future Research Directions

Our four studies and Li's series of studies inevitably have limitations which should be addressed in future research. The most important limitation concerns the methods used to measure students' virtue and mind learning concepts. The word association test used in Study 1 and other methods used by Li, such as story continuation and picture description tasks and discourse analysis, are qualitative, which makes it difficult to provide a clear definition of the virtue model or the mind model or to apply them to large-scale studies because of the heavy data processing workload. This is a problem for most studies of cultural beliefs. In Studies 2, 3, and 4, we took a first step in using quantitative methods to estimate the proportion of Chinese students' virtue and mind learning concepts, but these methods are too crude to draw robust conclusions. Accordingly, future research should explore new quantitative methods, such as developing a scale of virtue and mind learning concepts or adopting an implicit associative test to replicate our findings [44]. It would also be meaningful to replicate our studies in Western countries to obtain cross-cultural results by comparing the extent to which global cultural exchange affects Eastern and Western learning beliefs.

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